

ABSTRACT

COLTON, HEIDI MUTH. Dissecting Mechanisms of Toxicity in HepG2 Cells Using Gene Expression Analysis. (Under the direction of Dr. Scott Laster and Dr. Warren Casey.)

Reduction/oxidation (redox) balance is a critical component of cell viability.

When oxidants reach levels that overcome the ability of antioxidants to eliminate them, it results in damage to cellular macromolecules. The damage to DNA, lipids and protein initiates a cascade of physiological events in response to the oxidative stress. Researchers have been studying these cellular responses by analyzing gene expression and protein activity for many years. Recently, new technologies have emerged that allow scientists to analyze the differential expression of extremely large sets of genes in response to oxidative stressors and other toxicants. Most experiments performed to date have involved a single dose of a chemical and a single timepoint for analysis. However, gene expression has proven to be a dynamic process with many transcriptional changes over a relatively short timecourse. In order to study the dynamic nature of gene expression and its effects on cellular physiology, experiments were performed to analyze the effects of oxidative stress on HepG2 cells over a 24 hour timecourse with a range of doses of the glutathione depletor, diethylmaleate (DEM). Using Clontech™ microarrays, TaqMan™ RT-PCR, and assays to measure reduced glutathione (GSH) concentrations and to determine cell cycle status, an overall picture of the effects of oxidative stress in relation to dose and time was created. DEM caused GSH depletion to the extent that cells treated with 1.25mM DEM for 4 hours contained less than 20% of the GSH levels in untreated cells. The redox imbalance caused the transcription of genes that initiate cell cycle arrest,

DNA repair, and induction of stress proteins. The p53-independent induction of p21 initiated a cascade of events including the decreased transcription of cyclins that resulted in cell cycle arrest. Additionally, the transcription of stress induced genes such as HSP70 and heme oxygenase-1 exhibited significant time and dose-dependent increases in response to DEM. While the genes exhibiting differential expression remained generally the same between doses, it was the time taken for these gene changes to occur that varied greatly from the highest dose to the lowest dose of DEM. These experiments demonstrate the importance of analyzing an effective dose range over an extended time period when using differential gene expression to study the mechanisms of toxicity.

Dissecting Mechanisms of Toxicity in HepG2 Cells Using Gene Expression Analysis

by
Heidi Muth Colton

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Approved By:

Dr. Hosni Hassan

Dr. Steven Libby

Dr. Scott Laster
Co-chair of Advisory Committee

Dr. Warren Casey
Co-chair of Advisory Committee

Biography

Heidi Colton received a Bachelor of Science in Microbiology from Pennsylvania State University in 1996. She worked as a scientist in the Development Microbiology department at Glaxo Wellcome, Inc. from 1996 to April 2001. She enrolled in the Graduate School at North Carolina State University in August 2000 while working at Glaxo Wellcome, Inc.. Heidi completed her research and class requirements for the Master of Science in Microbiology while working in the Toxicogenomics Group in the Safety Assessment Department at Glaxo SmithKline, Inc.

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Introduction

The Evolution of Respiration

Four and a half billion years ago, when the Earth was formed, there was no oxygen in the atmosphere. Instead, a reducing atmosphere existed which consisted primarily of nitrogen, methane, carbon dioxide, hydrogen sulfide and water vapor (21). Over the next several billion years, photosynthetic organisms evolved that utilized the hydrogen in the atmosphere to survive thereby releasing free oxygen and carbon dioxide. Eventually, the original “reducing” atmosphere was converted into our present “oxidizing” atmosphere (21). Atmospheric oxygen was initially toxic to most creatures on Earth and the only remaining organisms survived by creating anaerobic niches. But, organisms gradually evolved to acquire the necessary defenses to deal with this exposure to oxygen. The first organisms with the ability to utilize oxygen by the process of respiration to create energy existed approximately 1.5 billion years ago (21). Today, eukaryotes still use oxygen as the final electron acceptor in the respiratory chain. This aerobic process leads to the production of toxic reactive oxygen intermediates (ROIs) and a variety of antioxidant mechanisms are used to defend cells from these byproducts.

Reactive Oxygen Species, Antioxidants and Redox Balance

Approximately 90% of the oxygen utilized by eukaryotic cells is reduced in the mitochondria to produce ATP through the process of oxidative phosphorylation. This

process engages five protein complexes that form a matrix in the mitochondrial membrane. The transport of electrons to molecular oxygen is catalyzed by four complexes; NADH dehydrogenase, succinate dehydrogenase, ubiquinol:cytochrome c oxidoreductase, and cytochrome oxidase. These electron transfers create an electrochemical proton motive force that is used to form ATP from ADP and inorganic phosphate in the fifth complex, ATP synthase (48). While this system is efficient and necessary for survival, inherent danger lies in the fact that 1-2% of the oxygen metabolized by mitochondria is converted to superoxide radicals by several different complexes in the respiratory chain (11).

The superoxide anion is converted to hydrogen peroxide by the action of superoxide dismutase, an antioxidant enzyme that serves to defend the cells from the toxic radical. The cells are further protected from damage caused by hydrogen peroxide through the action of catalases and peroxidases that convert H_2O_2 to water and oxygen. However, some of the H_2O_2 remains and it can react with transition metals, such as iron, in a Fenton-type reaction to produce the damaging hydroxyl radical ($\text{OH}\cdot$) species (63). The hydroxyl radical and other reactive oxygen intermediates (ROIs) are not solely products of normal respiration. Other physiological events can lead to the production of damaging oxidants. For example, peroxisomes, which are organelles responsible for degrading fatty acids, can produce H_2O_2 as a byproduct (1). Macrophage and other inflammatory defense mechanisms often produce harmful oxidants such as nitric oxide and H_2O_2 (1). Oxidants

can also be produced by other defense mechanisms such as the enzymatic reaction between cytochrome p450 and foreign toxicants present in the liver (1).

The presence of ROIs can cause damage to important macromolecules in the cell including lipids, proteins and DNA (63). For example, hydroxyl radicals can alter the purine/pyrimidine bases and deoxyribose sugars or can cleave the phosphodiester backbone of DNA causing potential mutagenic or lethal lesions (63). ROIs can also react with polyunsaturated fats and cholesterol in cell membranes causing a decrease in membrane fluidity and disruption of membrane bound proteins (25). Additionally, oxidation of proteins can cause disulfide formations, protein-protein crosslinking, adduction of amino acid residues and peptide fragmentation (58). These alterations can lead to enzyme deactivation, alteration of receptors and protein degradation (13).

In order to defend itself from injuries resulting from the inevitable production of the toxic intermediates, the cell has evolved defenses known as antioxidants. These oxidative defenses include enzymatic scavengers and lipophilic radical scavengers such as superoxide dismutase, tocopherol and carotenoids which directly break down the superoxide anion, and block free radical chain reactions. Other defenses include the hydrophilic radical scavengers, glutathione and thioredoxin as well as the enzymes that regenerate them to a reduced state; glutathione reductase and thioredoxin reductase (6). These antioxidants and related proteins are necessary for cell survival and a balance between the oxidants and antioxidants must be maintained to ensure normal cell function

and progression. In 1986, Sies stated that when the pro-oxidants outstrip the ability of the antioxidants to eliminate them, it results in the accumulation of the products of ROI damaged macromolecules. Sies went on to define this state of imbalance as oxidative stress (53). Oxidative stress has been shown to be a major contributor to aging, and to degenerative diseases such as cancer, cardiovascular disease, immune system decline, stroke, Parkinsons, Alzheimers, cataracts and inflammatory diseases (1, 24, 47, 49). These diseases can arise in response to a chain reaction of events that begins with reduction/oxidation (redox) imbalance causing the initiation of signal transduction cascades and ends with the transcriptional activation of genes to respond to the oxidative stress. A pair of endogenous thiol buffers act as the front line in defense against the initial redox imbalance, these small proteins are glutathione and thioredoxin.

Sulfhydryls: an Antioxidant Defense System

Sulfhydryl biochemistry plays a large part in maintaining redox balance within the cell. Glutathione and thioredoxin are both cysteine-containing peptides with the ability to scavenge free radical species created during normal cell metabolism while also maintaining proteins in their reduced state (36). Thioredoxins (TRX) are a class of 12-kDal proteins that contain redox active disulfides/dithiols within the conserved active site sequences: Trp-Cys-Gly-Pro-Cys-Lys (3, 14, 59). They carry out the cellular repair of sulfhydryl proteins by catalyzing the reduction of disulfide bonds and are kept in their reduced state by the action of the NADPH-dependent enzyme, thioredoxin reductase (3,

14, 36, 57, 59). Thioredoxins are ubiquitous and have been found in all eukaryotic and prokaryotic organisms, however, bacteria, yeasts and plants contain multiple TRXs while human cells contain only one cytoplasmic TRX (3). Mammalian TRX has a variety of biological activities. It was originally identified as a hydrogen donor for ribonucleotide reductase during DNA synthesis. More recently, it has been identified as a key regulator of gene expression, as it facilitates protein-nucleotide interactions by reducing the cysteine in the DNA binding loop of transcription factors such as NF- κ B and AP-1 (3, 4, 59). While the redox activity of TRX protects the cells from the toxic effects of moderate levels of oxidative stress, the proteins, themselves are vulnerable to oxidative damage because of the oxidizable sulfhydryls at their active sites (57). Consequently, when the abundance of oxidants in the cell overcomes the ability of thioredoxin reductase to reduce oxidized thioredoxin, oxidative stress occurs. The oxidized TRX that remains can no longer bind with some transcription factors. This causes a decrease in the expression of some genes normally present in healthy cells (47). Another implication of high levels of oxidized thioredoxin is exhibited through its effects on the regulation of apoptosis. In healthy cells, reduced thioredoxin has been shown to bind both MAPKKK and ASK1 which prevent downstream signaling for apoptosis. However, only reduced TRX can form these complexes while the oxidized form prevents the interaction, subsequently making the cell more susceptible to apoptosis (3, 36). Therefore, the redox status of pools of TRX is an important component of the protection that can be offered by the thiol buffers.

Another critical component of the thiol buffer system that works in concert with thioredoxin is glutathione. Reduced glutathione (GSH) is a glycine, glutamic acid, cysteine tri-peptide that constitutes the largest component of thiol buffer at cellular concentrations that range from 0.1-10 mM (52). The tri-peptide exists either in a reduced state (GSH) or an oxidized state (GSSG) and participates in redox reactions through the reversible reactions of its active thiol (4). GSH is present in the endoplasmic reticulum and the mitochondria, is formed by the consecutive actions of gamma-glutamylcysteine synthetase (γ -GCS) and glutathione synthetase (4, 47) and is responsible for its own rate of synthesis by controlling γ -GCS activity by feedback inhibition (38). GSH is kept in its reduced state by the action of glutathione reductase in a reaction requiring NADPH. Interestingly, all glutathione reductase isoenzymes are homologous to thioredoxin reductases (3). GSH can provide oxidative defense by protecting the cell directly from free radicals. For example, GSH reacts with hydrogen peroxides and lipid peroxides by the action of GSH peroxidases to reduce their toxicity (14). But, as seen with thioredoxin, GSH also serves to protect cells by keeping cellular proteins in a reduced state. The redox ratio of GSH:GSSG plays a role in many signal transduction pathways that activate redox-sensitive transcription factors and is, therefore, fundamental to the transcriptional activation of several pro-inflammatory and antioxidant-protective genes (47). The GSH:GSSG ratio also plays a role in the regulation of transcription factors, such as p21, that control cell cycle and DNA repair proteins, such as cyclins and GADD45 (49). A role for GSH has also been suggested in the regulation of heme oxygenase-1 (HO1) and other members of the heat shock family of proteins (4, 9, 38, 41).

Therefore, the redox status of the cell as controlled by thioredoxin and glutathione is critical for biological events that include more than the direct damage caused by ROIs. Sulfhydryl biochemistry dictates the native structure and activity of many enzymes, receptors, transcription factors and transport proteins required for cell viability. A redox imbalance can also affect transcriptional activation of specific genes. For example, some transcription factors have cysteine residues that must be in their reduced state in order to recognize DNA binding sequences and carry out the electrostatic interactions necessary to bind the DNA (4). These transcription factors are also affected by their ability to dimerize and trimerize into the tri-dimensional structure needed for DNA binding based on the availability of disulfide bonds (4). In addition to the effects on transcription factors, redox status of cells can affect the modulation of signal transduction cascades, and the regulation of inflammation, cell proliferation and apoptosis. By treating cells with a chemical that alters the redox balance by depleting reduced thiols, scientists can study the aforementioned downstream effects.

Diethylmaleate and Oxidative Stress

Diethylmaleate (DEM) is a weak electrophile that causes oxidative stress by depleting intracellular stores of reduced glutathione (GSH) by forming DEM-GSH conjugates in a reaction catalyzed by glutathione-S-transferase (7, 49). Studies have shown that 1 mM of DEM reduces the level of GSH in cells by 90% within 30 minutes (49). This reduction

impairs the ability of the cell to scavenge for free radicals created during normal cell respiration. Esposito et al. demonstrated that ROI generated following DEM treatment induces arrest in the G1 phase of the cell cycle (18). Russo et al. supported this theory with experiments using flow cytometry to measure the percentage of cells entering the G2/M phase after treatment with DEM. Russo also hypothesized that unlike most other oxidative stressors, DEM causes a p53 independent induction of p21. This induction of p21 up-regulates the transcription of many stress-induced proteins (HO-1, GADD45) and several heat shock proteins (HSP70, HSP90) (4, 9, 18, 41, 49). It has also been suggested that p21 protects cells from oxidative stress by preventing the cells' exit from G1 phase, thereby inhibiting DNA replication and allowing additional time to repair damaged DNA (26, 42). Using electrophoretic mobility shift assays, Russo showed that DEM treatment inhibited the ability of p53 to bind DNA. Northern blots, however, exhibited increased levels of p21 mRNA. Next, he used N-acetylcysteine to increase intracellular GSH and noted a marked decrease in p21 expression. Citing this data, he concluded that DEM causes a p53 independent induction of p21 probably caused by GSH depletion (49).

Experimental Analysis of Oxidative Stress

Many scientists have studied the effects of oxidative stress on cells using *in vivo* experiments with dosed animals and *in vitro* experiments with primary cells and cultured cell lines. Originally, the morphological, physiological and biochemical effects of oxidative stress were analyzed. Some assays that have been used to monitor the

physiological effects of oxidative stress have utilized GSH: GSSG ratios, analysis of lipid, protein or DNA oxidation levels, and direct measurements of ROI generation (40). Coimmunoprecipitation has been utilized to analyze protein-protein interactions (29) and immunofluorescence has also been used to track the distribution of antioxidant enzymes throughout the cell after exposure to oxidants (4, 59). Changes in morphology caused by oxidative stress have been visualized using Hoescht staining and other microscopic staining techniques (30). Normal and phase contrast microscopy, the TUNEL method, quantification of caspase-3 activity and Annexin-V-FITC staining in conjunction with flow cytometry have all been utilized to assess the levels of apoptotic induction (27, 43).

More recently, protein and gene expression analyses have become the methods of choice for studying the effects of oxidative stress. Initially, protein-based techniques were used to demonstrate the varying responses of cells to different species and doses of oxidants. Polyacrylamide gel electrophoresis assays with extracts from cells treated with H_2O_2 led to the discovery of 30-40 induced bacterial proteins and to the identification of heme oxygenase-1 in mammalian cells (12). Immunoblots were also used to compare the levels of stress-induced proteins in dosed cells (22, 67). Western blots were responsible for the discovery of several antioxidant enzymes such as superoxide dismutase and glutathione transferase as well as various cytokines, transcription factors and growth factors (4). For more specific, time-dependant analysis, two-parameter flow cytometry assays using monoclonal antibodies and propidium iodide staining were used to assess the levels of different proteins in different phases of the cell cycle upon treatment with oxidants (62).

While these experiments provided scientists with a vital wealth of information about oxidative stress and its effects on protein expression, working with unstable proteins and non-robust methods provided the need for a new realm of analysis.

Assays that measure levels of mRNA have been developed over the past decade allowing scientist to analyze gene expression while requiring less sample volume and time and providing less stringent methods for sample handling. While mRNA translation into protein and protein function requires factors such as mRNA splicing, correct tertiary structure and post-translational modifications such as editing or phosphorylation, the levels of the transcripts are a good indicator of relative gene expression. However, until recently, the analyses were limited to a small subset of genes. Initially, differential hybridization was used. This technique involves probing a cDNA library with a reverse transcribed, labeled cDNA obtained from the RNA of stressed versus unstressed cells. The downfall of this technique lied in the fact that it could only detect abundantly present cDNA and therefore, lacked sensitivity (53). Later, subtractive hybridization was performed by removing mRNA common to both treated and untreated cells and analyzing what remained, the subtracted population. This method was used to detect some GADD proteins, and while it was more sensitive than differential hybridization, it required large volumes of sample (19).

The polymerase chain reaction (PCR) provided scientists with the ability to perform gene expression analysis starting with small amounts of RNA/cDNA. Differential display was

a method used to discover hundreds of novel stress-induced genes. The method uses combinations of PCR primers to generate sub-populations of cDNA species that were subsequently analyzed by DNA sequencing (34). The major drawback of this method was the generation of false product brought about by the low template specificity of the primers during annealing. To solve this problem with nonspecific binding, higher annealing temperatures were necessary. The use of restriction enzyme-generated cDNA fragments as PCR templates allowed for these higher temperatures and more specific annealing (53).

The SAGE technique involved the ligation, cloning and sequencing of short sequence tags to determine the abundance of a particular tag and therefore the expression of a corresponding gene (61). This method was useful, but the requirement for huge amounts of DNA sequencing and problems with unwanted linker ligations caused the need for a new technique for gene expression analysis.

In 1995, Ammendola et al. amplified the cDNA of reverse transcribed mRNA from DEM treated and untreated cells. The cDNA fragments were cloned into vectors and the DNA was sequenced and used to search GenBank for homology. The sequences were used as probes in Northern blots to confirm differential expression. They found 10 genes that were differentially expressed, but they were only able to match half of them to known gene sequences in the database (2). Guyton et al. also used Northern blots to study the induction of genes in response to the oxidant, H₂O₂. Again, because of the large amounts

of time and supplies utilized for these analyses, and because of the limited information available, he could only analyze the expression of 3 genes, HO-1, GADD 153 and c-jun (23). Each of these nucleic acid-based techniques provided scientists with a large portion of what we know today about the effects of oxidative stress on gene expression. But, it was not until recently that the ability to analyze thousands of genes using minimal sample and robust methods arose.

Hybridization arrays and gene chips provide scientists with the ability to screen thousands of genes from the mouse, rat or human without the burden of large scale cloning or sequencing. These platforms, either nylon, silica or glass-based, are “spotted” with thousands of different cDNA specific to known genes. The assay requires the creation of labeled-cDNA probes that hybridize to the cDNA sequences anchored to the array/chip. After hybridization, phosphorescence or fluorescence is used to determine the relative amounts of cDNA for each specific gene. Data analysis is a daunting task, but software packages and statistical analysis programs are available to assist the user.

Time and Dose Response to Oxidative Stress

A limited number of publications have been written about the large-scale analysis of gene expression induced by oxidative stress. Most experiments involving differential gene expression with DEM treatment have used only one dose of the chemical at one or several timepoints. In past instances when several doses of DEM were used, it was only

to assess the cell viability and degree of GSH depletion (10, 40, 49). Morgan et al. utilized 13 different chemicals, including DEM, to analyze specific gene expression patterns that may be indicators of oxidative stress (40). The data exhibited differential expression of many genes that have been identified in previous studies using Northern blots and DNA sequencing as well as some genes that had not been studied previously. The experiments were performed using one dose of each chemical and the gene expression was analyzed only at the 6-hour timepoint. Additionally, experiments were performed by Casey et al. to study the dynamic nature of gene expression over a 24-hour timecourse (10). Compared to the experiment using the single timepoint, similar sets of genes demonstrated up-regulation or down-regulation in response to DEM treatment. However, additional genes were identified as responding to DEM treatment because the analysis of the mRNA at several times throughout the timeline of the treatment allowed for the identification of genes that are only induced after longer or shorter exposure to DEM. In extreme examples, some genes were only up or down-regulated at one timepoint during the 24-hour treatment (10).

Studies have demonstrated the dynamic changes in GSH levels that are dependent on both time and dose of oxidant exposure (10, 40, 47). It has also been demonstrated that the GSH-based redox status of cells regulates various aspects of cellular functions such as proliferation, transcriptional activation, growth inhibition and necrosis or apoptosis (9, 47, 57). For this reason, I hypothesize that the gene expression profiles of cells treated with DEM would be both time and dose dependent. I wanted to determine if cells

exposed to lower levels of oxidative stress would induce different sets of genes than cells exposed to near lethal doses of DEM. To test my hypothesis, I conducted a timecourse experiment with HepG2 cells using three doses of DEM, 0.25 mM, 0.75 mM and 1.25 mM. HepG2 is a human hepatocellular carcinoma cell line and was chosen based on the fact that it is a well-characterized cell line and because the liver is an important organ in metabolism and is the major site of glutathione production. I used nylon microarrays and radioactive probes to analyze the mRNA content of these cell extracts relative to control cultures at 11 timepoints over a 24-hour period. The differential expression was confirmed using gene specific primers with TaqMan™ RT-PCR. GSH levels of the cultures were compared to analyze the effects of different levels of GSH depletion on gene expression. Lastly, cell cycle analysis was performed to assess the degree of cell cycle arrest in concert with differential gene expression induced by increasing doses of DEM.

Materials and Methods

Cell Culture and DEM Treatment

Human hepatocellular carcinoma cells were obtained from ATCC (HepG2, ATCC 1998) and maintained in Modified Eagle's Medium (DMEM) with Glutamax™ and 10% fetal bovine serum (FBS) under standard cell culture conditions (37°C, humidified with 5%

CO₂) without antibiotics. The cells were cultured on collagen-coated T175 vented flasks (Collagen I Cellware, Beckton Dickinson, Labware™) and were fed every 2 days prior to the experiment. For DEM treatment, cells were grown on collagen-coated (Vitrogen™) 150-mm diameter cell culture dishes (Corning, Inc, NY) with 26 mL medium. The cultures were seeded at a concentration of 1×10^7 cells/plate. Twenty-four hours after seeding, the old medium was removed and 26 mL fresh medium was added. Forty-eight hours after seeding (Time 0 hr.), the medium was removed and 26 mL of fresh medium was added to control plates. Fresh medium containing final concentrations of 0.25 mM, 0.75 mM or 1.25 mM of the oxidizing agent, diethylmaleate (DEM), were added to the remaining cultures. Cell counts were performed on both control cultures and 1.25 mM DEM dosed cultures at 0, 4, 8, 12 and 24 hr after dosing by aspirating the medium and removing the attached cells by trypsinization. Ten μ L of a 1:10 culture dilution was added to a hemocytometer and the average cell count in 5 squares was used to calculate the cell concentration.

MTS Assay

The MTS™ (Promega, WI) assay is a colorimetric test that measures the reductive capacity of cells, thereby indicating cell viability. This assay was used to determine the range of DEM doses to be used in this study. HepG2 cells were cultured in a 96 well plate using 20,000 cells and 50 μ L DMEM + 10% FBS per well. Twenty-four hours after feeding, the old medium was removed and fresh medium containing serial dilutions of

DEM from 100 mM was added to the wells. Following exposure for 24 hours, 10 μ L MTSTM reagent was added to each well, the plate was incubated for 1 hour at 37° and the spectrophotometric absorbance was read at 490 nm. The concentration of DEM that caused a 50% decrease in reductive capacity was used as the maximum dose in subsequent gene expression and biochemical studies. This 24 hr MTSTM EC₅₀ was confirmed in 150-mm dish format.

RNA preparation

For gene expression analysis, 1 control and 3 treated (0.25 mM, 0.75 mM and 1.25 mM DEM) cultures were grown for each of 12 timepoints. The RNA was isolated for gene expression analysis at 0, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, and 24 hours after dosing. The total RNA was isolated by removing the medium and adding 14 mL Trizol reagentTM (Gibco BRL, MD) to each culture dish. The cells were scraped into 50 mL polypropylene centrifuge tubes and vigorously mixed with 3 mL chloroform for 2 minutes. After centrifuging the mixture at 7500 g, 4°C for 10 minutes, the aqueous layer was added to 7mL ice-cold isopropanol and shaken. After a 10-minute incubation at 4°C, the mixture was centrifuged at 7500 g for 10 minutes at 4°C to pellet the RNA and the isopropanol was removed. Ten mL cold 70% ethanol was added to wash the pellet and the tubes were centrifuged again at 7500 g for 10 minutes at 4°C. The RNA pellet was dried and rehydrated in 400 μ L H₂O. The RNA quality was assessed by electrophoresis using a

1.2% agarose gel with 1.85% formaldehyde. Quantification was performed using spectrophotometric absorbance at 260 nm.

Membrane Hybridization

³³P-labeled probes were prepared using 7 µg total RNA which were purified using G-50 Microspin columns (Pharmacia Biotech, NJ). The denaturation was performed at 70°C for 10 minutes using 7 µg RNA, and 1 µL Atlas™ Human 1.2 CDS primer mix (0.2 µM each). The annealing and extension reactions occurred at 45°C for 35 minutes and contained 50 mM Tris-HCl pH 8.3, 75mM KCL, 3 mM MgCl₂, 4.5 mM DTT, 0.5 mM each dGTP, dATP, dTTP, 100 µCi ³³P-ALPHA-dCTP (3000 Ci/mmol, NEN, NE) and 200 units SuperScript II™ RT (Gibco BRL, MD). The reactions were heated to 94°C for 5 minutes to terminate extension. Unincorporated ³³P-α-dCTP was removed using G-50 MicroSpin columns (Pharmacia Biotech, NJ) and scintillation counts were performed to determine the incorporation efficiencies. Clontech Atlas™ 1.2 Human Arrays (Clontech, CA) were prepared by soaking for 1 hour in a 5% solution of SDS heated to 100°C. The SDS was removed and a 64°C prehybridization solution containing 8 mL MicroHybe™, 4 µg poly-dA (Research Genetics, AL) and 8 µg heat denatured Human Cot-1 DNA (Clontech, CA) was added to each array. The arrays were incubated in this prehybridization solution at 64°C for 1 hour. The ³³P-cDNA was heat denatured and added to the arrays and allowed to hybridize at 64°C for 16 hours. The arrays were

washed at 64°C for 1 hour and the wash was repeated three times. The first wash solution contained 75 mM NaCl, 7.5 mM sodium citrate and 1% SDS. The more stringent wash solution used for the second and third washes contained 300 mM NaCl, 30 mM sodium citrate and 1% SDS. The arrays were rinsed in a solution containing 60 mM NaCl, 6 mM sodium citrate and 1 mM EDTA, set on a blotting pad and wrapped in saran wrap. The arrays were exposed to phosphor-imaging screens for 48 hours and the optical densities were acquired using OptiQuant software and a Cyclone scanner (Packard Biosciences Co., CT). Initial analysis was performed on the image files using Clontech Atlas Image Software™ (Clontech, CA), which enables background subtraction, normalization and array comparisons. After the qualities of the hybridizations were assessed, the adjusted intensity values were compared using Excel™ (Microsoft, WA) and Spotfire™ (Spotfire Inc., MA) software packages.

Quantitative Real Time RT-PCR

The total RNA isolated above was DNAase treated by incubating 100 µg RNA with 10 units DNAase I and 1X DNAase buffer (Ambion, TX) for 30 minutes at 37°C. The enzyme was heat inactivated at 75°C. RNA was quantified using the RiboGreen™ assay (Molecular Probes, OR) according to the manufacturers instructions. The RiboGreen™ fluorescence was measured using the Perkin Elmer ABI Prism 7700 Sequence Detection system (Applied Biosystems, CA).

Using the data provided by the arrays, genes exhibiting significant expression changes in response to DEM treatment were chosen for RT-PCR confirmation. Perkin Elmer Primer Express™ software (Applied Biosystems, CA) was used to design TaqMan™ primer sets consisting of 2 primers and an internal probe with 5'-FAM and 3'-TAMRA dye attachments (Table 1). TaqMan™ reactions containing 5.5 mM MgCl₂, 1X TaqMan buffer A, 75 mM each; dATP, dCTP, dTTP and dGTP, 1 Unit RNAase inhibitor, 12.5 Units MuLV reverse transcriptase and 1.25 Units AmpliTaq Gold, all obtained from Applied Biosystems, CA, were mixed with 3 μM forward primer, 3 μM reverse primer, 2 μM FAM labeled probe with TAMRA quencher and 50 ng RNA. The reactions were incubated at 48°C for 30 minutes for the reverse transcription reaction. The resulting cDNA was denatured at 95°C for 10 minutes and amplified during 40 cycles at 94°C for 15 seconds and 60°C for 1 minute. During this cycling, the increase in fluorescence caused by the dissociation of the FAM dye and TAMRA quencher was charted by the Perkin Elmer ABI Prism 7700 Sequence Detection system (Applied Biosystems, CA). The results were reported as “Ct” values that represent the cycle number at which the fluorescence reached a predetermined threshold value. The Ct value is inversely proportional to the starting concentration of mRNA of the specific gene in the pool of total RNA.

Glutathione Assay

To assess the degree of oxidation by DEM, levels of reduced glutathione (GSH) were determined at several timepoints after dosing. One control and 3 treated (0.25 mM, 0.75 mM and 1.25 mM DEM) cultures were grown for each of 6 timepoints: 0, 4, 8, 12, 16, 20 and 24 hours. The cultures were placed on ice prior to GSH extraction. After the cultures had cooled, the culture medium was removed and ice-cold phosphate buffered saline was used to wash the cells. The cells were trypsinized, scraped into a tube and vortexed to dissociate cell aggregates. One hundred μL of the cell suspension was diluted in DMEM and quantified using a hemocytometer. The remaining cell culture was centrifuged at 12,000 g, the trypsin was removed, and 1 mL of ice-cold 10% metaphosphoric acid was added. The cultures were then sonicated for 30 seconds, centrifuged at 12,000 g and the supernatant was stored at -80°C prior to GSH analysis. GSH was quantified using the Glutathione Assay kit (Calbiochem, CA). Fifty μL of the GSH extract prepared above was mixed with 850 μL of a buffer containing 200 mM potassium phosphate pH 7.8, 0.2 mM diethylene triaminepentaacetic acid (DTPA) and 0.025% LUBROL. To this solution, 50 μL of a reagent containing a 12 mM solution of the chromogenic reagent in 0.2 N HCl was added followed by 50 μL of 30% NaOH. The samples were incubated for 10 minutes at 25°C in the dark and the absorbance was measured at 400 nm. The levels of GSH were normalized against cell number and expressed as $\text{pmol}/1 \times 10^6$ cells.

Cell Cycle and DNA Synthesis Analysis

HepG2 cells were cultured as described previously. One control and 3 treated (0.25mM, 0.75mM and 1.25mM DEM) cultures were grown for each of 6 timepoints: 0, 4, 8, 12, 16, 20 and 24 hours. Ten μ M BrdU was added to each plate 30 minutes prior to cell collection. The cells were prepared for cell cycle analysis by pooling the media + BrdU from the culture dishes with the trypsinized cells. This mixture was centrifuged at 5000 g for 5 minutes to pellet the cells. The cells were resuspended in 1 mL phosphate buffered saline and strained through a 70 μ M cell strainer to remove large cell aggregates. One hundred μ L of the strained cell suspension was diluted in DMEM and the cell concentration was calculated using a hemocytometer. The cell number was adjusted to yield between 5.0×10^4 and 1×10^6 cells in 1 mL PBS and the cells were fixed by adding 2 mL ice-cold methanol drop-wise while vortexing. The cells were stored at -20°C prior to analysis by FACS. To prepare the cells for FACS analysis, the cells were incubated for 30 minutes in 1 mL 2N HCl / 0.5% Triton X 100 to denature the DNA. The cells were pelleted by centrifugation and resuspended in 1 mL 0.1 M sodium borate to neutralize the acid. The cells were then resuspended in 100 μ L Anti-BrdU-FITC diluted 1:5 in 0.5% Tween 20, 1% BSA in PBS and incubated for 30 minutes in the dark at room temperature followed by a 30 minute incubation in 5 μ g/mL propidium iodide (PI). The samples were analyzed on a FACSort™ (Becton Dickinson, NJ) instrument. Cell cycle phases from PI stained cells were analyzed using Modfit software (ModFit, ME) and the extent of BrdU incorporation was analyzed using CellQuest™ software (Becton Dickinson, NJ).

Results

Clontech Microarrays

In order to analyze the effects of mild to extreme oxidative stress on gene expression, human HepG2 cells were treated with 0.25 – 1.25 mM diethylmalate, a mild oxidant and GSH depletor. The RNA was extracted from the cells, labeled with radioactive probes and hybridized on Clontech™ Human 1.2 microarrays that were pre-spotted with the cDNA of 1200 human genes. The intensities of the radioactive, hybridized RNA were compared between control and treated cell cultures and significant differences in the transcript levels of cell cycle control, proliferation and stress genes were exhibited in treated versus control cultures.

Hybridization intensities were adjusted by subtracting background intensities for each membrane. Genes exhibiting average adjusted intensities less than 50 (two times average background) were removed from analysis. The remaining 582 genes were normalized using the global (sum) method. To analyze the relative gene expression of treated versus control, the \log_2 of treated intensity divided by control intensity was calculated for each treatment at each timepoint. Genes with \log_2 ratios of greater than 1.0 or less than -1.0 were considered up or down-regulated.

Several genes indicative of stress and redox changes were up-regulated in cultures treated with the highest dose of DEM (1.25 mM). These changes occurred as soon as 2 hours post treatment (Fig. 1a). Several heat shock proteins, including the oxidative stress associated HSP70, were up-regulated 2 hours after treatment. The mRNA content of the heme oxygenase-1 (HO-1), thioredoxin reductase and SOD1 genes were also significantly higher after treatment with 1.25 mM DEM. These changes were expected in response to the redox changes caused by DEM. The treated cultures also exhibited increased transcription of the DNA repair genes, GADD153 and GADD45.

The cultures treated with lower doses of DEM demonstrated varying stress responses (Figs. 1b-c). The heat shock proteins did exhibit increased transcription with these lower doses, however, this up-regulation was not seen until after longer exposure to the chemical. For example, the culture treated with 0.25 mM DEM did not increase HSP70 transcription until 2 hours after the effects were seen with the 1.25 mM treatment. Other stress proteins exhibited similar patterns, for example, thioredoxin reductase mRNA increased after longer exposure to the lower doses of DEM and SOD1 did not exhibit up-regulation throughout the timecourse of treatment with 0.25 or 0.75mM doses of DEM. Another point of interest was that cultures treated with the mid and low doses of DEM exhibited sporadic periods of increased transcription followed by a decrease to control levels. It is possible that the stress levels in these cultures were not enough to require the continued transcription of these stress proteins.

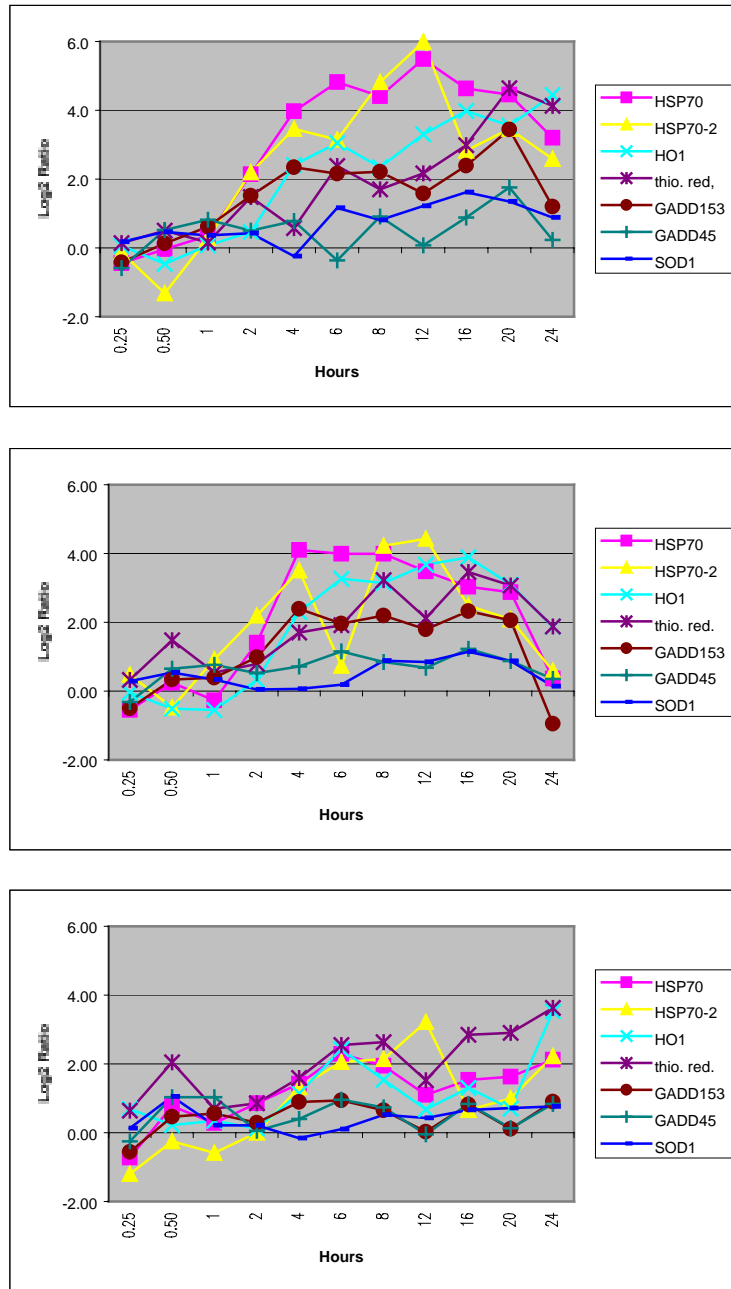


Figure 1: Stress-related genes exhibiting differential expression upon treatment with 1.25mM DEM (a), 0.75mM DEM (b), and 0.25mM DEM (c). The Log₂ ratios of treated/control hybridization intensities demonstrate that the mRNA levels of heat-shock and DNA repair genes as well as heme oxygenase-1 and thioredoxin reductase were up-regulated relative to control cultures in response to DEM treatment. The gene expression exhibited dose response with the lowest levels of stress-related gene transcription occurring with exposure to 0.25mM DEM.

Another set of genes that were differentially expressed in control and treated cultures was the cell cycle control genes. The most significant of these changes was the up-regulation of the cyclin-dependent kinase inhibitor 1 (p21). Expression of this gene was increased at 4, 4 and 24 hours after treatment with 1.25 mM, 0.75 mM and 0.25 mM DEM respectively (Figs. 2a-c). Immediately after these increases in p21 transcription, marked decreases were demonstrated in the cyclin D1 and D2 genes. However, since p21 transcription was not up-regulated until 24 hours after treatment with 0.25 mM DEM, cyclin D1 did not decrease within the 24 hour timecourse with the low dose. The increase in p21 transcription can cause other changes in addition to cyclin activity. For example, PCNA binds DNA polymerase-delta, allowing it to perform DNA elongation during DNA replication (65). However, PCNA preferentially binds to p21 when the cyclin inhibitor protein is present in the cell. Therefore, an increase in p21 expression can cause a decrease in the amount of PCNA available for DNA polymerase- δ binding thereby resulting in decreased DNA replication (49). In cells treated with 1.25 mM DEM, DNA polymerase delta exhibited decreased transcription after 8 hours exposure. It is possible that the increase of p21 several hours earlier negatively affected the cells' requirement for more DNA polymerase delta due to decreased availability of PCNA.

Several transcription factors involved in cell proliferation and cell cycle control demonstrated varying responses to DEM treatment. Fos-like antigen 1 (FRA1) is a major

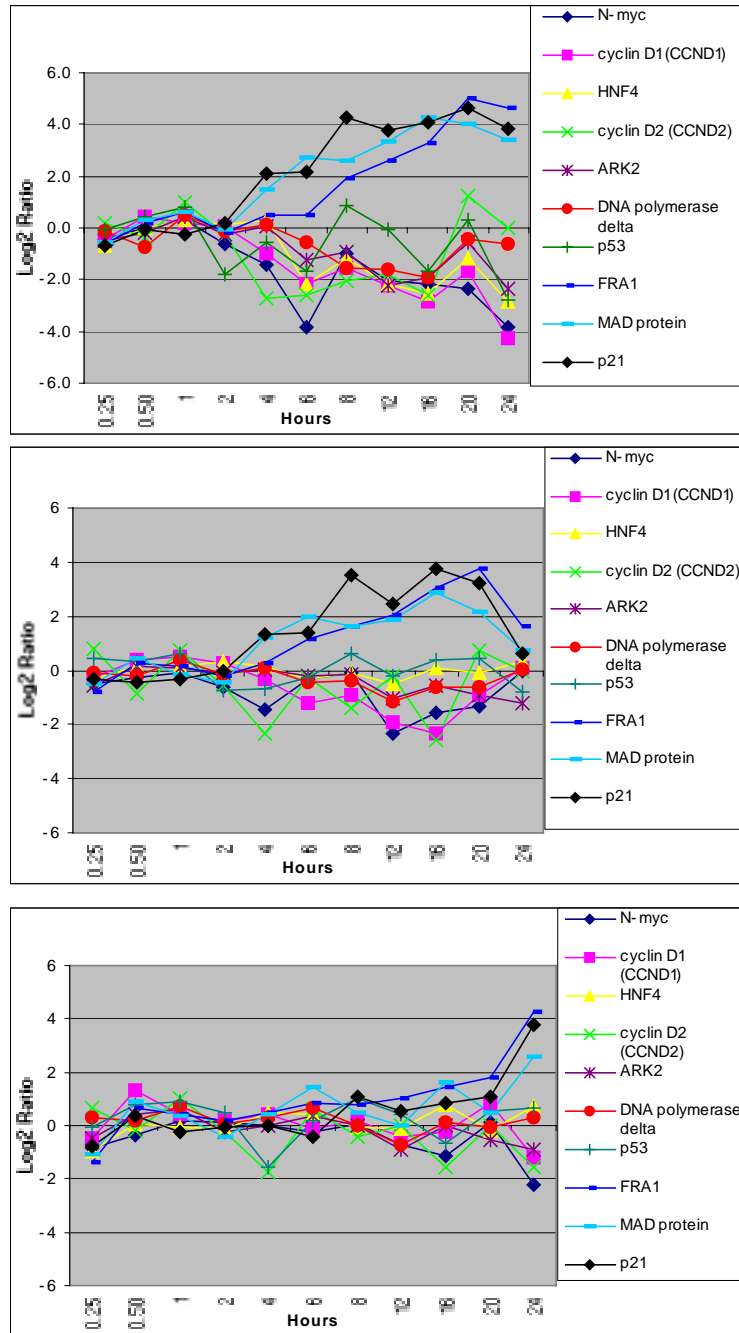


Figure 2: Cell-cycle genes exhibiting differential expression upon treatment with 1.25mM DEM (a), 0.75mM DEM (b), and 0.25mM DEM (c). The Log₂ ratios of treated/control hybridization intensities demonstrate a dose dependent response to DEM treatment. p21 transcription was increased relative to control after 4 hours exposure to 1.25mM DEM. This upregulation of the cell cycle inhibitor caused a chain reaction of transcriptional regulation of cell-cycle related genes such as cyclin D1 & D2. The differential expression occurred in the lower doses after additional exposure time to 0.75mM and 0.25mM DEM. Additionally, the Log₂ ratios of treated/control intensities decreased with the decreased dose.

component of the AP-1 transcription factor which controls many of the genes involved in cell proliferation and is sensitive to redox changes (16, 47). FRA1 transcription was up-regulated after 8 hours exposure to the high and mid dose of DEM and after 16 hours treatment with the low dose. Another factor involved in transcriptional regulation is the MAD protein that dimerizes with MAX protein, therefore blocking Myc-MAX dimerization (66). The Myc-MAX heterodimer plays a key role in the expression of genes essential for cell proliferation. Therefore, the competing dimerization of MAD-MAX inhibits the transcription of these proliferation genes (60). MAD protein transcription was up-regulated in response to all 3 doses of DEM. This upregulation was seen in parallel with the down-regulation of myc transcription. Another significant change was seen with the decrease in mRNA levels of the aurora related kinase protein 2 (ARK2) gene. ARK2 is a serine/threonine protein kinase expressed during S phase and G2/M phases. It is involved in chromosomal segregation during mitosis (56). ARK2 transcription is down-regulated after 6 hours treatment with 1.25 mM DEM and after 12 hours exposure to 0.75mM DEM. The lowest dose of DEM did not affect the gene expression of ARK2 within the 24 hour timecourse.

Several genes indicative of a resistance to apoptosis were expressed in the treated cultures (Figs. 3a-c). Bcl-2 is an integral membrane protein that functions as a suppressor of programmed cell death (54). Cultures treated with all 1.25 and 0.75 mM DEM exhibited increased transcription of bcl-2 at 4 hours exposure while the 0.25 mM

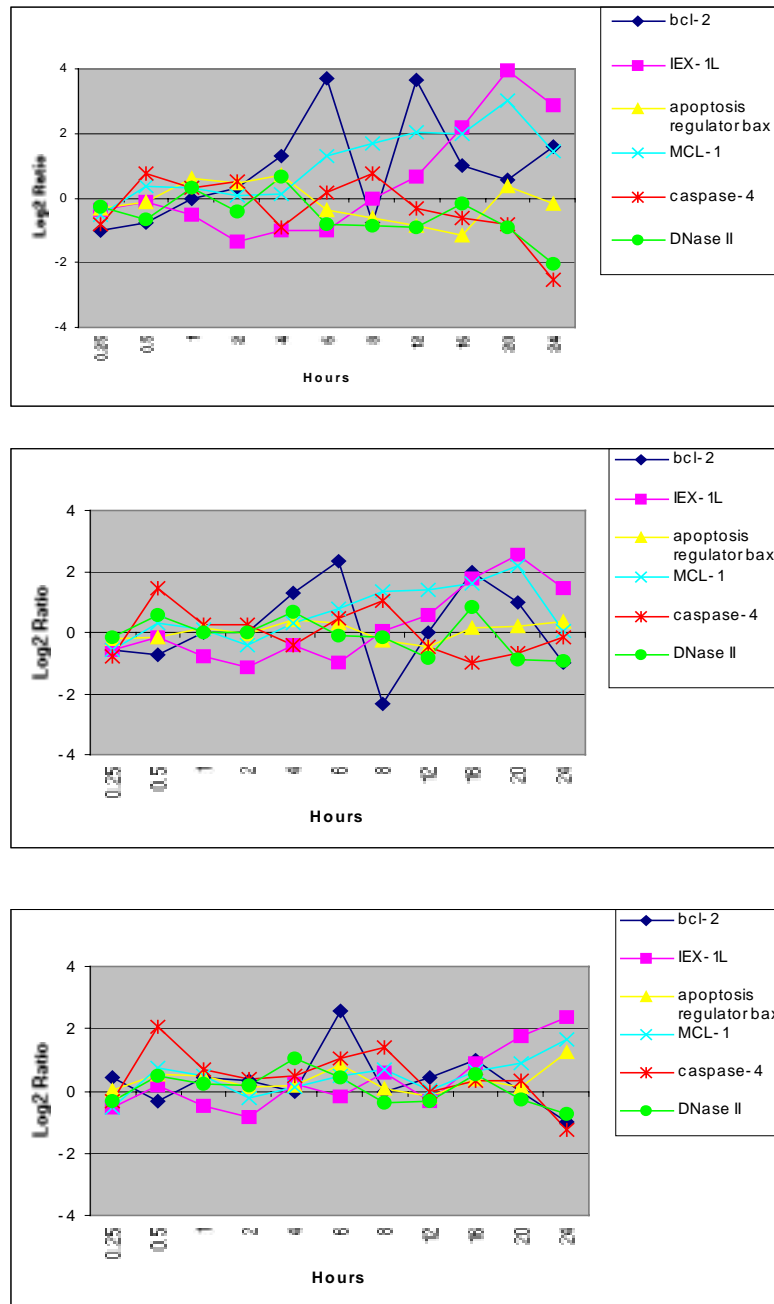


Figure 3. Apoptosis-related genes exhibiting differential expression upon treatment with 1.25mM (a), 0.75mM (b) and 0.25mM (c) DEM. The Log₂ ratio of treated/control hybridization intensities demonstrated a dose dependent response of transcriptional regulation to DEM treatment. The transcriptional up-regulation of the anti-death protein IEX-1L and the anti-apoptosis gene, bcl-2 occurs to a greater extent in the 1.25mM and 0.75mM DEM treated cultures than the 0.25mM DEM treated cells. The decrease in caspase-4 and DNase II transcription in the 1.25mM DEM treated culture also demonstrates a resistance to programmed cell death.

treatment induced the increase at 6 hours. The bcl-2 expression in the 1.25 mM and 0.75 mM dosed cells increased again at 12 and 16 hours respectively. Additionally, the mRNA levels of the IEX-1L anti-death protein were increased after 16, 16 and 20 hours exposure to the 3 doses of DEM. In the 1.25 mM DEM treated cultures, both DNAase II and caspase-4 precursor protein demonstrated decreased transcription after 24 hours treatment. These 2 proteins play key roles in apoptosis mechanisms and this down-regulation along with the up-regulation of bcl-2 and IEX-1L may indicate the resistance of the treated cells to programmed cell death.

TaqMan™RT-PCR

Eleven genes that exhibited significant up-regulation or down-regulation on the microarrays relative to control were chosen for TaqMan™ analysis in order to confirm the changes in gene expression. The TaqMan™ technology utilizes real-time RT-PCR with forward and reverse primers in addition to labeled-internal probes that are specific to the gene sequence of interest. These DNA sequences are complementary to separate areas of the gene sequences than the cDNAs on the microarrays. Also, the use of labeled-internal probes for each gene ensures the lack of false positive results caused by nonspecific priming. For these reasons, TaqMan™ RT-PCR was used to confirm the differences in gene expression that were exhibited by the Clontech arrays.

Primer-probe sets were constructed for the following up-regulated genes: fos-related antigen 1 (FRA1), 70-kDa heat shock protein 1 (HSP70), growth arrest & DNA-damage-

Table 1. TaqMan™ primer and probe sequences. For each gene, a primer and probe set was constructed consisting of forward and reverse primers complementary to DNA at the 5' and 3'-ends of the gene sequence. The probes were complementary to a sequence located between the forward and reverse primers. FAM is a dye that is non-fluorescent when it is in close proximity to the quencher dye, TAMRA. However, when the primer is extended during PCR extension, the FAM dye is released and emits fluorescence at 490 nm. This fluorescence increases in proportion to the amount of mRNA of the specific gene.

Gene	Forward Primer (5'-3')	Probe (5'-3')	Reverse Primer (5'-3')
CCND1	GTGAACAAGCTCAAGTGGAACCT	FAM-ACCCCGCACGATTTTCATTGAACACTTC-TAMRA	CGCCTCTGGCATTTTGGA
ARK2	AGCGAGTCTCCGGAAGA	FAM-CCTGTCACCCCATCTGCACCTG-TAMRA	CATTGGAGCGGCTCATGAG
HNF4	GCTGCAGATCGATGACAATGA	FAM-ATGCCTACCTCAAAGCCATCATCTT-TAMRA	CCTTGGCATCTGGGTCAAA
GADD153	AGAAACCAGGAACGGAAACAGA	FAM-TGGTCATTCCCAGCCCGGG-TAMRA	TCTCCTTCATGCGCTGCTTT
FRA1	GCCGCCCTGTACCTTGATC	FAM-CCTTTCOCAGGGCCTGTG-TAMRA	GTGCAGTGCCTCAGGTTCAA
HSP70	ACCAAGCAGACGCAGATCTTC	FAM-CCTACTCCGACAACCAACCCGGG-TAMRA	GCCCTCGTACACCTGGATCA
MAD	CAOCAAATCGACCAGCTTCAG	FAM-CTGCCTCTTCAGGTGTCGCTGCTCT-TAMRA	CCTCTCAATGCCAGCTTCT
DNA polymerase- δ	AACTTCGACCTTCGTACCTCAT	FAM-CCTCAAGGTACAACATTCCCTTTCC-TAMRA	GAAGAGTCCCGGATGTTGGA
p21	CCTAATCCGCCACAGGAA	FAM-CCTGCAGTCCTGGAAGCGCGA-TAMRA	AAGATGTAGAGCGGGCCTTTG
thioredoxin red.	GGCTGGCTGCTGAGGTTAAG	FAM-CCCAGTGTGGATGCTGTTGCCAAGA-TAMRA	ACGGAAACGAGCCAGTGGT
HO-1	ATGGCCTCCCTGTACCACATC	FAM-CCTGGAGGAGGAGATTGAGCGCAAC-TAMRA	GCGAAGACTGGGCTCTCCT

inducible protein 153 (GADD153), cyclin-dependent kinase inhibitor 1 (p21), heme oxygenase 1 (HO1), MAD protein, and thioredoxin reductase (Table 1). In addition, the following down-regulated genes were chosen for TaqMan™ confirmation: DNA polymerase delta (DNAPd), hepatocyte nuclear factor 4 (HNF4), aurora- & IPL1-like midbody-associated protein kinase 2 (ARK2), and G1/S-specific cyclin D1 (CCND1). The TaqMan analysis was performed using the RNA from the 8, 12, 16, 20 and 24 hour timepoints.

For each of the 11 genes, the gene expression changes of the treated cultures indicated by intensities on microarrays were confirmed by the relative quantities of mRNA for each gene measured by RT-PCR. The direction of change of the expression levels relative to controls were confirmed by TaqMan™ at the 5 timepoints (Figs. 4a-k). At several timepoints, the magnitude of change demonstrated by TaqMan™ was different than that of the microarray. These differences can be attributed to the non-parallel mechanisms of the 2 platforms used for analysis. For example, the Clontech arrays are compared using pixel intensities and these fold changes are based upon the software's ability to differentiate between the quantity of pixels. This platform is also dependent on the quantity of cDNA primers for each gene available for hybridization on the membrane, the Clontech arrays contain 10ng cDNA per gene. TaqMan™, on the other hand, is based on fluorescence emission and TaqMan™ supplies the reaction with excessive primers for each gene (~500 ng). For these reasons, the magnitude of the changes cannot be directly

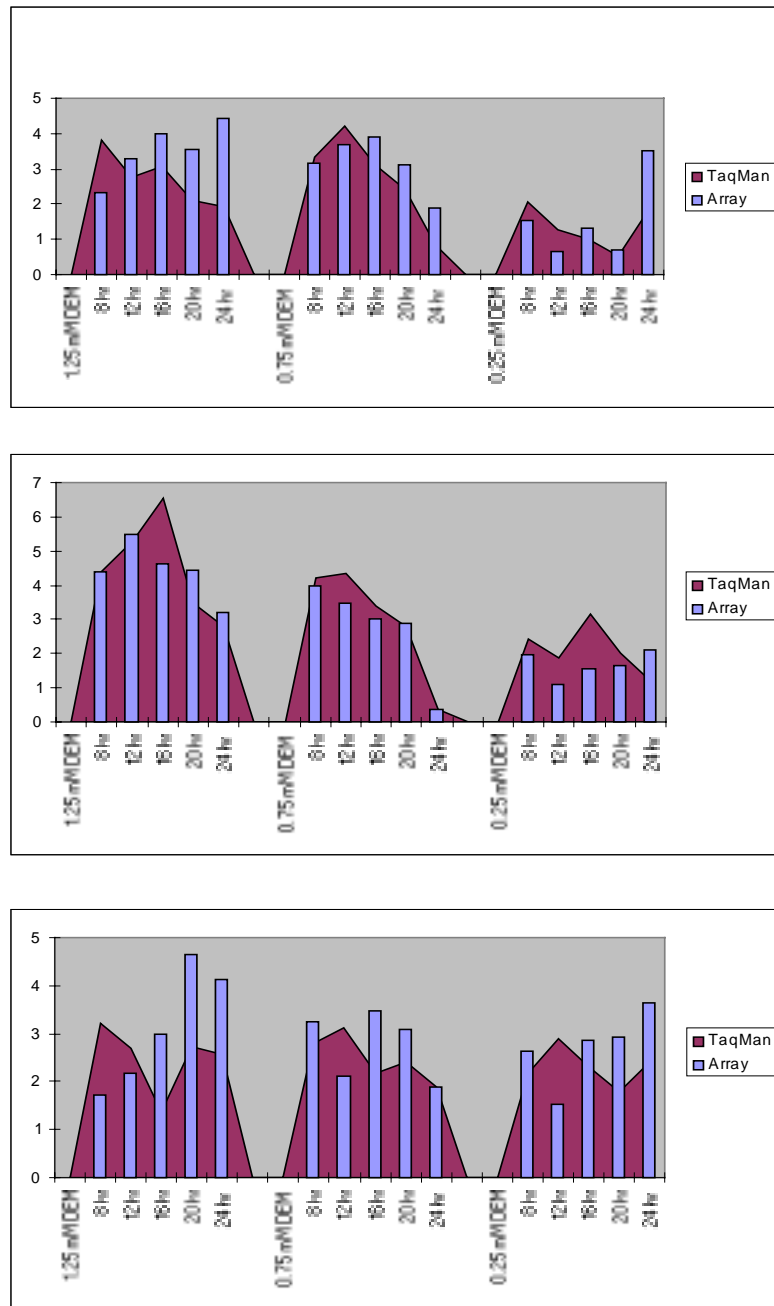


Figure 4a-c. Correlation of RT-PCR and array data. The Log₂ ratio values of treated/control hybridization intensities are plotted against the difference in mRNA content of HO-1 (a), HSP70 (b) and thioredoxin reductase (c) as determined by TaqMan™ analysis. For each gene, the up-regulation exhibited by the array data was confirmed by the TaqMan data.

Figure 4, continued

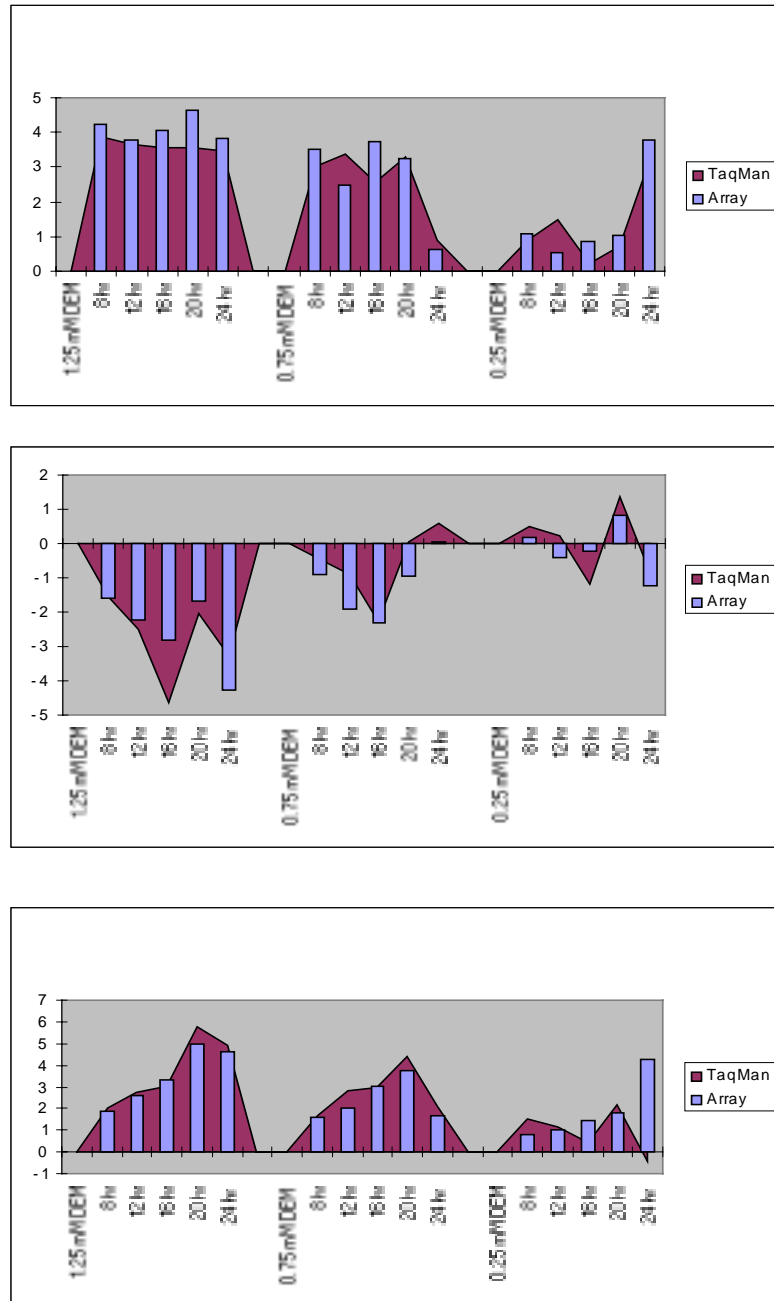


Figure 4d-f. Correlation of RT-PCR and array data. The Log₂ ratio values of treated/control hybridization intensities are plotted against the difference in mRNA content of p21 (d), FRA1 (e) and Cyclin D1 (f) as determined by TaqMan™ analysis. For each gene, the direction of differential expression exhibited by the array data was confirmed by the TaqMan data.

Figure 4, continued

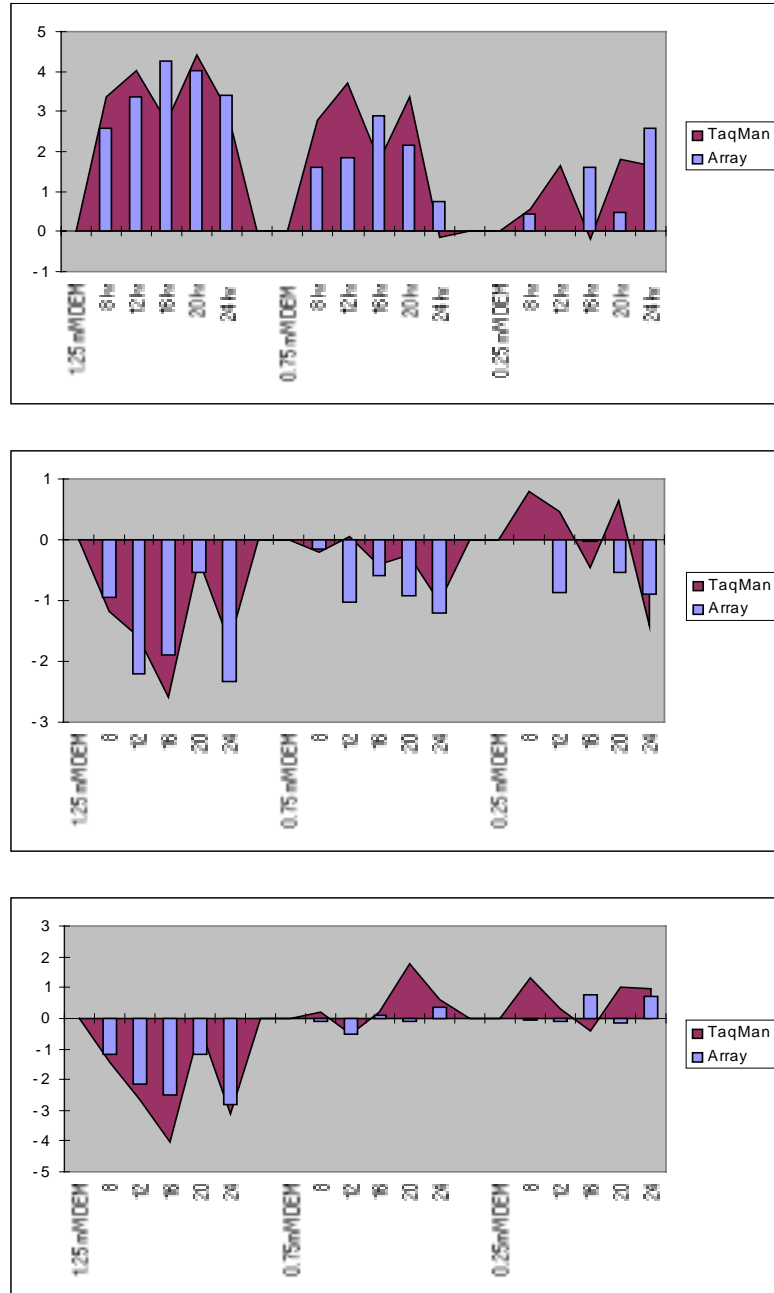


Figure 4g-i. Correlation of RT-PCR and array data. The Log₂ ratio values of treated/control hybridization intensities are plotted against the difference in mRNA content of MAD protein (g), ARK2 (h) and HNF4 (i) as determined by TaqMan™ analysis. For each gene, the direction of significant differential expression exhibited by the array data was confirmed by the TaqMan data. The 0.25mM DEM treated cells appear to exhibit ARK2 changes in different directions (h), however, only Log₂ ratios of +/- 2.0 are considered significant changes and given the differences in array and TaqMan platforms, these small discrepancies are expected.

Figure 4, continued

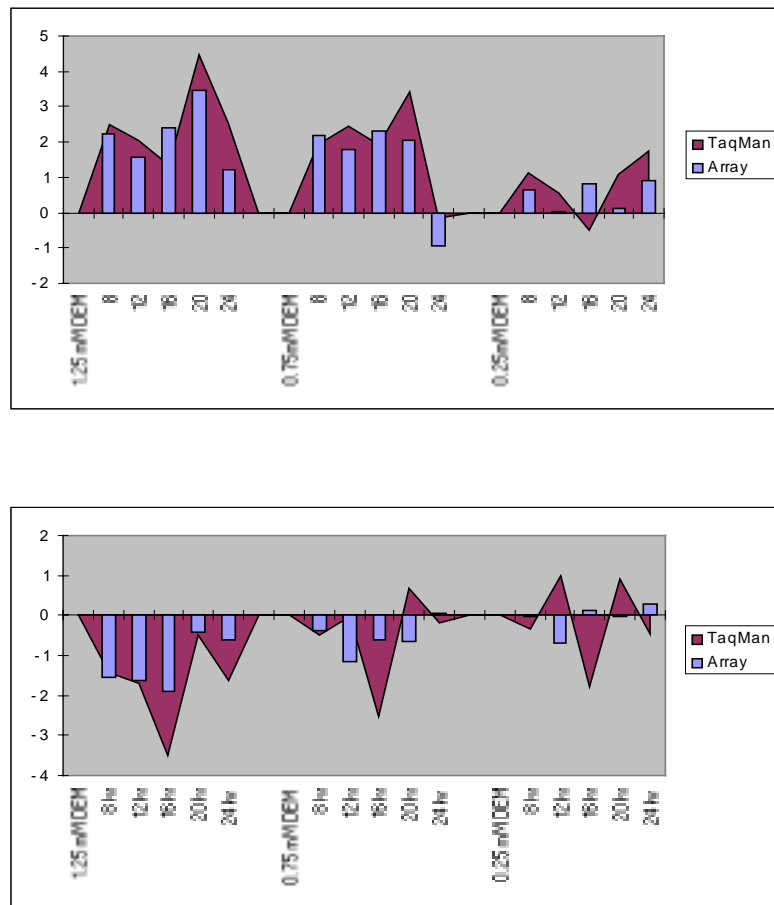


Figure 4j-k. Correlation of RT-PCR and array data. The Log₂ ratio values of treated/control hybridization intensities are plotted against the difference in mRNA content of GADD153 (j), and DNA polymerase-δ (k) as determined by TaqMan™ analysis. For both genes, the direction of significant differential expression exhibited by the array data was confirmed by the TaqMan data. The 0.75mM and 0.25mM DEM treated cells appear to exhibit DNA polymerase-δ changes in different directions (k), however, only Log₂ ratios of +/- 2.0 are considered significant changes and given the differences in array and TaqMan platforms, these small discrepancies are expected.

compared, however, the up or down-regulation, relative to control, can be compared for confirmation purposes.

Glutathione Assay

Reduced glutathione (L- γ -glutamyl-L-cysteinyl-glycine) is a one-electron donor involved in redox cycles and is important in maintaining the antioxidative capacity of cells (50). A colorimetric assay was used to compare the levels of reduced glutathione (GSH) in cells treated with 0.25 – 1.25 mM DEM compared to untreated cultures. DEM is a GSH depletor and the assay results demonstrated that the decrease in GSH levels was both dose and time dependent. Reduced glutathione (GSH) levels were depleted in a dose dependant manner upon treatment with DEM (Fig. 5). Four hours after treatment, cells treated with 1.25 mM DEM contained GSH concentrations that were 18% of the level of GSH in control cells. This trend continued with the high-dosed cultures, with the GSH levels remaining significantly lower than control cultures throughout the 24 hour timecourse. The GSH depletion was less severe in the cells dosed with 0.75 mM DEM, but the cells still contained 24% of the amount of GSH measured in control cultures 4 hours after treatment. The GSH depletion was apparent in all but the 20 hour timepoint when the 0.75 mM dosed cells regained 102% of the antioxidative capacity of the control cultures. The 0.25 mM dose, however, did not cause GSH depletion until 24 hours post exposure. Alternatively, at 4 of the 6 timepoints, the cells treated with 0.25 mM DEM contained more GSH than the control cultures. This increase in glutathione levels could

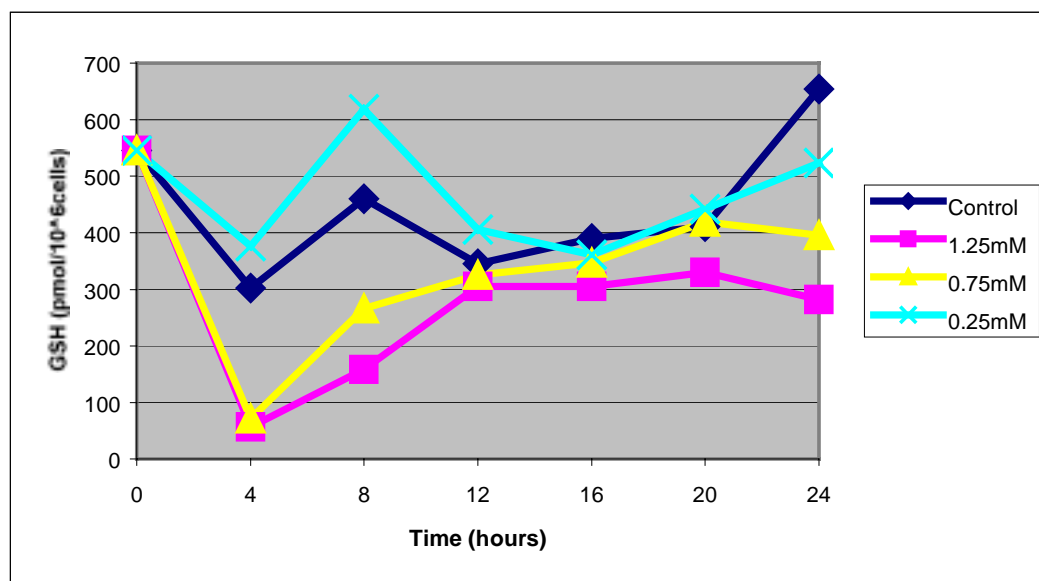


Figure 5. Concentrations of GSH in DEM-treated versus non-treated cells. The levels of reduced glutathione (GSH) in control cultures remained relatively steady throughout the 24-hour timecourse. The cultures treated with 1.25mM and 0.75mM DEM exhibited significantly decreased levels of GSH after 4 hours exposure to the chemical. The GSH levels rebounded after 12 hours exposure and the 0.75mM DEM treated culture contained 102% of the GSH concentration of the control culture at the 20 hour timepoint. The cells treated with the lowest dose of DEM, 0.25mM, maintained GSH concentrations at or above the levels of the control cultures.

be adaptive response attributed to the induction of glutathione reductase, which reduces the oxidized glutathione (GSSG) to maintain redox balance in the cells. In this case, the glutathione reductase would not have been induced in the control cultures due to the lack of oxidized GSH.

Cell Cycle and DNA Synthesis

In order to analyze the effects that the gene expression changes had on cell proliferation and cell cycle control, the cell cycle status and DNA synthesis levels of control cultures and cells treated with 0.25 mM, 0.75 mM and 1.25 mM DEM were analyzed by flow cytometry. Bromodeoxyuridine (BrdU) is an analogue of thymidine and it is incorporated during DNA synthesis in S phase. The cells were incubated with BrdU for 30 minutes prior to cell fixation. Acid was added to the fixed cells to denature the DNA and expose the incorporated BrdU. Anti-BrdU FITC was then added to the suspension to label the cells. After BrdU labeling, the cells were counter-stained with propidium iodide (PI), a fluorescent DNA stain that was used to measure the DNA content in each cell. During the flow cytometric analysis, the PI fluorescence was used to determine the position of the cells in the cell cycle based on DNA content, for instance, cells in the G1 phase of the cell cycle contain a level of DNA that corresponds to $2n$. After the cell doubles its DNA in S phase, and enters G2 phase, it contains the DNA equivalent of $4n$. If a cell contained less than $2n$, it was labeled apoptotic. In addition to PI analysis, the amount of BrdU in the cells was used to determine the rate of DNA synthesis among the cells in S phase. For

example, if one cell demonstrated a higher level of anti-BrdU FITC fluorescence than another cell, the cell emitting increased fluorescence incorporated more BrdU molecules, indicating a higher rate of DNA synthesis.

Both cell cycle status and DNA synthesis exhibited time-dependent and dose-dependent responses to DEM treatment. The cells identified as being in S phase by PI analysis demonstrated significant differences upon treatment with different doses of DEM. The percentage of S-phase cells incorporating BrdU decreased with increased dose and with increased exposure time (Fig. 6). In addition, the amount of BrdU incorporated into these cells during the 30-minute incubation steadily decreased according to dose and time (Fig. 6). This trend indicates a decrease in the rate of DNA synthesis and therefore a slower replication time for these cells. After 8 hours treatment with 1.25 mM DEM, the majority of the cells did not incorporate any BrdU indicating a lack of DNA synthesis and therefore, S-phase arrest. These data are supported by the direct cell counts that indicate no significant increase in cell number over the 24-hour period (Fig. 7).

The intercalation of PI indicates that the number of cells in S phase decreases over time. In addition, the G2 compartment of the treated cells is increased compared to control at all timepoints and all doses (Fig. 8). This data is consistent with a G2 arrest, possibly coupled with a G1 arrest meaning that no cells are moving from G1 into S phase. The data also demonstrates that there are no significant levels of apoptosis occurring in any of

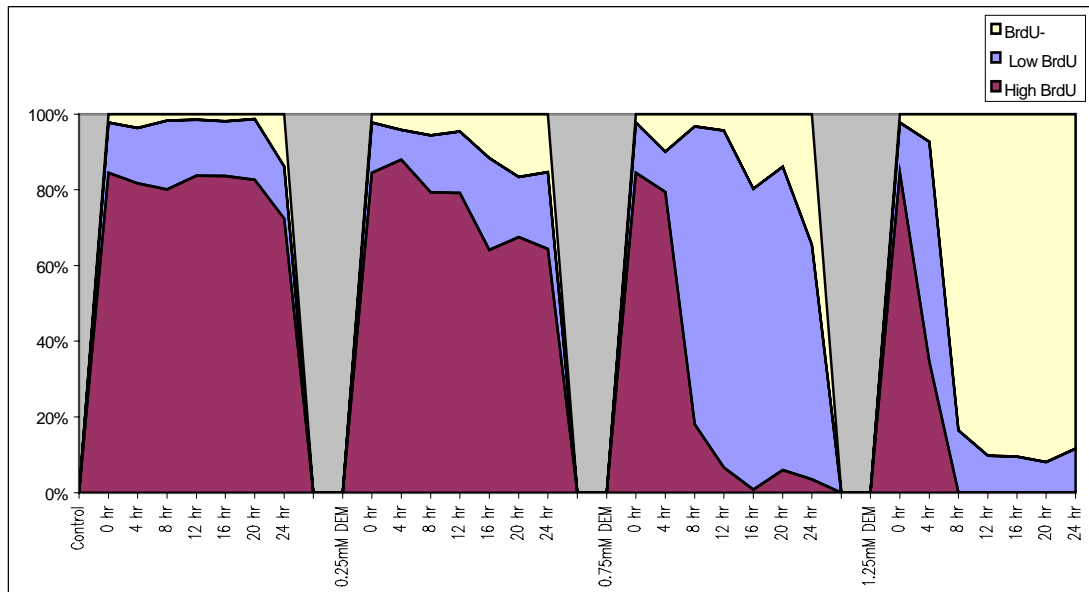


Figure 6. Extent of BrdU incorporation by cells in S-phase. Cells were incubated with BrdU stain for 30 minutes prior to cell fixation. The cell-cycle phases of the population were determined by measuring DNA content through propidium iodide incorporation. Of the cells in S phase, the BrdU incorporation, an indication of DNA synthesis, was measured using the fluorescence of anti-BrdU FITC. The cells that emitted FITC fluorescence between 1-100 were labeled low BrdU incorporators and FITC fluorescence above 100 indicated high BrdU incorporation. The majority of the control cells in S-phase incorporated BrdU at a high level, this indicates a high rate of DNA synthesis. The cultures treated with DEM exhibited dose dependent rates of DNA synthesis. The cells treated with 0.25mM DEM demonstrated similar DNA synthesis rates to the control cultures. A large percentage of the cells from the 0.75 mM DEM treated culture showed a decreased rate of DNA synthesis after 8 hours treatment. The majority of the 1.25mM DEM treated cells were no longer incorporating BrdU after 8 hours exposure to DEM. This indicates a lack of DNA synthesis and therefore, S-phase arrest.

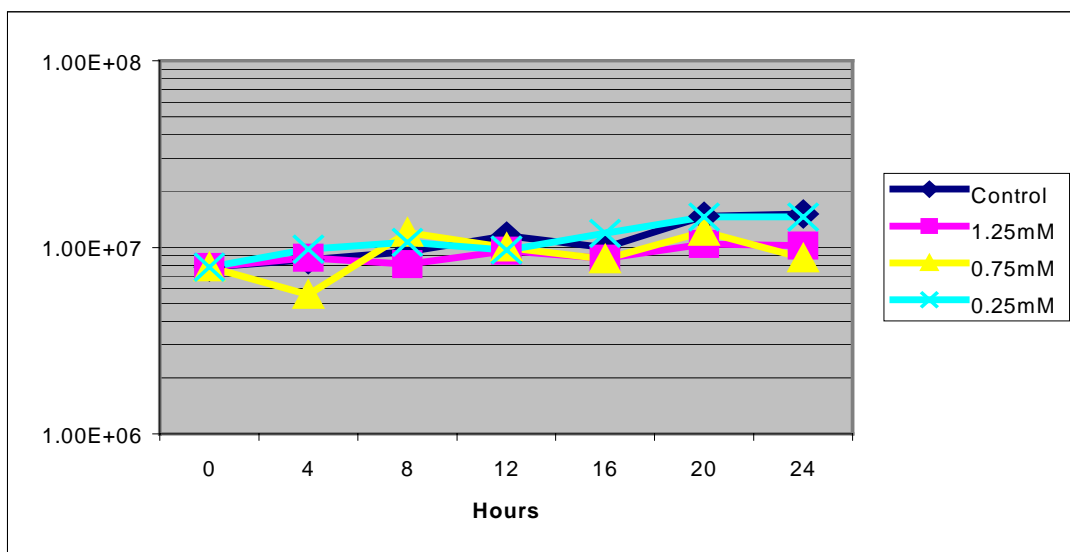


Figure 7. Cell count of DEM-treated versus non-treated cultures . The cell counts of DEM treated and control cultures remained steady throughout the 24 hour timecourse.

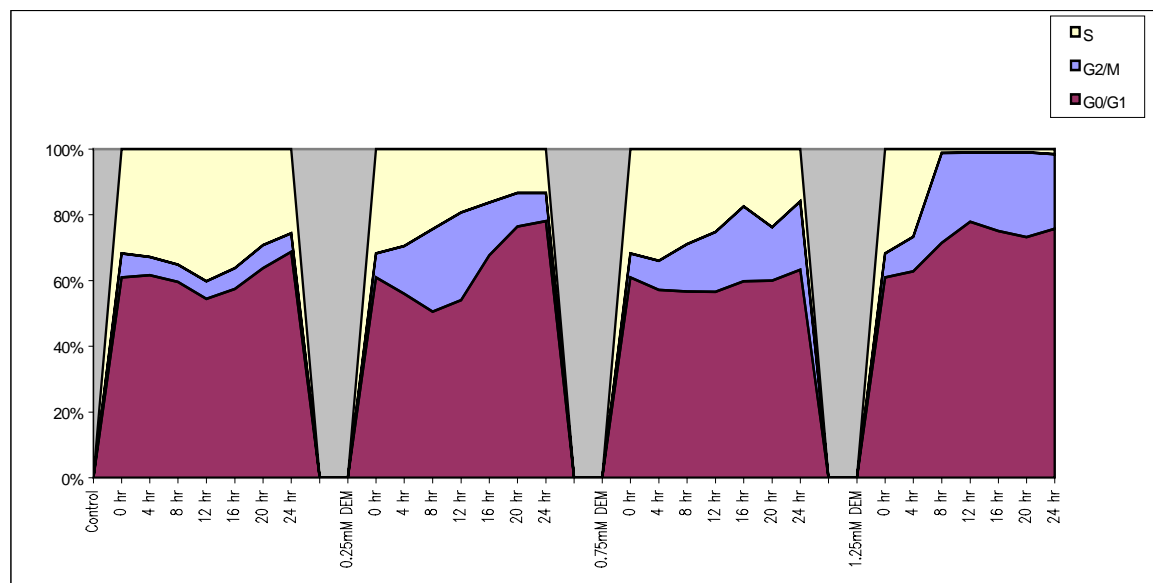


Figure 8. Distribution of DEM-treated and non-treated cells throughout cell-cycle phases. DEM treated and untreated cells were stained with propidium iodide to measure the DNA content of the cells. The amount of DNA in the cells indicated the cells' location in the cell cycle. The number of cells in S phase decreases while the amount of cells in the G2 phase rises with increased time and dose of DEM treatment. This increase in G2 phase cells with the decrease in S phase cells is indicative of G2 phase arrest.

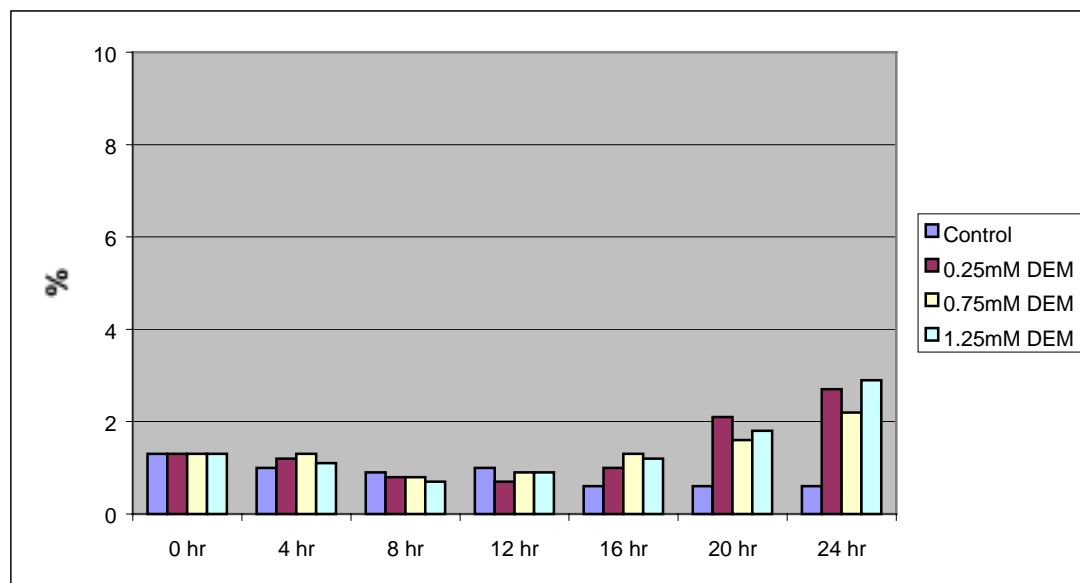


Figure 9. Percent apoptotic cells in DEM-treated versus non-treated cultures. The cells were stained with propidium iodide to measure DNA content. All cells that contained less than 2n, the level of DNA in G1-phase cells, were labeled apoptotic. Less than 3% of the cell populations in treated and untreated cultures were apoptotic.

the treated cultures (Fig. 9). The constant level of cell numbers throughout the 24-hour timecourse also exhibited this lack of apoptosis (Fig. 7).

Conclusions

The gene expression data can be used in concert with the GSH and cell cycle data to draw a comprehensive picture of the changes that were made in the cells treated with DEM. These changes in the cells appeared to be both time and dose-dependant. However, although genes were up or down-regulated at different times depending on the dose of the toxicant, it was interesting to note that, over the course of treatment, the same genes were differentially expressed relative to control cultures. Significant changes were seen in the expression of cell cycle-related genes and stress proteins in response to all three doses of DEM, it was only the time of gene induction after exposure that differed between doses. Other genes were only induced in the cells treated with the highest dose, for example, the GADD proteins were never up-regulated in the cells treated with the lowest dose, 0.25 mM DEM.

The dynamic nature of gene expression between cells treated with different doses may be partly explained by the changing levels of reduced glutathione throughout the time of exposure. My data demonstrated a strong correlation between GSH levels in the cells and subsequent induction of gene expression. For instance, p21 was up-regulated after 4 and 24 hours exposure to 1.25 mM, 0.75 mM and 0.25 mM DEM respectively. The GSH

content of the 1.25 mM and 0.75 mM treated cultures decreased significantly relative to control after 4 hours of exposure. However, as seen with the p21 induction, the 0.25 mM treated cultures did not exhibit decreased levels of GSH until after 24 hours exposure to DEM. In addition, after 24 hours exposure to 0.75 mM DEM, the expression of p21 was at the same level as the control cultures. Interestingly, GSH levels in the 0.75 mM treated cultures rebounded to 102% of the control after 20 hours of DEM treatment. These data suggest that the GSH content of the cell has a significant effect on the induction of p21. Russo et al. previously demonstrated this link between GSH depletion and p21 induction by counter-treating cells with N-acetylcysteine to increase GSH content. Upon the increase of GSH levels, he noted a decrease in p21 expression (49). He also proved that this p21 induction was p53-independent by demonstrating that upon treatment with DEM, p53 can no longer bind DNA, however, there is still a marked increase in p21 transcription (49). My data also support this observation, as p53 expression was not up-regulated throughout the 24-hour timecourse (Figs. 2a-c).

The increased expression of p21 caused a chain reaction of events involving cell cycle control. The flow cytometric data of cells incubated with BrdU and stained with propidium iodide indicated both S and G2 phase arrests occurring between 4 and 8 hours of treatment with 1.25 mM DEM. Many of the gene expression data correlate with this evidence of cell cycle arrest. The progression of cells through cell cycle transitions is positively regulated by cyclin dependent protein kinases (CDKs) (Fig. 10). These kinases are activated by cyclins and subsequently phosphorylate target proteins on serine and

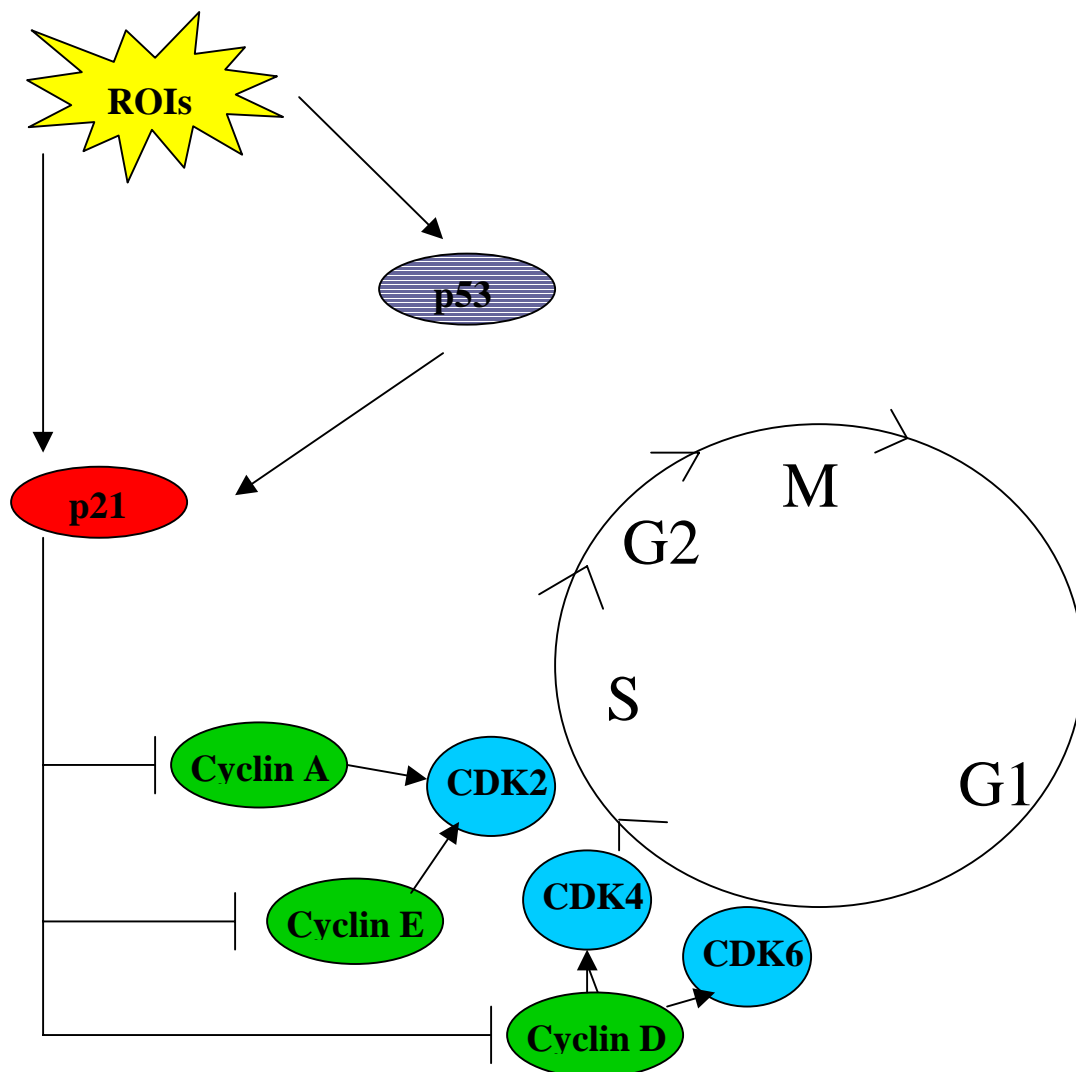


Figure 10. Diagram of oxidative-stress induced changes in cell cycle. During normal cell replication, cyclins A and E form complexes with CDK 2 and cyclin D forms complexes with CDK4 and CDK6. The cyclin dependent kinases (CDKs) phosphorylate proteins on serine and threonine residues to propel the cell through the cycle. In the presence of reactive oxygen intermediates (ROIs) indicative of oxidative stress, p21, a cyclin dependent kinase inhibitor, is produced by either a p53 dependent or independent process. The p21 inactivates the kinase ability of the cyclin/CDK complexes, thereby, initiating cell cycle arrest.

threonine residues to propel the cell through the cycle (15). Cyclins D and E are responsible for the progression of cells through G1 phase and triggering entry into S phase while cyclin A is more directly involved with progression of the cell in S phase (45). Cyclin dependent kinase inhibitors, such as p21, inhibit the kinase activity of the complexes made by cyclins A, E and D and the corresponding CDKs (45, 51). The genes involved in these stages of cell cycle control were differentially expressed upon treatment with DEM. As mentioned previously, GSH levels decreased and p21 expression increased at various timepoints in response to the range of DEM treatments. My data exhibited decreased transcription of cyclins D1 and D2 at timepoints that exactly correlate with the induction of p21 at each dose. Therefore, it appears that the decrease in GSH content caused the p53-independent induction of p21 which, in turn, inhibited the activity of the cyclins responsible for entry and progression in S phase, thereby causing S phase and G2 arrest.

The cell cycle arrest can also be explained by several other changes in gene expression in response to DEM. The MAX protein is a basic helix loop helix leucine zipper that plays a central role in transcriptional control of myc proto-oncoproteins. The expression of Myc is required for cell proliferation because the MAX-Myc heterodimer is necessary for the induction of cyclin G1 and entry into S phase (46, 66). The MAD protein competitively dimerizes with the MAX protein to form MAD-MAX heterodimers that repress transcription, thereby preventing entry into S phase (60, 66). MAX expression is constitutive while Myc and MAD expression is highly regulated and Foley et al.

suggested that relative levels of Myc versus MAD mediate the balance between cell proliferation and terminal differentiation (20, 32). My data exhibit these changes in expression of Myc and MAD and also demonstrate the subsequent changes in cell cycle and proliferation. MAD was up-regulated at 4, 4 and 6 hours after treatment with 1.25 mM, 0.75 mM and 0.25 mM DEM, respectively. Meanwhile, the transcription of myc decreased subsequent to those timepoints for each dose. Also at these timepoints, direct cell counts demonstrate the lack of proliferation, and BrdU analysis showed the onset of S phase arrest.

Another example of differential gene expression relating to cell cycle control was seen with DNA polymerase- δ . This protein plays a role in DNA elongation during replication, it is regulated during the cell cycle at the transcriptional level and its mRNA levels peak at G1/S border (65). DNA polymerase- δ contains a subunit, p66, which has a binding site for PCNA that acts as a clamp during replication (17, 65). PCNA also binds, at the same site, to p21 and if the p21 is bound to PCNA, DNA polymerase- δ cannot bind, therefore, preventing DNA replication (17, 49). As previously stated my data exhibits p21 increases at 4, 4 and 24 hours after treatment with 1.25 mM, 0.75 mM and 0.25 mM DEM respectively. DNA polymerase delta transcription decreases significantly after 8 hours treatment with 1.25 mM DEM. It is possible that the presence of p21, which competitively binds PCNA, prevents the action and therefore diminishes the need for additional DNA polymerase- δ to be transcribed. Li et al. demonstrated the decrease in DNA polymerase- δ mRNA levels in relation to increased p53 (33). Since p53 induces

p21 expression, it may be this downstream effect of p53 that causes the decrease in DNA polymerase- δ transcription. Russo et al. showed that DEM causes a p53 independent increase in p21 expression, therefore, my data supports the idea that increased p21, and not p53 expression, is responsible for the decrease in DNA polymerase- δ transcription (49).

The arrest in cell cycle exhibited by the cultures in response to oxidative stress can occur in order to allow the cell time to repair DNA damaged by ROIs. GADD45 and GADD153 are genes whose expression are regulated by growth arrest and DNA damage (5). GADD 153 is also known to respond to alterations in DNA structure like those that can be caused by the reaction of DNA with ROIs (5). GADD45 binds PCNA and promotes DNA repair while inhibiting DNA synthesis (15). Both GADD45 and GADD153 are up-regulated in the 1.25 mM DEM treated cells. The increases occurred during the time period that S phase arrest occurred in the cells treated with the same dose.

The cell cycle arrest demonstrated by the treated cultures can also occur in order to allow the cells time to activate the induction of stress proteins to deal with oxidative stress. For instance, heme oxygenase 1 (HO1) serves as an adaptive mechanism to protect cells from oxidative damage during stress (44). It has been stated that HO1 induction is caused by GSH depletion through the activation of p21 (41). My data partially support this idea because the HO1 increases in the 1.25 and 0.75 mM DEM treated cells just as the GSH dramatically decreases at 4 hours, this is also the same time that p21 up-regulation was

exhibited. However, the low-dose of DEM did not cause GSH depletion after 4 hours exposure, nor was the p21 up-regulated at this timepoint, but these cells do exhibit increased expression of HO1 at 4 hours. Perhaps another protein sensitive to low levels of oxidative stress is responsible for the short increase in HO1 mRNA levels after 4 hours treatment with 0.25 mM DEM.

Other stress proteins were up-regulated in response to DEM treatment. The microarray data show a marked increase HSP70 and heat shock 70k-Dal protein 2. Calabrese et al. reported a possible involvement of redox mechanisms in the heat shock signal transduction pathways (9). My data supports this theory as the HSP70 and heat shock protein 2 both exhibit increased transcription after 2 hours exposure to both 1.25 mM and 0.75 mM DEM. This corresponds with the depletion of GSH seen by 4 hours exposure to these doses of DEM. The response of these genes to redox imbalance may be indispensable due to the ability of the heat shock proteins to minimize the damaging effects of oxidative stress. The association between HSP70 and a key base excision repair enzyme suggests a role for heat shock proteins in promoting base excision repair (29). Additionally, Klein et al. performed a study inducing oxidative stress in mouse macrophages using nitric oxide. He concluded that although p21 was induced and cell cycle arrest occurred, only the cells able to produce HSP70 showed reduced activation of caspase 9 and caspase 3, thereby preventing apoptosis (30).

The BrdU and propidium iodide assays suggest that cells treated with the three doses of DEM demonstrated this resistance to apoptosis. Some of the genes that were regulated in

response to the treatments may explain this resistance. Bcl-2 is an integral membrane protein that functions as a suppressor of programmed cell death (54). It is the first discovered regulator of apoptosis and acts by forming a heterodimer with pro-apoptotic factor BAX, preventing its subsequent action (43). Mcl-1 is another protein involved in the suppression of cell death. Both bcl-2 and mcl-1 were up-regulated at several timepoints in the 1.25 mM and 0.75 mM treated cells. Perhaps the action of the cell cycle arrest proteins, the stress proteins and the DNA repair proteins were enough to keep these cells from being considered for apoptosis.

Possibly as interesting as the genes that exhibited increased transcription in response to DEM treatment were the genes that were expected to change in response to oxidative stress, but did not. For instance, the mRNA levels of the superoxide dismutases (SODs) increased only in response to the highest dose of DEM. The significant decrease in GSH caused by the 0.75 mM DEM treatment ensured that the cells lacked the thiol buffering capacity to deal with the ROIs created during cell respiration. Also, the glutathione reductase did not demonstrate increase mRNA levels relative to controls. This protein was critical for the rebound of reduced glutathione that was seen after the initial GSH depletion that occurred at 4 hours exposure to the mid and high doses of DEM. The failure to see these changes in expression can be explained by the fact that transcriptional control is not the only mode of regulation. Some genes are transcribed at equal levels regardless of the presence of environmental stress or toxicants. The mRNA, however, can remain in the cell until it is signaled for translation. Additionally, the protein can be

regulated after translation by post-translational modifications such as phosphorylations and dimerizations that can activate the proteins. In both of these cases, the mRNA in cells with very different protein activities could exist at equal concentrations.

Multiple signaling pathways can also provide explanation for the failure of some “expected” genes to be differentially regulated at the transcriptional level. For example, a majority of the literature pertaining to oxidative stress includes p53-dependent induction of p21. However, my data fail to show any increase in p53 transcription. Russo et al. previously demonstrated a p53-independent pathway for p21 induction, he also used DEM to induce oxidative stress (49). These data suggest that there are multiple pathways for the induction of the same gene. Most oxidants cause increased transcription of p53, DEM, on the other hand, makes the transcription factor unable to bind its target protein and therefore unable to induce p21 transcription. For this reason, the induction of p21 transcription is signaled by a separate pathway, Russo suggests it may be through a member of the STAT protein family (49). Post-translational modifications and multiple signaling pathways are just two examples of instances when solely analyzing the transcript of cells may not present the entire picture of a cell’s response to toxicants. However, the data do supply scientists with the information necessary to identify directions of future studies.

In summary, these data have demonstrated that gene expression is a dynamic process that changes dramatically and rapidly over time in response to both oxidative stress and the

genes that are transcribed upstream. The cascade of expression seems to remain the same over the range of doses of DEM. First, GSH is depleted and this redox imbalance causes the transcription of genes that initiate cell cycle arrest, DNA repair, and induction of stress proteins. While these responses are generally the same between doses, it is the time taken for these events to occur that varies greatly from the highest dose to the lowest dose of DEM. Using this information, one can assume that the intricate patterns of gene expression in response to other toxicants may be best studied using a range of effective doses over an extended period of time.

Literature Cited

- 1- Ames, B.N., Shigenaga, M.K., Hagen, T.M. (1993) Oxidants, Antioxidants, and the Degenerative Diseases of Aging. *Proc. Nat. Acad. Sci.* 90(17):7915-7922.
- 2- Ammendola, R., Fiore, F., Esposito, F., Caserta, G., Mesuraca, M., Russo, T., Cimino, F. (1995) Differentially Expressed mRNAs as a Consequence of Oxidative Stress in Intact Cells. *FEBS Letters*. 371(3):209-213.
- 3- Arner, E.S.J., Holmgren, A. (2000) Physiological functions of thioredoxin and thioredoxin reductase. *Euro. J. of Biochem.* 267(20):6102-6109.
- 4- Arrigo, A.P. (1999) Gene expression and the thiol redox state. *Free Rad Biol and Med.* 27(9-10):936-944.
- 5- Bartlett, J.D., Luethy, J.D., Carlson, S.G., Sollott, S.J., and Holbrook, N.J. (1992) Calcium ionophore A23187 induces expression of the growth arrest and DNA damage

inducible CCAAT/enhancer binding protein (C/EBP)-related gene, gadd153. *J. Biol. Chem.* 267:20465-20470.

6- Beckman, K.B., Ames, B.N. (1997) Oxidants, Antioxidants and Aging. *Oxidative Stress and the Molecular Biology of Antioxidant Defenses*. Scandalios, J.G. (ed). Cold Spring Harbor Laboratory Press, New York.

7- Boyland, E., Chasseaud, L.F. The effect of some carbonyl compounds on rat liver glutathione levels. *Biochem. Pharma.* 19(4):1526-1528.

8- Cai, J.X., Huang, Z.Z., Lu, S.C. (1997) Differential Regulation of Gamma-Glutamylcysteine Synthetase Heavy and Light Subunit Gene Expression. *Biochem Journal.* 326(Part 1):167-172.

9- Calabrese, V., Scapagnini, G., Catalano, C., Bates, T.E., Geraci, D., Pennisi, G., Giuffrida, S.A.M. (2001) Regulation of heat shock protein synthesis in human skin fibroblasts in response to oxidative stress: Role of vitamin E. *Int. J. of Tissue Reactions.* 23(4):127-135.

10- Casey, W.M., Anderson, S., Fox, T., Dold, K., Colton, H., Morgan, K. (2002) Time-Course Analysis Relating to the Transcriptional and Physiological Responses of HepG2 Cells Exposed to Diethyl Maleate. *Physiol. Genomics.* 8(2):115-122.

11- Chance, B., Sies, H., and Boveris, A. (1979) Hydroperoxide Metabolism in mammalian organs. *Physiol. Rev.* 59:527-605

12- Christman, M.F., Morgan, R.W., Jacobson, F.S., Ames, B.N. (1985) Positive control of a regulon for defenses against oxidative stress and some heat-shock proteins in *Salmonella typhimurium*. *Cell.* 41(3):753-62.

13- Davies, K.J.A., Delsignore, M.E. (1987) Protein Damage and protein degradation by Oxygen Radicals: modification of Secondary and Tertiary Structure. *J. Biol. Chem.* 262:9908-9913.

14- Davis, W., Ronai, Z., Tew, K.D. (2001) Cellular thiols and reactive oxygen species in drug-induced apoptosis. *J. Pharma. Exp. Therapeutics*. 296(1):1-6.

15- Denhardt, D.T. (1999) Signal Transduction Pathways and Regulation of the Mammalian Cell Cycle: Cell Type-Dependent Integration of External Signals. *The Molecular Basis of Cell Cycle and Growth Control*. Stein, G.S., Baserga, R., Giordano, A., Denhardt, D. (eds). Wiley-Liss, Inc., New York.

16- Deora, A.A., Lander, H.M. (2000) Regulation of Signal Transduction and Gene Expression by Reactive Nitrogen Species. *Antioxidant and Redox Regulation of Genes*. Sen, CK., Sies, H., Baerle, PA. eds. Academic Press, California.

17- Ducoux, M., Urbach, S., Baldacci, G., Hubscher, U., Koundrioukoff, S., Christensen, J., Hughes, P. (2001) Mediation of proliferating cell nuclear antigen (PCNA)-dependent DNA replication through a conserved p21(Cip1)-like PCNA-binding motif present in the third subunit of human DNA polymerase delta. *J. Biol. Chem*. 276(52):49258-49266.

18- Esposito, F., Russo, L., Chirico, G., Ammendola, R., Russo, T., Cimino, F. (2001) Regulation of p21(waf1/cip1) expression by intracellular redox conditions. *Lab Invest*. 81(1):67-70.

19- Fargnoli, J., Holbrook, N.J., and Fornace, A.J., Jr., (1990). Low ratio hybridization subtraction. *Anal. Biochem*. 187:364-373.

20- Foley, K.P., McArthur, G.A., Queva, C., Hurlin, P.J., Soriano, P., Eisenman, R.N. (1998) Targeted Disruption of the MYC Antagonist MAD1 Inhibits Cell Cycle Exit During Granulocyte Differentiation. *EMBO Journal*. 17(3):774-785.

21- Fowkes, SW. The Biological Evolution of Energy Systems. *Smart Drug News*. September, 1996

22- Goldbaum, O., Richter-Landsberg, C. (2001) Stress proteins in oligodendrocytes: differential effects of heat shock and oxidative stress. *J. of Neurochem*. 78(6):1233-1242.

- 23- Guyton, K.Z., Spitz, D.R., Holbrook, N.J. (1996) Expression of Stress Response Genes *gadd153*, *c-jun*, and *ho-1*, H₂O₂- and O₂-Resistant Fibroblasts. *Free Rad. Biol. & Med.* 20(5):735-741.
- 24- Haffner, SM. (2000) Clinical relevance of the oxidative stress concept. *Metabolism: Clinical & Experimental.* 49(2):30-34.
- 25- Halliwell, B., Gutteridge, J.M.C. (1989) Free Radicals in Biology and Medicine. 2nd. Ed. Clarendon Press, Oxford.
- 26- Helt, C.E., Rancourt, R.C., Staversky, R.J., O'Reilly, M.A. (2001) p53-dependent induction of p21(Cip1/WAF1/Sdi1) protects against oxygen-induced toxicity. *Tox. Sci.* 63(2):214-222.
- 27- Inguaggiato, P., Gonzalez-Michaca, L., Croatt, A.J., Haggard, J.J., Alam, J., Nath, K.A. (2001) Cellular overexpression of heme oxygenase-1 up-regulates p21 and confers resistance to apoptosis. *Kidney International.* 60(6):2181-2191.
- 28- Jover, R., Bort, R., Gomez-Lechon, M.J., Castell, J.V. (2001) Cytochrome P450 regulation by hepatocyte nuclear factor 4 in human hepatocytes: A study using adenovirus-mediated antisense targeting. *Hepatology.* 33(3):668-675.
- 29- Kenny, M.K., Mendez, F., Sandigursky, M., Kureekattil, R.P., Goldman, J.D., Franklin, W.A., Bases, R. (2001) Heat shock protein 70 binds to human apurinic/apyrimidinic endonuclease and stimulates endonuclease activity at abasic sites. *J. Biol. Chem.* 276(12):9532-9536.
- 30- Klein, S.D., Brune, B. (2002) Heat-shock protein 70 attenuates nitric oxide-induced apoptosis in RAW macrophages by preventing cytochrome c release. *Biochem. Journal.* 362(3):635-641.
- 31- Krieser, R.J., Eastman, A. (1998) The Cloning and Expression of Human Deoxyribonuclease II - a Possible Role in Apoptosis. *J. Biol. Chem.* 273(47):30909-30914.

- 32- Krippner-Heidenreich, A., Talanian, R.V., Sekul, R., Kraft, R., Thole, H., Ottleben, H., Luscher, B. (2001) Targeting of the transcription factor Max during apoptosis: phosphorylation-regulated cleavage by caspase-5 at an unusual glutamic acid residue in position P1. *Biochem. Journal.* 358(3):705-715.
- 33- Li, B.Q., Lee, M.Y.W. (2001) Transcriptional regulation of the human DNA polymerase delta catalytic subunit gene POLD1 by p53 tumor suppressor and Sp1. *J. Biol. Chem.* 276(32):29729-29739.
- 34- Liang, P., and Pardee, A.B., (1992). Differential display of eukaryotic messenger RNA by means of polymerase chain reaction. *Science* 257:967-971.
- 35- Luo, Z.H., Hines, R.N. (2001) Regulation of flavin-containing monooxygenase 1 expression by Ying Yang 1 and hepatic nuclear factors 1 and 4. *Mol. Pharma.* 60(6):1421-1430.
- 36- Masutani, H., Ueno, M., Ueda, S., Yodoi, J. (2000) Role of Thioredoxin and Redox Regulation in Oxidative stress Response and Signalling. *Antioxidant and Redox Regulation of Genes.* Sen, CK., Sies, H., Baerle, PA. eds. Academic Press, California.
- 37- Mcconkey, D.J., Orrenius, S. (1996) Signal Transduction Pathways in Apoptosis. *Stem Cells.* 14(6):619-631.
- 38- Meister, A., Anderson, M.E. (1983) Glutathione. *Ann. Rev. Biochem.* 52:711-760.
- 39- Meyer, M., Pahl, H.L., Baeuerle, P.A. (1994) Regulation of the Transcription Factors NF-Kappa-B and AP-1 by Redox Changes. *Chemico-Biological Interactions.* 91(2-3):91-100.
- 40- Morgan, K.T., Ni, H., Brown, H.R., Yoon, L., Qualls, C.W., Crosby, L.M., Reynolds, R., Gaskill, B., Anderson, S.P., Kepler, T.B., Brainard, T., Liv, N., Easton, M., Merrill, C., Creech, D., Sprenger, D., Conner, G., Johnson, P.R., Fox, T.R., Tyler, R.D., Sartor, M., Richard, E.B., Kuruvilla, S., Casey, W., Benavides, G. (2002) Mechanism of Action Combined with cDNA Microarray Technology to Select Genes for a Real-Time RT-PCR-Based Screen for Oxidative Stress in HepG2 Cells. *Toxicologic Pathology* 30: in press.

- 41- Oguro, T., Hayashi, M., Numazawa, S., Asakawa, K., Yoshida, T. (1996) Heme Oxygenase-1 Gene Expression by a Glutathione Depletor, Phorone, Mediated Through AP-1 Activation in Rats. *Biochem. & Biophys. Res. Comm.* 221(2):259-265.
- 42- O'Reilly, M.A., Staversky, R.J., Watkins, R.H., Reed, C.K., Jensen, K.L.D., Finkelstein, J.N., Keng, P.C. (2001) The cyclin-dependent kinase inhibitor p21 protects the lung from oxidative stress. *Amer. J. Resp. Cell & Mol. Biol.* 24(6):703-710.
- 43- Oshiro, M.M., Landowski, T.H., Catlett-Falcone, R., Hazlehurst, L.A., Huang, M., Jove, R., Dalton, W.S. (2001) Inhibition of JAK kinase activity enhances Fas-mediated apoptosis but reduces cytotoxic activity of topoisomerase II inhibitors in U266 myeloma cells. *Clin. Cancer Res.* 7(12):4262-4271.
- 44- Poss, K.D., Tonegawa, S. (1997) Reduced Stress Defense in Heme Oxygenase 1-Deficient Cells. *Proc. Nat. Acad. Sci. USA*, 94(20):10925-10930.
- 45- Prem Veer Reddy, G. (1999) Regulation of DNA Replication and S Phase. *The Molecular Basis of Cell Cycle and Growth Control*. Stein, G.S., Baserga, R., Giordano, A., Denhardt, D. (eds). Wiley-Liss, Inc., New York.
- 46- Puri, P.L., MacLachlan, T.K., Levrero, M. and Giordano, A. (1999) The Intrinsic Cell Cycle: From Yeast to Mammals. *The Molecular Basis of Cell Cycle and Growth Control*. Stein, G.S., Baserga, R., Giordano, A., Denhardt, D. (eds). Wiley-Liss, Inc., New York.
- 47- Rahman, I., MacNee, W. (2000) Regulation of redox glutathione levels and gene transcription in lung inflammation: Therapeutic approaches. *Free Rad. Biol. & Med.* 28(9):1405-1420.
- 48- Richter, C., Schweizer, M. (1997) Oxidative Stress in Mitochondria. *Oxidative Stress and the Molecular Biology of Antioxidant Defenses*. Scandalios, J.G. ed. Cold Spring Harbor Laboratory Press, New York.
- 49- Russo, T., Zambrano, N., Esposito, F., Ammendola, R., Cimino, F., Fiscella, M., Jackman, J., O'Connor, P.M., Anderson, C.W., Appella, E. (1995) A p53-Independent

Pathway for Activation of Waf1/Cip1 Expression Following Oxidative Stress. *J. Biol. Chem.* 270(49):29386-29391.

50- Scandalios, J.G., ed. (1997) *Oxidative Stress and the Molecular Biology of Antioxidant Defenses*. Cold Spring Harbor Laboratory Press, New York.

51- Schonthal, A.H., Mueller, S., and Cadenas, E. (2000) Redox Regulation of p21, Role of Reactive Oxygen and Nitrogen Species in Cell Cycle Progression. *Antioxidant and Redox Regulation of Genes*. Sen, CK., Sies, H., Baerle, PA. (eds). Academic Press, California.

52- Schroeder, C.P., Godwin, A.K., O'Dwyer, P.J., Tew, K.D., Hamilton, T.C., and Ozols, R.F. (1996) Glutathione and Drug Resistance. *Cancer Invest.* 14:158-168.

53- Sen, CK., Sies, H., Baerle, PA. eds. (2000) *Antioxidant and Redox Regulation of Genes*. Academic Press, California.

54- Sen, C.K. (2000) Oxidants and Antioxidants in Apoptosis: Role of Bcl-2. *Antioxidant and Redox Regulation of Genes*. Sen, CK., Sies, H., Baerle, PA. (eds). Academic Press, California.

55- Shackelford, R.E., Kaufmann, W.K., Paules, R.S. (1999) Cell cycle control, checkpoint mechanisms, and genotoxic stress. *Environ. Health Perspectives.* 107(1):5-24.

56- Shindo, M., Nakano, H., Kuroyanagi, H., Shirasawa, T., Mihara, M., Gilbert, D.J., Jenkins, N.A., Copeland, N.G., Yagita, H., Okumura, K. (1998) cDNA Cloning, Expression, Subcellular Localization, and Chromosomal Assignment of Mammalian Aurora Homologues, Aurora-Related Kinase (ARK) 1 and 2. *Biochem. & Biophys. Res. Comm.* 244(1):285-292.

57- Starke, D.W., Chen, Y.G., Bapna, C.P., Lesnefsky, E.J., Mielal, J.J. (1997) Sensitivity of Protein Sulfhydryl Repair Enzymes to Oxidative Stress. *Free Rad. Biol. & Med.* 23(3):373-384.

- 58- Starke, R.P., Oliver, C.N. (1989) Protein Oxidation and Proteolysis during Aging and Oxidative Stress. *Arch. Biochem. Biophys.* 275:559-567.
- 59- Ueno, M., Masutani, H., Arai, R.J., Yamauchi, A., Hirota, K., Sakai, T., Inamoto, T., Yamaoka, Y., Yodoi, J., Nikaido, T. (1999) Thioredoxin-dependent redox regulation of p53-mediated p21 activation. *J. Biol. Chem.* 274(50):35809-35815.
- 60- Vastrik, I., Kaipainen, A., Penttila, T.L., Lymboussakis, A., Alitalo, R., Parvinen, M., Alitalo, K. (1995) Expression of the *mad* Gene During Cell Differentiation *in vivo* and its Inhibition of Cell Growth *in vitro*. *J. Cell Biol.* 128(6):1197-1208.
- 61- Velculescu, V.E., Zhang, L., Vogelstein, B., Kinzler, K.W. (1995). Serial analysis of gene expression. *Science* 270:484-487.
- 62- Villman, K., Stahl, E., Liljegren, G., Tidefelt, U., Karlsson, M.G. (2002) Topoisomerase II- α expression in different cell cycle phases in fresh human breast carcinomas. *Modern Pathology.* 15(5):486-491.
- 63- Wallace, S. (1997) Oxidative Damage to DNA and its Repair. *Oxidative Stress and the Molecular Biology of Antioxidant Defenses*. Scandalios, J.G. (ed). Cold Spring Harbor Laboratory Press, New York.
- 64- Wu, M.X., Ao, Z.H., Prasad, K.V.S., Wu, R.L., Schlossman, S.F. (1998) IEX-1L, an Apoptosis Inhibitor Involved in NF-Kappa-B-Mediated Cell Survival. *Science*. 281(5379):998-1001.
- 65- Zeng, X.R., Hao, H.L., Jiang, Y.Q., Lee, M.Y.W.T. (1994) Regulation of Human DNA Polymerase Delta During the Cell Cycle. *J. Biol. Chem.* 269(39):24027-24033.
- 66- Zhang, H., Fan, S.J., Prochownik, E.V. (1997) Distinct Roles for MAX Protein Isoforms in Proliferation and Apoptosis. *J. Biol. Chem.* 272(28):17416-17424.
- 67- Zhou, L.Z.H., Johnson, A.P., Rando, T.A. (2001) Nf-kappa-b and AP-1 mediate transcriptional responses to oxidative stress in skeletal muscle cells. *Free Rad. Biol. & Med.* 31(11):1405-1416.

Appendix

Appendix.
Clontech™ Microarray Intensity Data

Protein/gene	Intensity – Control Cultures										
	15 min.	30 min.	1 Hour	2 Hour	4 Hour	6 Hour	8 hours	12 Hour	16 Hour	20 Hour	24 Hour
Von Hippel-Lindau tumor suppressor protein	409	136	202	318	184	224	193	347	199	235	322
cadherin1 (CDH1)	4	5	0	2	0	4	0	4	0	1	2
LUCA2	452	418	143	178	221	241	295	416	248	105	145
N-myc proto-oncogene	30	21	15	13	18	13	15	24	17	9	13
B-raf proto-oncogene (RAF1)	64	16	22	35	39	26	25	29	38	20	29
vascular endothelial growth factor receptor 1	186	115	25	57	36	84	104	58	28	15	20
transforming protein rhoA	10976	4950	4592	5933	5528	7679	4453	6930	6822	2524	1739
G2/mitotic-specific cyclin A	1027	240	543	867	859	507	415	612	767	378	444
BUBR1 protein kinase	212	21	91	154	176	76	124	146	153	83	81
wee1Hu CDK tyrosine 15-kinase	61	14	48	63	58	26	21	14	33	33	35
aurora-related kinase 1 (ARK1)	419	135	202	273	269	179	273	397	259	129	114
CDC25B; CDC25HU2	220	194	78	92	123	75	184	165	105	79	46
transmembrane 4 superfamily protein; SAS	491	385	116	187	180	288	344	279	133	87	90
calcium-activated potassium channel beta subunit	16	18	7	10	5	8	10	44	3	3	35
mothers against dpp homolog 4 (SMAD4)	148	29	66	102	89	81	95	177	105	76	111
ras-related protein RAP-1A	450	227	1348	652	392	251	241	247	184	803	1152
LUCA15 putative tumor suppressor	53	21	23	36	45	31	33	57	35	24	18
erythroblastosis virus oncogene homolog 1	11	22	4	23	4	19	15	6	11	2	3
pim-1 proto-oncogene	189	125	89	125	89	47	59	82	68	24	11
tyrosine-protein kinase receptor tyro3 precursor	230	204	143	242	155	158	168	200	160	145	163
transforming protein p21/K-ras 2B	319	84	170	263	224	209	172	201	213	153	194
G2/mitotic-specific cyclin B1 (CCNB1)	2824	984	1379	1878	2021	1391	1468	1815	1809	890	1159
cell division control protein 2 homolog (CDC2)	1653	322	539	700	957	601	952	1098	1100	174	71
DNA-binding protein inhibitor ID-1; Id-1H	2139	1566	1314	1633	1334	1623	769	1731	1477	743	930
ARK2	337	212	121	172	214	202	256	352	210	94	79
CDC25C; M-phase inducer phosphatase 3	365	125	166	228	182	163	149	266	184	79	83
C-1	1135	459	665	968	626	609	718	974	767	429	539
Gprotein-activated inward rect. potassium chan. 1	6	11	5	15	3	4	4	35	3	4	5
adenomatous polyposis coli protein	93	16	58	82	60	29	42	67	58	41	58
EB1 protein	1506	481	754	1048	848	494	683	1179	763	597	351
neogenin	18	17	15	21	11	18	10	26	17	15	16
MAD protein; MAX dimerizer	24	12	10	22	17	9	26	31	11	9	5
c-raf proto-oncogene	391	124	159	178	231	200	166	308	204	95	80
c-ros-1 tyrosine-protein kinase proto-oncogene	249	233	26	40	25	75	122	34	25	20	18
N-ras; transforming p21 protein	639	142	397	559	400	318	243	449	342	292	393
G1/S-specific cyclin D1 (CCND1)	811	346	374	468	588	672	412	655	501	195	285
cyclin-dependent protein kinase 2 (CDK2)	258	106	130	150	162	198	100	167	114	84	169
cell division protein kinase 9 (CDK9)	330	199	110	126	217	152	195	316	190	50	47
cyclin-dependent kinase 4 inhibitor B (CDKN2B)	9	7	3	14	6	2	9	4	4	6	1
prothymosin alpha (ProT-alpha; PTMA)	7337	3268	5346	4950	5199	2208	3093	4938	4120	2196	3562
cyclin-D binding Myb-like protein (hDMP1)	75	12	48	54	34	28	35	40	34	41	39
G protein-activated inward rect. potassium chan.	4	10	2	3	0	4	5	4	2	1	1
breast cancer type 2 susceptibility protein	175	89	47	71	67	50	64	52	46	33	47
ezrin; cytovillin 2; villin 2 (VIL2)	1802	973	405	659	1047	474	1264	1610	1001	204	111
transforming growth factor-beta signaling protein 1	129	51	85	116	78	78	60	121	87	64	92
jun-D	51	64	16	38	36	25	60	70	23	30	12
A-raf proto-oncogene serine/threonine kinase	32	38	12	19	15	17	43	25	18	8	4
proto-oncogene tyrosine-protein kinase abl	280	151	100	122	198	112	145	251	141	48	26
C-cbl proto-oncogene	16	10	4	6	8	5	5	13	6	3	5
G1/S-specific cyclin D2 (CCND2) + KIAK0002	6	8	2	5	19	5	20	6	11	2	2
cell division protein kinase 4	2205	1487	532	732	1440	1688	1217	2424	1174	193	161
stem cell tyrosine kinase 1 (STK1)	34	30	7	13	5	19	29	14	9	5	5
cyclin-dependent kinase 4 inhibitor	44	50	5	27	21	16	9	16	13	5	4
DNA-binding protein inhibitor ID-1; Id-1H	898	980	532	622	567	234	634	970	505	300	271
water channel aquaporin 3 (AQP3)	7	10	1	1	11	4	8	3	2	1	2
ASIC3 proton gated cation channel	15	17	1	3	3	4	6	4	3	2	1
tumor suppressor protein DCC precursor	19	38	25	30	13	5	8	25	12	4	7
transforming growth factor-beta 3 (TGF-beta3)	14	14	7	17	7	8	11	7	5	8	2
p78 putative serine/threonine-protein kinase	129	42	58	75	56	56	50	95	54	51	49
B-myb	839	869	409	557	416	425	577	846	429	300	218
tyrosine-protein kinase receptor UFO precursor	17	19	11	16	7	12	6	17	8	7	11
tyrosine-protein kinase ABL2	83	32	48	51	48	40	55	75	40	25	27
INT-2 proto-oncogene protein precursor	11	19	9	16	9	5	26	19	16	3	2
G1/S-specific cyclin D3 (CCND3)	12	19	5	7	14	3	14	6	4	4	2
cell division protein kinase 6 (CDK6)	1328	1353	540	644	633	531	743	862	489	324	240
serine/threonine-protein kinase KIALRE	14	11	1	6	13	12	21	17	14	2	1

cyclin-dependent kinase 4 inhibitor D (CDKN2D)	192	106	77	116	86	111	116	177	124	48	28
transcription factor DP2 (Humdp2)	146	104	68	156	126	104	99	166	109	95	43
sulfate transporter; diastrophic dysplasia protein	27	6	15	22	24	13	12	45	28	13	6
Gprotein-activated inward rect. potassium chan. 3	4	8	1	1	5	2	11	3	3	0	1
p53-associated mdm2 protein	549	103	167	235	361	156	307	417	288	142	138
(TGF beta receptor III; TGFBR3)	719	163	296	385	301	299	308	715	498	287	373
C-maf transcription factor	12	12	5	6	3	6	9	7	2	6	3
fos-related antigen 2 (FRA2)	10	14	5	11	11	2	15	4	6	4	3
(CSF-1-R)	114	98	20	40	37	19	61	114	75	10	17
C-src proto-oncogene (SRC1)	284	201	137	198	185	227	425	594	219	72	62
mas proto-oncogene	6	9	4	4	4	2	12	6	3	2	2
G1/S-specific cyclin E (CCNE)	419	192	108	127	225	162	218	332	170	36	13
cell division protein kinase 5 (CDK5)	401	324	198	217	213	264	189	461	255	82	83
CDC2-related protein kinase CHED	209	74	98	139	113	110	98	163	130	90	97
cyclin-dependent kinase inhibitor 1C	10	9	1	3	5	1	7	2	2	4	0
helix-loop-helix protein HLH 1R21	135	184	49	72	78	35	221	222	94	22	10
erythrocyte glucose transporter 1 (GLUT1)	207	128	205	181	136	99	95	223	132	257	360
ATP-sensitive inward rect. potassium chan. 8	4	14	3	4	5	1	4	4	3	3	0
neurofibromatosis protein type 1 (NF1)	68	17	39	45	37	25	34	73	38	33	46
prohibitin (PHB)	322	191	129	137	232	123	258	358	157	62	46
elk-1; ets-related proto-oncogene	27	26	15	20	13	11	15	24	15	12	5
fos-related antigen (FRA1)	82	51	55	61	81	36	62	96	60	29	30
c-kit proto-oncogene	4	7	6	3	9	1	3	6	3	0	1
C-yes proto-oncogene (YES1)	331	64	116	141	209	130	188	365	232	53	70
thrombopoietin receptor precursor (TPOR)	2	9	3	3	4	0	9	2	3	0	1
G2/mitotic-specific cyclin G1	252	53	159	148	176	96	126	247	143	113	147
protein serine/threonine kinase STK1	92	163	50	97	52	129	126	184	99	30	24
p35 cyclin-like CAK1-associated protein	223	69	155	191	124	87	127	194	122	131	119
cyclin-dependent kinase inhibitor 1 (CDKN1A)	273	214	151	122	146	127	124	168	100	98	98
40S ribosomal protein S19 (RPS19)	32891	17362	8675	8664	14755	6030	14364	20977	12014	2517	761
liver glucose transporter 2	101	13	51	54	51	29	46	84	47	23	26
calcium-activated potassium channel HSK1	5	12	4	14	5	5	7	12	8	6	2
moesin-ezrin-radixin-like protein (MERLIN)	362	174	104	125	190	233	168	298	181	37	26
tight junction protein zonula occludens (ZO-1)	43	15	12	29	31	19	35	42	23	14	17
A-myb proto-oncogene; myb-related protein A	276	194	42	57	37	92	102	54	42	33	30
v-erbA related protein (EAR2)	490	407	222	335	290	289	323	524	297	179	116
met proto-oncogene	44	14	15	33	35	22	8	45	38	20	29
C-fes proto-oncogene	25	26	9	16	18	14	30	34	15	3	4
cell surface glycoprotein MUC18	31	18	15	24	16	23	24	52	16	8	11
cyclin H (CCNH); MO15-associated protein	897	191	517	656	545	390	433	888	514	308	513
extracellular signal-regulated kinase 1	134	147	80	73	65	81	95	123	65	59	44
cyclin G-associated kinase (GAK)	144	146	65	87	71	95	109	176	78	50	46
cyclin-dependent kinase inhibitor 3 (CDKN3)	365	99	317	362	197	165	96	284	211	176	202
bullous pemphigoid antigen 1	58	19	44	68	38	20	30	51	27	21	14
brain glucose transporter 3 (GTR3)	2249	676	1894	1686	951	1248	708	1898	1362	1520	1927
chloride conductance regulatory protein ICLN	587	226	431	460	360	305	333	656	362	336	401
retinoblastoma-like protein 2	88	16	23	37	38	23	59	76	45	30	23
nucleoside diphosphate kinase B	4661	2903	2614	3650	3649	3139	3826	5823	3248	2183	2794
c-fos proto-oncogene; G0S7 protein	3	5	4	3	13	5	11	9	18	1	2
ets-related protein tel	17	13	7	10	8	5	7	17	10	8	8
ret proto-oncogene	3	6	3	5	4	0	5	4	0	0	0
C-fgr proto-oncogene (p55-FGR); SRC2	56	29	24	28	9	11	86	65	31	6	2
insulin-like growth factor binding protein 2	6201	2717	3549	4268	2330	945	2160	4476	2666	1316	1944
fte-1	5586	1210	2990	2913	2668	1666	3953	4990	2938	2471	3291
extracellular signal-regulated kinase 2	503	200	328	366	272	290	220	564	275	234	226
serine/threonine-protein kinase NEK3	90	36	38	62	53	48	45	102	57	30	24
ubiquitin-conjugating enzyme E2 H10	1475	1030	641	780	819	908	664	1383	805	300	165
proliferating cell nucleolar antigen P120	306	195	107	144	176	190	151	271	158	47	49
E16 amino acid transporter	579	659	280	341	565	245	459	849	470	215	202
HUKIV	17	22	8	2	4	6	10	8	3	2	2
p53 cellular tumor antigen	17	7	4	16	28	12	12	16	15	8	6
nucleoside diphosphate kinase A (NDKA)	2532	1678	1120	1803	2322	1658	2373	3337	1861	889	1078
transcription factor AP-1	268	147	415	518	239	158	151	359	169	148	280
triiodothyronine receptor	16	11	4	5	4	4	10	8	3	2	3
epidermal growth factor receptor (EGFR)	46	14	26	26	30	14	18	36	42	28	40
shb proto-oncogene	409	186	208	228	242	209	169	365	211	82	174
T-lymphoma invasion and metastasis inducing	23	19	6	7	8	6	14	12	4	5	6
Cl man-6-P receptor	423	273	197	246	297	207	373	601	271	195	150
extracellular signal-regulated kinase 3	436	119	236	240	315	251	246	534	255	142	251
CDC-like kinase 2 (CLK2)	50	24	17	29	18	31	20	61	17	29	24
geminin	463	146	242	274	240	163	285	473	191	133	157
NuMA	22	17	9	9	8	12	11	14	6	8	5

aquaporin 4	213	371	182	209	268	285	647	730	283	51	27
voltage-gated potassium channel protein KV11	44	50	46	67	9	19	37	36	29	14	19
retinoblastoma-associated protein	96	27	57	95	79	41	58	112	79	63	78
TSG101 tumor susceptibility protein	57	17	43	55	68	42	36	87	55	29	31
myb proto-oncogene; c-myb	248	146	45	56	33	66	76	57	30	25	31
v-erbA related protein (EAR3)	411	234	280	305	210	164	216	393	247	182	242
ERBB2 receptor protein-tyrosine kinase	205	146	56	66	88	70	133	203	108	58	56
ski oncogene	672	582	395	563	437	527	205	566	438	293	412
matrix metalloproteinase 11	365	387	120	152	133	165	284	352	142	39	32
cyclin A1 (CCNA1)	7	8	11	18	5	10	14	27	12	3	7
extracellular signal-regulated kinase 4	9	3	8	6	2	3	4	14	1	2	3
CDC-like kinase 3 (CLK3)	350	200	162	250	156	188	125	318	229	142	59
katanin p80 subunit	46	88	20	21	17	20	24	16	18	18	10
myeloid cell nuclear differentiation antigen	2	3	3	4	3	2	9	4	2	2	1
aquaporin 9	5	5	4	4	2	5	11	6	2	2	2
voltage-gated potassium channel protein KV14	10	5	3	3	23	2	27	5	3	0	4
Wilms' tumor protein (WT33; WT1)	21	13	14	30	24	22	11	27	19	14	18
maguk p55 subfamily member 2	68	13	26	110	3	5	8	5	3	4	1
c-myc oncogene	3822	2313	2782	3855	2548	1629	1522	3650	3044	1348	2206
ETS oncogene (PEP1)	46	86	20	43	35	26	126	99	61	22	15
epidermal growth factor receptor	828	422	545	617	466	426	455	720	472	511	524
snoN oncogene	264	46	165	225	218	119	108	196	139	71	66
cyclin T CDK9-associated	148	19	89	131	109	59	79	124	97	92	95
cyclin G2 (CCNG2)	12	6	6	7	3	5	9	10	13	9	6
ERK5	78	47	23	45	59	38	83	103	57	37	30
serum-inducible kinase (SNK)	50	18	19	25	47	13	30	51	26	14	14
diaphanous 1 (HDIA1)	509	174	295	301	244	248	191	358	243	176	170
transducer of erbB2 (TOB)	450	286	351	371	410	91	164	566	417	231	285
cationic amino acid transporter 3	7	14	3	2	3	1	6	2	2	1	0
N-type calcium channel alpha-1B subunit	29	36	3	2	1	8	14	5	0	3	1
putative protein-tyrosine phosphatase	284	55	123	183	149	116	94	277	184	117	169
tumor suppressor maspin	3	9	2	3	3	0	3	3	2	1	0
c-rel proto-oncogene protein	66	17	41	49	49	33	31	77	49	22	29
cot proto-oncogene	6	8	5	12	3	7	5	4	8	3	2
ERBB4 receptor protein-tyrosine kinase	1	6	7	7	0	1	6	2	0	2	0
CBL-B	155	54	78	96	71	79	96	168	121	33	29
cyclin K	308	129	185	215	173	148	157	280	200	129	135
bub1 mitotic checkpoint kinase	575	109	312	355	268	187	230	576	326	218	213
cdc2-related protein kinase PISSLRE	19	19	11	10	6	3	14	6	4	4	4
cyclin-dependent kinase regulatory subunit 1	1002	449	826	945	653	521	541	1145	651	483	438
sprouty 2 (SPRY2)	30	21	19	28	17	18	26	41	23	15	29
p55CDC	1823	1287	838	668	1024	849	1059	1823	889	366	166
putative renal organic anion transporter 1	5	7	3	3	4	3	12	4	1	2	2
CAB3A/CAB3B	3	7	2	3	0	2	3	4	2	1	0
colorectal mutant cancer protein (MCC)	5	10	1	7	1	3	2	1	1	1	1
tumor suppressor LUCA1	242	198	150	166	199	158	114	187	120	116	135
L-myc proto-oncogene (MYCL1)	1	4	1	3	2	1	6	1	2	1	1
C-mos proto-oncogene kinase	2	3	0	3	7	1	7	3	1	2	0
platelet-derived growth factor receptor alpha subunit	2	1	1	4	1	1	0	4	2	0	0
H-ras proto-oncogene; transforming G protein	99	78	37	39	74	27	59	89	43	15	9
cyclin E2	62	13	46	46	45	25	12	58	36	14	17
serine/threonine-protein kinase NEK2	116	11	58	71	59	39	48	103	69	44	46
CDC-like kinase 1 (CLK1)	352	83	291	511	250	292	208	554	375	397	441
cyclin-dependent kinase regulatory subunit	957	365	533	663	742	627	743	1446	803	373	311
cell division cycle protein 25A (CDC25A)	946	375	556	594	611	665	435	977	519	235	118
RCL growth-related c-myc-responsive gene	520	590	288	291	268	211	298	487	253	282	242
erythrocyte urea transporter	4	6	6	8	2	4	3	7	1	1	2
CACNA1G	21	27	3	6	1	6	12	6	1	0	5
kidney glomeruli chloride channel; CIC-5	217	47	106	162	102	91	90	210	144	108	103
monocarboxylate transporter 1 (MCT1)	1948	614	1166	1745	1057	885	774	1525	1159	1326	1282
zinc transporter 4	6	3	0	4	2	1	2	3	0	1	1
MSP receptor	5	12	2	5	1	1	10	6	2	2	0
U-PAR	932	690	460	576	538	530	403	1016	548	247	221
related to receptor tyrosine kinase (RYK)	352	250	115	150	135	108	212	168	103	89	73
proto-oncogene tyrosine-protein kinase lck	7	7	2	4	3	3	4	3	2	2	1
glycogen synthase kinase 3 beta	92	32	70	92	86	50	42	78	80	48	49
MAPKK 6	142	67	52	69	61	61	66	125	72	36	40
PRKAR2A	121	55	52	66	85	65	110	142	96	39	29
lipid-activated protein kinase PRK1	158	199	71	86	120	72	181	232	113	64	34
serine/threonine-protein kinase PAK-beta	4	9	1	2	4	5	11	3	1	3	1
phospholipase C-delta-1	10	18	6	5	10	4	14	9	2	2	1

ADP-ribosylation factor 1	157	144	132	100	202	58	100	135	99	58	36
cardiac muscle sodium channel alpha subunit	5	7	3	4	0	1	5	5	3	4	1
sodium/hydrogen exchanger 1	81	27	45	63	46	62	42	108	50	35	42
Golgi 4-transmembrane spanning transporter	632	342	384	481	458	411	384	809	491	324	358
autocrine motility factor receptor	32	20	9	18	24	19	29	28	12	10	7
vascular endothelial gf receptor 2 precursor	4	5	4	3	2	2	5	6	3	2	2
protein-tyrosine kinase transmembrane rec. ror1	6	7	3	5	1	1	7	4	1	3	2
tyrosine-protein kinase lyn	248	183	120	165	182	197	223	398	203	48	36
pyruvate dehydrogenase kinase precursor	223	44	102	108	85	110	82	306	214	216	289
MAPK/ERK kinase kinase 3	144	158	31	59	71	91	190	223	114	23	19
Janus kinase 1 (JAK1)	357	104	184	225	243	152	159	292	256	76	48
(SGK)	254	276	54	69	57	74	134	57	29	32	26
myotonic dystrophy protein kinase-like protein	4	6	0	2	0	1	0	5	3	1	0
P3-kinase catalytic subunit delta isoform	58	50	36	26	20	19	26	31	20	18	20
ras-related protein RAP-1B	603	156	507	534	367	327	221	589	412	288	377
KCNQ3 potassium channel	2	6	1	1	3	1	3	0	0	1	0
sodium/hydrogen exchanger 3	12	5	3	2	4	3	5	4	1	0	1
organic cation transporter 1	221	173	18	26	29	40	85	29	14	14	14
colon carcinoma kinase 4 precursor	182	214	64	97	82	77	120	152	86	98	76
angiopoietin 1 receptor precursor	29	80	19	58	13	65	44	42	48	7	7
neurotrophic tyrosine kinase receptor-related 3	10	7	12	14	6	8	8	9	12	4	8
integrin-linked kinase (ILK)	145	78	37	60	153	112	117	168	89	13	8
ribosomal protein kinase B (RSKB)	6	11	4	4	5	3	5	7	4	4	0
protein kinase C alpha polypeptide	303	119	151	209	157	129	111	233	168	124	105
janus kinase 3	385	223	2757	2714	587	241	1221	713	325	844	688
serine/threonine-protein kinase NRK2	315	84	201	235	187	166	138	308	215	171	191
ribosomal protein S6 kinase II alpha 1	182	231	166	218	135	145	111	247	170	110	114
(PI3-kinase p85-beta subunit	246	222	101	104	139	92	149	305	127	64	31
ras-related protein RAB2	733	312	620	706	500	397	378	777	505	455	385
voltage-gated potassium channel	5	5	0	1	1	2	2	1	0	0	0
small intestine oligopeptide transporter	506	24	76	7	6	10	8	7	7	4	3
apolipoprotein E precursor (APOE)	15805	12334	5469	5198	9688	5432	10411	13091	7818	3509	1835
activation B7-2 antigen	3	8	2	3	4	4	7	4	3	1	1
p68-trk-T3 oncoprotein	165	169	26	30	25	48	75	32	19	15	12
tyrosine kinase receptor tie-1 precursor	5	5	2	1	8	3	2	4	0	1	2
AF-1P protein	138	26	101	98	89	61	60	115	79	75	97
tyrosine-protein kinase ack	152	147	71	75	101	67	145	169	83	32	34
protein kinase C beta I (PKC-beta-1)	15	11	5	8	5	4	4	8	6	1	4
c-jun N-terminal kinase 1 (JNK1); JNK46	121	23	68	93	69	54	42	116	81	62	61
protein kinase MLK-3; sprk	1576	1550	864	933	943	1022	676	1943	1005	632	605
ribosomal protein S6 kinase II alpha 2	29	45	8	11	1	8	20	11	6	3	6
PTDINS(4)P-5-kinase	196	92	123	123	123	123	140	267	139	85	97
ras-related protein RAB3B	17	33	9	15	7	13	11	28	12	9	6
GLYT-1	31	40	14	21	14	19	25	44	19	23	32
high-affinity glutamate transporter	8	14	5	3	3	4	5	8	5	0	1
cholesteryl ester transfer protein precursor	10	8	4	4	6	3	3	5	2	0	0
CC chemokine receptor type 1	115	91	17	21	25	39	44	27	14	10	14
brain-derived neurotrophic factor	6	6	5	2	0	1	0	1	0	1	0
epithelial discoidin domain receptor 1 precursor	311	231	137	155	173	119	253	368	206	80	46
CDC25	22	24	9	16	9	12	24	28	20	5	4
tyk2 non-receptor protein tyrosine kinase	48	60	37	43	116	40	46	50	42	23	17
protein kinase C delta (NPKC-delta)	108	72	64	67	63	72	70	118	64	65	46
c-jun N-terminal kinase 2 (JNK2); JNK55	296	103	138	160	216	164	132	245	173	85	95
tyrosine kinase tnk1	67	62	43	49	29	36	37	65	30	22	12
ribosomal protein S6 kinase II alpha 3	1812	325	1116	1279	931	854	719	1935	1071	856	1029
phospholipase C (PLCL)	3	8	3	16	1	1	5	3	0	1	2
ras-related protein RAB4A	222	109	128	113	110	100	122	214	101	81	70
DA transporter (DAT)	5	6	2	2	0	1	0	3	1	0	0
ATP2B2; calcium pump;	6	12	2	3	0	1	7	1	2	1	0
lecithin-cholesterol acyltransferase (LCAT)	302	205	97	132	182	136	221	433	191	72	52
thrombin receptor (TR); F2R; PAR1	135	24	63	82	85	86	58	154	95	40	50
NT-3 growth factor receptor precursor	2	3	3	2	0	1	3	2	3	0	0
LTK	10	7	4	4	4	6	12	9	4	4	3
NCK melanoma cytoplasmic src homolog	105	26	56	90	69	49	48	86	77	68	67
MAPKAP kinase (3pK)	118	151	94	133	92	113	53	125	74	68	64
protein kinase C epsilon type (NPKC-epsilon)	7	6	4	4	2	5	12	43	4	4	17
C-jun N-terminal kinase 3 alpha2	1	4	1	3	5	0	8	1	0	1	0
serine kinase	1084	231	785	947	701	589	398	858	713	619	650
kinase suppressor of ras-1 (KSR1)	14	19	18	11	11	13	9	16	7	13	10
Gem; induced immediate early protein	0	7	2	5	0	2	5	3	5	1	1
ras-related protein RAB5A	489	108	333	303	219	202	169	380	242	132	103
sodium-&chloride-dependent GABA transporter 3	376	228	153	206	290	339	258	607	313	69	58

copper-transporting ATPase 2	78	17	21	28	79	50	87	141	60	19	20
vesicular acetylcholine transporter	7	12	1	4	6	3	13	12	6	2	2
ephrin type-B receptor 2 precursor	9	3	5	4	1	0	10	3	0	1	2
G protein-coupled receptor kinase GRK5	22	19	8	10	8	10	12	20	6	7	10
G-protein-coupled receptor HM74	6	7	7	2	9	3	2	4	3	2	2
Ink adaptor protein	46	25	35	40	35	28	23	35	21	23	29
mitogen-activated protein kinase p38	749	253	404	486	412	411	270	646	388	179	159
protein kinase C eta type	9	6	2	1	4	3	4	3	2	0	0
focal adhesion kinase (FADK)	148	41	62	69	103	55	67	146	82	50	42
CAMKI	349	318	135	165	85	158	137	147	100	126	126
ephrin A3 precursor	8	11	11	10	5	2	28	15	14	9	3
Ral A; GTP-binding protein	480	267	206	193	187	199	233	319	181	119	134
ras-related protein RAB6	351	130	266	285	287	265	173	423	253	172	151
sodium-dependent serotonin transporter	84	53	33	54	49	44	59	156	61	30	26
Na/K-transporting ATPase beta 3 subunit	208	96	139	184	120	115	97	175	113	108	122
T4-binding globulin	260	63	132	179	138	87	89	212	172	131	169
tyrosine kinase receptor HEK	3	9	3	4	3	2	5	0	0	2	1
transferrin receptor (TFRC)	2432	469	1315	1719	1663	1189	953	2532	1748	659	905
R-PTP-gamma	494	112	281	338	244	192	189	443	320	216	317
putative src-like adapter protein (SLAP)	4	9	0	2	0	1	6	5	1	0	0
LIM domain kinase 1 (LIMK-1)	183	136	109	116	90	107	59	139	91	57	21
protein kinase C gamma type	8	10	5	5	4	3	2	5	1	1	2
PTDINS-3-kinase P85-alpha	95	19	64	67	73	39	37	99	73	38	49
PHK-gamma-T	15	18	4	14	67	6	20	8	19	8	3
(PTDINS(4)P-5-kinase)	357	174	237	310	170	193	190	411	239	206	196
transforming protein rhoB	1056	1066	859	1268	657	413	579	1142	586	540	574
neuro epithelioma transforming gene 1	736	160	285	294	356	153	264	604	359	163	114
norepinephrine transporter (NET)	9	7	7	4	3	2	8	5	7	1	3
synaptic vesicle amine transporter (SVAT)	9	4	3	0	3	2	2	1	3	1	2
transthyretin precursor (TTR); prealbumin; TBPA	1039	766	708	830	451	696	678	967	665	663	917
frizzled	24	15	13	17	14	10	17	37	13	8	5
tyrosine-protein kinase receptor FLT4	222	191	207	205	50	65	106	62	44	59	65
ras-GRF; sos	130	19	68	83	83	69	50	129	95	67	120
EPS8	44	9	18	35	35	21	32	36	28	18	22
MAP kinase-activated protein kinase 2	213	142	195	203	131	232	87	150	121	118	181
protein kinase C zeta type (NPKC-zeta)	50	24	27	23	23	15	28	26	25	15	12
p21-activated kinase alpha (PAK-alpha; PAK1)	17	13	11	12	19	15	23	30	22	8	2
casein kinase I gamma 2 (CKI-gamma 2)	655	417	171	243	383	344	584	878	370	89	57
phospholipase C beta 3	25	39	20	19	15	15	23	30	17	18	11
ras-related protein RAB3A	94	62	16	15	17	39	74	144	66	29	23
guanine nucleotide regulatory protein tim1	10	11	12	9	3	3	7	8	5	4	3
NaCl-dependent taurine transporter	89	53	57	76	68	64	35	94	60	43	59
Na+/K+ ATPase	198	104	68	64	71	78	142	179	73	61	67
alpha-fetoprotein precursor	2094	429	1298	1607	3638	711	1245	2161	1299	1140	995
ephrin type-B receptor 3 precursor	8	6	6	1	1	3	8	4	3	4	2
ephrin A receptor 4 precursor	9	7	4	3	0	2	1	0	2	1	2
c-src kinase (CSK)	813	577	187	234	402	409	293	641	354	100	57
MAL	45	24	18	14	27	16	25	8	7	3	3
MAPKK 1	432	302	183	237	257	223	332	535	314	74	73
protein kinase C theta (PKC-theta)	3	5	3	5	4	2	4	6	2	1	2
serine/threonine-protein kinase PCTAIRE 1	448	359	122	188	265	276	260	433	228	61	34
PKA C-beta	26	8	15	27	21	15	15	30	22	20	21
PI3-kinase	47	13	34	56	39	20	30	60	40	28	27
ras-related protein RAB-7	742	338	515	460	447	350	264	596	307	287	212
transducin beta 2 subunit 2	141	147	97	93	111	22	83	124	83	60	46
Na+/glucose cotransporter 2	14	11	6	20	2	9	33	47	13	4	5
adrenoleukodystrophy protein	1188	698	448	755	171	110	232	406	169	506	62
serotransferrin precursor	33902	10897	17974	23177	16684	19109	11962	39426	25438	29455	37364
IFN-gamma accessory factor 1 (AF1)	64	18	37	34	52	33	37	50	32	23	34
epithelial cell kinase	130	91	99	139	91	77	60	113	89	72	101
tyrosine-protein kinase HCK	4	20	9	25	20	13	15	20	19	3	2
MAPKKK5	4	5	4	4	1	1	0	6	0	1	1
MAPKK 2	4	3	1	1	4	2	1	1	6	1	0
CAM-kinase II beta	11	12	2	4	8	3	8	6	2	3	2
AMPK alpha-1 chain	62	38	36	116	65	36	44	83	49	45	58
(PKA C-gamma)	20	23	8	10	8	10	9	21	13	5	4
PI4-kinase	222	122	117	117	116	131	102	229	107	91	79
G13	80	26	49	67	45	30	54	65	45	51	50
transducin beta 5 subunit	24	18	16	19	11	12	10	25	14	14	12
kidney oligopeptide transporter	1	2	0	3	0	1	0	1	1	1	1
ATP-binding cassette 8 (ABC8)	5	6	2	3	4	2	7	4	4	2	2
lactotransferrin precursor; lactoferrin	14	10	7	7	6	7	9	7	9	10	7

interleukin-6 receptor beta subunit precursor	263	20	156	160	126	78	81	220	159	121	300
TGF-beta I receptor (TGFBRI)	171	85	119	185	109	100	128	235	135	41	48
70-kDa zeta-associated protein (ZAP70)	1	10	2	1	1	0	2	4	0	1	1
myosin light chain kinase (MLCK)	218	104	104	129	118	90	93	165	110	69	90
MAPKK 3	447	473	187	269	268	202	311	488	289	137	134
CAM kinase-GR	2	8	4	5	1	1	7	3	2	2	0
tyrosine-protein kinase tec	4	8	3	6	4	2	6	3	7	2	3
PRKAR1B	294	509	182	335	294	152	532	677	503	65	54
PLC-beta 2	5	9	0	1	0	3	7	3	1	1	0
transducin beta-1 subunit	346	215	496	425	148	81	228	268	103	171	184
RAD1	36	91	14	35	7	21	52	62	30	8	4
sodium-dependent proline transporter	3	0	0	2	2	0	1	1	2	2	0
multidrug resistance-associated protein 2	359	82	194	187	206	161	135	322	183	141	147
melanotransferrin precursor	8	9	4	5	11	2	6	9	8	15	13
stromal cell derived factor 1 receptor	13	14	3	5	2	8	15	23	14	1	1
anaplastic lymphoma kinase GN (ALK)	6	3	6	3	3	0	4	3	3	1	2
c-fer proto-oncogene	84	6	39	52	58	31	50	77	49	30	34
tiitin	3	7	3	4	10	2	3	2	5	1	1
c-jun N-terminal kinase kinase 1 (JNKK)	42	19	22	32	32	18	29	36	32	21	24
casein kinase II alpha subunit	242	108	81	119	108	76	143	282	110	62	33
Bruton's tyrosine kinase (BTK)	1	5	0	3	0	0	2	1	0	1	0
PRKAR2B	1	6	2	2	6	0	9	3	7	1	0
PLC-gamma 1	134	81	73	82	79	69	78	172	96	61	50
ras-like protein TC25	1139	710	1098	1174	634	894	288	897	552	550	678
RalB GTP-binding protein	154	73	67	67	79	74	89	173	83	35	34
neutral amino acid transporter A (SATT)	89	74	37	46	71	64	65	154	74	34	48
cAMP- dependent chloride channel	1	11	0	5	0	0	6	1	1	2	0
Insulin receptor-related protein precursor	107	23	51	62	180	36	79	79	68	38	29
tyrosine-protein kinase receptor eph	2220	1589	522	701	835	1283	1385	1159	638	236	252
fibroblast growth factor receptor 3 precursor	21	19	4	15	27	6	42	23	18	6	6
(GRB2)	1155	600	447	785	789	681	706	1501	802	335	399
(TSE1)	1060	342	450	737	661	407	493	987	693	409	503
MAPKK 5	138	92	85	125	142	115	100	206	174	76	87
PKA C-alpha	660	437	233	312	498	316	403	883	532	119	82
Janus kinase 2 (JAK2)	38	20	8	24	16	14	19	30	18	10	16
focal adhesion kinase 2	17	15	6	7	5	2	21	23	10	4	6
PLC-gamma-2	1	14	2	4	2	0	9	1	0	2	1
vav oncogene	4	7	3	2	4	1	0	4	1	3	1
MKP4	621	613	237	216	392	167	333	464	391	161	93
protein-tyrosine phosphatase 1E	7	7	1	15	6	4	6	6	2	4	1
PTPCAAX1 nuclear tyrosine phosphatase	3511	1222	2450	2793	2432	1670	1748	4070	2287	1203	2315
adenylyl cyclase IX	114	69	41	67	53	61	72	144	71	33	36
STAT3	139	75	46	70	75	42	85	163	108	38	52
14-3-3 protein beta/alpha	1895	734	940	1290	1077	859	910	1891	1188	543	991
FKBP-rapamycin associated protein	65	27	39	51	48	27	38	68	46	28	36
retinoic acid receptor beta (RXR-beta; RXRB)	250	311	75	176	111	175	256	362	165	54	58
caspase & rip adaptor with death domain	92	44	21	37	77	43	83	170	66	12	11
calpain p94 large (catalytic) subunit	35	23	11	19	20	18	22	36	20	10	10
granzyme A precursor	3	6	1	2	0	2	6	0	1	2	0
poly(ADP-ribose) polymerase (PARP; PPOL)	68	25	37	41	58	24	50	114	44	27	28
DNA polymerase beta subunit (DPOB)	95	53	42	65	60	53	57	92	66	37	36
MCM2 DNA replication licensing factor	813	727	303	480	714	694	646	1109	724	195	145
DNA excision repair protein ERCC1	176	136	102	94	104	79	78	142	82	81	100
leukocyte common antigen precursor	2	8	0	2	3	2	3	5	0	4	0
(CGI-PDE B; CGIPDE1)	16	12	4	3	10	0	2	9	6	4	9
retinal guanylyl cyclase 1 precursor	9	8	5	2	0	4	4	3	0	0	1
(STAT6)	121	108	75	107	107	115	85	172	95	57	90
(PKCSH)	1909	1713	737	1260	1275	1375	1131	2509	1549	715	1049
SH3P17 SH3 domain-containing protein	43	13	15	22	42	12	32	44	35	13	28
(DDR3)	216	435	90	155	142	143	355	650	328	27	20
CD40 receptor-associated factor 1	826	704	238	301	515	316	990	1260	504	118	140
CANP	1475	1289	836	1172	859	1104	1000	2029	1115	740	802
CAD	29	42	6	12	17	8	34	36	14	5	5
inducible nitric oxide synthase (INOS)	1	7	2	2	2	3	7	8	5	3	2
DNA polymerase gamma	116	92	58	78	56	41	57	143	55	48	57
CDC21 homolog	467	193	259	380	245	267	241	458	269	172	189
DNA excision repair protein ERCC2	613	818	213	255	279	395	780	926	365	100	73
protein-tyrosine phosphatase 1B	258	115	130	218	233	146	218	450	208	102	125
CGI-PDE A	6	7	0	4	3	1	3	2	3	1	0
guanylate cyclase F (GCF)	7	10	0	2	0	3	0	3	1	2	1
cAMP-response element binding protein	378	60	192	217	210	159	126	342	240	133	260
linker for activation of T-cells (LAT)	72	48	27	50	32	31	46	66	38	11	16

SH3P18 SH3 domain-containing protein	59	18	27	35	37	18	38	48	44	18	24
CD27L antigen receptor precursor	146	140	62	129	67	27	135	245	127	33	51
FAN protein	88	17	37	54	53	33	49	79	52	26	31
BAD protein	257	246	21	46	45	55	120	61	31	21	23
DNA fragmentation factor 45 (DFF45)	95	60	46	54	68	28	76	118	59	34	36
defender against cell death 1 (DAD1)	2219	1199	1682	2181	1717	1309	1050	2057	2051	1312	1820
DNA polymerase delta catalytic subunit	486	558	164	296	386	433	407	857	473	132	101
CDC46 homolog	1149	1325	659	959	647	613	520	1262	601	485	510
DNA excision repair protein ERCC3	346	136	205	241	277	208	167	379	223	125	163
protein-tyrosine phosphatase 2C	471	112	268	393	300	247	170	473	323	210	379
3'5'-cAMP phosphodiesterase HPDE4A6	104	71	60	111	70	45	71	85	56	47	52
guanylate cyclase	13	21	1	1	6	5	7	3	2	1	1
RalGDSB	74	66	18	33	49	58	43	84	47	17	15
hint protein	3056	1536	1295	1926	2153	2260	1999	4625	2196	1045	1840
FRAP-related protein	54	7	25	34	24	16	25	58	33	19	27
lymphocyte activation CD30 antigen	6	4	0	2	0	2	2	3	6	1	1
caspase-2 precursor (CASP2)	511	221	235	243	293	272	172	453	280	125	193
BCL-2 binding athanogene-1	475	218	266	324	330	287	250	502	341	185	252
rac-alpha serine/threonine kinase	253	260	152	149	144	147	132	242	155	117	107
inhibitor of apoptosis protein 3	27	11	18	26	25	18	14	28	22	17	23
DNA topoisomerase I (TOP1)	927	339	425	624	684	673	339	783	599	268	402
p105MCM	179	59	94	148	102	76	63	145	97	72	106
excision repair protein ERCC6	11	12	3	4	3	4	9	5	4	3	8
leukocyte antigen-related protein precursor (LAR)	1083	1031	613	886	654	659	651	1348	743	799	753
adenylate cyclase type I	120	163	36	75	64	78	287	278	139	12	15
CGS-PDE	4	22	0	19	6	1	4	2	2	3	0
oligophrenin 1	10	8	2	5	3	3	5	3	3	2	2
macMARCKS	1069	930	716	857	767	1130	444	1027	772	652	995
connector enhancer of KSR-like protein	35	28	13	20	22	16	36	36	26	14	12
fasL receptor	66	14	22	34	39	19	18	40	45	15	24
caspase-3 (CASP3)	1651	250	660	716	952	409	735	1122	733	174	315
bcl2 homologous antagonist/killer	133	108	45	62	56	72	70	116	52	49	68
death-associated protein kinase 1	204	138	91	138	163	92	156	288	157	59	69
cytoplasmic dynein light chain 1	1345	1126	1375	1916	1163	1340	651	2031	1179	898	1286
DNA topoisomerase II alpha	1520	313	715	1333	1333	784	797	1765	1538	947	1118
MCM7 DNA replication licensing factor	288	266	195	261	251	224	172	308	196	140	168
6-O-methylguanine-DNA methyltransferase	349	312	127	191	265	165	213	330	212	70	22
PP2A-alpha catalytic subunit	313	122	170	227	240	155	112	321	200	128	175
adenylate cyclase type II	4	7	1	2	0	4	0	0	1	0	2
neurogranin (NRGN); RC3	17	17	7	12	20	5	7	23	12	4	7
ran GTPase activating protein 1	115	144	41	57	75	67	100	164	99	35	40
14-3-3 protein sigma	824	514	495	479	1151	228	654	699	374	414	327
CD40 ligand (CD40-L)	191	170	17	21	26	49	93	28	14	12	15
tumor necrosis factor receptor 1	909	664	232	260	339	255	435	587	375	137	91
caspase-4 precursor (CASP4)	278	59	163	176	143	114	64	199	148	107	216
apoptosis regulator bax	709	566	337	365	352	379	498	735	429	273	268
(P68 kinase)	412	82	209	290	232	190	143	337	298	170	225
cytochrome P450 reductase	160	234	237	259	167	155	145	225	155	192	198
proliferating cyclic nuclear antigen (PCNA)	3348	1709	2082	3145	2759	1503	1432	3182	2615	1338	2065
photolyase/blue-light receptor homolog	107	49	61	90	60	66	39	79	60	49	74
mutL protein homolog	101	36	60	49	78	47	73	119	76	37	37
beta-PR55	13	5	7	17	8	15	5	18	7	2	6
guanylate cyclase soluble alpha 2 subunit	7	4	5	10	0	1	5	5	1	2	4
recoverin	80	70	6	15	3	29	39	17	8	6	5
rap1 GTPase activating protein 1	22	25	5	7	28	19	10	28	24	5	6
GAP-associated protein	598	188	243	410	297	181	172	362	365	210	359
fas antigen ligand (FASL)	6	4	2	4	6	3	0	1	6	0	1
tumor necrosis factor receptor (TNFR)	65	50	86	97	60	26	64	64	45	28	26
caspase-6 precursor (CASP6)	30	7	87	117	30	17	14	34	25	25	34
apoptosis regulator bcl-2	5	4	2	3	1	0	4	2	0	1	1
Fas-activated serine/threonine kinase	158	193	67	92	87	54	118	171	85	66	59
cytoplasmic antiproteinase 3 (CAP3)	58	41	34	61	48	21	14	59	38	37	45
replication protein A 70-kDa subunit	181	74	139	177	137	121	82	160	125	97	136
nibrin (NBS1)	131	36	64	72	71	44	40	95	60	39	57
DNA excision repair protein ERCC5	152	21	64	81	103	56	75	153	105	57	72
alpha-PR55	215	67	95	175	108	130	103	245	154	102	190
guanylate cyclase 70-kDa subunit	8	9	1	2	2	2	1	2	2	1	1
S100 calcium-binding protein A7; psoriasin	13	13	3	3	2	5	4	5	4	0	1
rap1 GTPase-GDP dissociation stimulator 1	100	12	63	52	56	33	22	66	56	33	58
tuberlin; tuberous sclerosis 2 protein	57	43	12	22	31	33	49	55	26	12	24
tumor necrosis factor precursor	11	21	12	19	18	13	32	23	23	3	6
protein-tyrosine phosphatase zeta precursor	6	0	2	4	1	4	10	10	3	2	1

cysteine protease ICE-LAP3	128	42	58	62	90	44	76	128	74	36	48
apoptosis regulator bclw; KIAA0271; BCL2L2	74	25	18	28	36	17	38	48	22	17	21
apoptotic protease activating factor 1 (APAF1)	174	114	37	48	47	70	112	101	61	36	55
death-associated protein 3 (DAP3)	614	227	212	315	429	362	266	657	467	86	46
replication protein A 14-kDa subunit	3001	1267	1429	1970	2042	2038	1792	3707	2464	660	367
AP endonuclease 1	1601	645	516	694	855	761	553	1213	806	433	245
p58/HHR23B	1062	382	546	721	879	497	522	1301	749	355	510
calcineurin B subunit isoform 1	202	70	84	138	107	92	140	187	108	82	90
bone marrow stromal antigen 1 (BST-1)	8	16	4	2	0	3	0	2	2	2	0
S100 calcium-binding protein A1	210	198	118	128	233	130	150	188	161	97	126
rho GDP dissociation inhibitor 1	2056	2737	677	956	920	872	1100	1426	758	342	171
TRRAP protein	656	558	233	309	407	271	385	603	342	166	186
lymphotoxin-alpha precursor (LT-alpha)	12	12	3	4	13	9	25	17	7	4	6
adenosine A1 receptor (ADORA1)	7396	17063	3501	6148	7877	4600	38777	25477	10250	1503	892
caspase-8 precursor (CASP8)	386	137	99	115	186	181	173	312	164	42	54
apoptosis regulator bcl-x	989	513	335	452	605	464	656	925	547	191	225
lEX-1L anti-death protein; PRG-1; DIF-2	127	93	108	140	104	103	89	143	97	74	125
inhibitor of apoptosis protein 1	10	10	4	9	4	5	7	9	7	5	6
activator 1 140-kDa subunit	176	27	73	104	94	55	74	182	106	72	76
ataxia telangiectasia (ATM)	194	122	48	63	54	77	86	140	60	32	36
DNA mismatch repair protein PMS1	184	69	110	138	101	104	73	156	132	105	204
CAM-PRP catalytic subunit	233	72	141	212	157	136	108	267	176	125	201
HCAM-1	5	3	1	2	3	1	6	0	1	0	0
interferon regulatory factor 1 (IRF1)	26	9	7	20	5	20	5	33	19	12	14
GTPase-activating protein (GAP)	61	17	32	42	38	20	36	60	40	22	32
leucine-rich repeat protein SHOC-2	115	18	67	82	60	48	45	99	76	44	89
lymphotoxin-beta (LT-beta; LTB)	5	2	1	1	2	2	2	5	0	0	1
adenosine A2A receptor (ADORA2A)	5	9	1	5	5	4	11	14	6	1	2
caspase-9 precursor (CASP9)	48	71	86	133	31	34	43	55	38	23	37
MCL-1	593	287	206	302	257	245	268	312	231	136	253
SL cytokine precursor	109	203	50	93	68	43	201	300	118	22	20
inhibitor of apoptosis protein 2	86	28	67	87	71	54	52	78	71	58	108
activator 1 40-kDa subunit	333	284	67	95	88	114	156	108	66	41	48
Ku 70-kDa subunit	721	315	309	474	1154	333	525	902	547	238	240
DNA mismatch repair protein PMS2	156	42	48	65	126	104	124	319	139	36	42
PP2C-alpha	269	69	114	205	191	132	88	270	186	124	142
CAM-PDE1B	3	8	0	1	0	3	5	8	2	0	1
CRE-BP1	221	46	78	134	119	87	115	171	129	82	123
inhibitor of the RNA-activated protein kinase	41	12	17	31	32	17	23	37	15	19	26
IkappaB kinase complex-associated protein	139	71	49	72	119	61	155	204	92	39	57
TNF-related apoptosis inducing ligand	17	2	4	15	4	6	7	25	12	6	13
adenosine A3 receptor (ADORA3)	25	13	9	13	1	9	14	4	3	2	3
caspase-10 precursor (CASP10)	1411	1355	2831	3594	1779	462	2346	1230	616	2293	1248
BCL-2-related protein A1 (BCL2A1)	3	6	2	6	7	0	1	1	3	3	2
cellular apoptosis susceptibility protein	0	3	1	1	1	2	6	2	1	0	1
ALG-2 calcium-binding protein	739	397	365	510	371	415	370	679	433	257	318
DNA polymerase epsilon subunit B	125	26	65	112	61	57	40	90	66	51	73
ATP-dependent DNA helicase II	640	121	268	411	402	269	343	494	333	75	32
Rad50	59	17	22	36	29	15	26	46	32	20	30
(PP-1A)	369	374	160	244	182	251	202	369	215	201	257
ephrin A4 precursor	53	23	26	39	16	24	33	38	18	37	53
NFKB3	76	111	27	59	54	62	77	102	62	29	41
cortactin; amplexin	1545	513	591	836	844	713	445	1183	648	388	668
zyxin + zyxin-2	123	119	74	93	160	75	109	155	93	31	28
CD27 ligand (CD27LG); CD70 antigen	6	6	0	4	0	1	2	3	0	1	0
receptor interacting protein	36	11	12	22	5	17	25	31	21	9	14
interleukin-1 beta convertase precursor (IL-1BC)	9	8	3	3	5	3	1	2	5	3	7
bcl-2 interacting killer (BIK)	7	1	0	3	4	2	10	5	3	2	1
GADD153	379	233	125	213	137	152	205	246	163	111	278
DNA polymerase II subunit A	32	23	15	28	53	18	15	38	28	15	14
RFC36	202	67	67	103	119	91	92	130	88	43	25
DNA ligase I	669	560	300	475	432	459	347	607	369	235	234
DNA-repair protein complementing XP-A	14	11	2	7	19	11	8	15	7	4	4
dual-specificity protein phosphatase 2	10	13	1	4	0	3	5	1	3	0	1
DPDE3	162	23	66	124	116	80	65	147	122	65	136
STAT1	843	274	336	480	427	310	371	746	488	161	98
(PKI-alpha)	4	8	2	4	0	3	2	3	1	0	1
leukemia inhibitory factor receptor precursor	28	14	13	18	17	11	12	18	11	15	20
insulin-like growth factor I receptor (IGF1R)	156	92	73	73	115	102	82	148	87	52	70
DAXX	156	107	57	76	96	65	80	126	89	36	22
calpain 1 large (catalytic) subunit	3	7	0	1	0	0	4	0	1	1	0
NIP1 (NIP1)	39	19	22	26	38	25	25	41	34	18	34

clusterin precursor (CLU)	1325	1028	391	605	789	648	446	942	800	281	120
MCM3 DNA replication licensing factor	274	140	127	145	165	121	164	310	122	72	62
replication factor C 38-kDa subunit	225	125	64	87	111	102	104	157	80	41	59
DNA ligase III (LIG3)	273	130	85	118	172	125	158	281	164	62	53
DNA-repair protein complementing XP-C cells	173	70	58	86	103	90	85	150	106	63	51
myotubularin	52	10	22	48	31	23	28	64	36	19	39
adenylate cyclase VII	15	4	3	4	0	3	2	2	2	2	2
STAT2	150	92	83	117	84	101	48	110	98	95	177
14-3-3n protein eta	467	205	238	331	456	308	224	359	291	151	235
junction plakoglobin (JUP)	480	476	134	219	276	185	246	529	295	109	98
retinoic acid receptor epsilon (RAR-epsilon)	31	9	12	38	16	19	27	47	30	5	8
TRADD	20	38	13	24	35	16	8	16	18	16	8
calpain 2 large (catalytic) subunit	30	10	16	22	22	14	13	10	17	15	15
NIP3 (NIP3)	698	213	384	390	467	381	327	1070	757	604	1135
early response protein NAK1	28	53	5	4	7	9	49	44	22	3	2
DNA polymerase alpha catalytic subunit	316	96	189	328	218	131	121	238	224	135	247
activator 1 37-kDa subunit	477	205	234	362	316	220	230	388	316	191	181
DNA ligase IV (LIG4)	51	16	28	34	18	17	25	39	37	30	45
uracil-DNA glycosylase precursor (UNG1)	1264	758	458	681	1013	851	731	1219	997	303	287
DNA-repair protein XRCC1	397	203	150	178	188	142	332	325	215	97	36
GADD45	250	104	178	259	219	161	142	230	178	178	258
galanin receptor type 1	19	34	3	3	7	9	15	1	0	3	1
CHRN2	0	6	2	3	6	1	10	1	1	2	0
low-affinity nerve growth factor receptor	1	9	3	3	5	0	4	1	0	0	0
dopamine beta-hydroxylase	4	5	3	4	6	0	7	3	10	3	0
secretogranin V	10	10	5	16	4	20	14	19	4	4	4
achaete-scute homolog 1 (ASH1)	2	9	1	1	3	0	12	0	3	0	0
myelin proteolipid protein (PLP); lipophilin	19	9	4	2	2	2	12	9	9	3	6
ataxia-telangiectasia group D-associated protein	5	3	3	3	5	0	9	2	2	1	0
KRAB-associated protein 1 (KAP1)	52	52	10	16	44	13	104	49	34	10	0
CCAAT-BINDING FACTOR (CBF).	54	8	29	32	45	26	92	68	47	15	26
E2F-3	177	68	63	98	121	94	127	166	131	37	30
CACCC-box DNA-binding protein	249	36	155	201	142	74	92	135	194	134	137
DNA-dependent protein kinase (DNA-PK)	701	154	357	436	361	226	216	466	430	288	422
muscle-specific DNase I-like precursor	57	12	25	22	22	15	50	50	32	9	6
somatostatin receptor type 2	9	13	10	20	4	20	25	11	20	1	2
serotonin-gated ion channel receptor	70	58	11	20	15	24	36	20	3	7	6
DOPA decarboxylase (DDC)	438	214	231	248	284	262	268	420	298	144	175
noradrenaline N-methyltransferase	2	4	2	2	4	2	3	2	1	1	0
neuregulin	2	6	2	3	3	1	6	3	2	2	0
brain-specific antigen PCP-4	5	4	3	2	17	0	6	1	17	1	0
peripheral myelin protein 22	60	56	35	46	54	36	63	65	49	30	23
TREB36 protein	147	40	51	65	141	58	86	137	116	35	37
transcription intermediary factor 1 (TIF1)	491	150	300	437	338	201	225	337	371	286	281
hepatic leukemia factor (HLF)	595	272	203	293	404	205	367	492	291	118	40
E2F dimerization partner 1	415	259	131	189	244	167	377	463	258	117	79
60S ribosomal protein L6 (RPL6)	16117	3774	9150	11401	8979	5948	6784	10875	9474	9111	10107
RAD52	8	9	6	6	7	3	10	12	13	3	4
melatonin receptor type 1A (MEL-1A-R)	3	8	2	5	6	2	5	5	0	1	1
prostaglandin E2	0	18	1	0	1	1	8	1	0	0	0
GABA(A) receptor	14	5	8	11	7	8	14	7	3	6	6
acetylcholinesterase precursor	18	15	5	4	1	5	17	9	8	2	0
secretogranin II precursor	5	7	0	2	4	1	9	0	3	1	0
nociceptin precursor	9	11	3	1	10	3	60	4	2	6	0
neuronatin	25	12	7	6	16	2	9	7	7	4	1
MOG	355	276	105	116	98	119	284	158	84	84	57
CCAAT transcriptionfactor gamma subunit	378	248	202	245	200	187	234	283	222	156	159
YL-1 protein	115	83	81	71	67	55	95	121	77	57	45
early growth response protein 3	4	13	3	3	8	2	7	3	3	4	1
interferon regulatory factor 2 (IRF2)	143	55	65	72	73	66	78	136	93	71	63
cellular nucleic acid binding protein	3943	1247	1624	2057	2847	1534	2189	3327	2419	635	466
UV excision repair protein protein	1359	925	635	603	594	320	774	939	665	298	180
5-hydroxytryptamine 1A receptor	0	11	0	1	4	2	5	2	2	2	0
GRM5	4	10	2	4	2	3	7	2	2	1	0
(GABA(A) receptor)	2	3	2	2	2	2	1	1	0	1	0
choline O-acetyltransferase	5	12	1	3	5	8	8	1	3	1	0
neurotensin/neuromedin N precursor	5	8	2	7	7	4	6	1	0	3	0
leptin precursor; obesity factor; obese protein	5	12	6	5	2	4	12	5	7	3	1
roundabout 2 (ROBO2)	3	14	6	2	5	1	6	1	4	1	0
myelin basic protein (MBP)	6	26	2	3	8	3	12	6	4	3	1
(C/EBP alpha)	680	727	201	190	365	187	571	692	299	60	54
metal-regulatory transcription factor	60	12	52	53	58	38	40	57	43	35	32

(HIV-EP2)	8	2	4	7	12	1	36	5	13	4	4
LYL-1 protein	5	4	2	2	6	2	7	6	5	3	2
basic transcription factor 2 44-kDa subunit	641	267	320	307	380	378	383	601	411	125	174
ubiquitin-conjugating enzyme E2 17-kDa	586	352	278	270	229	333	241	365	213	141	174
serotonin receptor type 2	3	6	2	3	3	0	2	4	2	2	0
orexin receptor 2	16	12	3	4	3	3	9	6	6	1	2
GABA-B receptor 1A subunit (GABA-BR1A)	3	3	2	3	0	3	8	2	2	1	1
glutamate decarboxylase 67-kDa isoform	1	8	9	2	0	1	10	3	1	2	1
neuromedin B precursor	48	21	24	26	32	20	32	41	27	18	13
neuronal pentraxin II precursor (NP2)	3	9	3	2	5	3	8	5	2	5	0
veli-1	40	13	36	30	43	19	33	33	23	29	16
neuroglycan C precursor	14	15	4	2	3	4	11	10	10	3	1
hepatocyte nuclear factor 4 (HNF4)	1424	921	699	667	737	757	833	1549	1107	738	541
(MITF)	4	10	7	10	5	3	8	6	3	4	0
ets-related gene transforming protein (ERG1)	6	9	13	17	3	3	3	6	6	2	0
nuclear factor NF-kappa-B p100 subunit	67	54	33	42	50	38	87	77	37	40	27
estrogen receptor hSNF2b	1487	1099	898	1033	1000	1006	863	1686	1063	564	346
translin; recombination hotspot binding protein	614	186	360	433	336	240	420	688	416	265	287
mu-type opioid receptor (MOR-1)	27	22	7	10	2	2	10	3	4	1	1
P2X purinoceptor 1; ATP receptor P2X1	6	13	1	0	4	3	18	3	4	1	0
GABA-B receptor 2 subunit (GABA-BR2)	3	14	5	1	4	4	12	2	1	1	0
glutamate decarboxylase 65-kDa isoform	30	39	32	33	11	26	29	52	33	9	11
preprotachykinin beta	6	7	1	2	5	4	5	3	0	3	0
survival of motor neuron (hSMN)	510	137	268	285	291	189	250	326	323	183	135
43-kDa postsynaptic protein	7	15	2	3	4	0	29	2	3	1	0
parkin	2	15	3	3	2	4	8	1	2	2	0
TIS11B protein; EGF response factor 1	416	237	321	266	240	272	143	379	355	330	410
transcription repressor protein PRDI-BF1	6	8	6	11	6	2	11	1	3	4	1
transcription factor GATA-4	164	129	58	55	78	48	86	124	67	25	13
octamer-binding transcription factor 1	96	29	76	66	74	34	64	116	60	57	27
transcriptional repressor NF-X1	254	68	177	186	165	88	163	196	149	118	91
recA-like protein HsRad51	263	87	162	162	153	131	132	276	158	101	118
nociceptin receptor	11	19	14	19	2	3	12	10	8	1	2
P2X purinoceptor 3	2	8	1	1	4	1	4	2	5	0	0
glutamate receptor 5 precursor	3	12	1	4	0	1	6	3	0	0	0
neuroendocrine convertase 1 precursor	2	7	3	2	6	2	11	4	7	3	1
proenkephalin A precursor	16	11	1	2	2	8	13	6	8	3	2
lissencephalin X; doublecortin (DCX)	27	21	5	6	4	6	21	10	5	8	1
synaptosomal-associated protein 25	18	7	6	7	5	2	13	5	1	3	1
Huntington's disease protein (HD protein)	72	55	41	32	52	39	65	72	40	28	25
HIV-1 TATA element modulatory factor	230	26	163	131	113	73	112	176	122	123	130
PCAF-associated factor 65 beta	152	64	101	95	147	99	88	176	104	62	47
glucocorticoid receptor repression factor 1	268	95	264	218	164	162	107	202	137	220	235
pre-B-cell leukemia transcription factor-1	18	21	7	7	33	2	9	6	8	2	0
cAMP-responsive element-binding protein	5	10	5	3	36	2	12	1	4	4	0
V(D)J recombination activating protein 1	5	10	4	2	5	3	3	4	2	2	0
prostaglandin E2 receptor EP3 subtype	5	15	2	2	7	5	6	5	1	1	0
(GABA(A) receptor)	3	10	4	2	0	1	1	2	2	1	2
neuronal acetylcholine receptor	3	11	3	3	2	2	3	3	0	2	1
neuroendocrine convertase 2 precursor	11	19	10	16	3	8	20	13	12	2	2
beta-neoendorphin-dynorphin precursor	16	5	14	9	17	6	3	15	3	3	5
roundabout 1 (ROBO1)	457	150	422	402	223	208	186	360	272	325	343
synaptophysin (SYP)	1	5	3	1	1	1	4	7	2	1	1
major prion protein precursor	833	236	778	615	586	403	406	884	560	510	604
hypoxia-inducible factor 1 alpha	365	66	276	213	220	100	171	205	174	154	149
PCAF-associated factor 65 alpha	55	69	39	29	32	30	67	54	29	17	20
homeobox protein HOX-A5; HOX-1C	193	245	63	81	59	87	155	144	76	34	37
endothelial transcription factor GATA2	160	174	156	156	165	110	138	187	119	84	59
GA-binding protein alpha subunit	109	18	93	97	94	47	78	88	61	44	37
V(D)J recombination activating protein 2	2	13	2	3	4	1	3	1	2	2	0
substance-P receptor (SPR)	7	11	9	4	8	3	4	6	5	2	2
(GABA(A) receptor)	9	5	7	3	3	4	2	3	2	3	0
(CHRNA4; NACHRB4)	7	13	4	16	2	6	9	16	13	2	1
(COMT)	3308	2268	1250	1301	1594	1178	2145	3249	1844	801	421
acyl-CoA-binding protein (ACBP)	10080	3470	6690	7392	5327	4165	5666	9352	6904	4237	1507
CASK	85	20	42	43	45	22	44	61	46	29	27
presynaptic density protein 95 (PSD95)	9	10	9	13	8	3	10	15	11	4	1
Alzheimer's disease amyloid A4 protein	272	81	171	178	128	135	89	259	148	160	149
jun activation domain binding protein	483	105	248	252	189	144	265	439	226	189	135
SPT3-like protein	160	57	141	95	65	68	61	109	68	109	122
interferon regulatory factor 7 (IRF-7)	3	5	5	3	6	1	24	7	6	2	0
GC-box binding protein 2	92	101	35	25	66	33	65	32	28	11	13

GA-binding protein beta-2 subunit	342	81	283	263	182	112	214	299	224	150	129
telomerase reverse transcriptase (hTRT)	10	14	9	1	6	4	11	22	7	5	10
substance-K receptor (SKR)	10	19	6	5	6	2	7	8	2	2	8
glutamate receptor 1 precursor	4	1	4	1	2	0	6	1	1	2	1
NMDAR2B	4	7	3	3	3	1	5	8	2	3	1
tryptophan 5-monoxygenase	19	11	18	31	16	8	10	19	11	13	9
nerve growth factor 2 (NGF-2)	2600	1612	1454	1333	1547	858	1692	2590	1651	961	854
neuromodulin	6	11	11	4	5	4	24	11	3	3	2
synapsin IIIA	27	42	11	14	22	16	37	17	7	11	9
atrophin-1	144	116	66	50	82	48	147	184	72	28	13
ets domain protein elk-3	26	8	21	22	25	4	8	20	17	22	17
ADA3-like protein	372	316	257	164	182	88	303	399	216	146	64
interleukin enhancer binding factor 3 (ILF3)	580	316	302	185	365	397	251	610	355	96	109
basic transcription factor 62-kDa subunit	36	16	20	19	51	11	37	39	22	13	9
transcription factor AREB6	11	11	27	15	36	6	6	8	12	14	10
TRF1-interacting tankyrase	97	23	51	54	103	53	116	206	101	56	44
neuromedin K receptor (NKR)	3	8	4	3	3	0	10	1	5	2	2
glutamate receptor 2 precursor	4	12	3	3	0	0	6	0	2	0	1
NMDAR2C; NR2C	1	7	3	7	0	0	4	4	3	2	1
monoamine oxidase (MAO-A)	674	223	457	408	345	307	258	608	467	323	183
neurotrophin-4 (NT-4)	152	152	31	29	32	44	96	40	21	14	10
axonin-1 precursor	6	14	6	4	5	2	23	9	2	3	0
CHAPSYN 110	2	8	3	2	4	0	8	2	1	3	1
HU-antigen D	8	20	32	17	5	5	12	10	17	4	2
retinoblastoma-binding protein 7	1038	339	743	670	528	365	524	948	646	448	355
ADA2-like protein	159	51	126	96	91	81	70	147	94	80	93
RBP2 retinoblastoma binding protein	89	12	55	45	73	37	62	120	80	24	17
DNA-binding protein inhibitor Id-2	2176	1066	3118	1994	1401	977	869	1622	1590	1312	1300
transcription factor ZFM1	827	738	577	517	403	489	357	639	383	364	295
delta lactoferrin	4	5	1	1	2	1	9	2	5	0	0
neuropeptide Y receptor type 1	8	8	6	6	4	1	10	5	5	2	4
strychnine binding subunit	4	6	4	3	0	2	0	3	0	1	0
P2X purinoceptor 5 (P2X5)	15	34	8	4	6	3	11	9	2	2	0
histidine decarboxylase (HDC)	109	122	170	176	57	41	141	168	100	36	61
neuropeptide Y precursor (NPY)	5	13	4	2	3	2	9	1	3	3	2
glia maturation factor beta (GMF-beta)	505	257	241	240	183	131	248	287	229	132	138
amphiphysin (AMPH)	5	7	25	1	6	1	11	0	4	3	1
Machado-Joseph disease protein 1	67	24	63	44	33	25	35	58	40	40	31
BRCA1-associated ring domain protein	28	19	8	5	14	12	24	19	11	11	4
B-cell lymphoma 3-encoded protein (bcl-3)	12	17	11	5	5	3	15	6	8	7	5
BRCA1-associated ring domain protein	95	11	83	57	48	25	53	67	51	38	32
DNA-binding protein SMBP-2	62	47	53	43	66	31	91	100	48	43	35
ZFM1 protein alternatively spliced product	463	448	292	246	243	225	371	382	211	161	127
deoxyribonuclease I (DNase I)	10	10	6	2	19	5	18	22	4	4	6
metabotropic glutamate receptor 1	4	1	5	4	2	0	8	3	0	1	1
glycine receptor beta subunit precursor	2	5	11	4	5	2	9	4	2	2	0
P2X purinoceptor 6 (P2X6)	73	81	73	93	42	32	86	163	87	24	21
phenylalanine-4-hydroxylase (PAH)	1092	313	913	630	694	313	509	907	663	525	526
5-hydroxytryptamine 1D receptor	13	10	21	12	4	3	6	15	5	10	8
MAPKK7	84	100	54	46	65	45	78	99	58	32	19
neurexin III alpha	7	8	3	1	1	1	9	1	0	5	1
Kallmann syndrome protein precursor	7	8	10	1	3	1	10	2	4	3	0
serum response factor (SRF)	61	72	52	38	56	35	49	59	39	30	11
B-cell lymphoma 6 protein (bcl-6)	83	51	65	34	32	28	58	60	50	57	34
transcriptional repressor CTCF	138	19	155	93	100	52	71	69	65	52	46
global transcription activator SNF2L1	774	110	805	547	490	233	294	597	533	577	572
transcription factor RZR-alpha	25	5	31	18	31	3	12	38	28	29	40
deoxyribonuclease II (DNase II)	288	251	230	290	128	202	280	488	243	197	241
D2 dopamine receptor (DRD2)	3	5	8	6	25	0	6	4	4	1	0
cholinergic receptor (CHRNA3)	5	0	2	1	1	1	7	3	2	1	0
leptin receptor precursor	10	4	10	6	2	1	8	7	3	4	4
tyrosine 3-monoxygenase isozymes	4	6	11	2	1	0	1	2	3	1	0
glial cell line-derived neurotrophic factor precursor	6	6	9	5	3	1	11	8	6	3	2
myelin-associated glycoprotein precursor (MAG)	2	9	3	2	5	0	10	3	2	0	0
synapse-associated protein 97 (SAP97)	146	35	127	96	84	47	67	113	72	74	90
FCMD; fukutin	46	15	47	28	25	22	29	47	37	13	22
PC4	4734	1073	3697	3308	2311	1423	2149	4073	2679	2014	1915
ATF-3 (ACTIVATING FACTOR 3)	12	11	10	5	17	2	7	10	10	3	5
PRB-binding protein E2F1	717	543	301	234	403	165	603	566	345	139	34
ICSBP	3	4	12	4	39	0	8	4	0	2	1
paired box homeotic protein	3	3	8	3	87	0	4	2	6	1	2
octamer binding transcription factor 1	87	75	14	18	13	26	49	18	12	10	11

transcription factor TFIIIB	119	26	86	73	71	47	40	94	79	51	56
transcription factor NF-ATc	77	24	48	50	31	20	64	109	64	12	14
ets transcription factor	11	17	11	14	8	6	6	6	6	14	9
CCAAT displacement protein	70	61	25	27	37	24	39	91	40	18	35
Ini1	962	751	958	758	609	617	522	1131	644	682	761
osteoblast specific factor 2	5	5	5	5	3	3	5	0	2	1	1
leukosialin precursor	7	5	7	3	0	3	8	2	0	1	0
integrin beta 5 subunit precursor	75	55	47	39	36	35	59	75	34	22	8
beta catenin (CTNNB)	522	135	304	244	336	202	573	648	358	146	133
CD114 antigen	26	23	40	19	15	13	21	31	28	25	25
IL-2 receptor alpha subunit	2831	2294	9059	4723	1882	1254	3393	3231	1505	2196	1792
interleukin-12 receptor precursor	4	6	7	4	1	2	6	2	1	2	0
(GADD45 gamma)	64	44	59	45	38	16	69	57	29	36	43
nuclear factor I (NFI); NFI-X	233	152	120	95	116	104	106	182	127	44	15
transcription factor HTF4	220	68	194	161	83	98	65	186	100	107	185
R kappa B DNA-binding protein	433	228	186	162	161	177	240	673	257	170	189
TRAF-interacting protein (I-TRAF)	75	15	74	66	34	26	15	61	52	47	60
cAMP-dependent transcription factor ATF-4	3562	1917	4019	3115	1635	2693	1039	3080	2222	3134	4152
(DNA metase; MCMT)	9	13	6	12	3	5	9	10	6	3	5
cadherin 3 (CDH3)	2	4	6	2	0	1	6	2	0	1	1
corneodesmosin precursor	4	7	6	5	0	1	3	3	2	1	4
integrin alpha 4 precursor	369	336	110	95	83	122	166	123	62	41	27
semaphorin; CD100	3	10	7	1	2	1	6	2	1	0	0
C5a anaphylatoxin receptor	5	8	7	4	4	2	6	6	5	5	0
IL-6R-alpha	187	88	136	104	129	96	130	198	137	42	23
(IL-1R2)	17	7	11	17	7	4	17	21	10	11	4
(GADD45 beta)	3	4	6	3	2	4	21	2	2	4	0
RNA polymerase II elongation factor	273	100	165	145	202	124	99	200	129	59	77
transcription elongation factor SII	489	130	317	278	298	203	273	402	259	189	265
transcription factor 11 (TCF11)	420	227	162	172	225	167	265	559	249	173	158
TAFII31; TAF2G	794	190	503	398	374	258	238	502	347	211	348
heat shock transcription factor 1	724	576	398	365	281	352	531	673	297	300	264
DNA-binding protein A	553	322	385	349	321	258	312	737	334	206	144
cadherin 5 (CDH5)	0	10	1	3	0	1	3	0	2	2	0
(V-CAM 1)	4	4	3	2	0	0	5	2	1	2	0
CD18 antigen	18	11	31	14	11	5	14	24	17	25	19
T-cell surface glycoprotein T4/leu-3	44	62	40	48	5	21	67	99	47	12	12
neuromedin B receptor	367	414	142	113	198	191	208	145	95	57	37
(IFN-alpha receptor; IFNAR)	36	10	36	26	7	12	13	33	27	20	17
IL-8 receptor type 1	3	2	11	2	5	0	5	3	3	4	0
UK114 antigen homolog	210	51	205	178	127	55	103	226	192	146	134
homeobox protein HOXB7	19	15	17	7	14	2	10	9	4	6	6
NSEP	7437	3131	6471	5780	5097	3449	3330	7369	4592	3216	3653
nuclear factor NF45	297	114	167	138	355	100	296	327	135	73	43
helix-loop-helix DNA-binding protein	36	48	18	22	29	16	9	39	27	19	7
transcriptional activator hSNF2-alpha	400	181	345	296	251	191	185	375	214	218	106
telomeric repeat binding factor 1	143	24	114	90	58	40	63	74	78	67	58
cadherin 11 precursor	3	12	1	1	13	1	12	5	4	1	0
E-selectin precursor	3	3	3	2	5	1	1	7	3	1	0
CD41 antigen	4	12	1	10	2	0	0	3	0	2	0
B-lymphocyte surface antigen B4	56	86	56	53	24	30	64	72	43	12	14
Duffy blood group antigen	0	10	5	2	4	0	4	6	0	1	0
IL-2 receptor beta	2	4	6	3	2	0	9	1	2	1	1
androgen receptor (AR)	0	2	2	0	5	0	10	1	3	1	0
beta-defensin 2 precursor	3	7	6	0	4	0	7	3	1	4	0
transcription factor E2-alpha	305	223	287	307	206	259	108	189	147	211	174
(IFN-alpha) responsive transcription factor subunit	54	27	65	53	26	35	22	44	31	50	47
nuclear factor NF90	89	65	50	60	81	30	84	117	68	32	24
C-ets-2	31	19	10	16	24	19	20	54	24	13	16
putative transcription activator DB1	549	181	400	343	245	267	211	470	291	233	258
TTAGGG repeat binding factor 2	344	118	186	161	292	294	192	545	259	98	80
muscle cadherin precursor (M-cadherin)	5	14	3	3	4	3	0	5	3	3	0
cell adhesion protein SQM1	1803	2861	1126	1119	1362	1119	2217	4186	2553	271	225
integrin beta 6 precursor (ITGB6)	5	5	3	4	1	1	12	5	5	2	0
myeloid cell surface CD33 antigen precursor	4	9	3	3	2	1	4	6	0	1	0
(MCP-1RA)	11	8	50	48	51	13	12	21	5	17	33
IL-3R-alpha	40	40	6	5	3	2	15	8	2	1	2
angiotensin II type 1A receptor	1	6	9	5	4	0	4	2	1	2	0
defensin 6 precursor	3	3	4	1	6	1	8	3	4	3	0
transcription initiation factor IID	24	9	22	22	15	12	10	22	18	15	14
homeobox 2.1 protein	8	22	10	35	3	5	10	14	8	3	0
homeobox A1 protein	71	37	146	71	111	11	37	56	40	45	39

raf-responsive zinc finger protein	96	78	56	41	58	28	56	85	40	38	21
DNA-binding protein TAXREB302	329	234	120	101	95	122	169	127	70	56	51
polyadenylate binding protein-interacting protein	692	224	601	491	360	344	334	782	460	356	429
cadherin 8 (CDH8)	2	10	6	6	6	4	4	6	3	2	1
neural-cadherin precursor	11	3	8	13	6	3	5	14	4	2	6
integrin alpha 3 (ITGA3)	4	12	4	5	3	2	13	6	4	2	0
polycystin precursor	72	105	43	37	42	25	69	83	41	43	33
keratinocyte growth factor receptor	18	51	10	4	5	5	21	15	3	4	3
IL-4R-alpha	36	19	34	31	29	19	41	57	26	19	13
follicle stimulating hormone receptor	2	7	21	14	6	2	9	11	7	5	3
cytochrome P450 1A2	153	162	30	23	23	29	106	28	25	14	14
octamer-binding transcription factor 2	3	5	1	1	2	1	8	1	1	0	1
fli-1 oncogene; ergB transcription factor	2	8	3	3	1	0	0	2	0	2	1
homeobox protein hLim1; LHX1	13	15	11	13	8	13	28	33	14	7	1
orphan hormone nuclear receptor	7	12	3	3	12	3	6	7	4	3	2
zinc finger protein 91 (ZNF92)	451	193	216	240	182	133	188	251	207	159	177
RPD3 protein	518	235	260	227	304	290	240	672	300	132	101
intercellular adhesion molecule 2 precursor	19	19	12	15	11	8	22	42	17	13	14
B-cell differentiation CD72 antigen	7	1	3	2	0	0	1	5	1	8	8
leukocyte adhesion glycoprotein p150	9	7	15	8	6	0	18	4	7	1	1
ciliary neurotropic factor receptor	0	1	6	6	0	2	6	5	1	4	2
activin type I receptor	74	52	67	65	54	47	53	104	64	60	47
IL-5R-alpha	200	162	69	52	58	78	122	76	45	26	23
calcitonin receptor	3	12	4	4	3	0	10	3	3	3	0
cytochrome P450 1VB1	5	1	12	3	15	2	2	3	2	1	1
transcription factor AP-2	4	8	8	1	3	2	7	4	2	1	0
paired box protein PAX-5	392	241	134	160	169	176	220	226	153	59	44
T-cell specific transcription factor GATA3	6	13	12	14	8	14	8	9	7	7	5
NF-kappaB	165	84	117	99	112	108	63	121	90	53	36
adenylate cyclase-stimulating G alpha protein	5856	3346	3701	3304	3036	2246	2694	6825	4097	2774	2370
high mobility group protein	1915	1692	730	859	1212	679	2181	2894	1327	716	608
integrin alpha E precursor	12	10	7	5	1	4	3	6	5	5	5
CD44 antigen hematopoietic form precursor	0	7	4	5	4	1	11	1	7	2	1
fibronectin receptor alpha subunit	3	4	2	3	2	0	4	5	2	2	1
erythropoietin receptor (EPOR)	8	20	6	2	4	3	6	6	7	3	2
GM-CSFR-alpha	15	41	10	15	2	14	36	35	18	5	2
(IFN-alpha-R)	43	25	43	43	35	23	26	38	38	34	39
beta-2 adrenergic receptor	1	3	4	1	5	1	5	5	0	0	1
soluble epoxide hydrolase	47	33	34	32	27	21	28	54	41	34	26
mitochondrial transcription factor 1	757	171	607	633	431	313	198	436	425	396	394
special AT-rich sequence binding protein 1	1880	1512	2773	2192	2080	725	515	1437	1388	1408	1410
transcription factor Sp1 (TSFP1)	209	86	98	98	106	76	126	210	122	68	64
zinc-finger DNA-binding protein	105	33	114	86	65	66	25	56	57	33	49
stem cell protein (SCL)	9	12	9	8	4	3	3	6	3	3	2
procollagen alpha subunit precursor	10	6	10	19	0	4	11	21	10	2	5
integrin beta 8 precursor (ITGB8)	16	14	15	16	0	3	20	20	15	4	2
neural cell adhesion molecule L1 precursor	6	6	5	2	3	1	3	5	0	0	1
fibronectin receptor beta subunit	1906	336	1528	1403	1041	671	659	1543	1168	930	1081
platelet-activating factor receptor	4	5	3	2	0	67	1	688	1	2	54
CDW40 antigen	21	28	12	12	10	5	9	25	17	12	10
interleukin-2 receptor gamma subunit	2	2	5	7	6	1	8	14	1	2	2
alpha 1A adrenergic receptor	3	148	8	106	5	1	4	3	3	86	1
dimethylaniline monooxygenase	1	4	3	1	13	1	7	3	3	2	0
early growth response protein 1	418	698	895	657	268	75	455	989	399	120	353
MSX-1 homeobox protein; HOX7	598	344	406	482	429	459	237	602	348	325	304
I-rel (RELB)	2	8	2	3	1	2	6	6	3	1	4
26S protease regulatory subunit 6A	1571	660	847	877	762	719	657	1516	922	439	527
neural retina-specific leucine zipper protein	45	45	33	24	21	27	29	66	32	11	10
bystin	66	60	30	20	37	37	33	62	26	9	7
thrombospondin 2 precursor	110	321	74	71	76	38	159	249	107	20	9
contactin precursor	3	9	5	4	2	2	4	15	2	3	6
integrin alpha 6 precursor	461	106	283	241	307	125	231	515	384	156	167
endothelin receptor type A	2	7	2	2	3	0	5	1	3	0	1
corticotropin releasing factor	493	1388	491	530	506	214	1151	1193	852	139	79
interferon-gamma receptor	270	92	254	246	144	86	115	184	137	119	169
protoheme ferro-lyase; heme synthetase	58	20	49	41	68	56	45	91	69	26	25
glutathione reductase (GRase; GSR; GR)	269	158	165	126	210	160	158	287	181	87	93
transcription factor ETR101	259	292	178	180	162	91	159	280	190	118	106
PAX3/forkhead transcription factor fusion	412	156	178	211	176	118	106	255	196	110	54
Sp2 protein	82	105	53	45	56	28	76	116	45	29	20
DNA-binding protein alpha (PURA)	499	179	175	130	198	82	150	357	180	77	71
tristetraproline (TTP)	28	20	14	17	12	6	14	40	18	11	13

dominant polycystic kidney disease II	22	8	12	7	9	6	9	17	14	5	7
bone proteoglycan II precursor	1	5	9	2	6	1	2	2	1	2	4
(NCAM120); CD56 antigen	2	6	2	1	1	1	3	1	4	4	0
integrin beta 4 (ITGB4); CD104 antigen	49	83	40	29	30	10	38	51	31	12	6
endothelin receptor type B	3	8	6	9	2	1	8	5	6	5	0
cytokine receptor EBI3	1	0	3	2	3	1	5	0	7	1	1
interleukin-9 receptor precursor (IL-9R)	1	2	7	2	1	1	6	2	2	2	0
(microsomal GSTII)	724	410	828	682	627	485	466	935	708	509	545
(GST12; MGST1)	740	371	470	399	394	297	418	458	336	190	189
transcriptional enhancer factor (TEF1)	119	26	63	62	91	61	43	112	75	33	42
transcription factor IIIC box B-binding subunit	29	24	14	11	39	15	31	33	26	12	4
Sp3 protein	276	41	154	149	173	93	118	222	145	92	116
cell cycle gene 1 protein (CCG1)	59	21	23	29	42	20	27	56	31	20	25
nucleobindin precursor (NUC)	1511	1858	771	856	622	643	895	1320	774	602	300
tastin	22	21	30	19	21	8	10	19	26	17	12
vitronectin receptor alpha subunit	309	57	214	193	163	98	114	220	166	128	122
desmoglein 2 precursor (DSG2); HDGC	109	19	84	67	67	50	52	107	77	58	63
integrin alpha 1 (ITGA1)	68	16	58	51	60	27	46	89	61	28	34
insulin receptor precursor (INSR)	1112	585	472	377	551	442	588	1299	880	168	150
CC chemokine receptor type 2	6	17	4	1	0	3	2	4	1	2	3
interleukin 10 receptor (IL-10R)	2	6	3	2	4	1	6	2	1	4	1
selenium-binding protein	26	59	38	31	27	27	45	37	36	13	8
glutathione S-transferase pi (GSTP1; GST3)	4	13	9	6	2	4	7	9	5	1	2
homeobox protein HOX-11	5	12	4	1	7	3	11	7	1	2	2
nuclear respiratory factor 1	70	39	38	35	40	36	34	55	43	19	14
homeobox protein HOX-D3; HOX-4A	53	58	121	87	29	15	44	80	52	21	18
CCAAT-binding transcription factor subunit B	705	155	572	494	366	325	256	456	445	274	354
neu differentiation factor	3	13	2	5	0	2	4	5	1	1	1
trophinin	19	14	10	15	16	4	19	27	6	15	12
alpha1 catenin (CTNNA1)	4528	2276	3011	3252	2510	1209	1834	3925	3388	1669	665
platelet membrane glycoprotein IIIa precursor	7	5	4	5	5	1	3	5	7	2	1
integrin alpha 7B precursor (IGA7B)	202	127	61	75	71	72	139	112	57	24	22
platelet-derived growth factor receptor beta subunit	22	25	11	23	8	13	15	45	27	5	2
N-sam	3053	2285	1457	1328	1458	1348	2106	3091	1778	786	725
interferon gamma receptor (IFNGR)	21	55	10	20	15	3	74	83	28	12	0
microsomal stress 70 protein	129	28	67	66	98	53	94	172	121	42	33
glutathione S-transferase theta 1 (GSTT1)	997	858	822	864	726	556	626	1150	746	557	722
transcriptional repressor protein yin & yang 1	3488	1677	2286	2199	1443	1900	1994	3700	2094	910	723
FUSE binding protein	820	172	533	480	474	481	205	605	468	257	471
transcription factor TFIIIB 90 kDa subunit	424	770	193	236	195	131	652	1057	432	78	60
DNA-binding protein HIP116	245	210	71	65	63	84	120	91	68	46	76
transcription factor LSF	119	46	73	61	51	58	44	80	65	31	50
Herpes virus entry protein C (HVEC)	91	90	46	47	47	51	75	135	56	14	17
intercellular adhesion molecule-1 precursor	499	414	482	491	304	335	168	476	362	350	582
CR3A	5	5	3	3	13	2	61	1	75	1	1
LFA-1 alpha subunit precursor	2439	875	11063	8537	3370	714	3412	1624	1265	7063	3384
hyaluronate-binding protein	5	7	4	3	1	1	3	3	1	3	2
interleukin-7 receptor alpha subunit precursor	7	10	3	3	2	0	5	1	2	1	0
interleukin-1 receptor type 1 precursor	580	396	289	219	228	170	317	430	278	149	123
thiosulfate sulfurtransferase; rhodanese	35	56	12	21	24	16	46	44	24	15	14
heme oxygenase 1 (HO1); HSOXYGR	795	711	483	445	427	507	644	957	529	295	174
heme oxygenase 2 (HO2)	373	183	79	90	245	158	396	547	238	57	25
quinone oxidoreductase	341	93	233	233	255	164	189	388	277	157	222
MPV17 protein	70	49	89	57	81	53	32	49	48	30	44
bone morphogenetic protein 4	2064	950	1252	1326	1229	919	898	1400	944	639	916
thrombomodulin precursor	11	14	17	15	4	3	7	18	8	4	4
insulin-like growth factor binding protein 1	515	232	428	333	199	493	183	602	433	952	1336
teratocarcinoma-derived growth factor 1	260	92	1849	1555	318	104	538	250	154	443	340
insulin-like growth factor IA precursor	11	49	17	35	9	41	21	16	31	2	9
glycoprotein hormone alpha subunit precursor	3	4	0	1	4	1	6	3	0	0	1
interferon-beta	129	157	22	24	29	36	80	29	19	11	12
follicle-stimulating protein precursor	9	14	6	7	1	4	9	5	3	4	1
proteasome component C2	1427	614	1105	1174	936	706	673	1399	1188	767	965
25-kDa trypsin inhibitor	2	4	4	4	5	1	3	1	0	2	1
plasminogen precursor (PLG)	17	14	4	17	2	11	18	18	26	20	16
heat shock cognate 71-kDa protein	7631	2301	5367	4844	3622	4918	3196	8013	4483	3450	4616
heat-shock protein 40 (HSP40)	298	216	111	126	175	138	282	246	135	69	65
alpha-1-acid glycoprotein 1 precursor	10653	6852	7630	10246	7571	7805	4000	12685	9277	4501	6301
bone morphogenetic protein 5 precursor	12	28	7	19	6	4	9	10	6	5	3
FMLP-related receptor I (FMLPRII)	3	9	3	0	5	3	4	2	5	2	5
vascular endothelial growth factor precursor	1368	351	711	581	446	684	515	1438	1261	1553	2611
endothelial-monocyte activating polypeptide II	1893	390	931	881	1555	845	969	1950	1603	386	640

delta-like protein precursor (DLK)	1100	985	927	889	1076	731	518	1085	1008	823	1267
alpha calcitonin precursor	4	7	1	1	0	5	1	5	0	1	4
interferon-alpha2 precursor	7	8	8	14	3	3	14	6	2	2	2
complement component 5 (C5)	21	8	14	23	19	14	12	45	22	17	26
proteasome component C3	1214	441	782	900	900	540	567	1245	1201	596	926
matrix metalloproteinase 1 (MMP1)	8	7	0	1	7	1	4	10	7	4	1
protein C inhibitor (PROCI; PCI)	1834	1426	872	1333	1432	1008	1193	2632	1813	600	291
heat shock 70-kDa protein 6	6	11	8	3	3	5	8	8	5	2	5
HSPD1	5929	1204	2425	2607	3291	2519	2807	5067	3483	1479	1931
alpha-1-antichymotrypsin precursor	460	295	258	238	175	273	122	305	212	283	558
bone morphogenetic protein 6 precursor	28	2	16	3	5	4	11	5	1	2	2
(CSF-1; MCSF)	990	842	302	483	442	633	838	694	361	189	255
heparin-binding growth factor 8 (HBGF-8)	5	9	2	13	6	5	15	10	5	5	53
FLT4 ligand	8	5	5	3	3	4	8	4	4	3	1
(MIP1-beta)	7	7	12	5	3	70	1	403	4	1	348
parathyroid hormone-related protein precursor	5	9	2	4	3	3	7	3	4	2	3
interleukin-10 precursor (IL-10)	328	330	337	491	147	234	263	226	112	142	138
puromycin-sensitive aminopeptidase (PSA)	321	115	246	235	176	146	109	225	201	187	255
proteasome component C5	1996	717	1257	1530	1033	862	726	1587	1233	817	1225
matrix metalloproteinase 2 (MMP2)	4	8	1	3	6	12	6	7	6	5	1
endothelial plasminogen activator inhibitor-1	0	4	2	2	1	1	4	1	2	2	0
heat shock-related 70-kDa protein 2	22	24	8	6	3	5	14	6	11	3	5
heat shock 90-kDa protein A	10214	1511	4413	6161	6417	3801	4099	8752	7210	2219	2732
B94 protein	17	11	3	6	1	4	4	7	11	3	5
bone morphogenetic protein 8	12	3	4	3	6	4	4	9	8	1	2
hepatocyte growth factor activator	145	126	67	54	66	65	76	188	78	40	36
T-cell-secreted protein I-309 precursor	6	8	1	3	0	2	3	2	5	0	3
interferon gamma-induced protein precursor	1	8	4	5	3	1	5	0	4	0	1
ribonuclease/angiogenin inhibitor	1196	913	372	349	480	298	496	888	555	282	412
interleukin-16 (IL-16)	8	7	2	2	0	2	2	2	1	0	4
interleukin-13 precursor (IL-13); NC30	20	86	61	132	31	45	61	62	87	13	30
heregulin-beta3	20	19	12	15	6	29	11	24	12	12	19
proteasome component C8	1175	331	702	983	705	457	551	1172	944	519	696
matrix metalloproteinase 3 (MMP3)	3	9	3	4	2	2	0	9	2	3	3
placental plasminogen activator inhibitor 2	4	7	2	5	3	2	11	5	8	8	1
glutathione peroxidase (GSHPX1; GPX1)	415	475	277	288	301	97	159	322	177	146	172
27-kDa heat-shock protein (HSP27)	4440	3783	2449	2810	2563	2708	2408	5409	3619	969	1231
C-reactive protein precursor	20	9	6	3	11	16	13	10	14	2	3
bone-derived growth factor 1 (BPGF1)	5	1	2	2	3	2	4	10	4	2	11
hepatoma-derived growth factor (HDGF)	1589	929	660	684	948	1269	946	1994	943	280	279
stem cell factor precursor (SCF)	505	60	245	221	302	189	194	420	327	77	140
migration inhibitory factor-related protein 14	4	11	4	5	5	7	13	5	8	1	2
erythroid differentiation protein	4	12	2	6	2	2	7	3	1	1	2
interleukin-18 precursor (IL-18)	132	160	63	73	64	30	85	117	61	39	33
interleukin-14 precursor (IL-14)	51	43	28	38	64	26	44	47	39	20	24
alpha-1-antitrypsin precursor	31171	28792	23760	34178	19062	20838	10788	35208	27702	32831	40393
proteasome component C9	201	65	151	228	205	71	91	136	150	124	214
matrix metalloproteinase 7 (MMP7)	8	5	2	4	2	3	0	2	4	4	4
metalloproteinase inhibitor 1 precursor (TIMP1)	653	942	395	565	413	530	795	1349	710	150	123
glutathione peroxidase-gastrointestinal	2263	1935	1730	1503	1710	1876	946	1827	1456	707	1492
70-kDa heat shock protein 1	421	282	237	132	179	341	509	445	201	127	142
eosinophil granule major basic protein precursor	170	146	15	16	3	37	71	33	21	11	15
insulin-like growth factor II	7395	4335	2748	2019	3616	3814	4408	14009	6891	5332	6974
endothelin 3 (EDN3; ET3)	8	2	4	2	7	3	9	9	2	6	3
heparin-binding EGF-like growth factor	9	0	2	1	1	3	3	3	3	1	1
migration inhibitory factor-related protein 8	6	8	3	2	4	1	3	3	0	0	1
angiotensin-converting enzyme (ACE)	11	11	8	22	2	11	9	10	12	4	4
interferon gamma precursor	36	70	25	66	27	28	65	85	67	11	17
interleukin-11 (IL-11)	6	12	2	12	6	2	13	7	1	6	4
carboxypeptidase H precursor (CPH)	1807	994	1211	1654	1082	873	998	2002	1354	1560	2224
acrosin precursor	3	25	2	23	11	4	11	3	15	6	5
matrix metalloproteinase 8 (MMP8)	15	18	2	3	6	4	7	8	5	2	2
tissue inhibitor of metalloproteinases 2	68	49	27	33	29	29	46	36	32	18	12
thioredoxin peroxidase 1 (TDPX1)	4040	4308	1922	2348	2394	2113	1710	3343	2355	1665	2088
cytosolic superoxide dismutase 1 (SOD1)	1452	600	932	1108	914	739	688	1266	730	681	940
monocyte chemoattractant protein 4 precursor (MCP4)	7	6	3	2	1	2	2	3	0	3	2
pbacplermin; c-sis	193	168	39	33	21	46	84	52	26	17	19
neuroleukin (NLK)	2930	2349	1274	1328	1679	2581	1800	4546	2508	1181	1525
hepatocyte growth factor (HGF)	4	8	4	3	0	2	6	3	0	0	1
platelet-derived growth factor A subunit precursor	240	247	79	71	80	71	145	141	71	41	41
prorelaxin H2 precursor (RLN2)	4	4	3	7	4	2	8	0	0	1	1
interleukin-7 (IL-7)	156	145	18	26	25	44	82	24	47	13	14

interleukin-12 beta subunit precursor (IL-12B)	143	163	11	31	14	40	69	28	11	15	17
dipeptidyl-peptidase I precursor (DPP-I)	664	318	390	564	387	297	378	710	448	394	443
acrosin-trypsin inhibitor II precursor; HUSI II	5	14	3	10	5	4	6	0	2	10	2
matrix metalloproteinase 9 (MMP9)	104	145	41	62	49	38	150	184	96	22	12
tissue inhibitor of metalloproteinase 4 (TIMP4)	2	8	0	1	0	0	4	1	0	1	1
thioredoxin peroxidase 2 (TDPX2)	2274	628	920	1040	1380	1138	890	1588	1133	477	744
glutaredoxin	258	95	105	171	213	152	148	445	233	113	160
pancreatitis-associated protein 1 precursor	6	5	3	3	2	2	5	1	1	1	2
(GM-CSF); CSF2	10	8	6	14	3	3	8	8	6	3	8
thrombopoietin precursor (THPO)	57	61	36	36	31	27	13	41	30	33	46
keratinocyte growth factor (KGF)	8	5	2	1	1	1	5	3	2	0	1
leukemia inhibitory factor precursor (LIF)	83	56	57	50	32	42	38	74	46	41	37
renin-binding protein (RENBP; RNBP)	149	117	35	53	33	44	69	53	32	17	27
interleukin-2 precursor (IL-2)	83	83	7	12	13	20	34	15	9	7	7
interleukin-12 alpha subunit precursor (IL-12A)	2	15	3	2	0	3	4	2	2	2	2
cathepsin H precursor	527	401	365	510	348	360	220	531	461	358	566
leukocyte elastase inhibitor (LEI)	143	72	79	111	85	61	108	176	117	115	133
matrix metalloproteinase 12 (MMP12)	9	11	3	11	7	1	7	3	4	2	2
matrix metalloproteinase 17 (MMP17)	184	263	32	61	46	75	125	59	34	38	20
cytochrome P450 IIF1 (CYP2F1)	3	5	1	2	6	3	8	11	0	0	1
thioredoxin reductase	393	113	96	136	354	233	287	661	227	35	40
osteoclast stimulating factor	83	9	42	47	53	40	38	73	62	32	45
transforming growth factor-alpha	9	58	3	3	5	2	13	8	5	3	2
uromodulin	7	5	4	2	1	2	1	2	4	3	1
brain-derived neurotrophic factor (BDNF)	0	5	1	3	2	0	2	1	0	1	0
acidic fibroblast growth factor (AFGF)	1	7	3	3	0	0	0	6	2	0	6
glucagon precursor (GCG)	1	7	2	6	1	1	0	0	2	0	0
interleukin-1 alpha precursor	11	5	3	5	1	4	4	3	2	1	1
interleukin-15 (IL-15)	6	2	2	0	1	0	5	3	0	3	0
cystatin-related epididymal spermatogenic	3	12	1	14	1	1	6	3	2	1	1
inter-alpha-trypsin inhibitor heavy chain H2 precursor	2167	612	871	1298	1221	849	925	1904	1588	811	749
matrix metalloproteinase 14 precursor	24	27	18	25	23	20	24	36	25	13	8
tripeptidyl-peptidase I precursor	111	133	91	106	85	78	119	88	65	123	92
dioxin-inducible cytochrome P450 1B1	4	2	2	5	2	2	1	11	1	3	0
NAD(P)H dehydrogenase	285	201	170	196	385	152	159	223	158	108	85
CXC chemokine precursor	7	5	2	2	2	2	3	3	2	1	1
transforming growth factor-beta	81	68	888	1003	106	51	189	117	68	298	390
T-cell-specific rantes protein precursor	1200	621	4416	4606	1123	515	2167	1011	582	2346	1633
embryonic growth/differentiation factor 1 (MIP2-alpha)	10	9	7	7	3	3	6	8	4	7	41
inhibin alpha subunit precursor (INH4)	4	12	5	4	0	0	5	4	0	1	2
interleukin-1 beta precursor	72	65	58	38	30	21	47	104	53	52	34
interleukin-9 precursor (IL-9)	1098	618	301	400	365	432	515	605	393	195	232
major epididymis-specific protein E4 precursor	5	12	20	3	0	3	3	4	4	1	2
(ITI heavy chain H3)	4	2	3	3	2	1	5	2	3	1	2
matrix metalloproteinase 15 (MMP15)	179	135	79	108	88	116	122	235	152	125	65
dipeptidyl peptidase IV (DPP IV; DPP4)	88	126	35	33	59	49	87	127	77	31	17
S-mephenytoin 4 hydroxylase	186	36	123	170	164	105	125	192	139	98	144
2 P450VD1-alpha	4	13	3	11	0	0	3	2	1	1	0
bone morphogenetic protein 3B precursor	13	12	8	13	10	5	13	6	4	5	7
(G-CSF); pluripotent; CSF3	26	34	1	1	5	3	5	1	3	1	2
(MIP1-alpha)	7	12	4	3	0	2	7	4	1	1	1
endothelin 2 (ET2)	6	13	15	5	3	3	15	4	7	3	5
placenta growth factors 1 + 2	514	763	220	421	227	241	767	1095	449	101	114
estrogen sulfotransferase	94	104	25	34	24	42	54	51	23	18	22
interleukin-3 precursor (IL-3)	90	26	25	37	44	25	44	73	38	19	18
interleukin-17 precursor (IL-17)	13	17	3	1	4	2	9	5	5	1	1
insulin-degrading enzyme	3	2	3	4	2	0	23	3	3	0	1
(ITI heavy chain H4)	235	58	77	126	139	100	152	328	164	59	73
membrane-type matrix metalloproteinase 3	9	10	3	8	5	2	10	8	7	3	4
myeloblastin precursor (MBN)	3	14	3	13	1	2	15	15	6	3	1
P450(SCC)	2	5	1	0	4	1	0	2	3	2	2
glutathione synthetase	27	6	20	15	6	11	2	23	7	16	22
bone morphogenetic protein 1 (BMP1)	311	348	154	260	224	249	263	506	328	138	154
transforming growth factor beta2 precursor	57	46	30	28	26	32	28	67	35	19	19
monocyte chemotactic protein 1 precursor	417	277	116	270	115	147	215	322	190	79	121
hepatocyte growth factor-like protein	14	4	3	2	5	1	12	2	6	2	0
granulocyte chemotactic protein 2 (IGF-binding protein 3; IGBP3; IBP3)	1320	1032	560	642	823	496	981	1598	856	894	852
interleukin-4 precursor (IL-4)	2	7	4	6	1	3	6	4	3	1	2
parathyroidin	4	10	3	2	0	1	7	4	1	1	2
	2	1	1	3	0	2	1	5	0	2	0
	346	463	488	409	236	274	181	290	264	509	635

methionine aminopeptidase 2	1181	253	640	956	828	556	534	1045	823	517	772
neuroserpin precursor	29	13	14	22	14	9	18	32	21	12	16
matrix metalloproteinase 13 (MMP13)	1	2	0	2	2	0	2	2	1	1	0
cathepsin L precursor	117	44	44	56	57	41	52	86	57	33	32
polymorphic arylamine N-acetyltransferase	8	5	4	3	7	5	4	6	3	1	0
glutathione S-transferase mu1	148	140	79	73	137	81	104	92	87	46	55
bone morphogenetic protein 2A	97	84	41	72	45	37	98	160	86	22	27
kidney epidermal growth factor	18	9	9	4	1	5	5	10	10	2	3
oncostatin M (OSM)	77	58	52	43	6	4	71	74	38	9	1
thymosin beta-10	3464	3579	2094	3405	2555	2662	3505	5089	2900	2492	2888
OX40 ligand (OX40L)	9	17	8	11	7	3	90	14	18	14	14
cellular retinoic acid-binding protein II	1	4	3	1	0	1	4	0	0	2	0
interleukin-6 precursor (IL-6)	215	244	342	458	101	179	137	291	210	76	114
thymosin beta 4; FX	53	62	18	33	34	41	35	35	31	10	7
proteasome activator HPA28 subunit beta	278	159	114	146	454	106	322	250	161	94	66
cytoplasmic antiproteinase 2	4	10	2	7	3	3	19	5	3	2	3
cathepsin D precursor (CTSD)	604	987	269	373	293	397	363	576	356	394	449
activator of RNA decay (ARD-1)	105	39	27	52	47	34	95	88	62	25	26
serum paraoxonase/arylesterase 1	5	6	4	12	4	3	3	3	5	1	6
glutathione S-transferase A1	369	192	128	192	225	160	224	234	151	95	89
bone morphogenetic protein 3 (BMP3)	4	4	1	1	0	1	1	5	0	1	3
cytokine humig	1	6	3	3	2	4	2	7	1	2	2
amphiregulin (AR)	5	11	3	0	5	21	5	12	3	2	5
connective tissue growth factor precursor	78	13	46	79	54	14	20	26	16	21	61
interleukin-8 precursor (IL-8)	5	14	1	15	3	5	6	4	4	1	1
corticotropin-releasing factor-binding protein	5	14	0	3	0	4	4	4	0	2	2
interleukin-5 precursor	5	5	1	2	0	2	3	3	0	1	0
Wnt-13	4	4	2	41	0	2	5	5	2	3	2
proteasome inhibitor HPI31 subunit	567	381	174	292	307	235	506	678	374	112	55
bikunin	22	23	1	5	3	9	28	10	7	3	5
metalloprotease	65	19	38	65	48	29	47	72	47	44	46
zinc finger X-chromosomal protein	491	90	290	465	253	231	168	379	351	318	477
ubiquitin	14068	6645	11420	7413	7801	4724	6114	8721	5461	6873	3406
phospholipase A2	753	257	736	643	549	388	358	584	513	503	596
hypoxanthine-guanine phosphoribosyltransferase	203	91	208	159	154	85	141	211	210	155	118
(GAPDH)	44205	38493	41968	35937	25843	27698	20823	41871	33210	37330	31894
brain-specific tubulin alpha 1 subunit	41282	33474	23790	29461	35416	42721	18403	39577	43461	8167	4591
HLA class I histocompatibility antigen	569	663	385	283	659	310	536	394	356	235	144
cytoplasmic beta-actin (ACTB)	1385	1775	516	816	1028	995	1102	878	590	367	225
23-kDa highly basic protein	21478	18779	8829	17597	12634	17273	9755	13668	13765	8857	4251
40S ribosomal protein S9	4788	8417	1297	2471	3101	2207	2392	2308	1694	1473	774

Protein/gene	Intensity - 1.25mM DEM Treated Cultures										
	15 min.	30 min.	1 Hour	2 Hour	4 Hour	6 Hour	8 Hours	12 Hour	16 Hour	20 Hour	24 Hour
Von Hippel-Lindau tumor suppressor protein	254	210	293	299	222	184	370	444	319	464	188
cadherin1 (CDH1)	1	2	3	2	1	2	7	6	3	3	3
LUCA2	313	353	188	208	248	62	74	115	61	85	27
N-myc proto-oncogene	22	21	19	8	6	0	7	5	3	1	0
B-raf proto-oncogene (RAFBI)	39	17	40	45	17	26	51	56	44	55	22
vascular endothelial growth factor receptor 1	132	160	43	44	51	46	172	62	42	50	24
transforming protein rhoA	6505	6735	5981	7155	6529	3588	5019	8752	10798	10864	5358
G2/mitotic-specific cyclin A	609	400	827	958	261	274	317	386	180	317	109
BUBR1 protein kinase	145	59	120	159	38	43	70	64	49	61	17
wee1Hu CDK tyrosine 15-kinase	22	46	60	60	22	19	31	45	29	51	27
aurora-related kinase 1 (ARK1)	291	181	243	243	143	110	153	235	148	218	72
CDC25B; CDC25HU2	119	130	119	86	105	28	107	49	40	104	23
transmembrane 4 superfamily protein; SAS	334	343	176	189	169	147	429	239	135	192	90
calcium-activated potassium channel beta subunit	7	13	10	7	2	4	12	7	3	5	0
mothers against dpp homolog 4 (SMAD4)	121	55	92	100	66	93	150	226	150	133	72
ras-related protein RAP-1A	225	277	2047	599	167	126	248	459	625	800	589
LUCA15 putative tumor suppressor	43	32	40	35	30	21	40	60	55	64	24
erythroblastosis virus oncogene homolog 1	13	10	11	29	11	8	15	13	14	14	9
pim-1 proto-oncogene	95	104	88	143	248	113	415	453	502	213	81
tyrosine-protein kinase receptor tyro3 precursor	116	178	208	221	177	39	128	125	122	141	79
transforming protein p21/K-ras 2B	201	145	234	284	119	111	143	261	239	317	162
G2/mitotic-specific cyclin B1 (CCNB1)	1668	1336	2038	2349	1030	615	874	804	512	1050	359
cell division control protein 2 homolog (CDC2)	1101	461	539	837	481	456	555	540	495	538	176
DNA-binding protein inhibitor ID-1; Id-1H	1403	1608	1979	1946	1826	552	1094	1076	877	1249	555
ARK2	239	186	161	144	254	85	133	76	56	64	15
CDC25C; M-phase inducer phosphatase 3	186	155	169	245	206	105	190	169	159	144	68

C-1	683	471	799	1158	686	453	818	1158	1141	1083	461
Gprotein-activated inward rect. potassium chan. 1	3	10	21	14	1	0	8	6	1	8	1
adenomatous polyposis coli protein	54	17	71	85	23	55	82	111	142	138	91
EB1 protein	951	603	844	954	534	349	684	993	1258	1993	868
neogenin	19	13	25	13	13	10	13	15	16	16	7
MAD protein; MAX dimerizer	16	15	16	21	50	65	159	329	226	164	63
c-raf proto-oncogene	285	190	158	201	185	195	251	441	445	371	153
c-ros-1 tyrosine-protein kinase proto-oncogene	136	195	36	32	25	29	216	36	19	33	13
N-ras; transforming p21 protein	408	231	480	598	173	198	297	415	381	884	379
G1/S-specific cyclin D1 (CCND1)	600	459	419	493	296	146	138	140	70	60	14
cyclin-dependent protein kinase 2 (CDK2)	152	145	164	193	154	100	140	151	96	109	59
cell division protein kinase 9 (CDK9)	197	189	100	111	125	28	61	86	94	101	37
cyclin-dependent kinase 4 inhibitor B (CDKN2B)	2	6	5	4	1	0	10	7	1	4	2
prothymosin alpha (ProT-alpha; PTMA)	2753	2826	6026	4932	4754	1096	2676	5154	3602	3525	2182
cyclin-D binding Myb-like protein (hDMP1)	37	11	52	61	35	44	97	148	121	144	76
G protein-activated inward rect. potassium chan.	4	7	2	5	4	0	10	5	0	6	0
breast cancer type 2 susceptibility protein	82	81	53	62	29	36	156	63	64	65	27
ezrin; cytovillin 2; villin 2 (VIL2)	1086	867	552	608	897	271	439	1164	746	511	220
transforming growth factor-beta signaling protein 1	81	65	109	154	103	77	105	111	109	119	42
jun-D	46	41	36	36	78	35	72	101	35	59	14
A-raf proto-oncogene serine/threonine kinase	25	19	23	14	25	1	17	17	2	9	0
proto-oncogene tyrosine-protein kinase abl	154	209	98	158	378	74	232	224	306	214	101
C-cbl proto-oncogene	8	14	6	15	14	2	10	13	24	26	9
G1/S-specific cyclin D2 (CCND2) + KIAK0002	7	6	5	4	2	0	4	1	1	6	2
cell division protein kinase 4	1822	1339	464	660	2254	578	758	1058	776	346	106
stem cell tyrosine kinase 1 (STK1)	23	29	5	10	17	4	37	13	7	16	3
cyclin-dependent kinase 4 inhibitor	26	39	10	7	9	9	49	11	5	8	2
DNA-binding protein inhibitor ID-1; Id-1H	496	465	542	277	468	42	156	701	643	1189	562
water channel aquaporin 3 (AQP3)	3	6	2	2	8	0	6	0	2	3	0
ASIC3 proton gated cation channel	5	12	1	2	3	0	13	7	1	7	1
tumor suppressor protein DCC precursor	7	10	65	24	7	1	12	33	37	7	5
transforming growth factor-beta 3 (TGF-beta3)	13	9	12	15	12	13	7	15	7	4	2
p78 putative serine/threonine-protein kinase	83	43	89	72	41	55	88	162	127	138	61
B-myb	523	641	656	534	824	143	484	484	379	593	300
tyrosine-protein kinase receptor UFO precursor	15	20	19	12	6	0	7	3	8	9	5
tyrosine-protein kinase ABL2	58	38	58	58	32	25	47	59	47	50	18
INT-2 proto-oncogene protein precursor	8	8	14	13	4	4	8	9	6	15	1
G1/S-specific cyclin D3 (CCND3)	3	6	7	6	12	1	10	3	5	9	1
cell division protein kinase 6 (CDK6)	770	893	656	674	1021	330	1159	860	685	771	353
serine/threonine-protein kinase KKIALLRE	6	7	4	11	18	5	13	6	8	16	5
cyclin-dependent kinase 4 inhibitor D (CDKN2D)	132	109	91	152	184	70	165	368	483	485	194
transcription factor DP2 (Humdp2)	128	80	95	101	93	81	126	178	131	96	47
sulfate transporter; diastrophic dysplasia protein	24	7	21	24	4	0	13	4	3	5	2
Gprotein-activated inward rect. potassium chan. 3	2	2	3	2	1	0	4	0	2	4	0
p53-associated mdm2 protein	353	134	180	245	230	416	736	943	660	585	218
(TGF beta receptor III; TGFR3)	438	237	257	345	294	282	501	708	623	269	118
C-maf transcription factor	3	7	4	3	2	2	8	0	1	6	1
fos-related antigen 2 (FRA2)	4	4	10	5	8	1	21	37	15	59	32
(CSF-1-R)	78	67	40	31	47	2	30	57	33	15	3
C-src proto-oncogene (SRC1)	249	150	239	143	266	191	247	686	521	313	138
mas proto-oncogene	5	3	11	5	2	0	7	2	6	6	2
G1/S-specific cyclin E (CCNE)	330	190	109	115	160	61	104	298	349	249	128
cell division protein kinase 5 (CDK5)	276	252	193	201	315	81	140	199	157	66	25
CDC2-related protein kinase CHED	137	73	109	126	79	103	153	317	210	174	77
cyclin-dependent kinase inhibitor 1C	1	3	1	3	5	0	9	4	6	6	1
helix-loop-helix protein HLH 1R21	83	64	54	64	109	20	64	153	77	55	21
erythrocyte glucose transporter 1 (GLUT1)	114	128	259	179	130	34	116	128	94	124	79
ATP-sensitive inward rect. potassium chan. 8	2	3	3	5	41	0	5	0	5	7	1
neurofibromatosis protein type I (NF1)	44	17	41	51	16	24	46	60	36	47	26
prohibitin (PHB)	243	183	178	131	251	86	151	252	118	136	49
elk-1; ets-related proto-oncogene	21	22	19	18	20	3	23	11	13	20	8
fos-related antigen (FRA1)	52	59	85	54	117	52	233	581	599	966	766
c-kit proto-oncogene	0	1	3	3	2	1	1	1	3	1	1
C-yes proto-oncogene (YES1)	244	75	117	135	104	171	236	550	543	269	192
thrombopoietin receptor precursor (TPOR)	1	6	5	4	0	3	4	3	2	4	0
G2/mitotic-specific cyclin G1	161	66	174	156	67	96	154	202	168	162	75
protein serine/threonine kinase STK1	134	90	58	88	122	93	66	185	122	100	53
p35 cyclin-like CAK1-associated protein	145	45	164	154	76	70	108	138	93	129	67
cyclin-dependent kinase inhibitor 1 (CDKN1A)	173	209	129	137	638	577	2369	2293	1686	2446	1420
40S ribosomal protein S19 (RPS19)	16012	12918	6408	7597	18894	3436	9713	13402	15566	12747	7109
liver glucose transporter 2	76	40	66	70	35	25	38	39	28	9	3
calcium-activated potassium channel HSK1	3	5	3	16	2	1	7	4	3	8	1
moesin-ezrin-radixin-like protein (MERLIN)	283	221	102	146	254	134	207	244	228	157	81
tight junction protein zonula occludens (ZO-1)	32	11	28	27	13	16	30	66	38	51	33
A-myb proto-oncogene; myb-related protein A	162	206	52	57	44	39	214	57	45	57	24
v-erbA related protein (EAR2)	332	370	257	299	366	95	208	370	283	324	178

met proto-oncogene	34	10	30	37	11	10	17	23	15	22	3
C-fes proto-oncogene	16	14	11	14	18	0	10	12	13	9	0
cell surface glycoprotein MUC18	24	32	24	18	28	3	23	11	8	20	2
cyclin H (CCNH); MO15-associated protein	641	234	557	741	253	299	383	750	759	813	358
extracellular signal-regulated kinase 1	91	85	72	78	124	35	88	86	51	71	29
cyclin G-associated kinase (GAK)	104	86	75	83	108	36	86	93	79	120	42
cyclin-dependent kinase inhibitor 3 (CDKN3)	225	126	332	370	107	101	153	198	160	192	82
bullous pemphigoid antigen 1	38	10	58	49	16	22	17	42	34	37	19
brain glucose transporter 3 (GTR3)	1191	1143	1615	1137	494	163	315	258	145	125	50
chloride conductance regulatory protein ICLN	425	217	382	394	262	218	265	477	288	292	154
retinoblastoma-like protein 2	51	20	20	38	25	22	37	41	26	30	9
nucleoside diphosphate kinase B	3450	2942	2821	3514	3816	1925	3258	5361	3523	5542	2725
c-fos proto-oncogene; G0S7 protein	4	6	3	4	1	1	5	7	2	9	2
ets-related protein tel	7	8	9	7	18	2	12	3	7	3	0
ret proto-oncogene	2	4	2	4	2	0	4	2	3	3	1
C-fgr proto-oncogene (p55-FGR); SRC2	31	25	30	22	20	6	32	67	32	19	7
insulin-like growth factor binding protein 2	1618	2496	4036	4767	2251	473	2578	4299	3152	2679	1217
fte-1	3885	1186	2924	3050	1427	1884	2200	4397	3232	3799	2201
extracellular signal-regulated kinase 2	349	198	353	321	201	180	279	461	452	702	340
serine/threonine-protein kinase NEK3	75	21	32	31	38	33	34	60	73	53	29
ubiquitin-conjugating enzyme E2 H10	1257	848	637	593	850	333	426	766	722	852	385
proliferating cell nucleolar antigen P120	248	159	93	96	120	50	96	138	142	191	94
E16 amino acid transporter	411	523	363	368	526	163	487	800	385	710	207
HUKIV	14	14	4	5	3	3	24	6	8	10	0
p53 cellular tumor antigen	17	7	4	16	28	12	12	16	15	8	6
nucleoside diphosphate kinase A (NDKA)	2358	1746	1552	1617	2185	1073	2058	3217	2134	2110	1233
transcription factor AP-1	161	149	316	545	307	170	374	508	553	1587	581
triodothyronine receptor	6	8	6	3	6	1	8	9	8	6	1
epidermal growth factor receptor (EGFR)	20	26	33	27	14	2	13	16	4	22	7
shb proto-oncogene	227	266	210	270	461	177	337	765	685	634	326
T-lymphoma invasion and metastasis inducing	15	13	5	20	5	3	35	10	4	3	0
Cl man-6-P receptor	353	241	233	256	256	188	439	552	385	629	224
extracellular signal-regulated kinase 3	334	137	225	277	186	321	420	923	904	665	401
CDC-like kinase 2 (CLK2)	39	26	24	27	24	12	24	25	21	36	17
geminin	352	142	262	252	112	116	158	175	132	149	48
NuMA	12	14	10	9	8	2	17	8	3	15	3
aquaporin 4	205	144	245	166	461	148	140	861	215	134	62
voltage-gated potassium channel protein KV11	35	29	94	62	21	16	33	62	79	30	24
retinoblastoma-associated protein	83	41	88	91	32	40	47	100	63	64	32
TSG101 tumor susceptibility protein	58	31	43	58	41	35	46	127	86	68	44
myb proto-oncogene; c-myb	136	141	49	55	41	40	229	77	47	45	27
v-erbA related protein (EAR3)	215	192	328	253	177	35	104	144	120	93	54
ERBB2 receptor protein-tyrosine kinase	165	106	92	68	108	14	40	94	28	22	13
ski oncogene	410	670	603	602	756	211	451	593	485	582	374
matrix metalloproteinase 11	284	219	169	127	191	86	201	347	171	120	65
cyclin A1 (CCNA1)	5	4	25	15	7	7	3	14	20	8	6
extracellular signal-regulated kinase 4	6	4	6	9	3	2	7	0	14	3	2
CDC-like kinase 3 (CLK3)	233	194	171	150	233	101	273	656	779	522	435
katanin p80 subunit	33	47	30	22	38	3	83	8	4	32	9
myeloid cell nuclear differentiation antigen	4	2	6	6	0	0	7	6	1	6	0
aquaporin 9	2	2	3	4	1	0	6	0	0	6	0
voltage-gated potassium channel protein KV14	5	4	3	5	3	3	9	5	2	6	2
Wilms' tumor protein (WT33; WT1)	16	23	20	28	15	3	21	16	16	45	20
maguk p55 subfamily member 2	2	0	4	2	4	3	5	8	4	3	2
c-myc oncogene	2597	2873	3693	3528	3950	1245	2212	6312	4403	2803	1459
ETS oncogene (PEP1)	57	36	41	32	40	11	51	60	63	69	45
epidermal growth factor receptor	526	548	602	654	358	234	422	425	263	216	83
snoN oncogene	172	69	159	175	47	39	63	137	168	134	88
cyclin T CDK9-associated	95	46	90	100	43	47	124	199	197	262	132
cyclin G2 (CCNG2)	7	5	9	5	5	2	17	35	16	13	3
ERK5	67	35	46	37	50	22	42	88	60	66	40
serum-inducible kinase (SNK)	34	22	18	16	6	29	56	97	75	83	40
diaphanous 1 (HDLA1)	320	224	250	316	198	139	290	335	315	368	144
transducer of erbB2 (TOB)	113	145	441	304	238	55	183	839	417	291	153
cationic amino acid transporter 3	6	6	4	2	1	0	8	0	6	2	1
N-type calcium channel alpha-1B subunit	14	17	1	4	5	1	30	1	2	3	0
putative protein-tyrosine phosphatase	173	63	151	172	89	117	155	236	199	195	100
tumor suppressor maspin	4	1	2	0	3	1	8	5	4	1	0
c-rel proto-oncogene protein	48	18	56	50	34	52	82	191	154	88	58
cot proto-oncogene	15	4	10	12	4	4	15	7	11	9	4
ERBB4 receptor protein-tyrosine kinase	0	8	13	13	2	0	7	0	2	1	0
CBL-B	142	82	115	106	76	90	107	205	205	92	65
cyclin K	215	160	234	232	174	114	200	397	289	386	189
bub1 mitotic checkpoint kinase	402	129	406	349	127	176	221	319	198	317	168
cdc2-related protein kinase PISLRE	4	9	9	17	7	18	12	25	5	10	5
cyclin-dependent kinase regulatory subunit 1	765	512	867	876	602	517	986	1422	1322	1333	582

sprouty 2 (SPRY2)	29	17	35	24	17	8	13	14	17	23	9
p55CDC	1318	1210	826	889	1347	459	588	592	456	578	177
putative renal organic anion transporter 1	2	1	2	2	2	0	5	1	1	3	0
CAB3A/CAB3B	0	5	4	5	14	0	9	0	4	3	1
colorectal mutant cancer protein (MCC)	2	5	4	2	3	1	7	8	3	7	2
tumor suppressor LUCA1	193	159	225	163	180	82	118	74	45	49	17
L-myc proto-oncogene (MYCL1)	1	1	5	2	6	0	8	0	2	3	0
C-mos proto-oncogene kinase	2	2	3	2	2	0	3	0	0	0	0
platelet-derived growth factor receptor alpha subunit	1	5	5	2	2	0	2	0	1	6	1
H-ras proto-oncogene; transforming G protein	73	64	33	37	83	17	48	62	49	58	31
cyclin E2	47	12	40	36	14	14	17	34	30	29	15
serine/threonine-protein kinase NEK2	91	32	74	66	29	34	44	55	40	51	20
CDC-like kinase 1 (CLK1)	305	98	300	539	402	703	965	1642	1490	1209	663
cyclin-dependent kinase regulatory subunit	765	310	477	514	657	718	630	2875	2297	1506	991
cell division cycle protein 25A (CDC25A)	643	563	526	557	470	259	351	828	1002	827	438
RCL growth-related c-myc-responsive gene	274	383	296	312	523	101	414	269	210	260	131
erythrocyte urea transporter	4	1	20	6	1	3	3	6	5	5	1
CACNA1G	13	24	7	1	5	2	33	4	5	4	1
kidney glomeruli chloride channel; CIC-5	165	55	151	162	82	102	149	253	221	163	113
monocarboxylate transporter 1 (MCT1)	1461	846	1452	1501	697	721	1166	1816	1792	1954	1296
zinc transporter 4	8	4	3	5	1	5	4	8	1	3	0
MSP receptor	2	2	2	2	3	0	8	2	0	6	1
U-PAR	721	609	429	534	809	296	600	1062	867	629	378
related to receptor tyrosine kinase (RYK)	240	235	144	174	85	64	294	171	112	189	92
proto-oncogene tyrosine-protein kinase lck	7	5	7	0	5	2	4	3	3	2	2
glycogen synthase kinase 3 beta	75	52	115	124	55	42	102	165	148	148	88
MAPKK 6	124	71	62	79	44	45	73	47	31	16	1
PRKAR2A	131	76	67	71	61	50	85	134	90	96	40
lipid-activated protein kinase PRK1	143	118	83	86	176	45	105	149	115	111	48
serine/threonine-protein kinase PAK-beta	3	7	3	4	3	1	6	5	0	6	0
phospholipase C-delta-1	8	3	17	4	4	4	4	4	3	1	1
ADP-ribosylation factor 1	87	110	144	112	118	44	101	162	45	88	47
cardiac muscle sodium channel alpha subunit	3	5	5	3	3	0	6	0	5	3	1
sodium/hydrogen exchanger 1	56	42	45	52	53	36	57	104	79	104	61
Golgi 4-transmembrane spanning transporter	479	384	385	535	452	303	524	1039	783	725	405
autocrine motility factor receptor	28	21	18	19	27	18	35	56	29	55	30
vascular endothelial gf receptor 2 precursor	5	6	6	2	3	2	8	12	3	4	0
protein-tyrosine kinase transmembrane rec. ror1	2	2	6	4	2	1	6	1	1	5	0
tyrosine-protein kinase lyn	215	137	140	148	203	98	83	368	125	96	32
pyruvate dehydrogenase kinase precursor	202	77	136	86	47	55	53	89	42	46	21
MAPK/ERK kinase kinase 3	159	111	37	71	148	76	132	302	212	110	47
Janus kinase 1 (JAK1)	289	137	166	250	131	145	219	421	597	431	240
(SGK)	190	245	61	70	55	26	256	55	34	47	21
myotonic dystrophy protein kinase-like protein	5	6	6	1	2	0	5	5	0	5	0
P3-kinase catalytic subunit delta isoform	29	33	43	67	44	23	54	72	60	144	52
ras-related protein RAP-1B	388	252	429	664	228	313	501	950	1147	1156	738
KCNQ3 potassium channel	2	2	3	3	1	0	6	3	0	5	1
sodium/hydrogen exchanger 3	2	5	2	1	9	0	9	3	8	4	0
organic cation transporter 1	101	149	39	39	43	21	190	44	36	33	16
colon carcinoma kinase 4 precursor	139	98	97	98	137	35	80	122	67	50	30
angiopoietin 1 receptor precursor	38	45	28	61	70	52	37	89	57	26	14
neurotrophic tyrosine kinase receptor-related 3	7	4	16	15	5	7	15	23	16	8	0
integrin-linked kinase (ILK)	163	90	43	45	107	51	57	90	93	53	32
ribosomal protein kinase B (RSKB)	8	7	6	3	7	1	11	3	2	3	2
protein kinase C alpha polypeptide	264	154	201	231	115	141	196	329	220	262	106
janus kinase 3	307	170	5436	3117	237	225	478	645	1171	1883	649
serine/threonine-protein kinase NRK2	228	105	239	244	83	86	96	161	123	122	66
ribosomal protein S6 kinase II alpha 1	180	193	293	239	195	50	98	233	198	134	70
(PI3-kinase p85-beta subunit	174	133	88	108	176	45	104	126	97	79	37
ras-related protein RAB2	643	378	640	785	441	429	755	1372	1451	1718	931
voltage-gated potassium channel	3	0	2	1	2	1	5	1	2	5	1
small intestine oligopeptide transporter	5	11	9	5	10	5	12	12	11	8	3
apolipoprotein E precursor (APOE)	6722	5556	4719	5075	17015	3132	7521	9850	10033	7312	5269
activation B7-2 antigen	7	12	10	7	10	0	13	0	7	9	1
p68-trk-T3 oncoprotein	88	105	25	25	38	22	182	48	21	24	11
tyrosine kinase receptor tie-1 precursor	0	0	4	2	3	0	3	0	2	3	1
AF-1P protein	111	47	126	137	59	66	102	185	153	167	99
tyrosine-protein kinase ack	119	80	112	96	90	39	67	169	79	74	43
protein kinase C beta I (PKC-beta-1)	13	9	12	6	6	0	8	3	4	8	1
c-jun N-terminal kinase 1 (JNK1); JNK46	120	35	84	93	48	32	48	56	61	59	19
protein kinase MLK-3; sprk	1292	1048	1046	983	1624	503	595	1446	1205	850	388
ribosomal protein S6 kinase II alpha 2	21	20	11	15	6	3	32	13	8	9	2
PTDINS(4)P-5-kinase	195	112	141	121	131	136	252	502	421	347	188
ras-related protein RAB3B	22	13	16	12	8	2	7	11	7	17	5
GLYT-1	6	22	25	20	26	15	29	31	10	28	10
high-affinity glutamate transporter	5	5	3	2	7	0	4	7	1	2	0

cholesteryl ester transfer protein precursor	51	8	6	4	2	2	3	6	3	6	3
CC chemokine receptor type 1	75	76	15	22	18	28	96	38	18	22	11
brain-derived neurotrophic factor	0	8	4	3	4	0	7	2	0	3	1
epithelial discoidin domain receptor 1 precursor	209	220	131	161	205	46	114	226	113	81	51
CDC25	19	17	19	11	13	3	11	14	20	6	2
tyk2 non-receptor protein tyrosine kinase	42	37	59	38	46	39	31	77	24	51	29
protein kinase C delta (NPKC-delta)	96	72	77	50	46	17	26	60	45	43	27
c-jun N-terminal kinase 2 (JNK2); JNK55	278	134	171	135	125	123	127	195	160	107	50
tyrosine kinase tnk1	54	42	64	45	33	15	22	23	30	36	11
ribosomal protein S6 kinase II alpha 3	1332	497	1205	1472	396	666	958	1450	779	607	269
phospholipase C (PLCL)	5	6	21	14	5	1	4	5	2	5	1
ras-related protein RAB4A	178	87	119	131	91	63	98	174	87	117	63
DA transporter (DAT)	0	5	2	1	0	0	4	0	4	0	1
ATP2B2; calcium pump;	1	4	3	1	2	0	3	3	4	4	2
lecithin-cholesterol acyltransferase (LCAT)	270	144	84	69	211	66	98	156	95	54	50
thrombin receptor (TR); F2R; PAR1	97	52	53	62	59	44	39	42	40	25	33
NT-3 growth factor receptor precursor	3	0	6	3	1	0	2	9	4	1	0
LTK	4	2	3	3	5	3	6	3	1	4	1
NCK melanoma cytoplasmic src homolog	74	43	79	88	53	61	66	134	139	100	84
MAPKAP kinase (3pK)	102	124	155	94	151	38	68	60	39	50	20
protein kinase C epsilon type (NPKC-epsilon)	13	6	7	6	3	1	7	4	2	6	0
C-jun N-terminal kinase 3 alpha2	1	0	1	3	3	0	5	7	1	2	1
serine kinase	847	382	927	881	262	395	422	712	497	685	395
kinase suppressor of ras-1 (KSR1)	8	15	19	15	10	5	8	13	3	13	8
Gem; induced immediate early protein	2	2	7	5	1	0	4	1	1	5	0
ras-related protein RAB5A	331	171	299	345	147	292	484	907	1181	886	608
sodium-&-chloride-dependent GABA transporter 3	369	249	141	181	342	203	240	436	277	154	91
copper-transporting ATPase 2	92	38	26	31	64	58	64	134	38	14	7
vesicular acetylcholine transporter	7	2	5	3	4	1	5	12	3	2	1
ephrin type-B receptor 2 precursor	3	5	1	3	3	1	9	6	3	6	3
G protein-coupled receptor kinase GRK5	18	7	11	4	10	9	14	10	6	7	5
G-protein-coupled receptor HM74	3	5	1	4	1	1	4	2	2	4	0
Ink adaptor protein	35	22	41	27	52	53	158	208	151	155	119
mitogen-activated protein kinase p38	675	331	454	430	358	408	542	594	427	274	161
protein kinase C eta type	4	3	3	3	4	0	9	3	2	2	1
focal adhesion kinase (FADK)	129	44	83	69	46	45	90	123	70	69	33
CAMKI	275	296	170	154	102	67	299	118	68	100	47
ephrin A3 precursor	4	7	10	10	6	2	8	12	4	17	8
Ral A; GTP-binding protein	343	252	219	243	130	194	413	523	362	353	212
ras-related protein RAB6	301	188	249	272	238	293	368	744	446	526	283
sodium-dependent serotonin transporter	77	45	46	42	55	28	34	68	41	27	10
Na/K-transporting ATPase beta 3 subunit	161	109	198	176	105	95	193	429	336	676	497
T4-binding globulin	172	63	130	125	45	73	65	104	48	27	16
tyrosine kinase receptor HEK	2	4	5	3	4	0	3	12	2	2	0
transferrin receptor (TFRC)	1746	631	968	1216	615	1080	989	2464	1877	1329	1081
R-PTP-gamma	365	136	288	296	134	256	291	531	281	180	106
putative src-like adapter protein (SLAP)	1	4	3	2	2	2	3	5	2	6	1
LIM domain kinase 1 (LIMK-1)	110	123	103	98	125	50	66	88	87	121	83
protein kinase C gamma type	6	6	4	5	2	0	7	0	5	2	1
PTDINS-3-kinase P85-alpha	74	26	79	67	18	35	53	99	32	39	18
PHK-gamma-T	17	9	13	6	15	11	19	56	6	18	11
(PTDINS(4)P-5-kinase)	331	259	282	341	174	125	220	315	196	309	155
transforming protein rhoB	630	642	935	743	569	204	590	1362	1325	1918	978
neuro epithelioma transforming gene 1	487	242	301	329	206	181	388	644	620	296	180
norepinephrine transporter (NET)	4	7	1	4	4	2	2	6	8	4	0
synaptic vesicle amine transporter (SVAT)	2	10	4	6	2	0	6	1	2	6	0
transthyretin precursor (TTR); prealbumin; TBPA	723	752	691	696	494	163	423	613	471	546	265
frizzled	19	9	15	13	18	9	23	45	11	8	5
tyrosine-protein kinase receptor FLT4	135	142	320	145	39	38	212	57	179	72	45
ras-GRF; sos	101	34	91	92	38	92	131	219	155	105	80
EPS8	43	10	30	28	15	29	25	44	13	14	9
MAP kinase-activated protein kinase 2	165	148	300	191	157	87	145	317	228	330	391
protein kinase C zeta type (NPKC-zeta)	44	35	39	24	27	9	29	17	10	30	21
p21-activated kinase alpha (PAK-alpha; PAK1)	28	13	20	11	11	11	9	37	27	23	21
casein kinase I gamma 2 (CKI-gamma 2)	591	411	165	234	549	258	247	544	379	252	133
phospholipase C beta 3	26	23	19	25	25	6	30	17	15	40	14
ras-related protein RAB3A	83	52	32	27	19	5	18	27	6	16	10
guanine nucleotide regulatory protein tim1	3	8	11	9	6	3	6	2	6	8	2
NaCl-dependent taurine transporter	52	55	69	74	64	31	59	75	52	154	74
Na+/K+ ATPase	158	93	61	70	86	58	132	174	120	137	63
alpha-fetoprotein precursor	1689	480	1507	1271	425	1569	927	2820	791	865	553
ephrin type-B receptor 3 precursor	0	4	3	4	3	1	7	1	2	6	2
ephrin A receptor 4 precursor	1	3	1	2	1	0	0	15	0	2	1
c-src kinase (CSK)	670	514	179	231	627	203	327	440	325	259	145
MAL	31	30	13	12	5	18	44	14	16	3	1
MAPKK 1	414	255	237	183	251	196	223	670	496	254	249

protein kinase C theta (PKC-theta)	5	7	9	5	2	3	9	8	6	4	1
serine/threonine-protein kinase PCTAIRE 1	383	341	136	183	392	195	321	444	388	296	168
PKA C-beta	26	18	34	32	12	24	14	76	14	27	28
PI3-kinase	43	12	40	62	15	50	59	131	72	122	66
ras-related protein RAB-7	497	412	551	487	295	387	489	1370	793	1168	1093
transducin beta 2 subunit 2	46	78	142	117	115	12	118	177	101	202	139
Na+/glucose cotransporter 2	19	12	4	10	5	2	9	25	10	6	3
adrenoleukodystrophy protein	270	174	150	131	221	74	142	215	125	118	42
serotransferrin precursor	25255	16664	21374	22107	13276	14463	13679	29213	18898	19378	12990
IFN-gamma accessory factor 1 (AF1)	39	30	35	34	26	30	23	56	29	42	28
epithelial cell kinase	91	84	75	61	49	37	50	108	57	226	184
tyrosine-protein kinase HCK	5	21	21	34	17	11	7	18	13	6	8
MAPKKK5	3	5	7	2	1	2	4	0	1	2	1
MAPKK 2	1	1	4	0	2	0	2	1	1	0	0
CAM-kinase II beta	7	8	7	4	4	0	11	5	2	3	3
AMPK alpha-1 chain	57	22	54	62	16	33	42	75	46	78	59
(PKA C-gamma)	15	16	12	9	10	4	14	18	8	14	4
PI4-kinase	179	158	112	150	148	156	203	371	187	260	150
G13	59	29	54	72	35	72	97	177	141	242	207
transducin beta 5 subunit	19	18	9	21	11	5	10	9	5	19	16
kidney oligopeptide transporter	3	1	0	2	3	0	7	0	3	9	1
ATP-binding cassette 8 (ABC8)	7	3	7	3	2	2	7	7	1	3	0
lactotransferrin precursor; lactoferrin	11	9	8	11	8	6	14	17	7	6	22
interleukin-6 receptor beta subunit precursor	185	36	164	223	49	174	215	500	428	458	300
TGF-beta 1 receptor (TGFB1)	165	79	231	192	77	99	91	222	206	85	67
70-kDa zeta-associated protein (ZAP70)	4	4	4	1	2	0	1	3	0	0	0
myosin light chain kinase (MLCK)	177	121	159	134	65	49	98	87	30	22	16
MAPKK 3	427	337	252	222	333	140	205	289	190	188	100
CAM kinase-GR	2	3	14	6	1	0	6	12	3	5	2
tyrosine-protein kinase tec	4	3	8	4	1	3	6	9	2	6	3
PRKAR1B	218	252	365	470	463	116	202	1008	275	202	172
PLC-beta 2	2	1	13	1	2	2	3	0	0	3	0
transducin beta-1 subunit	159	212	681	560	112	77	309	300	261	512	337
RAD1	23	28	22	32	49	17	17	79	36	18	15
sodium-dependent proline transporter	1	0	4	2	1	15	0	16	0	5	2
multidrug resistance-associated protein 2	246	148	203	340	208	234	339	397	246	357	155
melanotransferrin precursor	3	9	3	5	5	2	5	2	2	5	4
stromal cell derived factor 1 receptor	18	9	10	18	6	10	8	30	12	4	5
anaplastic lymphoma kinase GN (ALK)	0	4	5	4	2	1	3	10	1	1	2
c-fos proto-oncogene	56	21	46	52	18	32	37	53	22	25	17
titin	4	8	6	3	2	0	3	3	1	6	3
c-jun N-terminal kinase kinase 1 (JNKK)	32	12	27	28	14	43	33	96	42	37	33
casein kinase II alpha subunit	273	126	118	93	93	97	133	322	179	167	115
Bruton's tyrosine kinase (BTK)	3	2	4	2	2	0	3	2	2	2	0
PRKAR2B	0	2	5	3	0	2	6	9	1	3	11
PLC-gamma 1	118	85	73	95	76	46	58	84	43	83	43
ras-like protein TC25	765	853	1040	1215	694	725	987	1655	1307	1687	1316
RalB GTP-binding protein	106	69	36	69	72	63	69	116	91	97	64
neutral amino acid transporter A (SATT)	89	84	51	55	112	114	146	283	164	98	42
cAMP- dependent chloride channel	0	0	2	4	3	1	7	1	3	4	0
Insulin receptor-related protein precursor	81	36	61	62	18	95	60	118	42	48	24
tyrosine-protein kinase receptor eph	2004	1451	586	703	1167	913	1409	1092	985	627	391
fibroblast growth factor receptor 3 precursor	26	12	8	13	7	4	15	31	7	21	13
(GRB2)	1092	783	473	740	849	424	700	1564	1352	980	719
(TSE1)	870	404	607	702	397	641	817	2140	1512	1784	1244
MAPKK 5	194	114	134	142	116	107	115	222	147	85	67
PKA C-alpha	659	463	256	315	562	227	273	634	520	314	314
Janus kinase 2 (JAK2)	22	7	22	21	7	20	36	41	25	30	20
focal adhesion kinase 2	15	6	7	7	6	4	11	21	8	6	3
PLC-gamma-2	0	1	4	2	0	23	5	7	2	2	2
vav oncogene	1	1	4	4	1	0	5	11	0	1	3
MKP4	263	322	187	251	437	115	207	327	94	181	83
protein-tyrosine phosphatase 1E	2	3	6	4	6	13	6	8	6	7	2
PTPCAAX1 nuclear tyrosine phosphatase	2559	1545	2903	3800	1823	4986	4880	16620	8415	9339	5294
adenylyl cyclase IX	113	68	70	60	58	50	49	111	63	79	44
STAT3	113	75	75	75	51	46	81	159	70	157	79
14-3-3 protein beta/alpha	1277	958	1212	1369	735	860	1028	2006	1510	2323	1867
FKBP-rapamycin associated protein	49	30	56	53	27	24	59	70	42	60	52
retinoic acid receptor beta (RXR-beta; RXRB)	241	232	140	181	217	124	192	173	130	105	78
caspase & rip adaptator with death domain	94	50	33	39	72	49	42	87	41	19	12
calpain p94 large (catalytic) subunit	37	22	26	30	21	16	16	15	16	18	10
granzyme A precursor	2	0	7	2	0	4	5	6	2	2	7
poly(ADP-ribose) polymerase (PARP; PPOL)	65	44	51	47	35	34	32	114	21	40	28
DNA polymerase beta subunit (DPOB)	85	50	58	68	39	104	55	125	41	41	38
MCM2 DNA replication licensing factor	787	816	265	448	794	409	287	560	306	189	135
DNA excision repair protein ERCC1	94	120	140	120	104	64	95	109	58	123	70

leukocyte common antigen precursor	7	5	2	3	1	0	4	0	2	3	0
(CGI-PDE B; CGIPDE1)	7	5	9	4	3	1	6	14	4	13	5
retinal guanylyl cyclase 1 precursor	4	4	1	1	2	1	3	7	2	4	1
(STAT6)	101	127	111	115	115	78	101	174	74	106	66
(PKCSH)	1732	1665	1083	1340	1751	778	1006	1816	1089	1013	670
SH3P17 SH3 domain-containing protein	38	22	23	23	14	20	32	53	21	20	14
(DDR3)	214	156	155	144	263	74	139	726	238	86	53
CD40 receptor-associated factor 1	862	529	432	371	725	266	508	1081	561	420	253
CANP	1502	1504	1302	1461	1340	709	1197	1739	1279	1986	1434
CAD	35	34	26	20	18	11	23	38	9	12	7
inducible nitric oxide synthase (INOS)	7	4	6	2	2	4	3	11	2	2	2
DNA polymerase gamma	87	88	66	102	67	31	67	97	82	127	55
CDC21 homolog	335	328	301	448	180	136	145	197	117	144	87
DNA excision repair protein ERCC2	575	414	302	257	486	262	309	537	246	185	124
protein-tyrosine phosphatase 1B	241	201	183	262	151	122	157	336	217	387	202
CGI-PDE A	3	2	1	0	2	0	4	3	1	1	0
guanylate cyclase F (GCF)	8	5	3	1	3	2	5	4	1	4	1
cAMP-response element binding protein	247	89	205	272	135	262	264	562	324	257	178
linker for activation of T-cells (LAT)	57	46	43	38	21	28	37	81	56	53	44
SH3P18 SH3 domain-containing protein	47	11	35	34	11	18	29	61	37	36	23
CD27L antigen receptor precursor	72	53	110	153	74	26	54	232	123	76	47
FAN protein	60	35	31	60	37	37	49	74	51	51	40
BAD protein	147	187	45	49	46	38	173	58	28	41	30
DNA fragmentation factor 45 (DFF45)	78	70	65	93	56	35	66	117	42	118	53
defender against cell death 1 (DAD1)	1662	1538	2028	2623	1371	1234	1475	3485	1950	2896	2098
DNA polymerase delta catalytic subunit	455	335	234	269	426	288	140	277	125	99	65
CDC46 homolog	742	1070	637	1098	984	344	657	831	625	747	426
DNA excision repair protein ERCC3	256	179	239	226	126	162	186	345	234	348	276
protein-tyrosine phosphatase 2C	335	152	356	519	94	273	232	613	387	543	308
3'5'-cAMP phosphodiesterase HPDE4A6	70	52	143	111	56	39	63	103	63	107	61
guanylate cyclase	13	7	10	5	4	3	23	7	2	2	0
RalGDSB	67	48	29	38	51	20	26	69	56	54	42
hint protein	3084	1800	1587	1966	2474	2627	1668	5633	3760	3026	2215
FRAP-related protein	46	4	36	40	14	31	25	42	18	27	20
lymphocyte activation CD30 antigen	4	2	20	2	1	4	3	12	1	2	1
caspase-2 precursor (CASP2)	356	289	294	295	201	170	121	252	210	200	177
BCL-2 binding athanogene-1	331	362	359	452	297	306	268	611	504	698	528
rac-alpha serine/threonine kinase	141	223	182	179	201	109	128	233	142	280	201
inhibitor of apoptosis protein 3	25	9	28	33	6	23	10	47	15	25	13
DNA topoisomerase I (TOP1)	746	401	533	698	344	1149	913	2934	2157	1745	1399
p105MCM	118	58	133	173	48	58	66	48	52	54	36
excision repair protein ERCC6	11	10	4	4	3	8	14	13	4	3	4
leukocyte antigen-related protein precursor (LAR)	909	875	1031	1021	745	257	605	736	465	855	475
adenylate cyclase type I	143	105	68	73	112	85	59	303	97	48	22
CGS-PDE	4	3	3	2	3	2	10	1	7	1	1
oligophrenin 1	6	4	7	4	13	10	14	16	19	5	5
macMARCKS	790	754	985	854	947	536	517	883	621	982	751
connector enhancer of KSR-like protein	33	26	24	15	19	16	26	17	4	16	9
fasL receptor	37	13	40	37	15	72	60	163	48	43	33
caspase-3 (CASP3)	767	416	662	878	425	558	570	1561	1395	978	791
bcl2 homologous antagonist/killer	91	103	67	76	114	48	71	89	83	185	139
death-associated protein kinase 1	211	154	139	156	148	118	153	299	167	86	63
cytoplasmic dynein light chain 1	1418	1382	2465	2062	1076	819	828	2202	1388	2161	1461
DNA topoisomerase II alpha	1346	413	1340	1419	345	1064	479	774	402	586	339
MCM7 DNA replication licensing factor	209	239	266	271	285	143	164	255	117	136	85
6-O-methylguanine-DNA methyltransferase	286	274	164	225	386	165	186	348	313	182	110
PP2A-alpha catalytic subunit	253	146	257	278	131	203	200	550	347	419	341
adenylate cyclase type II	2	2	11	1	2	17	6	11	3	3	9
neurogranin (NRGN); RC3	15	11	18	13	15	5	6	16	12	7	3
ran GTPase activating protein 1	115	82	73	67	118	89	113	204	112	108	53
14-3-3 protein sigma	692	455	1070	562	533	191	375	1465	904	1212	631
CD40 ligand (CD40-L)	105	133	31	33	30	33	146	38	18	34	12
tumor necrosis factor receptor 1	520	454	367	418	668	247	405	420	358	801	451
caspase-4 precursor (CASP4)	157	102	207	253	76	127	110	159	97	61	37
apoptosis regulator bax	569	516	518	501	584	295	320	402	192	352	240
(P68 kinase)	319	116	286	354	146	316	281	721	634	387	294
cytochrome P450 reductase	130	162	400	343	289	115	320	505	247	514	418
proliferating cyclic nuclear antigen (PCNA)	2353	1972	3270	3451	1598	1173	1489	4191	3517	2660	2487
photolyase/blue-light receptor homolog	73	59	77	110	46	86	82	311	306	220	148
mutL protein homolog	81	43	77	72	37	62	58	94	47	49	42
beta-PR55	16	8	17	14	5	14	13	30	24	4	4
guanylate cyclase soluble alpha 2 subunit	4	5	16	5	1	3	4	9	5	5	1
recoverin	74	74	16	13	11	24	84	27	11	14	7
rap1 GTPase activating protein 1	29	28	18	14	22	13	16	14	10	13	8
GAP-associated protein	422	174	472	457	102	307	335	648	516	463	368
fas antigen ligand (FASL)	3	7	4	3	1	12	6	11	1	1	5

tumor necrosis factor receptor (TNFR)	56	29	193	88	27	34	42	153	55	73	36
caspase-6 precursor (CASP6)	23	16	229	127	8	22	25	31	70	39	26
apoptosis regulator bcl-2	2	2	2	4	4	12	2	37	1	2	5
Fas-activated serine/threonine kinase	93	130	100	110	140	32	63	79	44	61	31
cytoplasmic antiproteinase 3 (CAP3)	37	39	50	49	21	19	17	50	35	34	17
replication protein A 70-kDa subunit	170	112	228	236	80	154	101	195	147	144	98
nibrin (NBS1)	84	38	84	100	26	67	50	87	32	34	18
DNA excision repair protein ERCC5	134	56	92	129	44	124	108	212	131	89	55
alpha-PR55	151	105	123	173	84	133	123	324	251	241	192
guanylate cyclase 70-kDa subunit	3	2	9	6	1	6	6	6	1	2	0
S100 calcium-binding protein A7; psoriasin	8	5	11	4	3	1	13	6	4	5	2
rap1 GTPase-GDP dissociation stimulator 1	59	33	75	77	24	46	61	102	69	98	64
tuberin; tuberous sclerosis 2 protein	49	49	36	28	34	27	33	47	18	25	12
tumor necrosis factor precursor	21	7	27	20	5	5	3	34	19	8	12
protein-tyrosine phosphatase zeta precursor	5	1	6	7	4	4	2	8	2	3	0
cysteine protease ICE-LAP3	92	65	72	89	39	52	81	106	71	50	26
apoptosis regulator bclw; KIAA0271; BCL2L2	49	33	38	40	32	13	21	32	19	38	28
apoptotic protease activating factor 1 (APAF1)	128	122	64	77	48	114	192	258	157	98	66
death-associated protein 3 (DAP3)	664	371	247	393	436	371	323	530	660	370	233
replication protein A 14-kDa subunit	2384	1707	1497	2123	2294	1926	1639	2871	2846	1033	820
AP endonuclease 1	1168	973	600	915	683	629	490	585	359	321	105
p58/HHR23B	1000	629	838	932	625	647	693	1685	1361	1044	830
calcineurin B subunit isoform 1	134	98	108	130	91	128	161	361	283	256	155
bone marrow stromal antigen 1 (BST-1)	3	4	8	4	6	0	0	6	4	12	3
S100 calcium-binding protein A1	176	115	244	139	168	136	112	225	60	81	64
rho GDP dissociation inhibitor 1	1677	1580	1059	873	1648	345	1678	1333	918	1271	709
TRRAP protein	536	449	313	368	468	223	480	707	374	513	212
lymphotoxin-alpha precursor (LT-alpha)	20	12	15	7	5	15	16	64	13	9	7
adenosine A1 receptor (ADORA1)	10598	5099	6750	6238	8414	2654	5944	17893	4803	4260	1951
caspase-8 precursor (CASP8)	278	191	114	132	117	171	198	225	201	152	101
apoptosis regulator bcl-x	854	486	409	432	619	519	613	824	431	514	243
IEX-1L anti-death protein; PRG-1; DIF-2	97	86	74	54	52	51	86	224	437	1144	922
inhibitor of apoptosis protein1	7	2	3	10	5	5	5	12	8	1	3
activator 1 140-kDa subunit	138	37	101	106	39	80	90	121	72	46	27
ataxia telangiectasia (ATM)	153	120	57	74	48	102	165	164	77	52	30
DNA mismatch repair protein PMS1	121	77	129	178	73	85	82	124	87	101	73
CAM-PRP catalytic subunit	188	104	223	216	111	129	162	243	170	111	70
HCAM-1	3	1	8	3	1	0	1	4	2	2	1
interferon regulatory factor 1 (IRF1)	22	12	17	27	5	1	2	18	3	6	2
GTPase-activating protein (GAP)	49	7	52	44	22	74	53	147	55	59	36
leucine-rich repeat protein SHOC-2	75	38	96	120	47	94	131	289	349	305	227
lymphotoxin-beta (LT-beta; LTB)	2	1	4	2	3	4	9	23	4	4	1
adenosine A2A receptor (ADORA2A)	8	5	5	5	6	5	6	16	2	4	2
caspase-9 precursor (CASP9)	46	35	206	101	41	23	34	82	129	49	33
MCL-1	419	377	259	318	283	607	881	1294	914	1114	690
SL cytokine precursor	73	51	121	97	110	34	43	355	109	53	27
inhibitor of apoptosis protein 2	63	38	115	119	41	110	125	235	217	216	191
activator 1 40-kDa subunit	223	252	105	94	113	80	274	96	68	57	54
Ku 70-kDa subunit	631	352	427	490	428	639	423	876	464	405	173
DNA mismatch repair protein PMS2	167	80	62	75	91	136	69	252	195	91	60
PP2C-alpha	204	134	172	209	118	168	249	534	485	370	258
CAM-PDE1B	3	4	4	3	3	0	6	0	1	1	2
CRE-BP1	178	56	166	140	65	181	262	465	369	271	194
inhibitor of the RNA-activated protein kinase	31	27	29	32	7	20	29	50	29	57	26
IkappaB kinase complex-associated protein	132	68	86	85	49	69	92	107	59	51	25
TNF-related apoptosis inducing ligand	12	7	13	19	5	15	12	14	3	8	1
adenosine A3 receptor (ADORA3)	16	17	13	9	2	6	19	14	2	6	2
caspase-10 precursor (CASP10)	1056	661	7311	3540	615	457	1266	2789	1581	5426	1860
BCL-2-related protein A1 (BCL2A1)	2	3	4	3	2	1	4	7	1	8	3
cellular apoptosis susceptibility protein	1	3	3	4	3	0	1	2	0	4	0
ALG-2 calcium-binding protein	527	460	416	519	389	331	401	624	502	630	367
DNA polymerase epsilon subunit B	85	42	100	113	46	65	85	108	107	84	78
ATP-dependent DNA helicase II	410	183	261	418	174	350	264	291	284	225	164
Rad50	36	12	35	42	8	22	21	22	15	23	10
(PP-1A)	251	334	273	239	398	147	341	410	230	306	238
ephrin A4 precursor	38	37	52	43	28	0	6	1	0	4	0
NFKB3	103	76	58	49	86	43	48	74	62	71	39
cortactin; amplexin	868	808	740	898	633	562	746	1960	1488	1632	854
zyxin + zyxin-2	110	89	104	93	128	28	50	72	60	139	95
CD27 ligand (CD27LG); CD70 antigen	2	3	8	3	1	2	2	5	3	4	0
receptor interacting protein	27	12	23	25	13	15	29	53	37	46	26
interleukin-1 beta convertase precursor (IL-1BC)	2	3	9	5	4	3	3	3	2	4	2
bcl-2 interacting killer (BIK)	6	5	3	4	0	1	8	1	3	4	1
GADD153	284	255	192	613	701	683	956	738	860	1216	641
DNA polymerase II subunit A	38	26	40	32	26	12	26	41	15	20	9
RFC36	170	86	109	107	56	72	53	56	41	33	16

DNA ligase I	529	572	531	481	510	296	460	383	293	170	123
DNA-repair protein complementing XP-A	12	14	9	15	2	21	4	34	6	12	5
dual-specificity protein phosphatase 2	4	5	7	5	2	3	8	5	1	3	2
DPDE3	124	54	80	116	83	135	142	161	96	76	53
STAT1	565	240	462	526	209	246	262	482	263	232	136
(PKI-alpha)	6	3	5	4	3	5	3	0	2	1	1
leukemia inhibitory factor receptor precursor	20	7	27	33	11	20	50	57	18	25	13
insulin-like growth factor I receptor (IGF1R)	92	81	90	75	143	96	174	231	237	148	97
DAXX	129	118	77	71	82	31	59	92	78	92	67
calpain 1 large (catalytic) subunit	1	3	0	0	4	2	0	9	0	2	2
NIP1 (NIP1)	22	31	40	32	16	9	13	15	9	20	9
clusterin precursor (CLU)	930	962	387	608	900	415	793	1339	1262	804	517
MCM3 DNA replication licensing factor	191	152	148	155	138	91	78	72	38	57	19
replication factor C 38-kDa subunit	187	122	90	89	70	94	90	69	46	47	34
DNA ligase III (LIG3)	215	162	112	130	126	110	108	116	93	80	42
DNA-repair protein complementing XP-C cells	151	89	81	80	91	130	103	132	132	68	57
myotubularin	35	2	31	43	20	58	48	92	48	37	19
adenylate cyclase VII	3	2	5	4	2	3	4	7	1	1	0
STAT2	91	105	147	151	97	50	84	100	68	96	59
14-3-3n protein eta	324	220	471	265	263	212	341	476	297	496	356
junction plakoglobin (JUP)	318	302	197	190	370	102	245	258	242	142	72
retinoic acid receptor epsilon (RAR-epsilon)	43	7	31	35	16	31	11	57	35	15	9
TRADD	19	24	16	16	14	4	8	10	4	7	2
calpain 2 large (catalytic) subunit	32	10	24	17	12	12	31	17	30	40	22
NIP3 (NIP3)	562	311	575	350	314	289	239	531	461	413	326
early response protein NAK1	19	49	13	6	15	5	7	62	17	8	1
DNA polymerase alpha catalytic subunit	185	105	341	326	89	138	127	156	156	88	40
activator 1 37-kDa subunit	352	220	336	376	181	144	167	162	109	103	70
DNA ligase IV (LIG4)	38	13	53	43	7	22	23	23	28	32	29
uracil-DNA glycosylase precursor (UNG1)	1125	895	520	618	863	608	425	678	528	288	187
DNA-repair protein XRCC1	198	163	220	190	188	67	122	163	89	60	25
GADD45	166	150	314	368	377	125	268	243	330	604	304
galanin receptor type 1	6	12	3	4	0	2	17	0	0	2	0
CHRNA2	2	1	1	3	3	0	3	0	0	2	0
low-affinity nerve growth factor receptor	11	2	8	1	1	0	7	0	8	3	0
dopamine beta-hydroxylase	4	2	8	6	1	7	4	16	4	2	5
secretogranin V	13	9	8	5	3	5	9	3	9	14	1
achaete-scute homolog 1 (ASH1)	0	5	4	1	2	0	5	0	0	1	0
myelin proteolipid protein (PLP); lipophilin	12	7	9	3	2	0	6	0	1	5	0
ataxia-telangiectasia group D-associated protein	2	5	7	2	0	0	9	10	2	4	1
KRAB-associated protein 1 (KAP1)	34	13	17	17	40	5	12	40	13	28	6
CCAAT-BINDING FACTOR (CBF).	50	10	39	31	10	23	8	43	30	38	17
E2F-3	140	69	72	105	82	49	96	109	108	92	40
CACCC-box DNA-binding protein	113	52	171	196	62	94	180	235	299	245	105
DNA-dependent protein kinase (DNA-PK)	354	161	409	512	177	175	408	333	416	311	164
muscle-specific DNase I-like precursor	36	30	31	20	30	5	6	13	30	19	4
somatostatin receptor type 2	6	10	22	19	18	5	1	10	15	8	3
serotonin-gated ion channel receptor	51	36	19	20	2	18	54	30	16	17	7
DOPA decarboxylase (DDC)	337	251	331	284	249	132	259	247	215	156	57
noradrenaline N-methyltransferase	1	3	5	3	0	0	4	0	0	5	0
neuregulin	2	1	5	3	1	0	6	0	0	4	0
brain-specific antigen PCP-4	0	3	3	2	3	0	6	0	1	5	0
peripheral myelin protein 22	47	44	55	44	41	14	45	47	38	47	19
TREB36 protein	129	47	80	57	58	40	61	112	113	59	34
transcription intermediary factor 1 (TIF1)	310	162	400	392	118	146	272	329	282	305	116
hepatic leukemia factor (HLF)	337	269	201	243	397	199	460	363	266	112	28
E2F dimerization partner 1	278	247	184	167	214	76	133	151	99	106	36
60S ribosomal protein L6 (RPL6)	8424	4824	9121	10195	4439	5740	8427	14293	14188	11051	5409
RAD52	7	6	12	10	3	3	3	2	2	1	0
melatonin receptor type 1A (MEL-1A-R)	0	1	11	5	0	0	6	2	5	7	0
prostaglandin E2	2	3	1	0	3	0	4	3	0	3	0
GABA(A) receptor	13	11	17	11	3	1	17	9	12	24	7
acetylcholinesterase precursor	6	9	6	9	4	4	15	10	6	4	3
secretogranin II precursor	2	7	2	4	1	2	10	46	2	2	0
nociceptin precursor	3	3	6	4	4	0	6	2	1	5	0
neuronatin	11	8	7	7	3	3	25	8	10	18	2
MOG	199	231	133	127	122	81	398	198	124	294	118
CCAAT transcriptionfactor gamma subunit	216	212	222	236	227	110	245	285	255	261	140
YL-1 protein	70	73	65	64	83	18	53	62	56	61	21
early growth response protein 3	2	10	2	6	1	0	7	5	1	8	0
interferon regulatory factor 2 (IRF2)	76	119	79	41	38	28	61	57	40	138	23
cellular nucleic acid binding protein	2295	1468	1128	1790	2018	1790	2623	5342	5963	3113	1491
UV excision repair protein protein	495	704	703	623	928	192	526	895	658	541	251
5-hydroxytryptamine 1A receptor	0	0	4	3	1	0	7	0	0	5	0
GRM5	5	6	4	3	5	0	5	0	4	1	0
(GABA(A) receptor)	1	4	3	3	3	0	0	0	0	5	0

choline O-acetyltransferase	6	8	2	1	3	0	14	0	0	2	0
neurotensin/neuromedin N precursor	1	7	7	5	0	0	4	1	2	5	0
leptin precursor; obesity factor; obese protein	3	7	9	4	2	0	5	1	1	7	0
roundabout 2 (ROBO2)	2	4	2	1	1	0	6	0	1	7	0
myelin basic protein (MBP)	8	5	6	1	2	0	9	4	1	4	1
(C/EBP alpha)	404	495	132	183	400	39	120	167	129	142	38
metal-regulatory transcription factor	40	32	54	46	31	33	70	121	146	124	81
(HIV-EP2)	1	13	9	8	2	0	6	4	3	11	0
LYL-1 protein	3	45	5	210	2	0	9	0	3	26	2
basic transcription factor 2 44-kDa subunit	407	314	292	277	354	203	278	391	341	209	82
ubiquitin-conjugating enzyme E2 17-kDa	369	354	318	317	277	184	320	565	366	528	301
serotonin receptor type 2	1	4	10	2	2	0	3	1	1	5	1
orexin receptor 2	8	3	7	2	3	0	29	0	2	5	0
GABA-B receptor 1A subunit (GABA-BR1A)	0	6	3	3	3	0	5	2	1	5	1
glutamate decarboxylase 67-kDa isoform	2	1	5	3	2	0	3	0	1	5	0
neuromedin B precursor	28	25	32	22	33	4	27	27	29	47	20
neuronal pentraxin II precursor (NP2)	3	4	5	4	3	0	4	0	3	6	0
veli-1	32	9	56	36	20	13	27	8	13	36	13
neuroglycan C precursor	16	12	3	4	5	2	8	4	3	4	0
hepatocyte nuclear factor 4 (HNF4)	885	907	866	722	914	169	365	349	194	323	76
(MITF)	2	8	10	14	2	0	2	9	7	9	0
ets-related gene transforming protein (ERG1)	1	32	25	69	1	0	9	1	16	28	0
nuclear factor NF-kappa-B p100 subunit	35	63	36	45	36	12	38	43	43	82	23
estrogen receptor hSNF2b	941	910	786	792	1138	583	897	1729	1347	1182	588
translin; recombination hotspot binding protein	384	219	393	446	203	143	270	411	366	389	179
mu-type opioid receptor (MOR-1)	13	18	6	6	3	0	26	4	3	0	0
P2X purinoceptor 1; ATP receptor P2X1	5	3	0	5	2	0	4	3	2	7	0
GABA-B receptor 2 subunit (GABA-BR2)	2	5	3	3	2	0	6	3	0	7	1
glutamate decarboxylase 65-kDa isoform	30	23	63	41	25	16	25	68	46	23	9
preprotachykinin beta	0	3	0	1	1	1	6	0	1	6	0
survival of motor neuron (hSMN)	282	148	246	242	141	168	349	458	371	363	147
43-kDa postsynaptic protein	3	5	4	2	1	0	10	0	0	4	0
parkin	2	4	0	4	2	225	5	5	2	8	2
TIS11B protein; EGF response factor 1	239	231	249	147	151	60	131	169	335	597	282
transcription repressor protein PRDI-BF1	2	2	5	3	3	0	14	8	1	2	0
transcription factor GATA-4	100	100	59	54	82	18	59	49	40	35	10
octamer-binding transcription factor 1	75	45	67	79	39	63	120	237	221	210	73
transcriptional repressor NF-X1	144	110	141	200	90	73	124	126	122	223	74
recA-like protein HsRad51	168	113	167	203	113	69	109	136	103	137	55
nociceptin receptor	8	4	32	14	7	0	13	8	22	4	3
P2X purinoceptor 3	2	3	4	2	0	0	2	0	0	1	0
glutamate receptor 5 precursor	1	6	13	7	11	0	3	5	1	12	0
neuroendocrine convertase 1 precursor	2	1	4	4	7	0	3	2	6	6	0
proenkephalin A precursor	13	5	5	2	3	1	27	2	0	4	1
lissencephalin X; doublecortin (DCX)	6	10	10	6	1	4	21	5	2	4	0
synaptosomal-associated protein 25	11	8	10	14	2	6	16	3	5	6	0
Huntington's disease protein (HD protein)	56	45	50	45	37	19	66	47	26	40	12
HIV-1 TATA element modulatory factor	123	57	142	160	54	108	251	446	538	400	171
PCAF-associated factor 65 beta	106	70	95	95	95	60	82	190	173	182	92
glucocorticoid receptor repression factor 1	124	115	297	252	118	102	212	274	202	273	120
pre-B-cell leukemia transcription factor-1	14	26	9	3	3	1	15	0	1	3	1
cAMP-responsive element-binding protein	2	11	2	7	3	0	4	1	1	5	0
V(D)J recombination activating protein 1	3	4	5	4	3	0	0	0	2	4	0
prostaglandin E2 receptor EP3 subtype	2	8	5	4	1	0	8	0	1	6	0
(GABA(A) receptor)	0	4	5	1	1	0	5	2	2	3	0
neuronal acetylcholine receptor	0	2	3	7	3	0	5	4	2	5	0
neuroendocrine convertase 2 precursor	5	29	20	14	11	3	8	13	8	12	2
beta-neoendorphin-dynorphin precursor	5	4	15	10	1	1	3	4	8	6	2
roundabout 1 (ROBO1)	219	153	393	418	139	172	384	340	271	219	87
synaptophysin (SYP)	64	3	2	6	1	0	7	3	1	6	2
major prion protein precursor	539	332	725	744	469	500	901	1525	1472	1674	779
hypoxia-inducible factor 1 alpha	183	81	225	220	87	90	172	206	182	322	126
PCAF-associated factor 65 alpha	37	32	22	26	33	3	26	25	24	21	8
homeobox protein HOX-A5; HOX-1C	82	117	51	64	89	35	125	127	57	59	22
endothelial transcription factor GATA2	101	122	125	109	76	20	63	100	119	186	96
GA-binding protein alpha subunit	64	62	69	145	62	90	105	216	208	320	137
V(D)J recombination activating protein 2	2	3	3	2	1	0	6	0	0	3	0
substance-P receptor (SPR)	4	5	16	8	2	0	5	0	4	19	0
(GABA(A) receptor)	2	5	19	14	4	0	6	0	3	6	0
(CHRNA4; NACHRB4)	6	10	9	15	5	4	10	2	9	6	2
(COMT)	2502	2323	1041	1216	3193	666	1715	1865	1972	1380	599
acyl-CoA-binding protein (ACBP)	6509	3597	5580	5682	4172	2870	4488	7473	10210	5957	2963
CASK	53	28	40	49	22	31	52	86	56	62	28
presynaptic density protein 95 (PSD95)	6	5	16	18	2	0	7	24	19	21	11
Alzheimer's disease amyloid A4 protein	179	107	161	176	97	94	185	299	293	335	121
jun activation domain binding protein	354	127	197	269	91	148	266	346	281	375	151

SPT3-like protein	88	67	115	97	52	41	68	51	50	70	23
interferon regulatory factor 7 (IRF-7)	7	6	3	6	3	0	5	2	5	6	1
GC-box binding protein 2	59	72	23	30	16	20	71	69	65	82	50
GA-binding protein beta-2 subunit	176	74	225	256	93	220	239	574	486	427	226
telomerase reverse transcriptase (hTERT)	11	14	3	5	7	0	11	0	1	7	0
substance-K receptor (SKR)	5	7	5	5	4	0	6	3	3	4	1
glutamate receptor 1 precursor	2	3	2	2	2	0	6	0	1	13	0
NMDAR2B	3	5	4	2	2	0	5	1	1	3	0
tryptophan 5-monooxygenase	9	7	29	17	7	0	5	8	6	6	5
nerve growth factor 2 (NGF-2)	1674	1656	1378	1443	1988	514	1558	2860	2727	2161	1318
neuromodulin	6	4	11	11	6	0	5	3	10	9	3
synapsin IIIA	25	26	20	16	14	4	48	10	4	6	1
atrophin-1	104	105	49	54	100	20	74	113	104	109	43
ets domain protein elk-3	11	7	30	27	7	0	11	4	9	41	17
ADA3-like protein	180	245	170	270	271	42	164	168	140	320	79
interleukin enhancer binding factor 3 (ILF3)	361	383	149	211	521	270	470	809	1004	446	238
basic transcription factor 62-kDa subunit	21	18	20	19	3	23	15	54	27	31	14
transcription factor AREB6	6	3	19	16	2	16	10	29	13	24	13
TRF1-interacting tankyrase	113	53	56	65	59	65	86	215	160	126	62
neuromedin K receptor (NKR)	3	2	6	4	1	0	6	4	4	4	1
glutamate receptor 2 precursor	0	3	4	1	0	0	8	0	0	6	1
NMDAR2C; NR2C	2	1	3	6	4	0	2	3	1	5	1
monoamine oxidase (MAO-A)	403	271	370	436	254	317	354	569	432	290	110
neurotrophin-4 (NT-4)	97	115	32	25	24	18	118	36	21	20	5
axonin-1 precursor	2	8	3	2	6	1	11	5	3	5	1
CHAPSIN 110	1	2	2	3	1	0	5	3	2	3	0
HU-antigen D	8	11	29	20	4	3	7	9	17	7	2
retinoblastoma-binding protein 7	682	386	599	720	320	364	525	848	705	783	361
ADA2-like protein	105	73	122	125	67	53	71	75	61	69	28
RBP2 retinoblastoma binding protein	69	27	34	48	32	72	112	241	211	95	48
DNA-binding protein inhibitor Id-2	1140	1015	2104	1120	626	324	905	3178	3227	5651	4056
transcription factor ZFM1	530	536	404	395	536	305	511	711	662	955	522
delta lactoferrin	0	0	5	1	0	0	4	1	1	3	1
neuropeptide Y receptor type 1	4	7	156	11	2	1	7	1	3	6	0
strychnine binding subunit	3	4	4	0	1	0	1	0	5	0	1
P2X purinoceptor 5 (P2X5)	15	22	6	2	7	2	12	1	3	7	1
histidine decarboxylase (HDC)	79	88	199	141	63	32	90	182	163	69	44
neuropeptide Y precursor (NPY)	5	6	5	3	4	0	3	0	2	3	0
glia maturation factor beta (GMF-beta)	356	203	223	242	133	123	354	227	239	235	123
amphiphysin (AMPH)	1	3	3	4	1	0	6	0	1	2	0
Machado-Joseph disease protein 1	43	37	54	45	18	27	47	58	62	74	37
BRCA1-associated ring domain protein	18	18	10	12	5	1	29	3	10	16	3
B-cell lymphoma 3-encoded protein (bcl-3)	8	11	11	11	7	0	24	17	16	19	6
BRCA1-associated ring domain protein	51	29	57	64	19	14	17	16	30	28	13
DNA-binding protein SMBP-2	45	41	35	49	36	28	62	74	60	92	43
ZFM1 protein alternatively spliced product	360	403	269	274	201	157	403	303	213	297	108
deoxyribonuclease I (DNase I)	10	6	4	2	6	0	9	2	2	11	2
metabotropic glutamate receptor 1	1	2	11	4	2	0	2	4	1	3	5
glycine receptor beta subunit precursor	1	4	6	6	2	0	5	0	1	6	0
P2X purinoceptor 6 (P2X6)	45	59	91	107	55	25	43	123	86	47	24
phenylalanine-4-hydroxylase (PAH)	656	465	865	798	430	325	699	654	365	319	97
5-hydroxytryptamine 1D receptor	3	9	22	13	4	7	26	13	18	21	4
MAPKK7	75	82	53	42	92	22	75	72	84	96	37
neurexin III alpha	3	6	6	4	1	0	8	1	0	2	0
Kallmann syndrome protein precursor	2	4	3	1	3	5	4	5	3	3	1
serum response factor (SRF)	63	49	35	31	44	31	64	80	66	92	42
B-cell lymphoma 6 protein (bcl-6)	56	53	46	38	42	20	75	51	59	72	28
transcriptional repressor CTCF	80	74	112	85	29	31	43	60	54	76	38
global transcription activator SNF2L1	454	187	550	616	126	245	218	429	308	314	147
transcription factor RZR-alpha	19	5	30	28	6	9	18	5	13	20	16
deoxyribonuclease II (DNase II)	236	160	283	216	202	113	155	263	215	106	57
D2 dopamine receptor (DRD2)	4	1	6	3	3	0	7	0	7	3	1
cholinergic receptor (CHRNA3)	1	2	0	1	3	0	5	3	3	5	0
leptin receptor precursor	6	6	11	7	4	1	14	13	20	15	5
tyrosine 3-monooxygenase isozymes	2	2	4	2	2	1	4	0	4	3	2
glial cell line-derived neurotrophic factor precursor	5	5	10	6	2	0	5	3	5	3	0
myelin-associated glycoprotein precursor (MAG)	81	2	3	3	3	0	3	0	0	5	0
synapse-associated protein 97 (SAP97)	96	40	133	125	34	55	81	117	79	78	31
FCMD; fukutin	41	31	33	42	17	26	39	44	46	23	13
PC4	3039	1276	2898	3951	1284	1550	1937	2648	3053	2745	1256
ATF-3 (ACTIVATING FACTOR 3)	13	5	6	7	30	24	59	31	27	38	13
PRB-binding protein E2F1	454	435	182	210	519	128	309	231	191	221	72
ICSBP	2	4	30	3	1	0	8	9	6	2	0
paired box homeotic protein	2	1	5	3	6	0	4	7	3	3	1
octamer binding transcription factor 1	53	66	10	18	10	14	59	8	10	12	3
transcription factor TFIIIB	88	38	77	99	31	29	32	119	138	164	116

transcription factor NF-ATc	66	37	56	43	25	14	37	106	62	24	10
ets transcription factor	4	1	13	14	4	4	15	10	14	9	9
CCAAT displacement protein	50	32	42	32	59	31	35	63	50	27	14
Ini1	704	660	928	804	919	314	592	767	588	702	304
osteoblast specific factor 2	5	3	3	4	2	2	8	21	3	3	2
leukosialin precursor	3	10	1	6	1	0	6	0	3	8	1
integrin beta 5 subunit precursor	74	53	44	58	59	26	67	61	57	86	31
beta catenin (CTNNB)	477	207	219	290	208	234	295	408	424	326	159
CD114 antigen	28	21	30	23	17	8	12	14	19	14	9
IL-2 receptor alpha subunit	2099	1834	11966	5629	1678	1008	2257	3143	3843	4946	2004
interleukin-12 receptor precursor	2	3	3	2	1	0	3	1	4	1	2
(GADD45 gamma)	40	39	41	65	40	22	65	45	41	99	59
nuclear factor I (NFI); NFI-X	179	159	100	130	161	34	86	72	86	61	21
transcription factor HTF4	147	62	197	195	72	161	225	423	348	255	181
R kappa B DNA-binding protein	399	290	186	174	266	127	204	264	189	238	95
TRAF-interacting protein (I-TRAF)	51	28	65	75	30	64	95	121	112	99	61
cAMP-dependent transcription factor ATF-4	2432	2391	3316	3296	4313	2205	4562	5976	8368	7132	4880
(DNA metase; MCMT)	8	8	7	5	5	1	12	17	6	9	5
cadherin 3 (CDH3)	0	0	4	3	0	0	3	83	2	4	38
corneodesmosin precursor	1	3	5	4	2	0	5	0	4	5	1
integrin alpha 4 precursor	220	263	71	88	126	78	302	94	77	72	39
semaphorin; CD100	0	4	2	0	2	0	5	0	1	3	1
C5a anaphylatoxin receptor	3	4	3	3	6	1	6	4	6	4	3
IL-6R-alpha	155	109	93	131	154	107	192	287	277	378	149
(IL-1R2)	7	10	13	13	3	2	4	2	3	2	1
(GADD45 beta)	4	2	2	3	2	3	35	31	2	18	12
RNA polymerase II elongation factor	222	132	154	165	120	121	157	290	259	239	154
transcription elongation factor SII	448	176	356	382	199	261	291	566	433	412	187
transcription factor 11 (TCF11)	367	292	156	182	254	134	181	290	169	234	105
TAFII31; TAF2G	533	249	436	518	225	293	420	603	500	642	376
heat shock transcription factor 1	545	437	308	384	637	225	465	459	467	690	308
DNA-binding protein A	514	400	341	326	389	128	303	539	630	638	379
cadherin 5 (CDH5)	1	2	2	1	3	0	3	0	2	1	0
(V-CAM 1)	2	1	2	2	2	7	2	0	1	1	2
CD18 antigen	16	21	7	15	23	4	16	1	11	16	13
T-cell surface glycoprotein T4/leu-3	52	27	54	35	18	18	15	81	43	18	11
neuromedin B receptor	345	312	124	109	212	159	325	142	94	92	69
(IFN-alpha receptor; IFNAR)	25	10	25	27	13	12	38	28	25	36	23
IL-8 receptor type 1	2	2	0	3	1	0	6	3	1	1	1
UK114 antigen homolog	143	71	158	197	75	87	151	146	151	99	54
homeobox protein HOXB7	8	9	19	11	7	2	10	5	7	7	7
NSEP	5313	5153	4910	7961	4816	2594	4540	10724	9349	11793	7179
nuclear factor NF45	261	168	158	186	82	141	117	253	102	135	60
helix-loop-helix DNA-binding protein	25	30	28	22	35	1	17	11	5	12	7
transcriptional activator hSNF2-alpha	252	154	265	281	202	187	419	498	628	339	171
telomeric repeat binding factor 1	86	31	75	71	7	26	23	42	40	62	38
cadherin 11 precursor	2	5	2	2	2	1	11	1	1	0	3
E-selectin precursor	1	3	4	4	1	0	1	3	2	1	0
CD41 antigen	2	2	2	5	2	8	3	7	3	4	4
B-lymphocyte surface antigen B4	64	53	71	50	37	16	42	83	54	28	18
Duffy blood group antigen	3	6	1	2	1	0	0	5	2	4	1
IL-2 receptor beta	2	2	0	1	3	0	6	2	2	1	0
androgen receptor (AR)	2	3	1	1	1	0	5	1	1	1	1
beta-defensin 2 precursor	0	4	0	0	2	0	5	0	3	7	0
transcription factor E2-alpha	161	281	234	366	211	159	261	340	371	661	315
(IFN-alpha) responsive transcription factor subunit	29	42	55	45	35	31	78	154	96	176	134
nuclear factor NF90	83	55	71	78	55	34	58	103	64	69	32
C-ets-2	36	28	13	21	18	11	21	39	30	33	18
putative transcription activator DB1	343	225	371	349	154	143	196	579	558	383	298
TTAGGG repeat binding factor 2	319	217	133	169	244	286	146	488	384	254	233
muscle cadherin precursor (M-cadherin)	2	3	2	2	3	1	6	7	4	5	2
cell adhesion protein SQM1	1122	1245	966	1400	1726	663	901	5329	1962	869	603
integrin beta 6 precursor (ITGB6)	3	6	2	2	2	1	7	0	5	5	0
myeloid cell surface CD33 antigen precursor	1	6	2	1	0	0	4	2	0	2	0
(MCP-1RA)	11	14	13	10	1	3	9	4	5	12	10
IL-3R-alpha	25	30	1	10	2	2	32	1	4	3	0
angiotensin II type 1A receptor	1	2	4	2	0	1	5	0	3	2	1
defensin 6 precursor	0	4	1	0	1	0	2	0	0	1	1
transcription initiation factor IID	24	13	25	20	6	20	26	69	43	51	40
homeobox 2.1 protein	11	13	10	15	3	4	8	8	8	2	3
homeobox A1 protein	26	27	180	73	17	24	78	184	61	159	102
raf-responsive zinc finger protein	64	67	69	39	34	11	42	36	23	64	44
DNA-binding protein TAXREB302	217	224	109	97	103	102	298	153	101	118	87
polyadenylate binding protein-interacting protein	470	247	406	489	221	393	440	767	608	509	345
cadherin 8 (CDH8)	6	5	7	9	3	0	8	4	7	3	2
neural-cadherin precursor	11	5	11	15	3	1	10	5	19	12	0

integrin alpha 3 (ITGA3)	8	6	4	5	5	1	3	6	6	4	0
polycystin precursor	60	58	49	45	48	44	71	101	89	90	34
keratinocyte growth factor receptor	20	19	12	3	11	2	28	1	3	4	3
IL-4R-alpha	39	43	26	25	23	1	9	25	31	68	43
follicle stimulating hormone receptor	4	8	20	9	2	2	5	8	14	3	3
cytochrome P450 IA2	81	131	27	28	20	20	159	18	21	23	12
octamer-binding transcription factor 2	3	4	0	2	0	0	4	1	2	5	1
fli-1 oncogene; ergB transcription factor	4	4	1	3	0	0	4	0	2	4	1
homeobox protein hLim1; LHX1	18	11	11	11	9	4	15	57	12	9	11
orphan hormone nuclear receptor	4	6	4	3	5	0	7	1	2	0	1
zinc finger protein 91 (ZNF92)	356	215	259	275	85	135	329	237	218	215	158
RPD3 protein	531	289	188	218	275	226	272	442	584	280	162
intercellular adhesion molecule 2 precursor	16	22	19	14	11	1	8	0	10	2	1
B-cell differentiation CD72 antigen	2	6	2	3	3	0	6	4	1	0	1
leukocyte adhesion glycoprotein p150	5	7	9	3	3	1	8	19	13	6	1
ciliary neurotropic factor receptor	0	2	12	3	0	1	10	1	5	6	0
activin type I receptor	60	56	63	73	50	38	49	47	48	81	60
IL-5R-alpha	156	137	70	71	83	124	198	96	58	59	39
calcitonin receptor	2	3	1	2	2	0	7	3	1	2	1
cytochrome P450 IVB1	2	5	5	2	2	1	5	0	5	3	1
transcription factor AP-2	4	3	7	5	1	1	4	8	3	3	3
paired box protein PAX-5	244	240	137	168	115	153	307	235	244	206	113
T-cell specific transcription factor GATA3	7	7	12	12	7	12	7	17	17	5	11
NF-kappaB	142	103	145	91	76	85	119	141	110	94	68
adenylate cyclase-stimulating G alpha protein	4553	3463	3414	3419	3344	1688	2933	6746	6451	5054	3937
high mobility group protein	1935	1243	725	912	1554	536	911	1530	1098	1122	622
integrin alpha E precursor	6	5	6	7	5	1	5	0	6	9	2
CD44 antigen hematopoietic form precursor	3	4	5	6	4	7	10	0	3	4	3
fibronectin receptor alpha subunit	4	2	6	1	3	0	3	1	2	3	1
erythropoietin receptor (EPOR)	6	2	4	5	2	0	4	5	1	1	3
GM-CSFR-alpha	25	14	21	16	16	8	13	33	22	9	4
(IFN-alpha-R)	33	29	33	42	21	19	27	7	25	38	21
beta-2 adrenergic receptor	0	3	4	2	3	5	4	1	1	1	3
soluble epoxide hydrolase	30	42	31	42	22	18	27	23	17	24	3
mitochondrial transcription factor 1	406	267	548	780	198	302	334	600	527	750	405
special AT-rich sequence binding protein 1	729	804	3391	2022	1157	732	1243	3589	1476	2497	2092
transcription factor Sp1 (TSFP1)	156	92	110	99	80	86	102	237	158	120	89
zinc-finger DNA-binding protein	66	44	98	71	38	74	75	272	327	295	377
stem cell protein (SCL)	3	5	13	10	4	2	14	12	11	10	5
procollagen alpha subunit precursor	6	7	22	22	2	1	7	6	18	6	5
integrin beta 8 precursor (ITGB8)	19	9	10	20	6	10	6	27	16	6	7
neural cell adhesion molecule L1 precursor	3	2	3	1	0	1	3	0	2	7	3
fibronectin receptor beta subunit	1257	537	1222	1459	451	1069	1045	2153	1948	1754	1464
platelet-activating factor receptor	0	6	3	2	2	10	3	4	1	2	2
CDW40 antigen	16	16	24	16	9	9	14	10	8	8	3
interleukin-2 receptor gamma subunit	5	4	4	4	1	3	10	6	4	3	3
alpha 1A adrenergic receptor	1	5	3	4	1	0	8	0	6	4	2
dimethylaniline monooxygenase	1	5	3	0	1	1	6	4	0	4	5
early growth response protein 1	152	213	1455	688	543	91	343	1900	1740	2568	1992
MSX-1 homeobox protein; HOX7	396	402	344	373	532	1266	1881	4322	2158	1292	740
I-rel (RELB)	3	3	4	3	3	4	6	15	3	4	8
26S protease regulatory subunit 6A	1127	856	905	941	761	637	703	1532	1113	723	496
neural retina-specific leucine zipper protein	35	39	21	26	51	39	47	141	111	57	47
bystin	54	42	26	19	46	27	26	41	21	30	15
thrombospondin 2 precursor	67	64	71	65	152	29	64	276	66	57	25
contactin precursor	2	7	10	5	2	1	6	1	3	6	1
integrin alpha 6 precursor	325	135	178	321	102	125	190	189	152	115	46
endothelin receptor type A	0	3	1	2	1	0	6	2	1	7	1
corticotropin releasing factor	379	401	760	624	711	132	378	1506	699	385	246
interferon-gamma receptor	184	116	245	238	88	104	136	139	98	164	110
protoheme ferro-lyase; heme synthetase	60	50	48	61	78	90	88	181	116	63	46
glutathione reductase (GRase; GSR; GR)	227	174	193	193	195	246	304	648	478	412	322
transcription factor ETR101	140	147	151	149	161	95	211	568	475	1100	701
PAX3/forkhead transcription factor fusion	232	171	184	177	109	123	168	311	264	173	104
Sp2 protein	71	61	74	52	73	23	62	78	44	48	40
DNA-binding protein alpha (PURA)	263	132	171	148	81	85	109	186	115	111	75
tristetraproline (TTP)	19	14	13	17	25	24	59	109	75	119	76
dominant polycystic kidney disease II	13	8	12	12	5	9	9	8	7	15	15
bone proteoglycan II precursor	4	2	7	3	1	0	4	8	4	3	1
(NCAM120); CD56 antigen	2	0	3	3	0	2	3	0	1	1	3
integrin beta 4 (ITGB4); CD104 antigen	34	32	71	37	35	10	21	44	27	13	5
endothelin receptor type B	2	4	7	7	2	1	6	0	10	3	1
cytokine receptor EBI3	4	2	4	5	0	0	5	0	2	2	0
interleukin-9 receptor precursor (IL-9R)	2	1	2	2	0	1	4	0	2	3	1
(microsomal GSTII)	592	400	723	910	506	675	640	1615	1252	1011	760
(GST12; MGST1)	581	423	435	576	240	367	491	427	370	306	140

transcriptional enhancer factor (TEF1)	94	33	74	72	35	107	86	275	155	81	56
transcription factor IIIC box B-binding subunit	29	26	18	11	19	8	12	30	7	19	11
Sp3 protein	211	57	171	183	44	183	117	360	197	212	192
cell cycle gene 1 protein (CCG1)	49	23	37	31	8	24	23	60	21	37	24
nucleobindin precursor (NUC)	1067	1285	690	857	1087	619	1410	1488	1089	1409	988
tastin	14	10	32	27	22	20	12	37	4	26	20
vitronectin receptor alpha subunit	192	64	167	231	63	173	188	374	258	220	135
desmoglein 2 precursor (DSG2); HDGC	89	25	71	73	28	64	62	99	84	76	62
integrin alpha 1 (ITGA1)	62	13	51	45	14	49	42	81	57	23	22
insulin receptor precursor (INSR)	877	609	488	546	601	546	597	1473	1108	412	252
CC chemokine receptor type 2	5	2	6	4	2	0	1	0	3	2	3
interleukin 10 receptor (IL-10R)	2	3	1	31	1	3	4	5	3	3	3
selenium-binding protein	30	34	41	38	38	20	25	56	32	16	17
glutathione S-transferase pi (GSTP1; GST3)	7	10	7	6	2	2	9	4	8	9	8
homeobox protein HOX-11	1	7	4	2	2	2	3	4	2	5	2
nuclear respiratory factor 1	68	40	43	42	38	35	31	52	31	43	29
homeobox protein HOX-D3; HOX-4A	34	25	154	71	27	28	16	87	104	28	26
CCAAT-binding transcription factor subunit B	475	255	557	501	127	263	195	428	307	382	497
neu differentiation factor	5	2	1	6	1	0	6	4	2	5	5
trophinin	14	9	20	12	5	6	7	21	8	6	9
alpha1 catenin (CTNNA1)	2664	2260	2703	3276	2203	1883	2894	6446	8848	5484	5656
platelet membrane glycoprotein IIIa precursor	3	3	7	4	3	0	3	7	6	3	5
integrin alpha 7B precursor (IGA7B)	140	96	67	70	57	98	154	117	106	58	58
platelet-derived growth factor receptor beta subunit	31	30	29	26	8	11	17	65	37	18	10
N-sam	2491	1854	1528	1691	1633	1288	1281	2769	1989	1102	759
interferon gamma receptor (IFNGR)	20	9	20	16	144	8	8	39	29	6	7
microsomal stress 70 protein	130	33	70	89	72	291	211	487	342	143	95
glutathione S-transferase theta 1 (GSTT1)	878	619	1031	928	759	541	776	1112	934	464	510
transcriptional repressor protein yin & yang 1	2499	1414	2096	2307	1471	2207	2374	6255	7351	4719	5025
FUSE binding protein	496	286	464	592	200	350	242	529	377	428	330
transcription factor TFIIIB 90 kDa subunit	322	213	251	251	331	133	145	813	368	175	101
DNA-binding protein HIP116	179	191	96	87	35	59	164	57	32	44	29
transcription factor LSF	92	48	75	89	41	53	51	57	37	43	26
Herpes virus entry protein C (HVEC)	92	88	52	60	75	32	44	78	58	31	26
intercellular adhesion molecule-1 precursor	372	420	472	399	244	77	122	180	252	601	463
CR3A	2	2	64	6	1	24	5	36	6	4	8
LFA-1 alpha subunit precursor	1481	695	17797	10954	762	1085	1977	3319	5119	13725	5795
hyaluronate-binding protein	2	5	10	6	3	1	7	4	3	5	3
interleukin-7 receptor alpha subunit precursor	1	13	5	12	1	4	1	4	3	7	5
interleukin-1 receptor type 1 precursor	387	227	301	333	390	234	233	377	357	624	441
thiosulfate sulfurtransferase; rhodanese	30	26	19	31	60	27	36	31	33	28	22
heme oxygenase 1 (HO1); HSOXYGR	831	514	507	615	2270	4197	3268	9467	8382	3474	3807
heme oxygenase 2 (HO2)	403	220	92	118	188	174	114	237	148	139	66
quinone oxidoreductase	266	116	281	297	123	278	244	485	339	340	277
MPV17 protein	61	66	104	71	54	65	36	95	36	59	49
bone morphogenetic protein 4	1540	1286	1438	1531	1319	1594	1730	2578	2695	1645	1065
thrombomodulin precursor	5	12	31	17	15	6	9	21	26	9	13
insulin-like growth factor binding protein 1	606	310	326	237	296	1331	887	3630	3156	2271	2156
teratocarcinoma-derived growth factor 1	181	107	3256	2407	80	221	216	318	708	1074	475
insulin-like growth factor IA precursor	19	20	32	49	30	42	21	44	23	9	18
glycoprotein hormone alpha subunit precursor	1	2	3	7	0	12	4	14	2	1	2
interferon-beta	105	126	32	31	21	34	159	36	24	18	19
follicle-stimulating protein precursor	7	10	3	9	6	7	7	10	6	3	7
proteasome component C2	969	720	1170	1591	733	1237	1090	2126	1612	1309	1415
25-kDa trypsin inhibitor	2	0	4	3	3	12	6	67	3	2	5
plasminogen precursor (PLG)	21	13	19	20	5	21	9	9	19	6	35
heat shock cognate 71-kDa protein	5683	3600	6533	7915	3927	11761	11393	21879	13582	8510	6649
heat-shock protein 40 (HSP40)	262	198	170	185	363	551	929	745	402	254	175
alpha-1-acid glycoprotein 1 precursor	8781	7731	9105	12047	6760	5725	5164	9720	9843	5779	4286
bone morphogenetic protein 5 precursor	10	9	24	13	24	6	31	24	31	7	8
FMLP-related receptor I (FMLPRII)	7	3	5	4	13	9	13	13	8	6	7
vascular endothelial growth factor precursor	895	553	725	746	749	1391	1588	2620	2004	2301	1989
endothelial-monocyte activating polypeptide II	1521	571	816	1376	687	2051	767	2484	1734	1100	1070
delta-like protein precursor (DLK)	788	1009	1006	1194	1018	557	799	1217	883	968	867
alpha calcitonin precursor	1	6	2	2	2	2	10	8	4	4	6
interferon-alpha2 precursor	8	7	30	21	3	19	11	34	8	9	11
complement component 5 (C5)	20	7	21	27	4	24	23	31	19	11	11
proteasome component C3	1010	416	896	1214	515	997	1037	1822	1919	1176	1116
matrix metalloproteinase 1 (MMP1)	4	5	9	5	2	9	7	14	6	1	8
protein C inhibitor (PROCI; PCI)	2155	1357	785	1043	1386	945	1158	1659	1631	506	599
heat shock 70-kDa protein 6	6	6	36	8	5	10	5	21	6	12	6
HSPD1	4809	1981	2884	3631	1466	5890	3402	9629	5543	3980	2394
alpha-1-antichymotrypsin precursor	294	322	345	300	244	167	230	171	132	170	97
bone morphogenetic protein 6 precursor	6	8	7	5	7	17	8	8	6	7	7
(CSF-1; MCSF)	841	768	422	586	425	580	771	691	457	571	349
heparin-binding growth factor 8 (HBGF-8)	7	7	9	12	5	5	9	9	12	9	5

FLT4 ligand	3	14	4	9	5	19	4	10	6	6	4
(MIP1-beta)	3	5	22	14	4	4	10	8	15	4	5
parathyroid hormone-related protein precursor	5	5	3	7	5	9	12	5	6	2	3
interleukin-10 precursor (IL-10)	308	261	797	546	141	237	284	221	240	227	149
puromycin-sensitive aminopeptidase (PSA)	231	152	264	328	122	255	303	531	469	376	346
proteasome component C5	1334	910	1301	1955	719	1277	1512	2152	2215	1680	1373
matrix metalloproteinase 2 (MMP2)	5	10	8	18	8	3	10	17	8	6	9
endothelial plasminogen activator inhibitor-1	5	3	3	4	4	3	5	3	1	4	3
heat shock-related 70-kDa protein 2	20	9	10	31	65	52	421	444	84	43	35
heat shock 90-kDa protein A	9166	2478	6203	9511	2716	16377	7873	28575	19236	11924	9538
B94 protein	5	4	10	6	14	28	134	55	32	5	13
bone morphogenetic protein 8	11	6	4	7	6	7	16	10	16	6	5
hepatocyte growth factor activator	102	73	74	92	97	49	61	89	50	63	36
T-cell-secreted protein I-309 precursor	2	4	3	5	3	20	3	12	5	3	9
interferon gamma-induced protein precursor	3	8	13	6	2	1	5	0	4	4	5
ribonuclease/angiogenin inhibitor	677	561	534	624	705	269	332	710	642	737	450
interleukin-16 (IL-16)	3	3	3	4	2	24	6	46	2	3	19
interleukin-13 precursor (IL-13); NC30	27	39	146	181	72	43	42	128	118	46	94
heregulin-beta3	19	11	27	35	12	24	34	41	12	13	23
proteasome component C8	1024	397	932	1216	407	976	737	1589	1224	1121	854
matrix metalloproteinase 3 (MMP3)	6	5	11	6	2	12	4	9	5	26	12
placental plasminogen activator inhibitor 2	2	6	7	6	1	3	7	18	3	4	7
glutathione peroxidase (GSHPX1; GPX1)	163	187	435	396	430	85	137	222	104	136	82
27-kDa heat-shock protein (HSP27)	3792	3340	3048	3395	4000	2517	2383	6486	7988	4992	3881
C-reactive protein precursor	8	6	7	5	11	16	15	108	14	5	14
bone-derived growth factor 1 (BPGF1)	4	8	3	5	4	35	11	454	6	4	276
hepatoma-derived growth factor (HDGF)	1447	1053	646	952	1469	1198	844	1650	1463	1314	1067
stem cell factor precursor (SCF)	339	111	217	300	83	241	115	188	133	73	59
migration inhibitory factor-related protein 14	3	4	5	12	4	20	4	9	9	6	3
erythroid differentiation protein	4	9	4	12	2	13	5	13	3	6	6
interleukin-18 precursor (IL-18)	71	82	101	96	96	39	54	118	71	76	62
interleukin-14 precursor (IL-14)	52	55	48	144	48	82	62	148	56	94	90
alpha-1-antitrypsin precursor	25848	21988	29996	31519	25047	20328	24352	39112	30624	32487	29652
proteasome component C9	123	61	187	242	74	118	154	153	227	128	138
matrix metalloproteinase 7 (MMP7)	6	5	7	12	7	8	16	14	12	6	12
metalloproteinase inhibitor 1 precursor (TIMP1)	721	444	568	478	697	412	381	1493	942	446	406
glutathione peroxidase-gastrointestinal	1320	1462	2185	2127	2031	937	943	1065	671	503	257
70-kDa heat shock protein 1	308	275	304	586	2827	9658	10809	19963	5025	2800	1316
eosinophil granule major basic protein precursor	87	106	27	24	28	33	137	79	20	26	22
insulin-like growth factor II	7956	4403	3213	2920	3489	3038	2626	4297	3404	2576	2326
endothelin 3 (EDN3; ET3)	8	13	10	7	7	16	7	6	8	9	5
heparin-binding EGF-like growth factor	4	3	6	4	2	1	6	5	5	8	9
migration inhibitory factor-related protein 8	3	2	2	3	2	1	5	0	2	5	3
angiotensin-converting enzyme (ACE)	13	10	29	22	11	21	12	18	19	12	11
interferon gamma precursor	58	39	61	70	43	52	33	121	65	30	29
interleukin-11 (IL-11)	9	102	13	33	1	48	8	106	5	13	37
carboxypeptidase H precursor (CPH)	1442	1029	1373	1719	939	1480	1790	2717	2354	2157	1743
acrosin precursor	19	10	4	51	9	4	85	10	10	21	12
matrix metalloproteinase 8 (MMP8)	16	14	8	12	9	46	22	13	25	3	10
tissue inhibitor of metalloproteinases 2	64	34	30	33	40	24	37	32	41	32	21
thioredoxin peroxidase 1 (TDPX1)	3061	4010	2829	3338	3651	1772	2633	3050	2239	2814	1491
cytosolic superoxide dismutase 1 (SOD1)	1214	794	1383	1640	817	1552	1406	3294	2996	3194	2065
monocyte chemotactic protein 4 precursor (MCP4)	7	3	9	2	3	33	15	39	4	5	6
pbacplermin; c-sis	102	229	39	120	27	53	137	64	40	99	20
neuroleukin (NLK)	2820	2421	1677	1831	2678	2148	1536	2436	2409	1738	1090
hepatocyte growth factor (HGF)	5	2	3	5	4	4	6	12	5	3	4
platelet-derived growth factor A subunit precursor	165	161	129	104	96	69	195	134	94	93	89
prorelaxin H2 precursor (RLN2)	2	2	9	2	1	4	7	0	2	4	3
interleukin-7 (IL-7)	120	100	18	24	28	39	149	35	19	22	16
interleukin-12 beta subunit precursor (IL-12B)	124	137	30	43	19	45	174	47	30	28	22
dipeptidyl-peptidase I precursor (DPP-I)	636	378	499	666	295	370	450	537	440	409	243
acrosin-trypsin inhibitor II precursor; HUSI II	2	10	4	11	4	3	5	10	3	7	1
matrix metalloproteinase 9 (MMP9)	105	71	64	71	75	45	64	241	136	47	32
tissue inhibitor of metalloproteinase 4 (TIMP4)	1	5	0	5	3	14	10	8	1	3	10
thioredoxin peroxidase 2 (TDPX2)	1795	967	1372	1546	835	1775	1393	4325	3041	2408	2086
glutaredoxin	286	118	131	163	149	321	214	798	652	527	206
pancreatitis-associated protein 1 precursor (GM-CSF); CSF2	3	3	2	4	1	4	6	10	2	4	4
thrombopoietin precursor (THPO)	6	2	21	18	3	13	8	16	22	3	5
keratinocyte growth factor (KGF)	37	76	65	47	26	11	7	8	6	15	11
leukemia inhibitory factor precursor (LIF)	2	4	2	2	1	5	3	7	2	0	1
renin-binding protein (RENBP; RBNP)	58	64	32	55	42	46	42	72	76	462	193
interleukin-2 precursor (IL-2)	112	112	54	114	35	53	85	60	58	88	34
interleukin-12 alpha subunit precursor (IL-12A)	54	65	9	13	4	14	83	11	8	14	9
cathepsin H precursor	4	3	6	5	1	21	7	6	2	7	2
leukocyte elastase inhibitor (LEI)	472	465	606	667	476	322	396	552	518	418	326
	137	75	125	116	72	92	74	79	64	63	55

matrix metalloproteinase 12 (MMP12)	5	6	10	14	1	26	9	10	8	6	4
matrix metalloproteinase 17 (MMP17)	171	196	51	79	47	70	176	76	35	38	32
cytochrome P450 IIF1 (CYP2F1)	8	3	8	6	2	4	5	3	3	9	4
thioredoxin reductase	434	160	107	380	529	1217	938	2964	1807	897	715
osteoclast stimulating factor	73	33	48	70	32	79	43	106	70	62	47
transforming growth factor-alpha	4	1	8	6	4	6	6	14	3	4	9
uromodulin	2	5	3	7	3	5	1	7	2	3	1
brain-derived neurotrophic factor (BDNF)	4	3	2	2	0	3	4	2	1	3	0
acidic fibroblast growth factor (AFGF)	1	4	5	5	2	3	7	10	3	6	1
glucagon precursor (GCG)	2	0	5	6	2	0	3	2	0	4	2
interleukin-1 alpha precursor	7	11	6	6	1	2	10	6	2	5	3
interleukin-15 (IL-15)	1	6	2	3	3	3	0	4	3	3	1
cystatin-related epididymal spermatogenic	3	10	3	8	1	4	5	8	4	5	3
inter-alpha-trypsin inhibitor heavy chain H2 precursor	1721	755	1038	1638	637	1472	1335	1723	1558	987	750
matrix metalloproteinase 14 precursor	23	29	36	35	27	20	26	50	52	48	30
tripeptidyl-peptidase I precursor	85	106	114	123	105	55	166	77	62	205	186
dioxin-inducible cytochrome P450 1B1	1	5	5	14	2	15	5	7	10	7	1
NAD(P)H dehydrogenase	252	204	349	263	232	283	238	463	198	393	258
CXC chemokine precursor	6	3	10	6	1	5	3	12	2	4	4
transforming growth factor-beta	71	50	2281	1365	34	120	100	212	647	682	358
T-cell-specific rantes protein precursor	942	481	12982	6152	337	702	1081	1238	2575	5406	1822
embryonic growth/differentiation factor 1 (MIP2-alpha)	4	10	10	28	6	19	7	15	6	22	10
inhibin alpha subunit precursor (INHA)	4	4	7	3	0	186	4	223	2	1	5
interleukin-1 beta precursor	42	57	72	48	45	10	25	32	40	13	15
interleukin-9 precursor (IL-9)	718	603	344	499	434	515	781	737	607	428	267
major epididymis-specific protein E4 precursor (ITI heavy chain H3)	5	3	4	6	2	68	4	3	4	4	2
matrix metalloproteinase 15 (MMP15)	5	4	5	4	1	3	3	0	3	7	1
dipeptidyl peptidase IV (DPP IV; DPP4)	180	137	112	133	98	88	87	128	121	84	65
S-mephenytoin 4 hydroxylase	103	70	44	44	83	35	51	69	38	25	15
2 P450VD1-alpha	185	56	124	176	72	188	172	364	245	198	211
bone morphogenetic protein 3B precursor (G-CSF); pluripotin; CSF3	0	4	12	13	2	3	4	5	4	4	2
(MIP1-alpha)	17	9	18	19	7	44	10	22	5	20	15
endothelin 2 (ET2)	15	9	4	6	3	4	15	6	2	3	2
placenta growth factors 1 + 2	3	5	7	5	5	10	3	11	2	7	4
estrogen sulfotransferase	2	0	49	15	4	15	7	33	21	9	8
interleukin-3 precursor (IL-3)	592	398	445	455	345	267	341	1079	524	268	124
interleukin-17 precursor (IL-17)	71	91	41	52	30	42	84	91	75	52	29
insulin-degrading enzyme	77	40	35	42	30	72	66	167	115	79	36
(ITI heavy chain H4)	7	17	2	3	3	42	23	12	2	2	4
membrane-type matrix metalloproteinase 3	2	4	8	11	0	4	6	7	6	4	2
myeloblastin precursor (MBN)	242	85	91	148	78	239	125	366	286	165	121
P450(SCC)	6	7	7	7	5	14	7	15	5	12	5
glutathione synthetase	8	7	6	6	7	5	10	15	5	7	1
bone morphogenetic protein 1 (BMP1)	3	2	3	3	2	13	2	28	4	2	10
transforming growth factor beta2 precursor	20	8	27	25	16	11	7	17	0	7	3
monocyte chemotactic protein 1 precursor	315	304	230	272	387	204	212	391	237	185	126
hepatocyte growth factor-like protein	50	46	49	46	41	20	37	56	49	54	38
granulocyte chemotactic protein 2 (IGF-binding protein 3; IGFBP3; IBP3)	347	303	253	288	91	151	293	447	378	169	96
interleukin-4 precursor (IL-4)	3	1	4	3	2	49	6	16	2	3	4
parathymosin	1130	971	846	933	702	573	699	1219	529	649	198
methionine aminopeptidase 2	0	7	10	11	1	2	6	4	4	7	4
neuroserpin precursor	2	1	5	4	0	30	2	36	3	3	9
matrix metalloproteinase 13 (MMP13)	2	6	2	2	1	5	3	3	0	3	3
cathepsin L precursor	205	367	688	563	361	124	254	292	279	501	472
polymorphic arylamine N-acetyltransferase	857	466	1025	1211	376	883	610	1470	1511	1051	984
glutathione S-transferase mu1	28	10	21	30	6	19	16	32	27	30	15
bone morphogenetic protein 2A	1	2	2	3	2	4	10	9	4	4	1
kidney epidermal growth factor	97	50	37	56	46	45	91	99	223	269	65
oncostatin M (OSM)	4	2	9	6	3	8	0	7	0	4	2
thymosin beta-10	115	101	157	93	65	72	130	113	60	63	40
OX40 ligand (OX40L)	98	68	120	90	48	27	70	155	100	43	20
cellular retinoic acid-binding protein II	7	5	4	10	4	4	8	12	7	1	2
interleukin-6 precursor (IL-6)	40	39	54	47	7	10	13	77	46	16	18
thymosin beta 4; FX	3106	3194	2257	3440	3021	2440	2484	5156	4300	9358	5701
proteasome activator HPA28 subunit beta	7	8	9	15	4	18	7	37	4	24	8
cytoplasmic antiproteinase 2	2	2	0	2	1	4	4	1	3	2	1
cathepsin D precursor (CTSD)	188	177	830	546	152	160	166	643	617	182	137
activator of RNA decay (ARD-1)	41	46	26	29	29	23	30	28	28	27	13
serum paraoxonase/arylesterase 1	278	165	182	208	114	267	161	346	128	167	87
glutathione S-transferase A1	3	9	3	5	4	1	4	0	4	15	9
bone morphogenetic protein 3 (BMP3)	481	517	329	386	601	191	525	386	428	586	275
cytokine humig	98	51	39	66	26	32	60	47	61	59	17
	4	5	14	17	1	8	1	7	3	0	2
	322	225	231	222	166	306	319	526	312	336	187
	4	1	4	2	0	0	1	0	1	2	0
	1	2	4	4	0	29	4	39	2	3	4

amphiregulin (AR)	1	2	2	1	1	2	8	5	1	5	0
connective tissue growth factor precursor	7	117	26	22	2	136	4	132	4	10	7
interleukin-8 precursor (IL-8)	6	12	11	13	4	5	6	14	6	11	7
corticotropin-releasing factor-binding protein	3	6	4	2	2	1	8	2	2	4	1
interleukin-5 precursor	2	3	6	4	0	2	4	0	1	7	3
Wnt-13	7	4	16	9	2	12	7	13	6	3	3
proteasome inhibitor HPI31 subunit	522	377	238	352	315	252	359	665	516	413	269
bikunin	15	12	7	8	6	10	24	12	8	4	7
metalloprotease	75	29	122	86	39	78	101	182	167	158	108
zinc finger X-chromosomal protein	464	134	278	712	148	196	225	220	224	200	100
ubiquitin	8304	8056	8953	12546	18216	15525	38729	20418	12944	15249	7830
phospholipase A2	514	422	600	803	299	381	606	739	890	1285	741
hypoxanthine-guanine phosphoribosyltransferase	160	108	163	178	101	107	116	247	202	208	115
(GAPDH)	37198	42392	40219	44061	43640	18098	38882	39270	42977	45617	40834
brain-specific tubulin alpha 1 subunit	36358	36757	20639	30969	34112	17124	10842	25722	30108	18784	19126
HLA class I histocompatibility antigen	384	460	439	376	459	385	399	506	200	458	406
cytoplasmic beta-actin (ACTB)	1237	1484	636	925	1119	969	1014	908	464	665	431
23-kDa highly basic protein	18815	23201	12444	20732	17384	17296	15997	18107	22253	15445	9816
40S ribosomal protein S9	3994	5741	1432	2621	5028	1191	3591	2375	2252	2885	1614

Protein/gene	Intensity - 0.75mM DEM Treated Cultures										
	15 min.	30 min.	1 Hour	2 Hour	4 Hour	6 Hour	8 Hour	12 Hour	16 Hour	20 Hour	24 Hour
Von Hippel-Lindau tumor suppressor protein	281	221	258	253	234	357	351	496	342	248	254
cadherin1 (CDH1)	3	8	1	0	4	5	10	5	0	0	1
LUCA2	324	298	152	145	191	109	175	212	201	58	105
N-myc proto-oncogene	21	17	14	8	6	10	14	4	5	3	13
B-raf proto-oncogene (RAF1)	34	23	35	41	31	44	34	77	57	32	26
vascular endothelial growth factor receptor 1	128	156	37	49	56	121	191	74	48	23	30
transforming protein rhoA	6468	6041	6269	8486	7569	9106	6634	11992	8953	6263	3747
G2/mitotic-specific cyclin A	661	549	666	919	521	923	502	600	478	285	233
BUBR1 protein kinase	144	117	107	143	68	176	65	112	94	46	38
wee1Hu CDK tyrosine 15-kinase	31	17	50	69	43	41	19	41	21	38	25
aurora-related kinase 1 (ARK1)	301	293	192	286	251	291	315	337	373	194	111
CDC25B; CDC25HU2	142	169	62	63	111	53	169	84	118	63	43
transmembrane 4 superfamily protein; SAS	413	384	151	151	251	440	585	275	235	90	110
calcium-activated potassium channel beta subunit	20	4	3	2	4	4	12	5	4	0	1
mothers against dpp homolog 4 (SMAD4)	113	106	63	106	93	196	171	218	205	71	76
ras-related protein RAP-1A	295	256	681	623	273	74	133	253	152	1269	650
LUCA15 putative tumor suppressor	46	26	29	29	33	29	38	69	57	24	23
erythroblastosis virus oncogene homolog 1	15	20	12	24	18	10	23	14	38	9	10
pim-1 proto-oncogene	115	128	127	151	275	117	344	492	277	97	58
tyrosine-protein kinase receptor tyro3 precursor	153	186	238	198	246	93	152	170	161	90	175
transforming protein p21/K-ras 2B	232	216	239	295	184	269	180	288	183	159	152
G2/mitotic-specific cyclin B1 (CCNB1)	1915	1747	1740	1993	1405	2028	1410	1753	1405	1014	753
cell division control protein 2 homolog (CDC2)	1065	1052	681	1035	606	1449	1021	1011	668	264	108
DNA-binding protein inhibitor ID-1; Id-1H	1558	1360	1553	2016	1747	1271	1373	1871	1570	1042	459
ARK2	227	231	128	162	248	174	230	172	140	49	34
CDC25C; M-phase inducer phosphatase 3	234	205	209	248	229	155	195	216	160	96	44
C-1	748	769	681	939	567	1308	1086	1427	1181	621	669
Gprotein-activated inward rect. potassium chan. 1	5	8	4	3	0	9	11	9	2	0	4
adenomatous polyposis coli protein	68	66	76	81	27	130	66	135	109	65	54
EB1 protein	995	1013	809	921	689	774	1198	1404	1333	915	664
neogenin	16	14	16	23	20	19	33	19	25	18	13
MAD protein; MAX dimerizer	17	17	9	16	41	38	81	115	88	43	9
c-raf proto-oncogene	264	187	173	191	233	250	367	575	357	154	95
c-ros-1 tyrosine-protein kinase proto-oncogene	153	186	35	36	31	24	177	29	29	15	23
N-ras; transforming p21 protein	508	432	538	503	267	462	414	516	473	447	407
G1/S-specific cyclin D1 (CCND1)	688	446	523	561	460	292	222	171	100	101	297
cyclin-dependent protein kinase 2 (CDK2)	162	152	198	269	193	244	145	142	71	68	95
cell division protein kinase 9 (CDK9)	224	180	121	121	145	44	124	200	199	62	51
cyclin-dependent kinase 4 inhibitor B (CDKN2B)	10	11	13	2	6	4	5	6	3	1	2
prothymosin alpha (ProT-alpha; PTMA)	3614	4583	6357	7099	4694	3176	2527	4919	3292	2801	3130
cyclin-D binding Myb-like protein (hDMP1)	54	62	49	49	34	127	93	161	96	57	52
G protein-activated inward rect. potassium chan.	4	11	5	25	3	3	15	1	4	0	1
breast cancer type 2 susceptibility protein	88	103	52	58	31	88	139	73	58	42	30
e3rin; cytoillin 2; villin 2 (VIL2)	1185	1122	526	556	1073	402	808	1161	1001	203	203
transforming growth factor-beta signaling protein 1	81	112	106	155	113	146	152	178	137	78	75
jun-D	43	29	19	19	81	53	100	70	83	28	18
A-raf proto-oncogene serine/threonine kinase	26	16	17	10	22	4	18	6	7	6	9
proto-oncogene tyrosine-protein kinase abl	176	162	130	164	401	185	268	438	351	98	69
C-cbl proto-oncogene	11	15	10	5	4	10	12	24	27	8	8
G1/S-specific cyclin D2 (CCND2) + KIAK0002	11	4	4	3	3	4	7	5	1	4	2

cell division protein kinase 4	1859	1142	727	866	2313	819	1594	1708	1176	245	203
stem cell tyrosine kinase 1 (STK1)	27	23	10	7	16	24	33	14	13	5	4
cyclin-dependent kinase 4 inhibitor	32	17	12	6	6	20	27	7	13	7	4
DNA-binding protein inhibitor ID-1; Id-1H	632	666	571	289	423	157	335	835	1118	762	436
water channel aquaporin 3 (AQP3)	6	13	2	2	2	6	4	3	3	2	1
ASIC3 proton gated cation channel	11	5	2	3	2	6	11	2	4	0	4
tumor suppressor protein DCC precursor	19	16	42	28	7	5	13	31	24	15	4
transforming growth factor-beta 3 (TGF-beta3)	15	16	8	9	11	8	14	7	14	4	8
p78 putative serine/threonine-protein kinase	71	61	72	67	56	128	126	157	126	68	54
B-myb	525	693	503	475	755	386	600	640	561	319	257
tyrosine-protein kinase receptor UFO precursor	16	19	14	15	14	7	13	13	8	5	15
tyrosine-protein kinase ABL2	67	56	47	51	38	62	73	85	57	29	27
INT-2 proto-oncogene protein precursor	10	9	11	14	6	9	9	19	9	5	3
G1/S-specific cyclin D3 (CCND3)	8	8	12	3	12	4	9	5	4	5	2
cell division protein kinase 6 (CDK6)	1009	1072	716	671	938	690	1022	965	761	416	368
serine/threonine-protein kinase KKIALRE	16	11	8	11	19	10	20	17	23	3	2
cyclin-dependent kinase 4 inhibitor D (CDKN2D)	124	148	95	128	161	97	263	433	508	138	49
transcription factor DP2 (Humpd2)	149	134	85	133	141	83	150	216	131	49	43
sulfate transporter; diastrophic dysplasia protein	50	19	20	5	2	18	15	4	13	4	5
Gprotein-activated inward rect. potassium chan. 3	4	6	3	2	2	2	6	3	0	0	0
p53-associated mdm2 protein	353	251	211	216	306	926	981	1412	1211	441	180
(TGF beta receptor III; TGFBR3)	404	424	357	383	345	779	793	930	565	165	419
C-maf transcription factor	6	14	4	2	3	3	9	5	4	1	2
fos-related antigen 2 (FRA2)	4	11	7	2	13	7	17	18	27	23	13
(CSF-1-R)	82	92	30	38	42	6	65	80	51	7	11
C-src proto-oncogene (SRC1)	194	244	144	131	204	327	446	672	580	118	87
mas proto-oncogene	3	6	3	9	2	2	5	4	7	4	1
G1/S-specific cyclin E (CCNE)	273	204	123	129	195	80	166	249	322	102	50
cell division protein kinase 5 (CDK5)	250	270	179	227	291	214	195	228	179	56	94
CDC2-related protein kinase CHED	119	125	95	110	80	224	223	283	213	79	86
cyclin-dependent kinase inhibitor 1C	4	161	1	7	4	3	2	6	8	9	1
helix-loop-helix protein HLH 1R21	87	215	62	44	78	45	130	184	205	29	27
erythrocyte glucose transporter 1 (GLUT1)	143	164	190	194	141	100	151	124	127	107	235
ATP-sensitive inward rect. potassium chan. 8	4	5	4	2	4	1	7	3	2	0	2
neurofibromatosis protein type I (NF1)	44	40	49	34	20	59	40	50	45	31	31
prohibitin (PHB)	268	214	140	108	202	116	241	289	240	100	68
elk-1; ets-related proto-oncogene	22	18	21	11	18	7	20	15	18	7	9
fos-related antigen (FRA1)	46	61	62	53	99	82	190	404	507	404	95
c-kit proto-oncogene	0	6	8	1	3	3	2	2	3	0	2
C-yes proto-oncogene (YES1)	242	196	149	180	130	283	332	568	412	120	68
thrombopoietin receptor precursor (TPOR)	1	4	4	1	4	5	4	2	1	0	1
G2/mitotic-specific cyclin G1	155	141	151	167	121	295	218	271	204	89	93
protein serine/threonine kinase STK1	145	209	54	80	119	92	143	176	217	48	34
p35 cyclin-like CAK1-associated protein	154	144	153	161	78	163	141	151	149	131	127
cyclin-dependent kinase inhibitor 1 (CDKN1A)	219	155	122	119	367	340	1405	943	1344	936	150
40S ribosomal protein S19 (RPS19)	14817	16342	9105	11232	20234	5598	16162	17464	17925	5241	2611
liver glucose transporter 2	63	63	53	70	37	54	65	47	27	9	29
calcium-activated potassium channel HSK1	6	9	8	16	6	2	7	2	6	4	4
moesin-ezrin-radixin-like protein (MERLIN)	354	184	162	149	272	213	225	316	286	86	46
tight junction protein zonula occludens (ZO-1)	33	18	19	27	29	31	55	55	52	23	17
A-myb proto-oncogene; myb-related protein A	155	152	52	46	47	85	195	50	42	28	27
v-erbA related protein (EAR2)	293	358	255	297	273	245	293	454	417	189	164
met proto-oncogene	32	22	35	38	26	31	22	28	28	11	26
C-fes proto-oncogene	11	37	4	9	14	14	15	20	28	5	3
cell surface glycoprotein MUC18	24	27	18	24	25	12	19	15	25	11	6
cyclin H (CCNH); MO15-associated protein	561	526	609	712	325	848	565	1128	772	470	566
extracellular signal-regulated kinase 1	104	118	68	72	96	75	88	100	95	59	46
cyclin G-associated kinase (GAK)	101	101	59	65	103	56	172	176	172	75	49
cyclin-dependent kinase inhibitor 3 (CDKN3)	264	231	303	385	159	266	197	260	208	136	100
bullous pemphigoid antigen 1	45	37	41	61	25	50	40	73	48	22	18
brain glucose transporter 3 (GTR3)	1388	1115	1400	1009	609	285	380	219	166	208	1740
chloride conductance regulatory protein ICLN	467	398	403	496	311	545	498	529	417	224	381
retinoblastoma-like protein 2	52	28	32	25	26	31	51	39	28	17	16
nucleoside diphosphate kinase B	4309	3476	2820	2870	3654	3479	4958	5145	4974	2836	2703
c-fos proto-oncogene; G0S7 protein	5	23	2	2	5	8	3	6	8	4	3
ets-related protein tel	8	12	11	13	11	8	14	11	5	7	12
ret proto-oncogene	3	5	3	2	2	2	4	1	3	1	0
C-fgr proto-oncogene (p55-FGR); SRC2	40	75	25	25	23	17	31	65	42	13	10
insulin-like growth factor binding protein 2	2133	5112	5011	4663	2571	1561	2318	4650	3821	1920	1946
fte-1	3198	3170	3087	3746	1471	4865	4450	4816	3707	2357	3085
extracellular signal-regulated kinase 2	410	360	379	373	310	396	382	614	551	349	240
serine/threonine-protein kinase NEK3	79	50	47	53	45	73	52	92	71	27	31

ubiquitin-conjugating enzyme E2 H10	1164	757	626	654	819	588	895	1279	1050	315	149
proliferating cell nucleolar antigen P120	275	230	139	106	124	109	234	280	307	101	72
E16 amino acid transporter	447	483	335	295	457	367	783	903	976	398	277
HUKIV	20	14	3	3	4	10	17	4	11	2	2
p53 cellular tumor antigen	23	9	7	9	17	10	19	14	20	11	3
nucleoside diphosphate kinase A (NDKA)	2693	2083	1460	1469	2527	1345	3600	3244	3119	1252	1227
transcription factor AP-1	173	186	357	506	495	399	489	685	1037	1158	581
triiodothyronine receptor	6	15	3	5	8	6	13	9	15	6	3
epidermal growth factor receptor (EGFR)	24	29	24	19	20	15	20	18	22	28	37
shb proto-oncogene	236	230	187	237	383	443	460	893	730	352	273
T-lymphoma invasion and metastasis inducing	16	27	23	13	3	7	17	5	7	2	4
Cl man-6-P receptor	310	364	186	183	297	482	735	761	676	304	252
extracellular signal-regulated kinase 3	442	253	274	315	257	535	668	1239	810	326	266
CDC-like kinase 2 (CLK2)	38	26	20	18	17	16	35	38	34	12	16
geminin	310	278	189	197	126	258	326	262	265	70	91
NuMA	15	17	8	9	18	8	15	7	10	3	1
aquaporin 4	303	414	158	145	440	232	191	479	651	93	53
voltage-gated potassium channel protein KV11	39	77	62	69	29	36	56	55	68	20	22
retinoblastoma-associated protein	85	100	78	81	36	102	69	96	62	44	52
TSG101 tumor susceptibility protein	55	36	50	45	59	29	65	111	92	38	34
myb proto-oncogene; c-myb	138	169	57	56	33	56	176	74	39	22	25
v-erbA related protein (EAR3)	236	272	300	262	178	147	111	162	116	70	162
ERBB2 receptor protein-tyrosine kinase	112	109	52	72	100	21	72	79	74	20	34
ski oncogene	476	485	564	667	661	649	457	748	589	440	332
matrix metalloproteinase 11	299	446	149	181	191	143	274	311	282	94	64
cyclin A1 (CCNA1)	10	21	16	27	10	15	10	16	21	6	3
extracellular signal-regulated kinase 4	3	12	8	5	4	4	8	5	7	0	2
CDC-like kinase 3 (CLK3)	221	190	174	186	250	127	236	513	395	206	129
katanin p80 subunit	54	36	21	20	37	33	37	20	18	16	15
myeloid cell nuclear differentiation antigen	4	14	3	1	2	3	7	3	4	0	1
aquaporin 9	7	7	4	1	2	7	5	2	8	0	2
voltage-gated potassium channel protein KV14	9	7	3	3	3	10	7	3	7	2	0
Wilms' tumor protein (WT33; WT1)	21	10	25	32	17	28	14	30	31	23	19
maguk p55 subfamily member 2	7	226	5	20	2	9	4	16	5	3	4
c-myc oncogene	2963	3346	4361	4237	5255	1820	2750	6187	4546	1918	1929
ETS oncogene (PEP1)	62	101	29	44	42	27	115	67	80	35	19
epidermal growth factor receptor	576	657	549	600	485	478	563	718	460	231	333
snoN oncogene	190	165	192	212	68	139	113	145	129	69	65
cyclin T CDK9-associated	101	91	84	106	56	102	131	212	182	117	89
cyclin G2 (CCNG2)	7	6	4	6	6	20	20	15	10	4	2
ERK5	60	62	35	37	54	49	68	91	89	39	37
serum-inducible kinase (SNK)	30	34	18	13	8	23	29	51	73	24	15
diaphanous 1 (HDI1)	374	275	284	276	210	349	373	474	303	166	153
transducer of erbB2 (TOB)	169	268	421	295	338	106	186	658	501	237	215
cationic amino acid transporter 3	3	7	2	2	3	6	5	1	5	1	1
N-type calcium channel alpha-1B subunit	21	26	3	2	2	7	26	4	3	1	1
putative protein-tyrosine phosphatase	174	131	155	169	103	311	202	324	251	106	113
tumor suppressor maspin	4	6	3	5	1	4	5	1	2	0	1
c-rel proto-oncogene protein	53	43	50	49	42	46	68	133	77	26	20
cot proto-oncogene	10	9	8	9	14	10	19	23	30	8	3
ERBB4 receptor protein-tyrosine kinase	4	7	5	5	3	2	3	2	2	2	0
CBL-B	113	171	83	115	100	144	173	224	149	47	48
cyclin K	171	204	151	209	155	258	253	390	318	212	162
bub1 mitotic checkpoint kinase	328	326	262	325	187	739	398	520	377	206	149
cdc2-related protein kinase PISLRE	4	13	5	5	8	2	5	7	1	2	2
cyclin-dependent kinase regulatory subunit 1	757	793	711	796	732	1054	1224	1553	1378	558	394
sprouty 2 (SPRY2)	15	21	19	19	14	25	26	31	31	13	24
p55CDC	1510	945	854	801	1172	718	1144	1282	1061	482	256
putative renal organic anion transporter 1	6	1	3	2	3	4	9	2	3	2	1
CAB3A/CAB3B	4	3	4	1	5	5	5	1	3	1	1
colorectal mutant cancer protein (MCC)	1	4	0	2	2	3	2	2	4	2	2
tumor suppressor LUCA1	181	134	172	153	196	137	151	117	108	56	106
L-myc proto-oncogene (MYCL1)	2	2	1	3	1	4	5	4	5	0	0
C-mos proto-oncogene kinase	1	13	1	0	2	2	5	1	4	1	1
platelet-derived growth factor receptor alpha subunit	4	5	1	1	1	2	3	0	0	0	0
H-ras proto-oncogene; transforming G protein	62	68	34	35	68	34	81	95	74	33	18
cyclin E2	43	29	34	38	18	32	17	29	21	8	17
serine/threonine-protein kinase NEK2	59	68	54	68	38	84	71	91	59	38	19
CDC-like kinase 1 (CLK1)	250	180	250	475	308	943	634	779	584	319	279
cyclin-dependent kinase regulatory subunit	796	534	529	578	721	1406	1295	2172	1919	596	299
cell division cycle protein 25A (CDC25A)	675	471	640	548	498	365	401	860	583	261	214

RCL growth-related c-myc-responsive gene	335	341	271	247	465	203	575	304	351	140	222
erythrocyte urea transporter	1	10	10	16	5	4	2	4	5	1	1
CACNA1G	17	21	4	3	3	8	26	3	4	3	1
kidney glomeruli chloride channel; CIC-5	193	115	142	176	115	194	188	242	169	72	85
monocarboxylate transporter 1 (MCT1)	1461	1346	1388	1602	907	1744	1569	1846	1676	1030	1149
zinc transporter 4	4	9	1	0	0	3	7	4	4	0	1
MSP receptor	7	10	2	1	1	3	6	2	2	0	1
U-PAR	723	459	542	472	842	420	841	1180	956	253	242
related to receptor tyrosine kinase (RYK)	246	265	128	117	114	114	369	241	216	67	85
proto-oncogene tyrosine-protein kinase lck	9	9	2	3	3	3	6	5	4	0	1
glycogen synthase kinase 3 beta	104	98	115	117	65	53	59	143	118	69	60
MAPKK 6	126	100	73	80	42	49	68	65	25	7	25
PRKAR2A	112	90	55	68	71	64	125	156	125	49	33
lipid-activated protein kinase PRK1	128	138	66	83	120	70	177	186	166	62	49
serine/threonine-protein kinase PAK-beta	4	7	4	3	2	2	8	1	3	0	2
phospholipase C-delta-1	15	18	5	3	3	8	7	19	6	0	0
ADP-ribosylation factor 1	118	126	109	91	118	72	98	107	86	71	55
cardiac muscle sodium channel alpha subunit	5	6	2	3	4	2	1	5	3	1	1
sodium/hydrogen exchanger 1	59	25	42	50	55	57	46	83	91	58	33
Golgi 4-transmembrane spanning transporter	413	460	415	415	485	781	729	980	729	264	357
autocrine motility factor receptor	32	19	13	10	31	37	53	42	55	13	7
vascular endothelial gf receptor 2 precursor	3	6	4	3	2	5	4	2	3	0	1
protein-tyrosine kinase transmembrane rec. ror1	2	5	1	5	3	5	8	4	1	0	1
tyrosine-protein kinase lyn	217	275	163	146	244	179	144	316	299	43	49
pyruvate dehydrogenase kinase kinase precursor	154	100	101	59	60	114	83	85	64	48	217
MAPK/ERK kinase kinase 3	133	153	33	48	96	100	199	328	288	27	15
Janus kinase 1 (JAK1)	283	215	209	237	193	286	356	445	439	144	78
(SGK)	160	173	45	42	50	27	213	45	30	13	25
myotonic dystrophy protein kinase-like protein	6	11	1	2	1	4	6	0	1	7	1
P3-kinase catalytic subunit delta isoform	28	27	25	35	59	46	80	97	122	69	25
ras-related protein RAP-1B	455	374	469	559	322	783	567	1035	1134	409	332
KCNQ3 potassium channel	2	5	1	2	0	5	3	7	1	0	1
sodium/hydrogen exchanger 3	1	5	0	1	3	4	1	12	1	0	2
organic cation transporter 1	91	134	25	27	31	26	163	29	25	15	21
colon carcinoma kinase 4 precursor	140	125	73	72	136	37	121	103	124	29	62
angiopoietin 1 receptor precursor	57	99	32	48	49	75	49	93	116	9	13
neurotrophic tyrosine kinase receptor-related 3	10	9	14	15	8	9	14	15	12	2	5
integrin-linked kinase (ILK)	132	64	46	46	101	50	98	180	124	16	12
ribosomal protein kinase B (RSKB)	7	10	4	3	6	6	9	7	6	2	1
protein kinase C alpha polypeptide	285	196	185	205	180	249	278	372	301	139	104
janus kinase 3	369	510	2199	1888	243	171	632	410	497	1049	449
serine/threonine-protein kinase NRK2	206	158	212	195	120	295	164	192	194	81	142
ribosomal protein S6 kinase II alpha 1	183	186	215	216	217	114	114	258	218	115	140
(PI3-kinase p85-beta subunit	139	163	91	104	168	94	155	186	175	59	48
ras-related protein RAB2	578	551	555	607	584	1256	869	1597	1391	602	529
voltage-gated potassium channel	3	5	1	5	2	8	4	14	2	1	4
small intestine oligopeptide transporter	6	20	5	119	7	14	13	72	10	80	3
apolipoprotein E precursor (APOE)	8215	7332	5736	6260	12560	6222	7526	13745	10565	4687	3910
activation B7-2 antigen	5	11	2	6	2	4	3	3	1	0	0
p68-trk-T3 oncoprotein	95	109	23	23	34	37	137	34	27	14	15
tyrosine kinase receptor tie-1 precursor	3	10	1	2	7	1	4	0	4	0	0
AF-1P protein	91	79	106	120	69	157	130	248	165	88	108
tyrosine-protein kinase ack	102	145	93	81	118	65	99	115	114	45	25
protein kinase C beta I (PKC-beta-1)	18	12	4	5	3	4	10	13	7	1	1
c-jun N-terminal kinase 1 (JNK1); JNK46	81	72	63	85	47	57	46	72	79	32	47
protein kinase MLK-3; sprk	1017	872	870	1037	1498	1123	904	1786	1593	523	602
ribosomal protein S6 kinase II alpha 2	27	27	8	11	10	16	35	12	13	2	3
PTDINS(4)P-5-kinase	185	137	120	118	142	176	289	428	314	110	86
ras-related protein RAB3B	25	23	11	5	8	6	9	16	18	9	11
GLYT-1	25	18	18	22	33	32	50	34	30	25	15
high-affinity glutamate transporter	5	18	3	3	4	5	4	5	5	1	4
cholesteryl ester transfer protein precursor	7	11	3	5	5	5	7	4	5	0	1
CC chemokine receptor type 1	72	88	18	21	26	32	115	28	17	9	15
brain-derived neurotrophic factor	5	3	3	2	1	2	6	0	1	2	1
epithelial discoidin domain receptor 1 precursor	226	236	145	153	186	69	173	205	175	54	69
CDC25	19	26	24	18	19	6	15	23	19	3	3
tyk2 non-receptor protein tyrosine kinase	48	49	40	35	49	56	41	52	46	31	18
protein kinase C delta (NPKC-delta)	86	67	71	51	52	27	41	45	38	24	43
c-jun N-terminal kinase 2 (JNK2); JNK55	268	175	153	181	175	206	198	283	195	78	85
tyrosine kinase tnk1	49	76	48	50	31	29	30	37	46	14	19
ribosomal protein S6 kinase II alpha 3	1332	1162	1187	1386	610	1190	1269	1665	1036	374	700
phospholipase C (PLCL)	5	11	11	5	1	4	6	4	2	1	1

ras-related protein RAB4A	131	167	79	99	107	158	167	198	150	62	55
DA transporter (DAT)	4	9	0	0	1	4	1	2	1	0	1
ATP2B2; calcium pump;	4	12	1	1	5	3	7	0	2	2	4
lecithin-cholesterol acyltransferase (LCAT)	246	200	97	103	197	61	141	186	152	25	32
thrombin receptor (TR); F2R; PAR1	105	96	71	101	97	70	62	74	78	23	46
NT-3 growth factor receptor precursor	6	5	3	4	2	0	0	2	3	0	0
LTK	2	9	3	5	4	4	3	3	3	2	1
NCK melanoma cytoplasmic src homolog	65	65	69	93	75	124	105	128	134	69	47
MAPKAP kinase (3pK)	100	118	92	105	123	83	71	66	64	48	59
protein kinase C epsilon type (NPKC-epsilon)	10	4	3	4	8	6	9	5	7	2	2
C-jun N-terminal kinase 3 alpha2	0	12	1	13	1	5	0	3	3	1	2
serine kinase	851	647	932	960	522	874	679	1043	917	522	710
kinase suppressor of ras-1 (KSR1)	15	12	12	10	21	8	11	6	10	13	10
Gem; induced immediate early protein	3	9	3	2	2	2	5	0	2	1	1
ras-related protein RAB5A	264	250	271	314	219	691	467	848	743	242	168
sodium-&-chloride-dependent GABA transporter 3	370	248	179	240	395	307	437	596	482	138	99
copper-transporting ATPase 2	74	72	20	25	60	70	113	131	99	15	13
vesicular acetylcholine transporter	5	8	4	5	5	5	11	6	9	0	1
ephrin type-B receptor 2 precursor	6	7	2	2	2	3	10	5	5	2	2
G protein-coupled receptor kinase GRK5	16	16	13	6	14	10	23	14	18	9	10
G-protein-coupled receptor HM74	4	0	1	1	2	3	9	1	2	3	4
lnk adaptor protein	26	25	47	28	76	55	118	115	69	50	19
mitogen-activated protein kinase p38	559	492	489	565	497	491	537	728	497	244	198
protein kinase C eta type	4	11	3	4	1	3	4	4	5	1	0
focal adhesion kinase (FADK)	127	85	67	86	72	42	124	148	114	51	37
CAMKI	242	268	139	163	124	103	212	104	80	44	79
ephrin A3 precursor	5	13	15	10	18	4	8	15	9	13	3
Ral A; GTP-binding protein	354	290	203	209	186	292	442	444	342	141	122
ras-related protein RAB6	287	244	234	260	329	567	464	658	471	237	138
sodium-dependent serotonin transporter	77	77	38	51	83	44	58	70	50	16	19
Na/K-transporting ATPase beta 3 subunit	160	147	142	188	157	188	237	358	360	298	159
T4-binding globulin	154	154	138	151	62	145	98	91	62	18	66
tyrosine kinase receptor HEK	2	6	2	5	4	2	0	3	3	0	0
transferrin receptor (TFR)	2004	1319	1653	1880	1080	1672	1735	2460	1921	1106	1036
R-PTP-gamma	327	279	269	341	199	407	356	500	346	152	221
putative src-like adapter protein (SLAP)	4	4	1	1	2	0	7	4	4	0	0
LIM domain kinase 1 (LIMK-1)	118	140	107	131	160	102	115	124	162	134	78
protein kinase C gamma type	7	6	3	5	7	1	5	1	6	2	1
PTDINS-3-kinase P85-alpha	76	36	72	64	35	88	57	88	98	36	36
PHK-gamma-T	15	17	10	8	14	10	18	14	19	9	4
(PTDINS(4)P-5-kinase)	304	280	272	326	248	284	342	421	445	247	171
transforming protein rhoB	546	839	852	758	792	508	794	1430	1398	905	808
neuro epithelioma transforming gene 1	369	359	266	331	290	158	383	527	378	103	135
norepinephrine transporter (NET)	7	2	1	3	6	4	9	11	11	3	3
synaptic vesicle amine transporter (SVAT)	3	3	2	2	3	3	7	5	3	1	3
transferrin precursor (TTR); prealbumin; TBPA	721	769	746	702	466	305	496	521	521	472	1424
frizzled	20	19	12	13	16	10	33	27	22	4	4
tyrosine-protein kinase receptor FLT4	154	160	148	164	47	31	208	54	53	43	34
ras-GRF; sos	111	56	85	99	49	231	151	206	143	65	70
EPS8	36	45	28	43	15	51	51	40	32	12	16
MAP kinase-activated protein kinase 2	170	133	207	245	221	254	159	224	261	261	169
protein kinase C zeta type (NPKC-zeta)	26	30	24	22	27	20	39	29	43	28	11
p21-activated kinase alpha (PAK-alpha; PAK1)	28	20	16	17	22	8	23	28	32	8	2
casein kinase I gamma 2 (CKI-gamma 2)	483	449	187	244	563	380	744	871	862	148	74
phospholipase C beta 3	25	24	20	14	31	17	25	35	38	16	16
ras-related protein RAB3A	69	76	20	19	26	19	24	31	42	13	28
guanine nucleotide regulatory protein tim1	8	11	8	5	4	7	8	5	7	6	2
NaCl-dependent taurine transporter	72	52	71	67	80	57	73	125	136	128	103
Na+/K+ ATPase	153	109	59	56	130	110	326	175	171	55	62
alpha-fetoprotein precursor	1590	1437	1526	1479	759	1340	1355	1701	1124	573	661
ephrin type-B receptor 3 precursor	10	8	7	1	4	3	2	6	4	1	1
ephrin A receptor 4 precursor	3	7	3	2	3	1	2	5	0	0	1
c-src kinase (CSK)	617	438	206	276	595	292	609	691	685	172	120
MAL	30	17	14	13	7	18	42	9	10	2	3
MAPKK 1	357	238	216	171	326	179	417	637	559	103	94
protein kinase C theta (PKC-theta)	2	7	4	3	1	2	7	4	4	1	0
serine/threonine-protein kinase PCTAIRE 1	408	338	176	215	451	298	533	621	565	142	90
PKA C-beta	27	18	25	29	19	25	34	31	45	24	8
PI3-kinase	39	19	33	43	28	115	68	110	96	36	30
ras-related protein RAB-7	465	452	371	500	490	456	582	930	911	641	339
transducin beta 2 subunit 2	59	141	82	90	137	27	88	147	168	118	64
Na+/glucose cotransporter 2	6	9	6	4	7	8	12	27	19	2	2

adrenoleukodystrophy protein	228	368	90	370	211	113	271	366	334	127	123
serotransferrin precursor	21177	17616	18811	19813	20006	20203	23177	25064	22535	11142	19347
IFN-gamma accessory factor 1 (AF1)	44	10	39	37	38	38	47	57	48	21	29
epithelial cell kinase	90	90	99	64	50	74	67	98	161	135	137
tyrosine-protein kinase HCK	21	33	12	19	25	10	16	25	34	5	7
MAPKKK5	3	3	4	4	1	2	8	0	2	2	0
MAPKK 2	16	2	5	1	1	1	8	1	2	0	1
CAM-kinase II beta	6	5	3	3	4	3	7	6	8	0	1
AMPK alpha-1 chain	57	48	68	70	29	61	67	73	78	45	44
(PKA C-gamma)	13	13	15	6	16	6	16	19	13	3	3
PI4-kinase	181	138	102	132	168	179	284	413	326	154	74
G13	55	59	57	71	55	119	136	141	136	102	72
transducin beta 5 subunit	24	20	17	22	12	9	7	7	17	18	14
kidney oligopeptide transporter	4	3	2	0	2	5	1	3	3	0	2
ATP-binding cassette 8 (ABC8)	3	7	2	3	3	1	9	3	3	0	2
lactotransferrin precursor; lactoferrin	66	10	11	7	17	15	17	10	9	4	5
interleukin-6 receptor beta subunit precursor	185	161	226	253	87	323	300	482	374	223	209
TGF-beta 1 receptor (TGFB1)	168	166	143	182	122	90	167	232	205	55	43
70-kDa zeta-associated protein (ZAP70)	4	13	4	0	1	2	2	2	2	0	1
myosin light chain kinase (MLCK)	171	150	135	133	116	58	117	69	57	33	77
MAPKK 3	296	346	200	238	358	219	408	430	425	159	187
CAM kinase-GR	5	3	7	6	4	2	6	1	3	0	1
tyrosine-protein kinase tec	3	4	4	5	7	3	3	4	2	2	3
PRKAR1B	315	642	279	368	498	153	291	618	909	137	140
PLC-beta 2	7	6	3	1	2	3	8	0	1	1	0
transducin beta-1 subunit	211	289	394	372	192	105	300	237	288	344	194
RAD1	34	65	18	18	35	25	44	65	54	15	7
sodium-dependent proline transporter	2	1	1	0	1	1	5	6	1	0	0
multidrug resistance-associated protein 2	265	254	233	324	351	351	595	549	425	265	297
melanotransferrin precursor	7	10	5	5	5	3	9	2	8	4	4
stromal cell derived factor 1 receptor	24	16	3	11	20	7	11	22	24	2	2
anaplastic lymphoma kinase GN (ALK)	5	5	4	3	2	1	4	4	2	0	0
c-fcr proto-oncogene	61	52	45	46	20	55	63	45	45	21	33
titin	7	10	4	1	0	2	7	2	3	1	0
c-jun N-terminal kinase kinase 1 (JNKK)	39	16	35	34	20	64	43	83	53	33	25
casein kinase II alpha subunit	213	163	96	104	154	53	200	308	274	94	65
Bruton's tyrosine kinase (BTK)	3	6	0	1	3	1	6	1	1	2	0
PRKAR2B	3	6	2	4	1	2	3	1	0	1	0
PLC-gamma 1	102	143	58	94	88	74	117	124	149	75	54
ras-like protein TC25	858	842	1037	1270	845	1445	667	1321	1059	974	730
RalB GTP-binding protein	115	117	57	86	104	72	134	137	151	71	42
neutral amino acid transporter A (SATT)	89	76	45	46	150	75	211	282	168	43	28
cAMP- dependent chloride channel	1	1	2	2	2	2	8	1	1	0	0
Insulin receptor-related protein precursor	86	101	59	56	37	71	90	75	59	27	18
tyrosine-protein kinase receptor eph	1999	1507	666	756	1281	1756	1996	1279	894	337	238
fibroblast growth factor receptor 3 precursor	27	19	5	4	15	8	10	19	9	9	7
(GRB2)	979	804	648	687	1007	415	1195	1702	1545	457	397
(TSE1)	767	697	608	700	608	661	1421	2244	2277	807	526
MAPKK 5	151	147	111	136	158	129	175	242	190	65	77
PKA C-alpha	554	407	281	346	565	199	479	809	663	190	124
Janus kinase 2 (JAK2)	24	13	26	23	10	32	35	42	40	14	12
focal adhesion kinase 2	9	9	8	3	6	9	19	16	16	3	4
PLC-gamma-2	2	5	3	2	1	5	5	0	6	1	0
vav oncogene	2	0	1	0	1	0	2	2	0	1	0
MKP4	245	381	152	163	385	101	249	339	470	244	110
protein-tyrosine phosphatase 1E	5	4	2	3	3	7	3	5	3	2	2
PTPCAAX1 nuclear tyrosine phosphatase	2768	2412	2939	3099	2592	6379	4684	9661	5954	2577	1507
adenyl cyclase IX	105	92	66	63	76	60	96	133	117	41	34
STAT3	102	113	62	50	74	32	117	192	174	87	50
14-3-3 protein beta/alpha	1365	1064	1191	1126	965	1754	1492	2308	1885	1269	1139
FKBP-rapamycin associated protein	55	60	52	49	41	25	73	78	76	46	32
retinoic acid receptor beta (RXR-beta; RXRB)	267	326	142	175	215	204	399	332	256	70	66
caspase & rip adaptator with death domain	87	80	33	39	89	37	81	105	93	10	16
calpain p94 large (catalytic) subunit	39	29	25	25	31	17	21	31	32	12	10
granzyme A precursor	2	9	0	2	2	2	5	1	2	1	0
poly(ADP-ribose) polymerase (PARP; PPOL)	56	63	35	39	47	25	81	81	73	27	30
DNA polymerase beta subunit (DPOB)	62	66	31	66	58	92	79	102	65	39	44
MCM2 DNA replication licensing factor	739	694	335	543	935	399	542	535	405	106	88
DNA excision repair protein ERCC1	85	110	79	92	119	75	121	118	141	117	83
leukocyte common antigen precursor	3	7	2	0	3	2	6	6	6	1	1
(CGI-PDE B; CGIPDE1)	5	4	14	13	4	9	4	9	6	5	7
retinal guanylyl cyclase 1 precursor	1	8	3	3	2	4	0	4	2	1	1

(STAT6)	130	128	99	101	114	94	124	204	128	77	80
(PKCSH)	1564	1372	1137	1223	1804	872	1447	2136	1540	587	676
SH3P17 SH3 domain-containing protein	27	34	17	19	20	9	44	63	48	18	14
(DDR3)	226	523	109	134	298	88	225	658	651	58	43
CD40 receptor-associated factor 1	798	1017	303	299	881	256	1102	1365	1320	229	167
CANP	1303	1383	982	1162	1301	895	1789	2282	2277	1172	942
CAD	22	32	7	10	18	6	20	21	32	7	3
inducible nitric oxide synthase (iNOS)	10	6	5	1	1	1	4	4	4	2	1
DNA polymerase gamma	85	154	72	90	72	51	113	155	130	79	57
CDC21 homolog	342	407	275	349	249	255	174	230	171	95	121
DNA excision repair protein ERCC2	528	648	196	241	486	302	472	651	708	150	90
protein-tyrosine phosphatase 1B	223	211	176	198	215	133	277	424	381	170	114
CGI-PDE A	2	6	2	0	1	2	3	1	4	0	1
guanylate cyclase F (GCF)	2	7	1	3	1	0	8	0	4	2	1
cAMP-response element binding protein	262	255	243	286	192	217	338	672	410	203	181
linker for activation of T-cells (LAT)	66	73	40	51	28	33	46	78	68	29	15
SH3P18 SH3 domain-containing protein	43	50	31	38	14	24	44	60	63	23	22
CD27L antigen receptor precursor	89	206	102	122	78	37	78	227	168	59	50
FAN protein	59	70	37	45	37	35	100	89	88	26	23
BAD protein	156	190	42	35	48	35	173	53	40	22	32
DNA fragmentation factor 45 (DFF45)	79	83	56	53	87	29	116	144	170	99	38
defender against cell death 1 (DAD1)	2015	1799	2146	2433	1991	1513	1866	2903	2902	2263	1808
DNA polymerase delta catalytic subunit	462	477	216	262	407	320	312	381	306	84	104
CDC46 homolog	698	997	648	743	831	417	600	768	634	281	237
DNA excision repair protein ERCC3	259	246	223	214	221	200	234	437	418	220	149
protein-tyrosine phosphatase 2C	354	304	395	474	182	633	370	697	491	340	342
3'-cAMP phosphodiesterase HPDE4A6	75	122	91	99	65	57	67	85	79	76	48
guanylate cyclase	11	8	3	4	2	3	15	3	5	0	1
RaiGDSB	68	52	39	38	57	36	55	121	98	21	23
hint protein	2802	2108	1837	1939	2751	2941	3219	6202	4001	1340	1455
FRAP-related protein	34	27	26	36	19	44	51	56	58	21	22
lymphocyte activation CD30 antigen	3	7	1	0	1	3	3	4	4	0	1
caspase-2 precursor (CASP2)	402	313	283	269	361	298	252	369	323	135	125
BCL-2 binding athanogene-1	352	317	308	309	361	557	500	796	670	336	309
rac-alpha serine/threonine kinase	149	196	119	147	232	119	182	272	314	156	128
inhibitor of apoptosis protein 3	50	24	22	31	22	29	27	32	25	24	23
DNA topoisomerase I (TOP1)	900	735	555	731	723	1062	1272	2039	1498	724	462
p105MCM	118	130	117	134	81	102	74	64	51	32	51
excision repair protein ERCC6	8	17	4	3	7	6	13	9	10	4	3
leukocyte antigen-related protein precursor (LAR)	866	816	721	818	984	527	798	957	754	450	670
adenylate cyclase type I	115	293	51	74	75	54	125	281	234	26	16
CGS-PDE	4	11	2	0	3	4	9	1	2	0	1
oligophrenin 1	4	7	2	2	3	7	2	7	5	0	2
macMARCKS	868	752	804	790	1076	1006	773	982	847	544	715
connector enhancer of KSR-like protein	23	31	13	11	13	8	17	26	18	7	13
fasL receptor	40	27	30	32	23	109	72	124	86	32	17
caspase-3 (CASP3)	890	840	823	825	535	697	875	1451	1008	356	252
bcl2 homologous antagonist/killer	114	74	55	49	81	72	134	143	181	100	74
death-associated protein kinase 1	231	222	150	151	208	82	244	309	224	69	34
cytoplasmic dynein light chain 1	1793	1595	2300	2000	1524	1294	1141	2567	2432	2091	1132
DNA topoisomerase II alpha	1506	1055	1194	1309	804	1411	1121	1503	1126	471	379
MCM7 DNA replication licensing factor	253	285	235	208	259	165	201	145	185	79	93
6-O-methylguanine-DNA methyltransferase	270	256	202	269	370	98	256	354	331	114	52
PP2A-alpha catalytic subunit	241	246	207	222	184	368	240	468	344	190	162
adenylate cyclase type II	2	1	0	2	3	6	0	1	0	1	0
neurogranin (NRGN); RC3	11	21	15	10	12	4	14	16	9	2	3
ran GTPase activating protein 1	95	117	53	57	93	43	166	224	193	61	30
14-3-3 protein sigma	569	617	513	518	592	99	660	1042	1036	893	321
CD40 ligand (CD40-L)	114	171	28	27	32	26	145	34	22	14	15
tumor necrosis factor receptor 1	498	512	324	385	590	390	725	983	1185	619	289
caspase-4 precursor (CASP4)	160	163	194	213	107	159	131	143	75	67	194
apoptosis regulator bax	622	502	370	348	463	467	422	525	470	319	342
(P68 kinase)	291	293	250	335	235	546	376	747	572	220	175
cytochrome P450 reductase	135	195	271	285	330	230	230	395	416	434	253
proliferating cyclic nuclear antigen (PCNA)	2175	2668	3090	3475	2790	1634	2140	4429	4022	1769	1302
photolyase/blue-light receptor homolog	60	63	75	82	111	119	114	198	138	71	62
mutL protein homolog	67	85	63	75	47	81	62	94	77	41	25
beta-PR55	17	26	13	20	9	26	11	42	30	4	5
guanylate cyclase soluble alpha 2 subunit	2	9	8	3	3	2	5	2	5	1	1
recoverin	60	94	14	13	10	17	79	14	8	5	7
rap1 GTPase activating protein 1	28	17	17	20	28	18	34	21	18	9	7
GAP-associated protein	400	415	401	475	155	446	489	596	409	269	250

fas antigen ligand (FASL)	0	6	11	3	2	2	4	2	5	6	0
tumor necrosis factor receptor (TNFR)	52	66	82	67	32	30	39	85	59	65	24
caspase-6 precursor (CASP6)	34	26	96	92	20	34	14	31	30	41	28
apoptosis regulator bcl-2	3	2	2	3	4	4	0	2	3	3	0
Fas-activated serine/threonine kinase	116	132	78	81	120	48	96	128	89	48	45
cytoplasmic antiproteinase 3 (CAP3)	44	72	42	44	40	20	26	47	57	43	54
replication protein A 70-kDa subunit	188	199	201	202	148	181	160	197	161	110	84
nibrin (NBS1)	92	103	82	87	43	85	56	66	47	32	40
DNA excision repair protein ERCC5	131	117	85	103	80	59	156	165	127	60	55
alpha-PR55	169	144	130	146	104	367	212	372	291	147	168
guanylate cyclase 70-kDa subunit	4	6	4	8	2	4	9	0	1	0	0
S100 calcium-binding protein A7; psoriasin	9	18	4	2	5	10	11	9	9	0	3
rap1 GTPase-GDP dissociation stimulator 1	65	29	63	67	40	70	72	115	73	60	64
tuberlin; tuberous sclerosis 2 protein	46	56	19	23	32	23	65	56	29	13	18
tumor necrosis factor precursor	20	26	11	18	7	13	11	36	33	4	7
protein-tyrosine phosphatase zeta precursor	5	6	1	2	3	2	4	6	1	1	2
cysteine protease ICE-LAP3	96	92	60	71	47	74	110	108	64	40	46
apoptosis regulator bclw; KIAA0271; BCL2L2	62	72	30	44	41	11	29	41	43	45	29
apoptotic protease activating factor 1 (APAF1)	126	155	48	67	59	125	219	164	105	45	45
death-associated protein 3 (DAP3)	639	448	332	445	526	368	473	871	657	249	134
replication protein A 14-kDa subunit	2471	2364	1739	2623	2788	2833	2501	3582	2514	844	593
AP endonuclease 1	1113	882	635	807	1022	719	732	879	666	364	414
p58/HHR23B	932	842	794	799	1164	421	1026	1896	1301	586	467
calcineurin B subunit isoform 1	140	94	110	129	112	234	216	266	233	117	75
bone marrow stromal antigen 1 (BST-1)	4	0	3	3	2	0	5	4	6	4	2
S100 calcium-binding protein A1	142	152	117	125	182	103	141	178	128	69	87
rho GDP dissociation inhibitor 1	1839	1965	1022	866	1798	535	1923	1717	1345	784	559
TRRAP protein	500	528	299	318	523	257	708	840	769	314	207
lymphotoxin-alpha precursor (LT-alpha)	14	16	3	4	8	21	14	14	9	3	4
adenosine A1 receptor (ADORA1)	10334	13633	3614	3341	8814	2620	10102	17185	13373	1664	1644
caspase-8 precursor (CASP8)	285	234	109	137	153	262	230	327	226	85	76
apoptosis regulator bcl-x	726	695	334	359	645	553	1149	1169	1008	411	260
IEX-1L anti-death protein; PRG-1; DIF-2	85	82	62	64	77	51	91	211	334	434	346
inhibitor of apoptosis protein1	6	7	4	9	6	7	2	8	5	3	2
activator 1 140-kDa subunit	136	119	95	99	59	81	121	134	95	35	36
ataxia telangiectasia (ATM)	148	177	58	61	69	88	201	149	114	34	27
DNA mismatch repair protein PMS1	122	122	140	187	97	170	133	145	128	109	132
CAM-PRP catalytic subunit	172	175	181	239	155	304	186	266	177	92	123
HCAM-1	4	8	2	2	5	3	5	4	9	0	1
interferon regulatory factor 1 (IRF1)	21	18	16	4	4	4	8	11	16	4	10
GTPase-activating protein (GAP)	43	58	41	38	22	58	75	104	70	19	27
leucine-rich repeat protein SHOC-2	78	84	92	105	55	175	160	263	184	111	70
lymphotoxin-beta (LT-beta; LTB)	6	4	1	1	3	3	3	3	1	1	1
adenosine A2A receptor (ADORA2A)	4	14	3	4	7	0	9	6	8	1	0
caspase-9 precursor (CASP9)	40	61	76	90	47	43	49	69	78	41	28
MCL-1	399	360	219	228	316	414	697	832	714	619	262
SL cytokine precursor	74	208	62	64	132	39	91	244	200	29	20
inhibitor of apoptosis protein 2	57	77	65	93	53	153	130	157	107	98	71
activator 1 40-kDa subunit	214	249	86	95	129	124	245	100	77	46	42
Ku 70-kDa subunit	524	750	310	414	550	531	645	865	732	272	238
DNA mismatch repair protein PMS2	164	132	54	82	142	100	194	325	247	54	40
PP2C-alpha	190	217	146	228	200	287	293	388	401	131	96
CAM-PDE1B	2	5	1	2	1	5	4	1	2	0	0
CRE-BP1	168	145	124	128	104	238	287	347	272	128	77
inhibitor of the RNA-activated protein kinase	37	22	30	22	29	25	56	33	28	26	21
IkappaB kinase complex-associated protein	139	115	76	76	81	61	156	144	103	44	38
TNF-related apoptosis inducing ligand	7	11	10	10	20	15	11	15	6	1	3
adenosine A3 receptor (ADORA3)	14	25	4	1	5	4	19	5	5	4	3
caspase-10 precursor (CASP10)	1358	1446	2559	2567	854	288	1380	1157	959	3860	1307
BCL-2-related protein A1 (BCL2A1)	2	5	2	2	1	2	4	2	4	2	2
cellular apoptosis susceptibility protein	2	4	2	1	4	3	2	2	3	0	0
ALG-2 calcium-binding protein	553	450	415	354	464	516	521	608	660	415	297
DNA polymerase epsilon subunit B	77	99	70	106	57	132	101	109	104	48	37
ATP-dependent DNA helicase II	468	417	279	521	260	488	425	422	352	178	78
Rad50	48	53	22	28	15	26	27	31	34	14	16
(PP-1A)	267	310	180	200	349	306	371	336	364	219	203
ephrin A4 precursor	34	48	33	36	37	3	36	7	5	14	29
NFKB3	76	94	46	50	77	50	94	114	145	50	34
cortactin; amplexin	1193	808	806	879	1075	608	1338	2128	1602	982	668
zyxin + zyxin-2	133	84	81	96	136	31	67	133	142	106	59
CD27 ligand (CD27LG); CD70 antigen	3	8	3	0	3	3	2	1	4	1	2
receptor interacting protein	25	21	17	19	26	25	51	65	50	24	12

interleukin-1 beta convertase precursor (IL-1BC)	7	10	5	2	7	0	5	3	4	2	1
bcl-2 interacting killer (BIK)	5	4	2	2	4	3	9	1	5	3	2
GADD153	268	294	164	423	722	594	942	855	820	464	144
DNA polymerase II subunit A	38	38	27	25	46	10	30	46	30	17	7
RFC36	145	101	87	114	100	69	76	85	82	46	39
DNA ligase I	565	587	436	452	699	298	549	602	474	194	172
DNA-repair protein complementing XP-A	9	8	11	9	12	7	7	18	14	5	3
dual-specificity protein phosphatase 2	4	1	4	8	5	5	9	4	3	2	1
DPDE3	95	125	88	150	127	207	176	166	102	76	101
STAT1	672	567	438	502	389	273	373	481	410	216	219
(PKI-alpha)	8	5	5	4	5	3	8	4	5	0	2
leukemia inhibitory factor receptor precursor	25	15	23	21	19	55	48	38	34	14	19
insulin-like growth factor I receptor (IGF1R)	123	126	98	85	179	121	193	252	289	106	82
DAXX	143	131	70	76	95	58	83	114	119	77	41
calpain 1 large (catalytic) subunit	4	4	0	3	2	2	3	1	3	0	0
NIP1 (NIP1)	28	22	32	27	19	18	11	32	22	21	27
clusterin precursor (CLU)	1309	774	529	587	1235	396	832	1382	1012	280	204
MCM3 DNA replication licensing factor	270	229	132	138	195	69	153	138	121	64	53
replication factor C 38-kDa subunit	181	174	93	99	101	116	150	107	87	42	46
DNA ligase III (LIG3)	233	221	105	108	216	110	212	282	201	85	68
DNA-repair protein complementing XP-C cells	123	97	58	57	148	181	179	275	188	58	49
myotubularin	42	44	36	50	36	52	83	81	94	31	21
adenylate cyclase VII	4	7	3	1	2	6	5	2	4	1	2
STAT2	113	101	124	126	102	88	66	115	83	67	112
14-3-3n protein eta	353	268	329	307	356	572	290	563	460	346	301
junction plakoglobin (JUP)	395	359	183	202	420	88	280	467	329	90	90
retinoic acid receptor epsilon (RAR-epsilon)	34	57	23	31	21	39	45	58	59	9	11
TRADD	24	17	13	14	23	4	15	15	15	13	14
calpain 2 large (catalytic) subunit	28	18	21	17	23	29	36	32	38	38	17
NIP3 (NIP3)	487	370	383	273	358	324	420	518	554	439	692
early response protein NAK1	24	22	8	5	19	6	10	35	34	3	4
DNA polymerase alpha catalytic subunit	222	233	258	324	173	249	158	187	129	98	107
activator 1 37-kDa subunit	353	290	308	341	346	220	244	245	197	112	153
DNA ligase IV (LIG4)	42	42	34	41	17	52	28	41	45	30	36
uracil-DNA glycosylase precursor (UNG1)	1125	1061	591	739	1319	834	817	1037	863	205	301
DNA-repair protein XRCC1	205	208	155	175	159	130	121	162	141	57	81
GADD45	200	164	303	373	361	359	256	369	418	328	330
galanin receptor type 1	10	14	3	0	3	1	16	2	2	0	2
CHRNA2	2	10	2	2	5	3	3	2	4	2	2
low-affinity nerve growth factor receptor	5	9	2	2	2	1	8	3	5	0	1
dopamine beta-hydroxylase	3	5	8	4	12	3	5	3	12	0	1
secretogranin V	16	18	8	9	4	24	21	22	26	4	2
achaete-scute homolog 1 (ASH1)	1	10	2	1	2	1	5	2	9	0	1
myelin proteolipid protein (PLP); lipophilin	5	14	8	10	3	6	9	2	1	2	2
ataxia-telangiectasia group D-associated protein	5	8	1	2	6	5	8	0	7	2	1
KRAB-associated protein 1 (KAP1)	34	39	15	13	35	21	28	42	43	10	4
CCAAT-BINDING FACTOR (CBF).	47	37	37	39	16	50	33	53	89	27	30
E2F-3	144	123	80	124	129	112	176	198	206	52	42
CACCC-box DNA-binding protein	143	118	172	224	81	263	173	246	226	111	158
DNA-dependent protein kinase (DNA-PK)	453	350	490	577	251	439	409	538	456	244	367
muscle-specific DNase I-like precursor	28	35	24	23	33	8	26	44	43	15	12
somatostatin receptor type 2	16	18	13	19	19	17	14	30	36	1	2
serotonin-gated ion channel receptor	57	60	15	16	16	49	85	26	27	7	8
DOPA decarboxylase (DDC)	334	292	222	292	322	306	353	356	383	137	196
noradrenaline N-methyltransferase	2	4	2	2	1	1	9	3	2	0	2
neuregulin	3	0	3	3	1	2	7	2	8	1	2
brain-specific antigen PCP-4	3	3	0	1	2	1	7	1	0	0	1
peripheral myelin protein 22	61	51	41	48	45	56	63	62	81	24	28
TREB36 protein	130	88	75	77	74	53	118	167	154	48	47
transcription intermediary factor 1 (TIF1)	372	371	419	478	203	415	348	489	583	269	335
hepatic leukemia factor (HLF)	526	405	280	328	525	592	664	820	669	114	131
E2F dimerization partner 1	367	274	165	217	323	199	326	256	281	81	110
60S ribosomal protein L6 (RPL6)	11553	7539	11390	12416	6464	13472	11312	14590	12512	6174	11715
RAD52	5	14	7	20	6	8	13	4	5	2	2
melatonin receptor type 1A (MEL-1A-R)	2	9	5	4	3	4	10	4	4	1	3
prostaglandin E2	1	4	2	0	3	2	5	1	4	0	0
GABA(A) receptor	3	8	11	10	6	9	22	21	23	10	11
acetylcholinesterase precursor	16	33	5	6	5	10	20	5	18	2	2
secretogranin II precursor	5	6	3	29	2	4	12	0	2	2	1
nociceptin precursor	8	6	4	2	4	7	8	1	5	0	2
neuronatin	18	14	4	3	7	23	20	13	15	7	6
MOG	243	260	120	111	150	229	421	256	283	209	122

CCAAT transcriptionfactor gamma subunit	263	284	211	267	278	315	332	365	349	155	161
YL-1 protein	95	36	79	67	100	39	93	96	127	46	49
early growth response protein 3	6	8	0	2	2	2	4	2	1	1	1
interferon regulatory factor 2 (IRF2)	96	87	61	80	58	113	106	134	111	48	64
cellular nucleic acid binding protein	2772	2482	1523	2840	2711	3560	3953	5662	4581	1278	1007
UV excision repair protein protein	499	791	542	694	1026	476	727	1086	1118	381	448
5-hydroxytryptamine 1A receptor	3	3	1	0	1	4	6	3	2	1	1
GRM5	3	35	1	5	2	5	7	4	4	2	1
(GABA(A) receptor)	3	10	1	2	1	3	5	0	0	0	0
choline O-acetyltransferase	11	11	1	3	5	6	17	1	3	1	0
neurotensin/neuromedin N precursor	1	1	2	0	0	2	4	0	3	1	1
leptin precursor; obesity factor; obese protein	5	12	3	3	4	6	8	2	2	0	0
roundabout 2 (ROBO2)	5	7	3	4	3	5	10	3	3	1	1
myelin basic protein (MBP)	8	3	2	2	4	5	12	4	6	1	2
(C/EBP alpha)	381	557	185	227	349	138	378	733	847	170	50
metal-regulatory transcription factor	48	37	52	69	55	91	62	114	105	70	49
(HIV-EP2)	5	2	4	5	3	4	6	5	5	10	14
LYL-1 protein	9	9	4	2	3	6	7	2	2	1	4
basic transcription factor 2 44-kDa subunit	547	497	387	412	413	542	533	618	541	182	197
ubiquitin-conjugating enzyme E2 17-kDa	463	342	356	295	291	454	422	556	403	238	148
serotonin receptor type 2	3	6	2	2	3	0	9	0	6	0	2
orexin receptor 2	8	12	4	5	2	11	24	2	2	0	2
GABA-B receptor 1A subunit (GABA-BR1A)	5	5	2	1	1	5	10	1	4	1	5
glutamate decarboxylase 67-kDa isoform	4	6	4	1	0	4	6	1	1	0	1
neuromedin B precursor	42	15	20	26	26	21	31	36	44	22	19
neuronal pentraxin II precursor (NP2)	6	3	3	0	2	6	5	3	0	0	2
veli-1	37	45	30	39	23	34	23	29	26	25	17
neuroglycan C precursor	13	10	5	5	8	4	9	5	5	3	3
hepatocyte nuclear factor 4 (HNF4)	1121	1031	790	835	831	599	777	1093	1184	694	688
(MITF)	7	10	9	6	2	2	6	6	5	2	4
ets-related gene transforming protein (ERG1)	5	8	13	11	3	4	8	0	14	1	3
nuclear factor NF-kappa-B p100 subunit	43	27	29	21	23	45	56	73	71	28	40
estrogen receptor hSNF2b	1243	1170	808	1296	1372	1519	1395	2045	2000	768	704
translin; recombination hotspot binding protein	429	386	379	429	218	321	366	546	453	249	270
mu-type opioid receptor (MOR-1)	16	15	4	2	7	18	11	5	6	1	2
P2X purinoceptor 1; ATP receptor P2X1	8	7	1	1	1	7	11	2	6	2	1
GABA-B receptor 2 subunit (GABA-BR2)	2	3	7	3	1	8	6	2	2	3	0
glutamate decarboxylase 65-kDa isoform	35	58	40	46	25	22	38	64	51	11	10
preprotachykinin beta	1	2	1	1	3	5	6	2	0	2	0
survival of motor neuron (hSMN)	328	306	237	237	166	536	347	472	466	210	184
43-kDa postsynaptic protein	4	5	2	3	1	0	9	5	4	1	2
parkin	5	4	1	2	2	1	5	2	2	1	8
TIS11B protein; EGF response factor 1	244	261	213	184	178	202	160	222	279	258	542
transcription repressor protein PRDI-BF1	7	5	1	1	2	3	13	3	2	0	3
transcription factor GATA-4	122	108	55	57	80	45	68	119	119	25	22
octamer-binding transcription factor 1	86	108	55	107	61	180	182	254	222	88	38
transcriptional repressor NF-X1	160	184	119	188	97	231	212	232	264	157	140
recA-like protein HsRad51	198	188	167	202	125	157	153	199	147	70	79
nociceptin receptor	16	22	13	8	6	7	16	6	5	2	2
P2X purinoceptor 3	8	1	4	1	5	3	5	2	4	1	1
glutamate receptor 5 precursor	10	2	5	3	4	4	7	1	2	0	1
neuroendocrine convertase 1 precursor	2	8	3	2	5	4	7	0	5	0	1
proenkephalin A precursor	10	14	2	2	3	10	23	4	4	0	1
lissencephalin X; doublecortin (DCX)	22	16	8	3	5	6	33	2	5	1	6
synaptosomal-associated protein 25	10	14	5	4	2	2	17	4	4	1	1
Huntington's disease protein (HD protein)	62	82	31	38	47	67	64	61	78	28	29
HIV-1 TATA element modulatory factor	131	149	136	165	77	321	241	292	220	115	139
PCAF-associated factor 65 beta	121	115	84	102	124	146	132	258	213	71	72
glucocorticoid receptor repression factor 1	187	214	243	278	192	292	174	310	249	211	216
pre-B-cell leukemia transcription factor-1	9	25	1	6	4	3	14	3	3	2	2
cAMP-responsive element-binding protein	1	3	3	2	5	3	8	1	3	15	6
V(D)J recombination activating protein 1	5	6	4	0	2	5	10	0	5	9	0
prostaglandin E2 receptor EP3 subtype	7	10	3	0	1	4	8	0	1	1	1
(GABA(A) receptor)	2	6	3	2	1	6	5	0	1	0	0
neuronal acetylcholine receptor	2	14	0	12	1	1	10	1	2	9	1
neuroendocrine convertase 2 precursor	11	37	12	21	8	9	12	20	16	13	2
beta-neoendorphin-dynorphin precursor	9	8	6	4	7	4	17	10	9	1	3
roundabout 1 (ROBO1)	283	289	350	403	194	569	414	368	299	136	269
synaptophysin (SYP)	4	4	4	0	3	7	7	3	9	2	2
major prion protein precursor	610	527	592	645	672	1510	1019	1646	1693	669	742
hypoxia-inducible factor 1 alpha	211	153	210	186	127	342	269	282	262	155	175
PCAF-associated factor 65 alpha	39	61	28	26	33	16	48	34	43	12	15

homeobox protein HOX-A5; HOX-1C	105	210	51	52	60	64	166	128	156	29	32
endothelial transcription factor GATA2	132	123	110	102	100	96	100	159	224	110	70
GA-binding protein alpha subunit	79	90	71	115	80	223	152	198	149	72	62
V(D)J recombination activating protein 2	3	6	3	1	2	5	2	3	3	0	1
substance-P receptor (SPR)	6	4	11	6	4	5	6	5	2	1	3
(GABA(A) receptor)	4	7	6	5	1	3	4	0	3	0	1
(CHRNA4; NACHRB4)	11	20	8	12	5	11	14	19	48	1	2
(COMT)	2471	2254	1024	1361	2777	1096	3398	3349	3927	962	939
acyl-CoA-binding protein (ACBP)	6920	6079	7025	7718	4478	6731	6671	11178	8962	4206	3465
CASK	61	49	40	40	21	95	58	89	70	32	24
presynaptic density protein 95 (PSD95)	11	15	8	14	5	7	15	13	16	7	4
Alzheimer's disease amyloid A4 protein	178	184	130	161	126	356	198	305	275	123	164
jun activation domain binding protein	325	330	185	222	139	353	466	390	423	154	170
SPT3-like protein	110	108	87	97	69	146	71	87	51	41	100
interferon regulatory factor 7 (IRF-7)	5	18	3	5	3	4	9	3	10	1	3
GC-box binding protein 2	66	61	26	22	22	38	81	38	27	21	18
GA-binding protein beta-2 subunit	223	239	203	278	154	385	345	428	338	130	152
telomerase reverse transcriptase (hTRT)	7	8	5	3	11	6	17	2	8	3	0
substance-K receptor (SKR)	8	4	3	2	13	17	6	1	5	2	8
glutamate receptor 1 precursor	6	4	2	2	2	3	9	1	1	0	1
NMDAR2B	3	3	2	1	4	3	8	1	1	0	1
tryptophan 5-monoxygenase	26	22	20	26	12	12	18	13	10	7	7
nerve growth factor 2 (NGF-2)	1976	1763	1515	1586	2161	799	2703	2951	2831	927	846
neuromodulin	10	6	7	5	4	10	19	12	9	4	3
synapsin IIIA	29	24	14	14	13	22	32	9	8	3	9
atrophin-1	99	112	40	47	112	62	141	186	175	44	25
ets domain protein elk-3	11	31	24	22	8	9	7	8	24	22	34
ADA3-like protein	232	263	153	173	223	121	281	256	295	105	125
interleukin enhancer binding factor 3 (ILF3)	423	344	218	260	470	429	547	887	664	174	102
basic transcription factor 62-kDa subunit	28	15	20	23	14	14	20	38	53	27	17
transcription factor AREB6	11	7	16	16	8	24	18	22	18	17	13
TRF1-interacting tankyrase	105	85	48	43	65	118	161	278	193	46	39
neuromedin K receptor (NKR)	6	9	5	1	1	3	12	2	5	2	1
glutamate receptor 2 precursor	2	9	4	4	2	2	2	2	3	1	1
NMDAR2C; NR2C	5	16	4	28	4	7	4	0	7	2	3
monoamine oxidase (MAO-A)	487	298	412	405	408	835	478	654	549	173	245
neurotrophin-4 (NT-4)	89	104	25	20	23	39	119	34	22	10	10
axonin-1 precursor	6	19	3	2	5	3	13	4	7	2	0
CHAPSIN 110	4	5	2	1	0	1	9	1	2	0	1
HU-antigen D	18	18	21	19	12	8	5	5	12	15	2
retinoblastoma-binding protein 7	656	519	511	507	434	942	683	829	876	324	369
ADA2-like protein	99	117	77	122	102	124	98	104	131	52	65
RBP2 retinoblastoma binding protein	85	78	40	53	55	55	146	184	155	24	21
DNA-binding protein inhibitor Id-2	1756	1986	2108	1618	828	905	921	1881	2477	2757	1701
transcription factor ZFM1	824	777	473	613	726	466	817	717	923	505	346
delta lactoferrin	3	6	2	2	3	5	2	0	1	0	0
neuropeptide Y receptor type 1	2	6	5	4	2	2	6	1	2	1	0
strychnine binding subunit	3	3	3	1	1	0	9	6	0	0	1
P2X purinoceptor 5 (P2X5)	21	20	4	2	6	4	12	4	6	2	3
histidine decarboxylase (HDC)	123	191	139	127	69	93	113	200	190	58	49
neuropeptide Y precursor (NPY)	5	10	3	2	4	5	11	3	5	1	1
glia maturation factor beta (GMF-beta)	356	398	227	287	151	396	462	321	355	159	164
amphiphysin (AMPH)	4	8	2	2	1	3	8	1	4	0	0
Machado-Joseph disease protein 1	43	28	36	41	30	72	57	69	72	43	29
BRCA1-associated ring domain protein	22	9	4	4	16	9	23	15	19	3	4
B-cell lymphoma 3-encoded protein (bcl-3)	7	11	3	3	5	3	18	14	19	16	2
BRCA1-associated ring domain protein	56	68	44	46	21	32	34	27	35	16	26
DNA-binding protein SMBP-2	42	58	35	41	49	70	96	82	117	57	38
ZFM1 protein alternatively spliced product	428	458	210	278	224	309	465	289	277	161	126
deoxyribonuclease I (DNase I)	6	11	4	3	6	6	20	7	6	3	1
metabotropic glutamate receptor 1	3	4	4	6	2	1	5	0	1	2	1
glycine receptor beta subunit precursor	1	2	7	3	0	3	0	0	1	1	1
P2X purinoceptor 6 (P2X6)	72	162	80	90	67	48	56	145	154	43	25
phenylalanine-4-hydroxylase (PAH)	805	830	668	803	538	699	731	901	643	370	422
5-hydroxytryptamine 1D receptor	16	2	16	11	15	10	17	32	38	19	5
MAPKK7	76	104	39	52	79	49	91	130	106	50	18
neurexin III alpha	6	6	1	1	3	2	10	1	7	0	1
Kallmann syndrome protein precursor	4	5	3	1	1	6	8	4	3	1	3
serum response factor (SRF)	70	42	26	25	46	33	107	94	115	54	20
B-cell lymphoma 6 protein (bcl-6)	61	51	29	41	43	33	83	52	53	42	33
transcriptional repressor CTCF	94	88	85	99	51	93	37	70	42	59	41
global transcription activator SNF2L1	513	444	533	649	194	554	358	363	375	265	410

transcription factor RZR-alpha	11	13	23	23	9	25	21	17	11	21	38
deoxyribonuclease II (DNase II)	256	371	232	292	206	187	249	278	433	108	124
D2 dopamine receptor (DRD2)	8	8	6	3	1	3	1	2	5	0	1
cholinergic receptor (CHRNA3)	2	7	3	1	5	4	13	2	2	1	1
leptin receptor precursor	14	10	11	6	4	9	18	12	14	8	2
tyrosine 3-monooxygenase isozymes	2	5	2	1	2	4	7	1	4	0	1
glial cell line-derived neurotrophic factor precursor	4	11	4	4	1	1	6	0	5	1	1
myelin-associated glycoprotein precursor (MAG)	5	5	1	0	3	2	7	0	4	1	1
synapse-associated protein 97 (SAP97)	115	92	119	133	48	180	105	126	83	54	64
FCMD; fukutin	54	53	38	42	27	55	57	58	63	18	19
PC4	3079	2585	2829	3738	1434	4981	2591	3888	2916	1363	2290
ATF-3 (ACTIVATING FACTOR 3)	16	7	3	4	16	14	38	13	8	6	4
PRB-binding protein E2F1	467	546	172	225	361	194	512	339	390	126	68
ICSBP	5	3	4	2	1	3	4	0	1	2	1
paired box homeotic protein	3	7	2	2	3	4	6	0	3	1	0
octamer binding transcription factor 1	59	76	19	16	14	17	67	12	10	8	11
transcription factor TFIIIB	120	63	94	75	43	82	64	112	134	60	56
transcription factor NF-ATc	75	105	42	45	33	31	59	95	107	21	14
ets transcription factor	11	10	17	23	4	11	8	5	10	4	8
CCAAT displacement protein	54	57	28	31	54	39	40	68	59	20	18
Ini1	799	802	669	839	743	666	618	888	796	519	696
osteoblast specific factor 2	7	8	4	2	1	6	9	4	7	0	3
leukosialin precursor	6	7	2	3	1	0	10	0	6	1	1
integrin beta 5 subunit precursor	76	60	44	48	52	33	104	85	74	44	22
beta catenin (CTNNB)	464	436	207	236	250	405	659	608	627	142	154
CD114 antigen	29	19	19	20	18	18	22	21	17	4	10
IL-2 receptor alpha subunit	2723	2384	5235	3686	1379	1926	2455	2155	2003	2789	1280
interleukin-12 receptor precursor	5	2	3	3	3	2	3	4	3	3	6
(GADD45 gamma)	50	73	37	55	54	47	64	44	46	65	48
nuclear factor I (NFI); NFI-X	168	144	104	145	144	55	95	100	98	34	38
transcription factor HTF4	138	134	176	196	89	477	234	330	217	116	133
R kappa B DNA-binding protein	358	324	127	139	290	191	495	358	602	115	131
TRAF-interacting protein (I-TRAF)	56	30	56	62	52	116	85	100	111	59	59
cAMP-dependent transcription factor ATF-4	2492	2104	2735	3627	5125	3667	4367	5611	5250	4592	2835
(DNA metase; MCMT)	8	10	8	6	8	8	13	4	9	1	4
cadherin 3 (CDH3)	1	1	2	3	2	7	8	0	1	2	0
corneodesmosin precursor	3	6	1	1	1	3	5	0	4	1	1
integrin alpha 4 precursor	272	261	76	97	122	158	265	108	104	55	47
semaphorin; CD100	5	2	1	1	2	2	4	8	3	2	1
C5a anaphylatoxin receptor	9	10	4	2	4	2	4	6	7	2	2
IL-6R-alpha	198	114	115	161	228	293	384	850	742	333	82
(IL-1R2)	16	20	8	7	6	8	11	3	4	6	7
(GADD45 beta)	6	14	2	0	3	4	5	2	4	8	1
RNA polymerase II elongation factor	214	189	146	171	138	227	175	313	214	124	102
transcription elongation factor SII	395	254	267	314	255	406	416	608	483	197	225
transcription factor 11 (TCF11)	298	306	117	122	214	178	367	330	402	121	109
TAFII31; TAF2G	523	391	445	426	272	529	458	746	629	255	387
heat shock transcription factor 1	486	520	281	302	454	475	571	684	862	355	265
DNA-binding protein A	480	360	298	345	435	217	429	764	840	295	243
cadherin 5 (CDH5)	9	3	1	2	3	5	6	2	1	0	0
(V-CAM 1)	1	2	2	1	1	0	1	2	1	0	1
CD18 antigen	23	16	12	17	15	15	16	7	8	17	19
T-cell surface glycoprotein T4/leu-3	55	87	38	37	28	39	63	74	75	18	11
neuromedin B receptor	464	309	120	113	209	261	355	128	109	51	50
(IFN-alpha receptor; IFNAR)	35	9	23	22	14	46	24	38	49	21	15
IL-8 receptor type 1	5	6	3	1	2	5	6	1	0	0	0
UK114 antigen homolog	191	153	182	176	80	201	146	178	178	104	96
homeobox protein HOXB7	17	31	9	19	9	9	10	7	3	4	4
NSEP	7065	5795	6164	6955	6025	3233	6003	10152	8845	4632	4151
nuclear factor NF45	244	264	161	113	113	131	193	178	199	63	49
helix-loop-helix DNA-binding protein	41	24	24	18	36	9	24	23	30	10	13
transcriptional activator hSNF2-alpha	417	305	312	328	205	306	368	556	288	181	186
telomeric repeat binding factor 1	90	88	91	97	33	144	71	120	89	50	60
cadherin 11 precursor	6	9	4	0	6	1	2	3	4	1	1
E-selectin precursor	5	1	1	1	5	6	2	3	8	0	1
CD41 antigen	7	18	3	3	4	3	3	5	5	1	3
B-lymphocyte surface antigen B4	80	124	46	44	33	29	61	80	70	19	15
Duffy blood group antigen	2	4	3	0	2	2	0	0	2	0	1
IL-2 receptor beta	1	4	2	0	2	0	6	1	4	0	1
androgen receptor (AR)	9	4	2	0	2	3	12	2	2	1	0
beta-defensin 2 precursor	1	12	1	0	1	2	7	0	0	0	0
transcription factor E2-alpha	206	242	216	364	193	528	230	356	319	314	230

(IFN-alpha) responsive transcription factor subunit	48	43	52	44	39	51	40	94	88	75	54
nuclear factor NF90	68	110	49	55	73	45	76	104	153	40	24
C-ets-2	44	28	17	14	26	10	34	48	59	23	24
putative transcription activator DB1	427	376	382	300	236	185	292	682	513	193	279
TTAGGG repeat binding factor 2	357	237	158	203	405	326	356	668	613	121	88
muscle cadherin precursor (M-cadherin)	6	11	5	6	5	4	4	3	5	2	1
cell adhesion protein SQM1	1942	4057	1149	1303	2362	800	1348	4099	4485	509	329
integrin beta 6 precursor (ITGB6)	5	9	2	3	4	2	8	5	1	0	0
myeloid cell surface CD33 antigen precursor (MCP-1RA)	8	6	2	1	4	2	6	0	2	0	0
IL-3R-alpha	10	15	19	9	3	3	6	1	5	1	18
angiotensin II type 1A receptor	28	37	5	1	3	5	19	0	2	1	3
defensin 6 precursor	7	5	3	1	3	2	4	2	1	0	1
transcription initiation factor IID	5	6	0	0	1	3	2	0	2	0	1
homeobox 2.1 protein	23	31	25	21	18	21	30	50	61	26	14
homeobox A1 protein	7	8	6	4	5	4	14	8	18	2	1
raf-responsive zinc finger protein	34	53	74	62	43	32	36	49	59	116	38
DNA-binding protein TAXREB302	72	76	60	38	50	26	70	61	102	46	24
polyadenylate binding protein-interacting protein	228	221	90	92	107	185	267	117	93	54	62
cadherin 8 (CDH8)	440	454	404	512	363	999	645	1114	778	266	432
neural-cadherin precursor	12	21	8	3	5	6	6	7	10	3	4
integrin alpha 3 (ITGA3)	11	8	15	15	7	10	9	18	5	5	2
polycystin precursor	9	11	5	5	8	3	9	7	12	0	1
keratinocyte growth factor receptor	52	65	37	37	60	57	147	97	96	21	25
IL-4R-alpha	26	42	8	3	25	9	40	5	12	3	1
follicle stimulating hormone receptor	43	39	25	21	29	10	21	44	75	45	25
cytochrome P450 IA2	19	14	14	15	7	2	4	3	8	2	0
octamer-binding transcription factor 2	104	104	24	23	23	24	123	18	23	11	13
fli-1 oncogene; ergB transcription factor	2	6	2	2	1	4	5	2	2	2	0
homeobox protein hLim1; LHX1	3	3	3	1	1	2	5	1	2	1	1
orphan hormone nuclear receptor	19	19	11	11	17	14	12	24	22	4	2
zinc finger protein 91 (ZNF92)	5	11	4	4	3	4	11	4	6	1	2
RPD3 protein	393	334	260	301	138	184	339	283	196	145	143
intercellular adhesion molecule 2 precursor	566	335	218	229	354	231	439	673	516	156	141
B-cell differentiation CD72 antigen	21	25	12	11	8	4	13	0	2	2	9
leukocyte adhesion glycoprotein p150	9	7	4	1	1	7	5	1	3	0	0
ciliary neurotropic factor receptor	14	14	5	4	5	5	11	6	19	1	0
activin type I receptor	3	7	8	1	2	5	5	0	2	1	0
IL-5R-alpha	76	60	67	66	67	111	91	93	116	52	43
calcitonin receptor	155	148	51	73	113	213	199	79	75	43	30
cytochrome P450 IVB1	5	7	1	1	1	5	11	3	5	1	1
transcription factor AP-2	5	2	1	4	2	5	4	2	2	3	2
paired box protein PAX-5	3	1	4	1	3	5	2	2	2	0	2
T-cell specific transcription factor GATA3	327	280	186	165	171	305	319	217	190	94	56
NF-kappaB	15	22	16	14	14	11	11	14	33	10	6
adenylate cyclase-stimulating G alpha protein	149	112	91	103	123	97	144	155	145	53	43
high mobility group protein	4119	3994	2974	3656	4684	1987	4658	7873	7474	2551	2120
integrin alpha E precursor	1731	1742	704	807	1336	688	1892	1834	1690	478	591
CD44 antigen hematopoietic form precursor	11	6	4	5	9	7	8	11	8	9	3
fibronectin receptor alpha subunit	0	5	2	1	3	2	4	1	1	0	0
erythropoietin receptor (EPOR)	4	6	4	0	3	4	4	3	4	0	1
GM-CSFR-alpha	5	6	4	2	3	5	7	0	6	0	1
(IFN-alpha-R)	30	49	11	9	11	9	30	30	35	8	2
beta-2 adrenergic receptor	44	35	43	49	38	51	25	36	37	45	36
soluble epoxide hydrolase	3	3	2	2	2	5	4	2	6	0	0
mitochondrial transcription factor 1	50	47	31	30	33	27	29	36	36	15	18
special AT-rich sequence binding protein 1	547	442	652	783	312	810	367	568	538	398	443
transcription factor Sp1 (TSFP1)	1224	1520	2674	2264	1976	1854	745	2242	2022	2345	1580
zinc-finger DNA-binding protein	164	152	91	99	115	110	143	176	169	46	51
stem cell protein (SCL)	76	86	105	112	67	129	69	128	112	84	45
procollagen alpha subunit precursor	3	10	8	14	6	5	4	11	8	10	4
integrin beta 8 precursor (ITGB8)	16	13	10	15	7	7	13	6	17	2	4
neural cell adhesion molecule L1 precursor	25	22	12	14	7	8	19	24	21	2	2
fibronectin receptor beta subunit	3	8	3	2	2	5	3	2	1	2	1
platelet-activating factor receptor	1544	951	1321	1303	838	1739	1464	1985	1643	987	989
CDW40 antigen	7	7	1	1	2	5	0	2	3	0	0
interleukin-2 receptor gamma subunit	21	15	11	13	17	7	9	7	17	10	10
alpha 1A adrenergic receptor	14	20	3	7	2	5	14	10	10	5	1
dimethylaniline monooxygenase	6	9	13	46	1	5	5	1	5	3	2
early growth response protein 1	1	3	1	1	2	6	6	2	3	2	2
MSX-1 homeobox protein; HOX7	170	620	669	470	527	126	183	1011	1354	752	327
	464	393	374	378	621	1890	1456	2263	2171	1019	431

I-rel (RELB)	6	6	5	4	3	4	4	6	2	9	1
26S protease regulatory subunit 6A	1196	915	852	980	1190	648	1213	1256	1315	475	424
neural retina-specific leucine zipper protein	40	33	22	23	51	51	91	139	149	23	10
bystin	51	32	27	24	47	31	47	65	33	25	13
thrombospondin 2 precursor	108	183	63	56	144	40	58	195	185	34	18
contactin precursor	6	6	16	3	1	4	8	0	7	0	0
integrin alpha 6 precursor	380	313	237	232	164	209	315	289	283	88	152
endothelin receptor type A	3	5	4	1	2	0	3	1	0	1	2
corticotropin releasing factor	573	1305	424	472	775	258	512	1107	1405	280	165
interferon-gamma receptor	227	187	244	250	101	213	126	144	128	156	179
protoheme ferro-lyase; heme synthetase	85	71	46	67	123	112	179	254	189	61	40
glutathione reductase (GRase; GSR; GR)	253	194	139	195	294	387	473	705	682	320	225
transcription factor ETR101	178	253	137	127	139	106	215	398	504	268	166
PAX3/forkhead transcription factor fusion	274	184	195	198	176	159	167	312	207	91	104
Sp2 protein	83	92	50	41	81	34	84	75	59	29	22
DNA-binding protein alpha (PURA)	248	202	157	136	148	119	167	200	259	88	52
tristetraproline (TTP)	22	16	12	12	18	24	40	56	66	49	25
dominant polycystic kidney disease II	11	15	11	15	9	14	13	17	26	10	8
bone proteoglycan II precursor	2	6	7	3	3	3	2	2	3	1	1
(NCAM120); CD56 antigen	7	3	1	1	3	3	5	0	2	3	1
integrin beta 4 (ITGB4); CD104 antigen	36	59	43	27	40	14	12	37	31	8	10
endothelin receptor type B	5	9	3	3	4	2	6	4	4	1	4
cytokine receptor EBI3	6	7	4	1	3	3	2	2	2	2	1
interleukin-9 receptor precursor (IL-9R)	5	4	1	1	2	1	4	2	4	3	1
(microsomal GSTI1)	967	642	799	856	656	891	808	1416	988	678	639
(GST12; MGST1)	728	608	425	561	374	611	758	552	577	406	339
transcriptional enhancer factor (TEF1)	104	69	69	74	57	164	137	228	203	49	30
transcription factor IIIC box B-binding subunit	32	26	13	12	26	11	39	23	36	14	4
Sp3 protein	174	141	129	164	85	218	186	268	271	102	77
cell cycle gene 1 protein (CCG1)	42	38	26	23	23	16	36	43	45	27	14
nucleobindin precursor (NUC)	956	1203	536	657	1147	831	1562	1605	1336	797	492
tastin	11	26	18	23	29	10	20	23	27	25	9
vitronectin receptor alpha subunit	192	185	176	207	98	263	194	315	244	146	115
desmoglein 2 precursor (DSG2); HDGC	81	65	72	71	46	61	80	120	98	68	66
integrin alpha 1 (ITGA1)	60	54	47	60	32	79	69	88	56	22	23
insulin receptor precursor (INSR)	889	749	438	418	733	519	981	1843	1439	270	220
CC chemokine receptor type 2	5	4	3	3	5	2	7	4	2	1	0
interleukin 10 receptor (IL-10R)	2	8	3	1	2	1	7	2	2	1	0
selenium-binding protein	34	35	29	32	45	32	32	39	50	17	12
glutathione S-transferase pi (GSTP1; GST3)	8	6	5	3	6	6	7	6	9	3	2
homeobox protein HOX-11	6	10	1	2	5	4	7	2	8	3	1
nuclear respiratory factor 1	77	67	41	49	46	24	52	59	66	36	11
homeobox protein HOX-D3; HOX-4A	36	55	88	66	39	29	22	87	76	32	19
CCAAT-binding transcription factor subunit B	548	456	622	616	291	461	275	290	346	239	255
neu differentiation factor	3	4	4	3	4	6	2	2	3	2	2
trophinin	9	19	9	12	11	2	10	6	11	4	11
alpha1 catenin (CTNNA1)	2731	3692	3546	3931	3517	2661	2824	5709	5544	3037	1743
platelet membrane glycoprotein IIIa precursor	3	11	4	3	3	3	5	1	5	4	2
integrin alpha 7B precursor (IGA7B)	174	173	53	63	67	150	194	106	101	26	30
platelet-derived growth factor receptor beta subunit	38	32	22	18	27	18	27	57	36	9	7
N-sam	2646	2253	1374	1358	1617	1878	1888	2652	2339	575	684
interferon gamma receptor (IFNGR)	23	27	18	5	21	16	16	53	56	1	4
microsomal stress 70 protein	154	80	84	83	80	268	239	499	261	89	52
glutathione S-transferase theta 1 (GSTT1)	1074	883	858	998	771	720	730	1214	855	489	679
transcriptional repressor protein yin & yang 1	2544	2980	2074	2614	1990	4216	2753	4967	4297	2070	889
FUSE binding protein	617	507	543	589	314	449	316	420	349	265	301
transcription factor TFIIIB 90 kDa subunit	280	565	188	174	307	166	313	802	656	99	58
DNA-binding protein HIP116	201	211	82	67	46	61	195	53	45	27	43
transcription factor LSF	84	85	57	74	59	62	52	77	83	40	34
Herpes virus entry protein C (HVEC)	88	90	44	53	85	33	71	86	93	23	15
intercellular adhesion molecule-1 precursor	377	449	415	414	284	155	156	306	703	777	795
CR3A	5	13	6	5	4	3	7	3	3	6	1
LFA-1 alpha subunit precursor	2431	2164	8819	7185	1209	1124	1884	1441	1603	11394	2917
hyaluronate-binding protein	4	6	17	5	4	4	1	2	4	3	3
interleukin-7 receptor alpha subunit precursor	4	9	3	2	4	2	6	0	3	1	1
interleukin-1 receptor type I precursor	386	335	292	306	393	395	406	672	767	422	247
thiosulfate sulfurtransferase; rhodanese	36	39	12	15	46	19	49	60	69	26	12
heme oxygenase 1 (HO1); HSOXYGR	770	497	330	559	2107	4874	5697	12249	7842	2537	637
heme oxygenase 2 (HO2)	313	290	60	79	153	180	311	354	430	68	58
quinone oxidoreductase	271	198	213	272	170	414	390	475	440	288	231
MPV17 protein	60	65	85	75	99	51	40	77	62	76	58

bone morphogenetic protein 4	1553	1171	1217	1120	2013	2178	2169	2858	2096	1283	844
thrombomodulin precursor	10	23	15	13	20	6	11	26	22	9	5
insulin-like growth factor binding protein 1	278	227	343	444	457	1213	600	1010	514	1744	3571
teratocarcinoma-derived growth factor 1	256	346	1550	1301	114	250	347	192	215	727	252
insulin-like growth factor IA precursor	28	47	28	35	36	63	21	38	44	12	10
glycoprotein hormone alpha subunit precursor	4	1	2	1	2	3	9	2	1	0	0
interferon-beta	106	143	25	22	23	30	156	29	21	17	17
follicle-stimulating protein precursor	10	16	6	6	10	8	15	10	13	4	1
proteasome component C2	1401	1174	1350	1807	1081	1911	1305	2003	1591	1317	1336
25-kDa trypsin inhibitor	3	5	2	6	2	2	6	0	2	10	0
plasminogen precursor (PLG)	8	21	3	14	15	9	22	19	9	9	10
heat shock cognate 71-kDa protein	6309	5448	5098	7836	5432	20646	13553	18319	6625	4775	4840
heat-shock protein 40 (HSP40)	268	267	146	147	385	361	884	562	334	158	78
alpha-1-acid glycoprotein 1 precursor	8353	7545	8564	11528	14863	6531	6647	10617	7458	6312	5717
bone morphogenetic protein 5 precursor	11	10	13	8	20	3	19	5	10	2	4
FMLP-related receptor I (FMLPRII)	5	10	18	2	5	4	7	3	3	4	3
vascular endothelial growth factor precursor	622	605	535	594	931	1227	1109	1505	1590	1495	1889
endothelial-monocyte activating polypeptide II	1602	1189	917	1374	1316	1848	1703	2910	1973	787	593
delta-like protein precursor (DLK)	919	858	983	1016	1039	604	673	1307	932	734	1164
alpha calcitonin precursor	7	4	4	1	7	1	1	1	4	10	0
interferon-alpha2 precursor	8	12	13	18	4	7	4	3	4	9	2
complement component 5 (C5)	25	33	20	24	13	21	23	32	17	9	4
proteasome component C3	1363	843	1152	1005	697	1445	1130	1872	1557	771	854
matrix metalloproteinase 1 (MMP1)	7	8	3	3	7	4	11	3	3	1	4
protein C inhibitor (PROCI; PCI)	2035	1448	1123	1206	2009	1089	1443	2034	1303	416	398
heat shock 70-kDa protein 6	8	17	9	5	8	34	7	42	8	4	8
HSPD1	5742	3252	3109	2930	3028	6166	5586	7741	4697	1895	1900
alpha-1-antichymotrypsin precursor	352	331	266	245	302	227	236	196	175	114	245
bone morphogenetic protein 6 precursor	8	23	4	4	11	32	4	2	2	2	3
(CSF-1; MCSF)	1025	1044	389	467	484	1264	986	853	465	329	296
heparin-binding growth factor 8 (HBGF-8)	11	18	5	5	5	8	10	7	10	1	2
FLT4 ligand	7	11	5	5	6	6	6	3	5	3	1
(MIP1-beta)	4	9	4	11	3	2	7	1	5	3	1
parathyroid hormone-related protein precursor	5	7	3	2	6	2	6	4	6	1	2
interleukin-10 precursor (IL-10)	356	296	398	308	146	338	288	242	127	160	109
puromycin-sensitive aminopeptidase (PSA)	271	197	310	298	225	376	298	413	276	235	197
proteasome component C5	1761	1408	1543	1863	1092	2744	1580	2528	1800	1568	1227
matrix metalloproteinase 2 (MMP2)	4	8	3	2	2	5	2	2	2	3	2
endothelial plasminogen activator inhibitor-1	7	7	3	0	8	11	1	4	2	3	4
heat shock-related 70-kDa protein 2	31	17	16	31	67	9	279	150	66	16	8
heat shock 90-kDa protein A	9421	6160	5483	8606	5503	14979	15110	23689	16338	5806	4266
B94 protein	14	62	6	12	20	5	35	8	18	14	4
bone morphogenetic protein 8	8	38	3	28	5	7	14	8	10	6	2
hepatocyte growth factor activator	100	102	52	55	122	63	117	111	121	69	53
T-cell-secreted protein I-309 precursor	5	3	3	2	3	4	6	4	3	0	1
interferon gamma-induced protein precursor	4	9	3	3	5	4	5	1	3	0	0
ribonuclease/angiogenin inhibitor	622	723	365	410	753	299	497	842	980	429	441
interleukin-16 (IL-16)	0	6	1	0	4	3	5	3	5	2	3
interleukin-13 precursor (IL-13); NC30	50	114	76	124	99	62	44	109	189	40	46
heregulin-beta3	41	58	14	41	17	9	23	8	13	24	10
proteasome component C8	1226	896	1046	1015	588	1269	982	1454	1146	712	775
matrix metalloproteinase 3 (MMP3)	3	6	4	3	4	4	8	5	2	4	4
placental plasminogen activator inhibitor 2	11	13	14	4	6	2	9	5	8	4	3
glutathione peroxidase (GSHPX1; GPX1)	222	369	420	394	574	112	159	216	155	158	240
27-kDa heat-shock protein (HSP27)	3783	3121	3411	3551	5158	3160	2821	4869	3875	1454	1374
C-reactive protein precursor	14	18	3	11	28	6	14	5	12	4	5
bone-derived growth factor 1 (BPGF1)	6	22	4	9	10	4	9	4	3	6	4
hepatoma-derived growth factor (HDGF)	1749	1362	821	1025	1920	1277	1480	2602	2238	781	404
stem cell factor precursor (SCF)	338	275	257	316	155	245	180	196	132	52	90
migration inhibitory factor-related protein 14	9	29	10	8	8	10	9	8	13	3	3
erythroid differentiation protein	5	11	3	5	5	0	6	2	1	1	1
interleukin-18 precursor (IL-18)	88	154	79	83	129	34	75	110	99	87	39
interleukin-14 precursor (IL-14)	58	95	34	51	66	32	75	81	75	58	21
alpha-1-antitrypsin precursor	28047	25705	30449	31432	35414	18823	27689	34622	34266	26850	30762
proteasome component C9	238	103	299	285	97	209	111	165	136	169	196
matrix metalloproteinase 7 (MMP7)	9	7	13	2	4	7	3	4	2	4	3
metalloproteinase inhibitor 1 precursor (TIMP1)	724	873	423	537	721	376	581	1008	1142	423	233
glutathione peroxidase-gastrointestinal	1400	1551	1440	2083	2790	2301	1449	1993	1368	754	2578
70-kDa heat shock protein 1	287	334	196	352	3093	5424	8126	4973	1653	936	183
eosinophil granule major basic protein precursor	103	118	27	74	31	11	129	29	22	52	17
insulin-like growth factor II	5049	5509	2412	2214	4305	2633	4637	5011	4565	2124	3651
endothelin 3 (EDN3; ET3)	9	12	3	2	4	2	10	4	2	3	2

heparin-binding EGF-like growth factor	3	13	1	5	4	5	2	5	6	3	0
migration inhibitory factor-related protein 8	3	5	2	0	4	2	4	2	0	0	1
angiotensin-converting enzyme (ACE)	16	23	17	17	18	10	15	14	18	6	6
interferon gamma precursor	59	128	42	72	56	53	72	107	129	47	20
interleukin-11 (IL-11)	126	144	21	83	5	8	12	6	6	68	6
carboxypeptidase H precursor (CPH)	1522	1483	1374	1537	1501	1794	2067	3034	2378	1836	1790
acrosin precursor	25	11	9	13	6	4	1	5	6	17	9
matrix metalloproteinase 8 (MMP8)	14	13	3	6	6	8	13	11	7	4	3
tissue inhibitor of metalloproteinases 2	60	33	26	35	40	35	31	37	41	33	17
thioredoxin peroxidase 1 (TDPX1)	3719	3186	2552	2482	4127	2494	3223	3182	3120	1872	2035
cytosolic superoxide dismutase 1 (SOD1)	1427	1007	1243	1215	1242	1173	1865	2529	2218	1437	1046
monocyte chemotactic protein 4 precursor (MCP4)	6	14	5	3	6	3	5	3	4	3	0
pbacplermin; c-sis	123	188	32	40	42	44	129	31	38	27	17
neuroleukin (NLK)	2828	2180	1329	1514	3334	1259	2586	3570	3344	1286	1518
hepatocyte growth factor (HGF)	3	6	2	2	6	2	5	3	4	0	2
platelet-derived growth factor A subunit precursor	164	248	95	70	120	80	178	146	122	84	48
prorelaxin H2 precursor (RLN2)	4	1	5	4	4	2	6	3	2	3	1
interleukin-7 (IL-7)	94	138	28	27	34	25	124	24	20	5	12
interleukin-12 beta subunit precursor (IL-12B)	102	148	33	38	31	36	136	31	27	26	14
dipeptidyl-peptidase I precursor (DPP-I)	633	465	543	471	634	444	646	591	751	336	479
acrosin-trypsin inhibitor II precursor; HUSI II	5	9	1	1	6	4	4	2	2	7	2
matrix metalloproteinase 9 (MMP9)	98	179	47	44	98	54	109	229	218	38	21
tissue inhibitor of metalloproteinase 4 (TIMP4)	3	7	3	0	4	5	6	0	0	2	4
thioredoxin peroxidase 2 (TDPX2)	2000	1428	1146	1658	1448	1228	2199	3578	3211	1731	1158
glutaredoxin	320	163	140	141	229	228	359	909	751	371	502
pancreatitis-associated protein 1 precursor	2	10	3	2	5	5	4	1	6	3	1
(GM-CSF); CSF2	5	14	11	12	8	3	13	9	10	4	2
thrombopoietin precursor (THPO)	45	18	30	29	31	6	11	13	22	35	33
keratinocyte growth factor (KGF)	2	4	2	1	6	5	5	4	6	0	1
leukemia inhibitory factor precursor (LIF)	72	30	45	44	75	48	86	113	220	245	85
renin-binding protein (RENBP; RNBp)	102	141	54	53	57	74	100	81	87	50	30
interleukin-2 precursor (IL-2)	53	67	14	9	15	8	57	11	11	2	3
interleukin-12 alpha subunit precursor (IL-12A)	3	8	4	3	5	5	4	6	4	4	1
cathepsin H precursor	495	439	544	571	617	401	397	526	568	481	497
leukocyte elastase inhibitor (LEI)	138	117	94	86	77	116	84	85	86	58	100
matrix metalloproteinase 12 (MMP12)	7	9	5	6	4	9	9	11	9	4	3
matrix metalloproteinase 17 (MMP17)	177	218	47	62	76	71	181	60	56	30	28
cytochrome P450 IIF1 (CYP2F1)	8	13	6	5	14	2	22	6	4	7	1
thioredoxin reductase	494	317	140	236	1152	885	2703	2876	2516	301	150
osteoclast stimulating factor	86	75	62	61	55	51	76	98	90	44	47
transforming growth factor-alpha	10	12	5	4	6	1	7	2	2	3	3
uromodulin	3	3	2	4	6	0	7	0	3	9	2
brain-derived neurotrophic factor (BDNF)	2	2	1	0	2	4	8	1	1	1	0
acidic fibroblast growth factor (AFGF)	2	10	1	2	5	0	2	2	3	1	2
glucagon precursor (GCG)	1	1	4	2	3	2	5	0	2	0	1
interleukin-1 alpha precursor	7	12	3	1	9	11	14	3	7	3	3
interleukin-15 (IL-15)	3	4	1	0	7	5	5	3	3	1	1
cystatin-related epididymal spermatogenic	3	7	4	2	5	5	7	2	4	3	1
inter-alpha-trypsin inhibitor heavy chain H2 precursor	2025	1444	1223	1462	1262	1756	1693	1860	1617	668	766
matrix metalloproteinase 14 precursor	32	50	24	25	48	15	39	58	69	36	10
tripeptidyl-peptidase I precursor	132	120	127	135	171	95	115	109	129	291	168
dioxin-inducible cytochrome P450 1B1	2	12	12	1	6	0	3	0	0	2	1
NAD(P)H dehydrogenase	297	282	252	186	415	195	348	435	521	313	278
CXC chemokine precursor	6	4	2	4	5	5	11	8	5	2	1
transforming growth factor-beta	106	131	1013	868	57	54	132	87	109	463	198
T-cell-specific rantes protein precursor	1247	1235	4077	3715	569	947	1387	795	846	3635	1192
embryonic growth/differentiation factor 1	8	14	2	6	12	4	9	6	10	4	2
(MIP2-alpha)	4	5	3	2	5	3	2	0	1	0	0
inhibin alpha subunit precursor (INHA)	35	52	40	32	47	9	27	25	23	16	52
interleukin-1 beta precursor	754	763	389	466	652	789	1032	876	607	287	274
interleukin-9 precursor (IL-9)	2	7	3	3	4	1	5	3	7	1	1
major epididymis-specific protein E4 precursor	1	10	5	2	6	6	4	2	0	1	0
(ITI heavy chain H3)	163	150	129	125	143	83	127	123	125	46	88
matrix metalloproteinase 15 (MMP15)	90	89	37	32	79	37	69	71	96	30	24
dipeptidyl peptidase IV (DPP IV; DPP4)	184	115	186	208	160	270	205	305	257	186	159
S-mephenytoin 4 hydroxylase	2	1	5	15	3	2	4	2	2	3	1
2 P450VD1-alpha	11	16	12	14	11	11	14	13	11	8	10
bone morphogenetic protein 3B precursor	4	25	4	5	6	4	13	3	5	3	1
(G-CSF); pluripoinetin; CSF3	2	5	2	5	6	2	0	5	5	2	3
(MIP1-alpha)	4	12	12	26	6	3	11	7	10	6	2

endothelin 2 (ET2)	596	1094	305	330	442	342	563	1068	880	177	116
placenta growth factors 1 + 2	87	82	34	32	56	47	94	54	57	29	22
estrogen sulfotransferase	81	63	35	35	66	55	127	160	145	76	87
interleukin-3 precursor (IL-3)	10	17	4	1	6	8	18	1	3	0	2
interleukin-17 precursor (IL-17)	2	6	6	2	3	5	1	4	2	1	2
insulin-degrading enzyme	255	171	115	129	161	207	352	528	405	115	90
(IT1 heavy chain H4)	10	15	4	4	5	2	12	5	9	8	3
membrane-type matrix metalloproteinase 3	8	14	4	5	6	7	14	13	19	4	1
myeloblastin precursor (MBN)	1	18	3	9	2	2	5	3	3	4	2
P450(SCC)	7	10	16	20	19	11	11	6	10	2	9
glutathione synthetase	447	370	245	260	399	250	382	550	506	146	154
bone morphogenetic protein 1 (BMP1)	48	60	35	48	59	9	54	84	49	30	25
transforming growth factor beta2 precursor	431	530	220	281	164	146	456	366	299	126	103
monocyte chemotactic protein 1 precursor	4	9	1	0	8	1	6	5	3	0	3
hepatocyte growth factor-like protein	1040	1139	531	619	1071	388	1313	1154	1255	602	783
granulocyte chemotactic protein 2	7	6	4	4	8	6	6	9	10	3	2
(IGF-binding protein 3; IGFBP3; IBP3)	4	3	2	3	4	2	11	3	5	2	1
interleukin-4 precursor (IL-4)	4	9	1	1	3	4	4	1	4	4	1
parathymosin	270	290	461	471	560	291	211	210	283	397	566
methionine aminopeptidase 2	1169	800	1156	1300	867	1463	1090	1235	1259	725	681
neuroserpin precursor	27	26	25	28	14	30	32	25	29	20	13
matrix metalloproteinase 13 (MMP13)	1	9	2	2	4	6	10	1	2	10	1
cathepsin L precursor	110	59	53	47	76	102	182	264	248	139	50
polymorphic arylamine N-acetyltransferase	2	2	8	3	5	3	8	4	3	2	1
glutathione S-transferase mu1	136	179	111	93	102	151	135	138	95	60	60
bone morphogenetic protein 2A	120	202	67	70	67	39	85	171	127	35	26
kidney epidermal growth factor	6	25	5	12	4	11	9	19	15	10	9
oncostatin M (OSM)	52	212	67	30	30	9	29	79	55	4	13
thymosin beta-10	3111	3773	2156	2109	4128	3703	4023	4126	5392	2765	3893
OX40 ligand (OX40L)	6	10	12	6	14	5	29	3	15	4	13
cellular retinoic acid-binding protein II	0	6	0	1	7	4	0	1	2	1	1
interleukin-6 precursor (IL-6)	307	454	412	445	268	281	186	456	420	173	130
thymosin beta 4; FX	56	52	25	27	47	61	40	38	36	23	11
proteasome activator HPA28 subunit beta	306	210	163	126	224	139	337	211	244	106	73
cytoplasmic antipeptidase 2	10	8	5	2	6	6	9	3	7	10	6
cathepsin D precursor (CTSD)	563	423	361	369	606	541	546	633	588	501	484
activator of RNA decay (ARD-1)	117	88	45	39	56	97	101	106	88	31	27
serum paraoxonase/arylesterase 1	3	9	10	12	4	5	3	16	4	0	2
glutathione S-transferase A1	340	318	181	210	285	432	424	671	631	415	270
bone morphogenetic protein 3 (BMP3)	4	6	3	2	2	4	4	2	0	0	1
cytokine humig	4	12	4	5	1	2	12	1	2	4	1
amphiregulin (AR)	6	26	3	10	1	5	5	3	2	6	3
connective tissue growth factor precursor	17	17	20	16	3	8	8	5	6	6	39
interleukin-8 precursor (IL-8)	7	12	4	8	13	4	9	8	10	1	2
corticotropin-releasing factor-binding protein	4	6	2	2	3	3	3	2	2	0	1
interleukin-5 precursor	4	7	1	1	5	6	4	2	3	2	1
Wnt-13	8	5	5	4	3	5	4	5	6	5	1
proteasome inhibitor HPI31 subunit	641	522	252	289	446	191	516	704	683	196	127
bikunin	19	20	5	6	10	10	18	7	8	7	3
metalloprotease	78	68	64	69	52	128	125	180	164	89	74
zinc finger X-chromosomal protein	445	283	404	604	228	651	314	349	193	154	270
ubiquitin	13406	8404	8141	12635	23000	18059	21168	15023	12947	12568	6993
phospholipase A2	734	544	461	921	392	956	659	741	646	671	603
hypoxanthine-guanine phosphoribosyltransferase (GAPDH)	171	152	122	185	126	275	185	237	224	140	161
	41205	36417	35465	37160	43345	40669	42140	41699	42600	36636	42537
brain-specific tubulin alpha 1 subunit	43704	30379	29359	37178	43102	26028	20346	37418	29143	13945	8413
HLA class I histocompatibility antigen	519	549	317	281	558	578	479	439	404	502	289
cytoplasmic beta-actin (ACTB)	1609	1368	596	656	1613	1620	1334	913	793	500	345
23-kDa highly basic protein	25113	17562	15026	20712	26961	30471	18347	18908	15815	9222	6324
40S ribosomal protein S9	6926	3981	2079	2226	6730	2348	4969	2177	2472	1307	749

Protein/gene	Intensity - 0.25mM DEM Treated Cultures										
	15 min.	30 min.	1 Hour	2 Hour	4 Hour	6 Hour	8 Hour	12 Hour	16 Hour	20 Hour	24 Hour
Von Hippel-Lindau tumor suppressor protein	265	484	257	345	323	346	307	271	308	270	324
cadherin1 (CDH1)	2	13	0	1	4	5	3	2	2	1	0
LUCA2	347	388	180	155	251	257	300	241	286	76	78
N-myc proto-oncogene	16	16	17	14	18	11	16	14	7	10	2
B-raf proto-oncogene (RAFB1)	39	60	41	38	47	47	55	43	51	21	41
vascular endothelial growth factor receptor 1	115	144	51	43	58	100	150	39	36	26	24
transforming protein rhoA	7001	8506	6376	5836	10810	9176	7539	6592	9913	4339	5785
G2/mitotic-specific cyclin A	640	1056	659	1009	778	965	841	574	733	400	182

BUBR1 protein kinase	168	180	135	121	119	205	162	104	120	45	41
wee1Hu CDK tyrosine 15-kinase	18	40	72	61	53	36	33	21	25	22	20
aurora-related kinase 1 (ARK1)	281	351	245	212	252	363	327	286	371	99	139
CDC25B; CDC25HU2	167	179	112	67	73	102	154	115	104	41	90
transmembrane 4 superfamily protein; SAS	425	419	205	141	190	504	440	214	190	95	118
calcium-activated potassium channel beta subunit	6	11	4	4	3	7	16	7	7	1	1
mothers against dpp homolog 4 (SMAD4)	124	179	87	94	119	246	128	139	142	68	100
ras-related protein RAP-1A	143	336	1100	789	323	62	202	246	237	708	689
LUCA15 putative tumor suppressor	42	72	29	39	39	35	47	34	42	25	25
erythroblastosis virus oncogene homolog 1	11	46	12	35	10	20	13	14	22	9	16
pim-1 proto-oncogene	105	130	136	148	196	88	115	178	122	84	105
tyrosine-protein kinase receptor tyro3 precursor	114	204	199	224	260	114	160	150	187	162	64
transforming protein p21/K-ras 2B	218	289	236	283	362	317	262	183	236	208	127
G2/mitotic-specific cyclin B1 (CCNB1)	1931	2611	2218	2123	2117	2921	2078	2080	2241	1056	963
cell division control protein 2 homolog (CDC2)	1193	1707	797	942	1433	2191	1348	1074	887	247	263
DNA-binding protein inhibitor ID-1; Id-1H	1340	1954	1659	1862	1951	1421	1836	1642	1703	674	828
ARK2	244	285	182	145	243	261	257	191	208	64	42
CDC25C; M-phase inducer phosphatase 3	197	296	187	200	298	169	208	161	188	62	93
C-1	694	1020	656	820	890	1787	838	836	1474	540	625
Gprotein-activated inward rect. potassium chan. 1	6	14	4	5	2	11	9	4	5	1	3
adenomatous polyposis coli protein	76	105	95	100	75	121	66	88	73	58	76
EB1 protein	855	1469	720	951	1263	964	1025	1193	1109	747	1022
neogenin	11	36	23	25	21	24	17	24	17	20	20
MAD protein; MAX dimerizer	11	23	13	16	23	26	36	31	36	13	35
c-raf proto-oncogene	255	315	175	189	402	314	352	329	352	146	171
c-ros-1 tyrosine-protein kinase proto-oncogene	85	130	39	34	36	28	134	36	21	24	21
N-ras; transforming p21 protein	498	727	500	523	547	431	499	399	577	497	389
G1/S-specific cyclin D1 (CCND1)	583	877	494	536	781	629	464	499	427	345	121
cyclin-dependent protein kinase 2 (CDK2)	151	217	189	236	252	222	178	108	107	113	75
cell division protein kinase 9 (CDK9)	178	246	143	140	255	120	175	223	271	109	91
cyclin-dependent kinase 4 inhibitor B (CDKN2B)	4	10	6	5	10	11	3	8	7	3	4
prothymosin alpha (ProT-alpha; PTMA)	2232	4559	4922	7094	7497	3364	2767	3627	5050	5117	2217
cyclin-D binding Myb-like protein (hDMP1)	40	68	51	47	43	73	13	39	55	37	48
G protein-activated inward rect. potassium chan.	7	11	3	3	0	5	4	3	1	1	1
breast cancer type 2 susceptibility protein	91	150	75	78	55	83	102	49	34	27	43
ezrin; cytovillin 2; villin 2 (VIL2)	1220	983	627	640	1375	675	728	1193	1155	298	238
transforming growth factor-beta signaling protein 1	98	156	129	166	185	180	144	125	125	82	78
jun-D	39	43	30	19	42	58	48	35	32	28	29
A-raf proto-oncogene serine/threonine kinase	11	24	25	12	14	17	32	20	7	11	4
proto-oncogene tyrosine-protein kinase abl	165	214	134	165	500	184	227	341	302	116	111
C-cbl proto-oncogene	14	39	13	12	15	19	7	8	21	8	11
G1/S-specific cyclin D2 (CCND2) + KIAK0002	10	7	5	4	5	8	15	6	3	2	0
cell division protein kinase 4	1765	1795	776	769	2938	1124	1614	1786	1895	445	381
stem cell tyrosine kinase 1 (STK1)	25	43	11	13	11	23	32	7	9	7	7
cyclin-dependent kinase 4 inhibitor	11	23	6	16	14	18	11	21	13	11	4
DNA-binding protein inhibitor ID-1; Id-1H	529	679	660	445	454	245	350	592	701	677	684
water channel aquaporin 3 (AQP3)	5	12	7	3	2	7	7	3	2	2	0
ASIC3 proton gated cation channel	8	5	4	2	4	8	3	3	2	1	0
tumor suppressor protein DCC precursor	12	19	33	20	11	14	10	41	11	6	12
transforming growth factor-beta 3 (TGF-beta3)	16	19	16	13	13	14	12	15	16	9	5
p78 putative serine/threonine-protein kinase	108	115	101	65	83	124	119	113	110	63	105
B-myb	532	782	656	532	644	454	600	535	421	374	312
tyrosine-protein kinase receptor UFO precursor	10	41	15	12	15	6	13	18	7	17	10
tyrosine-protein kinase ABL2	84	86	67	46	57	73	73	67	61	25	29
INT-2 proto-oncogene protein precursor	8	18	13	16	10	12	1	24	12	9	4
G1/S-specific cyclin D3 (CCND3)	6	19	13	4	8	8	8	9	5	4	4
cell division protein kinase 6 (CDK6)	822	1077	784	691	1120	813	1317	986	657	512	552
serine/threonine-protein kinase KKIALRE	11	22	5	11	20	13	12	18	14	4	3
cyclin-dependent kinase 4 inhibitor D (CDKN2D)	139	222	123	146	189	177	153	234	257	77	138
transcription factor DP2 (Humdp2)	134	167	112	106	209	100	143	151	127	61	39
sulfate transporter; diaztrophic dysplasia protein	36	41	20	6	17	36	6	8	29	9	1
Gprotein-activated inward rect. potassium chan. 3	3	15	4	5	3	4	4	3	2	7	0
p53-associated mdm2 protein	391	395	257	299	443	601	520	650	645	250	500
(TGF beta receptor III; TGFBR3)	601	635	496	419	530	817	482	414	412	410	156
C-maf transcription factor	5	15	13	4	5	8	7	4	2	1	5
fos-related antigen 2 (FRA2)	6	15	11	6	10	10	12	37	7	9	32
(CSF-1-R)	48	71	32	41	52	17	34	70	70	15	8
C-src proto-oncogene (SRC1)	300	271	196	129	200	326	230	337	304	113	115
mas proto-oncogene	2	10	6	5	3	7	13	7	7	2	2
G1/S-specific cyclin E (CCNE)	351	286	168	132	226	188	170	264	169	85	127
cell division protein kinase 5 (CDK5)	276	381	280	231	438	258	189	284	358	151	89

CDC2-related protein kinase CHED	146	210	126	119	143	204	139	141	195	99	76
cyclin-dependent kinase inhibitor 1C	30	13	7	2	5	6	1	1	6	3	2
helix-loop-helix protein HLH 1R21	209	158	236	58	55	92	70	203	159	37	38
erythrocyte glucose transporter 1 (GLUT1)	105	127	302	191	157	102	119	108	128	177	96
ATP-sensitive inward rect. potassium chan. 8	0	7	28	2	4	8	12	2	7	3	2
neurofibromatosis protein type I (NF1)	41	61	51	45	40	79	53	44	47	35	36
prohibitin (PHB)	254	296	168	117	171	198	283	321	285	97	107
elk-1; ets-related proto-oncogene	14	30	16	19	16	12	16	20	19	13	11
fos-related antigen (FRA1)	31	81	74	70	112	64	108	193	162	102	601
c-kit proto-oncogene	6	12	2	2	1	4	7	2	0	1	0
C-yes proto-oncogene (YES1)	246	299	144	146	306	341	266	329	364	121	139
thrombopoietin receptor precursor (TPOR)	3	9	3	4	1	6	5	1	1	3	0
G2/mitotic-specific cyclin G1	142	231	178	182	177	274	155	155	162	115	69
protein serine/threonine kinase STK1	171	211	78	83	92	180	91	244	183	42	51
p35 cyclin-like CAK1-associated protein	152	222	134	162	148	212	137	175	197	124	105
cyclin-dependent kinase inhibitor 1 (CDKN1A)	160	275	129	119	148	95	266	248	180	204	1383
40S ribosomal protein S19 (RPS19)	11718	11157	11209	9090	21604	9010	8797	19174	13348	6973	7305
liver glucose transporter 2	91	83	99	57	63	44	18	49	45	30	3
calcium-activated potassium channel HSK1	11	14	19	14	5	4	1	9	5	3	2
moesin-ezrin-radixin-like protein (MERLIN)	317	359	150	158	274	314	295	294	264	90	113
tight junction protein zonula occludens (ZO-1)	33	25	35	18	34	33	52	38	30	19	21
A-myb proto-oncogene; myb-related protein A	107	157	54	48	54	72	184	42	34	31	31
v-erbA related protein (EAR2)	327	448	340	293	352	300	292	314	416	226	199
met proto-oncogene	40	55	41	33	33	39	20	39	32	33	5
C-fes proto-oncogene	23	21	11	12	15	15	14	19	16	3	3
cell surface glycoprotein MUC18	25	25	41	17	29	30	31	30	24	13	9
cyclin H (CCNH); MO15-associated protein	721	899	736	648	913	959	600	691	1056	584	470
extracellular signal-regulated kinase 1	106	134	99	71	90	73	115	93	101	62	61
cyclin G-associated kinase (GAK)	122	212	84	76	149	88	155	121	174	69	82
cyclin-dependent kinase inhibitor 3 (CDKN3)	325	513	327	442	405	287	271	229	291	165	109
bullous pemphigoid antigen 1	64	57	52	43	70	54	44	46	47	20	19
brain glucose transporter 3 (GTR3)	1384	1953	1637	1375	930	727	779	583	793	1800	200
chloride conductance regulatory protein ICLN	459	557	484	421	489	582	407	379	502	386	199
retinoblastoma-like protein 2	37	55	25	35	44	57	58	57	49	27	22
nucleoside diphosphate kinase B	4926	4959	3921	3106	5495	4700	5253	4995	4990	3114	3415
c-fos proto-oncogene; G0S7 protein	8	0	3	3	4	7	6	3	3	3	2
ets-related protein tel	16	12	20	16	12	12	13	7	8	13	8
ret proto-oncogene	3	6	5	2	1	4	3	3	3	3	1
C-fgr proto-oncogene (p55-FGR); SRC2	23	50	21	20	24	27	32	60	46	7	8
insulin-like growth factor binding protein 2	1282	2237	4158	5260	4231	2153	1342	4298	3641	2091	2175
fte-1	3704	4615	3168	3476	3793	4850	3060	3354	4216	3533	2315
extracellular signal-regulated kinase 2	344	526	344	322	470	371	414	443	442	318	342
serine/threonine-protein kinase NEK3	84	114	50	53	104	104	76	79	86	44	44
ubiquitin-conjugating enzyme E2 H10	1162	1628	643	813	1354	810	1045	1040	1091	320	401
proliferating cell nucleolar antigen P120	272	294	111	118	196	185	268	307	301	100	121
E16 amino acid transporter	349	470	336	309	502	424	493	831	753	374	424
HUKIV	8	20	4	12	5	8	9	5	3	1	0
p53 cellular tumor antigen	16	13	8	23	9	14	25	22	9	12	10
nucleoside diphosphate kinase A (NDKA)	2851	2908	1864	1681	3320	1910	3409	2885	3391	1492	1442
transcription factor AP-1	217	313	557	690	737	519	451	437	545	732	1748
triiodothyronine receptor	5	24	12	6	9	9	9	7	7	8	4
epidermal growth factor receptor (EGFR)	17	41	44	31	20	21	33	28	39	58	21
shb proto-oncogene	328	311	272	206	456	473	327	460	376	281	514
T-lymphoma invasion and metastasis inducing	9	8	7	11	6	10	15	8	5	5	3
Cl man-6-P receptor	395	491	244	175	298	458	464	483	473	314	386
extracellular signal-regulated kinase 3	404	396	271	305	644	493	531	685	559	317	403
CDC-like kinase 2 (CLK2)	55	55	48	34	27	36	33	33	30	30	10
geminin	326	472	235	279	276	368	251	260	310	131	89
NuMA	11	23	17	15	7	9	18	9	5	12	5
aquaporin 4	195	290	224	195	177	305	177	876	357	91	64
voltage-gated potassium channel protein KV11	34	73	68	79	31	48	34	52	57	20	41
retinoblastoma-associated protein	96	157	84	102	84	164	108	79	101	57	74
TSG101 tumor susceptibility protein	69	76	68	69	71	46	69	91	75	40	43
myb proto-oncogene; c-myb	106	104	60	64	50	70	169	62	41	27	34
v-erbA related protein (EAR3)	212	345	370	327	303	255	205	238	256	187	77
ERBB2 receptor protein-tyrosine kinase	135	137	82	62	94	49	76	117	102	45	19
ski oncogene	472	644	690	639	973	631	688	587	580	476	490
matrix metalloproteinase 11	256	275	179	159	191	231	229	357	261	74	142
cyclin A1 (CCNA1)	8	22	20	29	8	21	6	20	20	6	5
extracellular signal-regulated kinase 4	8	11	8	5	4	13	9	7	4	5	2
CDC-like kinase 3 (CLK3)	162	259	213	197	272	162	240	405	345	212	268
katanin p80 subunit	31	57	29	22	19	26	55	22	5	26	21

myeloid cell nuclear differentiation antigen	3	8	2	3	4	4	5	6	2	2	1
aquaporin 9	4	1	3	5	5	7	7	2	2	2	0
voltage-gated potassium channel protein KV14	5	14	1	5	2	2	6	4	1	1	2
Wilms' tumor protein (WT33; WT1)	22	55	33	31	27	48	36	26	26	25	23
maguk p55 subfamily member 2	5	14	6	1	8	44	15	43	3	2	1
c-myc oncogene	2346	3712	4380	5109	5369	3170	3163	5962	5206	2941	2421
ETS oncogene (PEP1)	58	98	37	31	32	38	69	74	51	33	26
epidermal growth factor receptor	679	804	843	694	634	547	589	438	401	395	183
snoN oncogene	242	234	216	201	298	288	167	175	195	99	90
cyclin T CDK9-associated	90	169	107	127	116	111	130	136	141	114	138
cyclin G2 (CCNG2)	10	12	6	6	7	12	17	7	11	6	2
ERK5	64	66	46	33	59	66	48	85	68	41	48
serum-inducible kinase (SNK)	34	57	48	30	28	44	38	46	55	29	47
diaphanous 1 (HDIA1)	442	426	331	294	405	330	401	299	366	220	214
transducer of erbB2 (TOB)	134	163	469	435	493	123	180	434	604	384	184
cationic amino acid transporter 3	4	16	4	1	2	6	8	2	3	2	0
N-type calcium channel alpha-1B subunit	12	17	5	6	3	6	16	8	0	2	0
putative protein-tyrosine phosphatase	205	247	170	199	178	363	231	225	274	145	125
tumor suppressor maspin	4	7	2	1	3	7	7	76	1	1	24
c-rel proto-oncogene protein	68	49	53	46	61	67	71	91	88	33	42
cot proto-oncogene	8	19	8	11	12	11	20	20	11	10	9
ERBB4 receptor protein-tyrosine kinase	2	11	2	2	4	3	13	4	0	0	1
CBL-B	123	170	119	120	162	185	116	141	140	64	68
cyclin K	234	339	233	227	200	273	205	238	302	186	224
bub1 mitotic checkpoint kinase	449	654	377	343	349	765	465	434	458	182	229
cdc2-related protein kinase PISSLRE	11	4	8	5	5	6	9	11	4	3	4
cyclin-dependent kinase regulatory subunit 1	901	1217	886	939	1091	1089	998	782	906	477	587
sprouty 2 (SPRY2)	19	43	28	27	31	28	21	32	40	29	9
p53CDC	1505	1659	873	966	1877	1151	1662	1598	1616	578	404
putative renal organic anion transporter 1	3	7	3	6	15	2	9	4	5	1	1
CAB3A/CAB3B	6	10	7	3	1	3	4	3	3	1	1
colorectal mutant cancer protein (MCC)	4	8	4	3	2	8	12	6	1	5	8
tumor suppressor LUCA1	203	231	207	197	198	176	236	157	148	144	101
L-myc proto-oncogene (MYCL1)	1	5	4	2	2	2	8	1	3	3	1
C-mos proto-oncogene kinase	3	13	1	0	0	4	7	1	0	2	0
platelet-derived growth factor receptor alpha subunit	2	9	5	2	2	5	6	2	0	3	0
H-ras proto-oncogene; transforming G protein	57	66	40	41	59	41	76	79	64	33	40
cyclin E2	54	63	51	41	40	46	42	29	31	14	10
serine/threonine-protein kinase NEK2	82	102	64	84	76	75	76	67	64	43	29
CDC-like kinase 1 (CLK1)	247	337	307	539	408	509	293	297	536	416	287
cyclin-dependent kinase regulatory subunit	801	1016	603	679	1296	1516	1000	1346	1341	547	515
cell division cycle protein 25A (CDC25A)	665	930	563	744	938	653	568	577	574	327	225
RCL growth-related c-myc-responsive gene	319	363	404	349	406	256	431	335	270	336	136
erythrocyte urea transporter	8	2	7	6	2	5	7	4	1	1	0
CACNA1G	11	11	6	2	5	12	24	3	2	1	3
kidney glomeruli chloride channel; CIC-5	177	262	146	193	180	235	191	150	203	128	76
monocarboxylate transporter 1 (MCT1)	1565	2186	1673	2018	1587	2234	1834	1744	1871	1508	1073
zinc transporter 4	5	2	1	2	3	5	4	3	1	0	1
MSP receptor	8	4	6	2	2	7	3	22	2	0	12
U-PAR	749	893	598	640	978	552	897	1067	902	420	439
related to receptor tyrosine kinase (RYK)	199	282	179	144	147	150	281	240	153	114	148
proto-oncogene tyrosine-protein kinase lck	5	14	7	3	4	7	11	7	2	1	3
glycogen synthase kinase 3 beta	84	123	112	106	108	53	100	75	106	73	74
MAPKK 6	134	155	76	100	111	70	90	66	88	37	11
PRKAR2A	123	167	66	81	119	88	116	120	166	59	47
lipid-activated protein kinase PRK1	124	216	86	99	149	90	125	152	176	83	57
serine/threonine-protein kinase PAK-beta	5	5	1	1	1	6	9	4	0	0	1
phospholipase C-delta-1	14	7	12	5	4	9	9	13	5	2	1
ADP-ribosylation factor 1	86	129	155	106	122	99	131	150	121	92	66
cardiac muscle sodium channel alpha subunit	6	1	6	5	1	5	6	4	2	0	3
sodium/hydrogen exchanger 1	75	81	61	63	60	90	66	67	83	46	87
Golgi 4-transmembrane spanning transporter	488	781	559	534	527	856	633	591	620	433	468
autocrine motility factor receptor	30	22	22	16	21	39	54	38	24	16	23
vascular endothelial gf receptor 2 precursor	5	8	4	4	1	2	4	6	3	0	0
protein-tyrosine kinase transmembrane rec. ror1	6	9	3	3	2	6	9	5	2	2	1
tyrosine-protein kinase lyn	190	277	161	173	261	261	199	432	294	91	76
pyruvate dehydrogenase kinase precursor	195	142	178	108	182	218	192	141	260	237	76
MAPK/ERK kinase kinase 3	163	219	52	49	117	165	148	192	230	32	35
Janus kinase 1 (JAK1)	361	399	235	264	473	330	362	349	424	188	195
(SGK)	110	138	73	63	63	36	171	40	28	27	23
myotonic dystrophy protein kinase-like protein	3	0	1	3	3	2	4	1	1	0	0

P3-kinase catalytic subunit delta isoform	39	56	50	57	82	51	71	56	55	43	90
ras-related protein RAP-1B	596	748	591	664	656	732	538	533	717	430	534
KCNQ3 potassium channel	3	13	2	1	1	8	2	4	0	7	2
sodium/hydrogen exchanger 3	4	6	3	2	3	11	9	7	1	1	2
organic cation transporter 1	65	74	37	26	27	26	119	30	19	13	25
colon carcinoma kinase 4 precursor	150	179	110	101	87	57	119	128	79	73	45
angiopoietin 1 receptor precursor	66	125	36	62	36	110	57	83	120	12	21
neurotrophic tyrosine kinase receptor-related 3	7	7	10	16	12	5	7	6	7	4	5
integrin-linked kinase (ILK)	192	115	57	46	152	93	142	144	140	37	45
ribosomal protein kinase B (RSKB)	7	8	4	1	3	4	10	3	2	3	2
protein kinase C alpha polypeptide	296	306	243	212	270	232	328	224	258	176	175
janus kinase 3	404	735	2224	1530	270	230	493	445	375	723	760
serine/threonine-protein kinase NRK2	239	306	282	264	292	362	255	199	268	186	107
ribosomal protein S6 kinase II alpha 1	190	277	265	236	292	169	191	297	297	155	155
(PI3-kinase p85-beta subunit	163	164	121	104	212	126	164	215	207	80	76
ras-related protein RAB2	682	770	665	655	832	1017	748	872	904	502	758
voltage-gated potassium channel	0	10	7	0	2	7	2	4	4	0	3
small intestine oligopeptide transporter	12	29	6	4	21	13	17	9	26	5	13
apolipoprotein E precursor (APOE)	7861	9597	6241	6083	10948	7890	7233	10322	9000	6903	8858
activation B7-2 antigen	2	5	5	2	0	3	9	5	1	6	2
p68-trk-T3 oncoprotein	72	72	33	25	27	41	99	31	19	17	22
tyrosine kinase receptor tie-1 precursor	8	7	4	3	2	4	6	2	0	1	1
AF-1P protein	101	121	123	123	119	165	137	165	122	104	114
tyrosine-protein kinase ack	103	133	98	86	103	92	120	121	85	47	38
protein kinase C beta I (PKC-beta-1)	9	5	5	4	4	7	14	6	6	0	0
c-jun N-terminal kinase 1 (JNK1); JNK46	110	128	92	100	98	87	98	73	110	60	34
protein kinase MLK-3; sprk	1239	1383	994	1091	1946	1444	1061	1451	1667	754	674
ribosomal protein S6 kinase II alpha 2	9	30	14	13	8	13	28	7	10	5	5
PTDINS(4)P-5-kinase	182	213	115	114	184	167	209	187	230	111	122
ras-related protein RAB3B	34	36	15	9	18	7	25	28	24	10	12
GLYT-1	19	37	26	23	15	31	39	24	17	16	31
high-affinity glutamate transporter	7	4	3	9	3	7	8	9	2	3	3
cholesteryl ester transfer protein precursor	8	10	7	7	3	7	2	3	2	3	3
CC chemokine receptor type 1	68	79	23	18	22	35	67	24	16	11	12
brain-derived neurotrophic factor	2	1	4	1	2	3	1	0	0	1	2
epithelial discoidin domain receptor 1 precursor	198	238	195	155	194	159	196	238	201	126	67
CDC25	11	21	20	18	11	11	16	31	23	7	8
tyk2 non-receptor protein tyrosine kinase	35	71	54	43	49	64	58	44	41	41	23
protein kinase C delta (NPKC-delta)	108	98	75	65	84	57	80	56	93	69	30
c-jun N-terminal kinase 2 (JNK2); JNK55	287	284	164	173	331	282	328	215	293	122	70
tyrosine kinase trk1	41	78	51	55	43	48	40	53	49	22	24
ribosomal protein S6 kinase II alpha 3	1559	2157	1214	1632	1405	1561	1322	1310	1394	936	394
phospholipase C (PLCL)	5	5	12	3	2	5	8	2	1	1	1
ras-related protein RAB4A	145	218	108	114	141	185	171	123	133	90	53
DA transporter (DAT)	3	10	4	2	1	8	6	1	0	0	1
ATP2B2; calcium pump;	3	10	3	4	1	5	3	2	4	1	2
lecithin-cholesterol acyltransferase (LCAT)	250	257	105	95	205	136	183	204	213	61	43
thrombin receptor (TR); F2R; PAR1	132	142	88	118	172	134	95	89	129	65	46
NT-3 growth factor receptor precursor	9	5	2	0	2	3	7	2	1	2	1
LTK	11	10	4	4	3	5	7	4	3	6	2
NCK melanoma cytoplasmic src homolog	90	129	82	96	95	135	96	82	102	89	62
MAPKAP kinase (3pK)	108	160	135	125	114	103	154	94	86	100	38
protein kinase C epsilon type (NPKC-epsilon)	10	10	8	3	10	7	9	5	8	2	2
C-jun N-terminal kinase 3 alpha2	1	1	5	1	2	6	2	3	2	2	1
serine kinase	899	1141	965	1090	1246	1206	1107	922	1109	881	547
kinase suppressor of ras-1 (KSR1)	11	19	26	15	11	11	18	7	7	13	13
Gem; induced immediate early protein	3	4	3	1	2	4	5	2	0	1	0
ras-related protein RAB5A	424	490	387	391	445	533	324	391	419	272	325
sodium-&chloride-dependent GABA transporter 3	380	514	226	224	404	432	503	544	457	148	163
copper-transporting ATPase 2	83	136	32	33	49	108	83	78	78	26	11
vesicular acetylcholine transporter	9	5	18	3	3	9	10	9	5	0	15
ephrin type-B receptor 2 precursor	5	11	7	2	2	1	7	2	1	1	2
G protein-coupled receptor kinase GRK5	20	16	17	6	12	25	28	7	10	8	13
G-protein-coupled receptor HM74	3	12	3	2	2	3	4	3	3	6	10
Ink adaptor protein	26	40	37	26	51	27	67	38	30	33	49
mitogen-activated protein kinase p38	601	940	520	632	912	671	767	485	594	412	254
protein kinase C eta type	7	2	3	3	4	4	6	3	3	3	1
focal adhesion kinase (FADK)	124	122	92	89	143	58	129	138	121	80	56
CAMK1	215	216	179	186	155	117	225	89	99	95	42
ephrin A3 precursor	5	11	18	11	9	5	9	12	5	13	11
Ral A; GTP-binding protein	397	492	241	245	289	377	336	341	324	173	176
ras-related protein RAB6	381	413	344	314	445	431	416	417	338	220	252

sodium-dependent serotonin transporter	63	77	42	66	86	73	58	80	85	24	15
Na/K-transporting ATPase beta 3 subunit	140	221	163	186	180	222	222	168	213	128	317
T4-binding globulin	155	219	133	152	139	200	136	85	114	51	25
tyrosine kinase receptor HEK	3	4	4	3	3	10	8	7	2	0	5
transferrin receptor (TFRC)	1668	2458	1421	1705	2837	2809	2020	2413	2292	1974	1690
R-PTP-gamma	397	448	358	331	397	452	413	341	314	266	167
putative src-like adapter protein (SLAP)	4	7	2	1	1	4	8	5	0	1	3
LIM domain kinase 1 (LIMK-1)	130	184	152	143	187	123	169	139	129	155	181
protein kinase C gamma type	5	8	4	2	3	4	4	3	4	1	3
PTDINS-3-kinase P85-alpha	87	108	88	87	69	103	77	69	63	55	57
PHK-gamma-T	9	16	12	12	12	14	13	17	10	6	8
(PTDINS(4)P-5-kinase)	341	545	318	370	309	316	284	330	331	293	262
transforming protein rhoB	636	1044	1061	1017	1127	691	713	1040	999	1208	1152
neuro epithelioma transforming gene 1	482	552	349	382	448	270	353	517	447	246	128
norepinephrine transporter (NET)	15	21	4	5	4	9	10	3	3	1	4
synaptic vesicle amine transporter (SVAT)	3	4	8	1	1	7	2	2	0	2	0
transferrin precursor (TTR); prealbumin; TBPA	891	1282	728	782	565	532	735	465	730	951	535
frizzled	13	19	13	16	11	24	13	20	13	6	4
tyrosine-protein kinase receptor FLT4	80	119	127	106	59	53	118	52	45	41	40
ras-GRF; sos	100	121	74	124	136	231	137	128	143	101	90
EPS8	52	57	39	46	45	40	46	47	37	24	11
MAP kinase-activated protein kinase 2	165	265	258	286	223	246	269	179	159	240	377
protein kinase C zeta type (NPKC-zeta)	22	42	34	21	20	28	39	42	29	21	29
p21-activated kinase alpha (PAK-alpha; PAK1)	37	36	74	18	24	20	17	26	21	11	14
casein kinase I gamma 2 (CKI-gamma 2)	648	574	227	218	603	618	580	636	542	146	187
phospholipase C beta 3	20	39	22	26	24	23	43	34	22	21	22
ras-related protein RAB3A	85	89	30	24	47	48	76	89	111	37	21
guanine nucleotide regulatory protein tim1	12	21	12	11	8	9	11	10	4	5	2
NaCl-dependent taurine transporter	62	112	68	85	95	94	119	133	138	77	192
Na+/K+ ATPase	163	221	71	64	95	107	174	113	96	48	66
alpha-fetoprotein precursor	1303	2098	1775	1601	1453	1760	1520	1271	1292	593	432
ephrin type-B receptor 3 precursor	4	9	4	2	4	6	3	4	2	1	2
ephrin A receptor 4 precursor	2	4	2	3	1	6	6	2	2	2	0
c-src kinase (CSK)	710	563	250	255	654	457	724	676	479	231	241
MAL	24	26	21	13	14	24	39	7	11	3	5
MAPKK 1	344	371	217	214	339	307	335	528	411	145	214
protein kinase C theta (PKC-theta)	7	10	5	5	3	11	6	4	5	0	2
serine/threonine-protein kinase PCTAIRE 1	441	520	196	216	476	391	469	519	406	149	221
PKA C-beta	25	58	72	37	29	31	21	24	23	18	23
PI3-kinase	41	79	45	53	44	96	56	46	62	43	44
ras-related protein RAB-7	612	720	658	670	588	421	553	649	573	538	758
transducin beta 2 subunit 2	32	71	123	114	92	38	53	131	92	106	117
Na+/glucose cotransporter 2	9	18	4	2	10	22	8	8	30	3	2
adrenoleukodystrophy protein	318	248	137	146	268	423	256	556	383	90	283
serotransferrin precursor	26228	28580	24805	25801	26993	26926	20653	22693	28828	15573	16068
IFN-gamma accessory factor 1 (AF1)	28	46	29	43	42	54	49	44	38	19	40
epithelial cell kinase	83	118	81	89	89	118	103	89	115	89	229
tyrosine-protein kinase HCK	12	40	18	34	15	30	5	30	24	7	11
MAPKKK5	5	10	6	3	3	3	6	3	4	2	1
MAPKK 2	2	7	4	2	1	2	4	2	1	0	1
CAM-kinase II beta	5	8	3	2	3	6	7	6	6	3	1
AMPK alpha-1 chain	59	115	46	75	81	93	89	69	84	62	44
(PKA C-gamma)	5	17	11	10	13	7	31	18	7	4	4
PI4-kinase	220	237	133	154	230	219	220	202	224	119	139
G13	73	109	60	88	85	130	112	89	76	96	109
transducin beta 5 subunit	26	29	20	27	19	14	18	22	23	16	18
kidney oligopeptide transporter	3	3	2	2	1	8	3	1	1	0	4
ATP-binding cassette 8 (ABC8)	4	7	5	3	4	2	10	6	2	1	2
lactotransferrin precursor; lactoferrin	12	15	10	8	11	61	27	13	11	4	5
interleukin-6 receptor beta subunit precursor	157	266	191	281	210	285	213	223	264	148	259
TGF-beta 1 receptor (TGFB1)	174	237	150	199	156	131	157	233	193	48	82
70-kDa zeta-associated protein (ZAP70)	0	9	0	2	1	4	5	4	1	2	0
myosin light chain kinase (MLCK)	162	198	133	168	155	83	136	100	112	81	39
MAPKK 3	407	419	240	270	381	389	417	496	426	214	232
CAM kinase-GR	3	2	3	3	2	4	9	1	3	2	1
tyrosine-protein kinase tec	5	13	3	3	3	6	1	0	3	1	2
PRKAR1B	274	358	321	440	324	313	212	939	743	151	274
PLC-beta 2	3	6	2	9	2	5	0	4	2	0	0
transducin beta-1 subunit	175	246	532	331	151	127	179	219	177	248	351
RAD1	26	51	26	30	24	40	15	63	43	11	15
sodium-dependent proline transporter	1	10	2	1	1	5	4	4	0	0	0
multidrug resistance-associated protein 2	235	366	218	332	539	538	619	455	420	234	205

melanotransferrin precursor	2	11	13	5	6	11	5	5	6	3	9
stromal cell derived factor 1 receptor	11	27	8	17	10	11	16	27	11	3	9
anaplastic lymphoma kinase GN (ALK)	3	5	2	6	2	5	5	9	1	1	13
c-fer proto-oncogene	50	80	52	64	61	70	69	54	70	42	26
titin	8	14	2	5	2	5	4	2	4	2	0
c-jun N-terminal kinase kinase 1 (JNKK)	28	55	22	39	45	62	56	51	38	29	36
casein kinase II alpha subunit	243	265	104	119	197	109	221	256	243	102	129
Bruton's tyrosine kinase (BTK)	2	9	2	2	1	6	7	2	0	0	0
PRKAR2B	1	1	2	5	8	2	16	2	1	4	0
PLC-gamma 1	131	134	101	82	122	104	100	120	158	82	61
ras-like protein TC25	1178	1463	1414	1559	1365	1138	1144	1108	1100	1005	1089
RalB GTP-binding protein	164	154	71	74	157	90	132	149	152	58	98
neutral amino acid transporter A (SATT)	102	95	48	72	115	106	124	111	86	27	63
cAMP- dependent chloride channel	5	8	2	2	1	5	11	2	1	1	1
Insulin receptor-related protein precursor	71	90	75	77	58	77	98	60	47	24	23
tyrosine-protein kinase receptor eph	2328	2040	789	751	1317	2203	1876	887	591	326	369
fibroblast growth factor receptor 3 precursor	16	30	8	4	27	16	39	19	27	5	13
(GRB2)	1093	1539	577	825	1465	669	1202	1336	1455	373	690
(TSE1)	888	1008	578	744	1138	699	949	1069	1204	519	1472
MAPKK 5	184	196	133	141	238	155	167	158	216	71	72
PKA C-alpha	589	607	306	350	785	398	408	639	688	182	359
Janus kinase 2 (JAK2)	18	25	8	23	22	38	33	27	26	11	17
focal adhesion kinase 2	16	23	5	9	7	16	4	15	13	2	7
PLC-gamma-2	3	12	4	6	2	7	2	3	1	0	1
vav oncogene	2	8	2	3	2	6	9	2	0	1	2
MKP4	236	390	287	230	232	197	256	496	395	215	193
protein-tyrosine phosphatase 1E	1	14	3	4	4	4	1	0	4	1	1
PTPCAX1 nuclear tyrosine phosphatase	2671	4764	2634	4064	3843	4891	2936	3492	3991	365	2748
adenylyl cyclase IX	93	124	54	63	118	119	113	93	114	3	52
STAT3	104	154	83	68	81	69	102	138	146	15	111
14-3-3 protein beta/alpha	1331	1926	1109	1361	1508	2116	1438	1576	1923	544	1897
FKBP-rapamycin associated protein	40	100	39	59	61	34	67	64	65	20	57
retinoic acid receptor beta (RXR-beta; RXRB)	275	346	149	262	222	319	346	278	271	71	89
caspase & rip adaptator with death domain	115	97	24	34	163	89	93	148	145	16	25
calpain p94 large (catalytic) subunit	31	72	24	30	35	30	16	30	38	11	23
granzyme A precursor	6	6	1	1	2	3	7	2	1	2	1
poly(ADP-ribose) polymerase (PARP; PPOL)	50	90	35	45	57	51	66	83	66	33	33
DNA polymerase beta subunit (DPOB)	54	112	43	52	94	142	106	86	86	40	46
MCM2 DNA replication licensing factor	868	1125	324	552	1184	778	723	842	696	168	117
DNA excision repair protein ERCC1	111	125	123	95	102	96	117	116	106	91	136
leukocyte common antigen precursor	4	10	1	5	3	3	12	5	5	1	3
(CGI-PDE B; CGIPDE1)	10	21	7	14	15	11	6	14	5	1	5
retinal guanylyl cyclase 1 precursor	1	5	2	1	4	8	3	2	1	1	3
(STAT6)	146	173	99	122	191	135	194	146	158	21	96
(PKCSH)	1741	1667	1104	1056	2402	1309	1511	1524	1993	305	749
SH3P17 SH3 domain-containing protein	29	46	16	26	22	43	47	38	51	12	18
(DDR3)	223	250	146	153	132	232	160	781	447	49	93
CD40 receptor-associated factor 1	867	863	409	400	527	389	766	1102	910	158	289
CANP	1702	2309	1395	1255	1470	1319	1868	1579	1902	973	1809
CAD	23	33	10	10	23	31	28	40	31	6	7
inducible nitric oxide synthase (iNOS)	15	20	10	30	2	1	3	3	2	2	1
DNA polymerase gamma	93	128	87	80	76	72	95	103	101	58	79
CDC21 homolog	436	608	315	400	318	458	291	295	252	130	110
DNA excision repair protein ERCC2	574	540	267	248	349	562	423	804	487	139	206
protein-tyrosine phosphatase 1B	226	333	190	207	333	191	216	275	316	26	209
CGI-PDE A	2	7	2	3	1	5	5	1	5	0	0
guanylate cyclase F (GCF)	6	8	1	3	8	4	5	0	2	0	1
cAMP-response element binding protein	243	395	229	250	520	292	414	423	407	39	275
linker for activation of T-cells (LAT)	63	81	43	51	48	64	52	64	60	11	35
SH3P18 SH3 domain-containing protein	51	78	35	33	27	50	35	42	51	19	31
CD27L antigen receptor precursor	66	99	113	162	92	82	59	254	185	52	75
FAN protein	86	96	47	44	58	68	63	67	89	24	37
BAD protein	108	130	81	43	53	44	115	53	40	19	33
DNA fragmentation factor 45 (DFF45)	75	126	77	66	89	61	108	127	127	50	123
defender against cell death 1 (DAD1)	1872	3236	2425	2837	3349	2260	2584	2132	3003	1949	2808
DNA polymerase delta catalytic subunit	606	641	266	314	473	690	403	527	513	129	123
CDC46 homolog	829	1264	838	931	1102	708	843	682	751	308	301
DNA excision repair protein ERCC3	262	332	246	255	292	292	261	381	399	192	284
protein-tyrosine phosphatase 2C	383	538	382	513	475	601	363	474	520	66	389
3'5'-cAMP phosphodiesterase HPDE4A6	91	138	135	120	87	63	74	103	78	32	102
guanylate cyclase	15	7	4	4	6	7	12	3	4	0	1
RalGDSB	57	124	36	38	131	108	117	101	109	5	41

hint protein	3351	3316	1990	1969	5572	4854	3435	4348	4710	394	2234
FRAP-related protein	45	68	37	34	38	82	55	51	53	16	32
lymphocyte activation CD30 antigen	5	10	4	2	4	3	9	2	0	0	3
caspase-2 precursor (CASP2)	461	432	344	261	466	444	362	401	391	107	155
BCL-2 binding athanogene-1	434	487	371	320	515	722	508	533	584	266	587
rac-alpha serine/threonine kinase	167	248	212	177	197	181	188	256	220	138	221
inhibitor of apoptosis protein 3	23	61	28	31	28	36	22	30	21	21	19
DNA topoisomerase I (TOP1)	859	1184	683	645	1021	1100	1148	1442	995	529	1024
p105MCM	147	187	153	141	115	155	132	94	83	51	37
excision repair protein ERCC6	7	11	7	4	5	10	15	6	5	5	7
leukocyte antigen-related protein precursor (LAR)	832	1292	858	1021	1132	785	734	803	788	153	560
adenylate cyclase type I	115	168	63	59	53	117	102	271	166	13	30
CGS-PDE	15	18	6	2	1	3	12	2	2	0	2
oligophrenin 1	8	12	3	4	9	11	15	7	7	1	1
macMARCKS	954	1189	1063	887	1414	1318	1057	875	858	85	834
connector enhancer of KSR-like protein	35	59	20	15	15	27	43	29	25	4	12
fasL receptor	40	59	33	37	37	94	54	61	60	12	46
caspase-3 (CASP3)	980	1295	826	867	1343	1294	957	1240	1179	358	564
bcl2 homologous antagonist/killer	126	149	76	52	67	111	140	106	96	65	146
death-associated protein kinase 1	194	281	161	155	259	147	158	237	218	64	85
cytoplasmic dynein light chain 1	1454	2378	2596	2158	1836	1651	1958	2626	2251	1193	1957
DNA topoisomerase II alpha	1342	1807	1417	1414	1891	2249	1612	1794	1380	507	559
MCM7 DNA replication licensing factor	264	408	277	259	233	238	266	229	199	102	105
6-O-methylguanine-DNA methyltransferase	243	283	218	257	333	199	230	330	328	149	170
PP2A-alpha catalytic subunit	225	343	249	248	305	373	259	285	317	53	223
adenylate cyclase type II	2	9	4	2	2	2	5	0	1	0	2
neurogranin (NRGN); RC3	17	14	20	15	18	11	10	28	9	2	5
ran GTPase activating protein 1	136	173	72	61	90	69	131	140	142	10	70
14-3-3 protein sigma	680	490	723	490	905	219	538	758	514	326	676
CD40 ligand (CD40-L)	88	94	42	20	26	29	113	25	17	6	17
tumor necrosis factor receptor 1	532	533	379	325	662	591	623	766	747	277	746
caspase-4 precursor (CASP4)	217	246	263	232	201	233	173	193	188	136	90
apoptosis regulator bax	724	810	467	399	401	672	520	654	558	302	638
(P68 kinase)	366	569	324	395	435	679	393	414	478	174	245
cytochrome P450 reductase	137	261	391	301	217	188	224	254	201	188	630
proliferating cyclic nuclear antigen (PCNA)	2049	3584	3523	3778	3528	2298	2047	2601	2656	1276	2339
photolyase/blue-light receptor homolog	74	106	81	84	72	134	65	90	80	49	99
mutL protein homolog	126	131	81	69	59	112	76	72	81	33	34
beta-PR55	17	27	12	26	10	36	19	50	26	3	22
guanylate cyclase soluble alpha 2 subunit	4	11	3	9	2	4	9	4	2	0	3
recoverin	42	73	15	11	14	18	54	19	7	0	9
rap1 GTPase activating protein 1	28	51	18	20	30	28	37	28	21	2	12
GAP-associated protein	472	573	413	395	447	557	411	415	415	62	317
fas antigen ligand (FASL)	5	8	5	3	2	5	3	14	0	0	3
tumor necrosis factor receptor (TNFR)	38	79	105	75	34	37	50	89	38	28	40
caspase-6 precursor (CASP6)	23	53	104	80	25	44	30	110	35	23	47
apoptosis regulator bcl-2	7	3	3	4	1	5	4	3	1	1	0
Fas-activated serine/threonine kinase	103	168	98	91	99	87	110	141	99	57	65
cytoplasmic antiproteinase 3 (CAP3)	44	60	56	41	43	54	51	44	54	43	52
replication protein A 70-kDa subunit	175	275	207	226	190	236	224	201	174	124	134
nibrin (NBS1)	101	151	73	96	68	161	97	112	110	52	51
DNA excision repair protein ERCC5	169	187	100	98	122	98	133	126	166	69	58
alpha-PR55	205	265	155	216	253	456	246	174	339	90	137
guanylate cyclase 70-kDa subunit	3	12	2	3	5	7	9	15	2	0	2
S100 calcium-binding protein A7; psoriasin	7	13	4	6	3	10	9	15	6	0	1
rap1 GTPase-GDP dissociation stimulator 1	67	116	81	85	72	71	90	66	63	8	74
tuberlin; tuberous sclerosis 2 protein	51	55	26	24	38	57	51	35	30	7	20
tumor necrosis factor precursor	16	31	19	26	10	30	13	26	26	5	9
protein-tyrosine phosphatase zeta precursor	7	8	1	4	2	19	4	25	3	0	8
cysteine protease ICE-LAP3	128	134	82	73	60	108	92	96	71	32	57
apoptosis regulator bclw; KIAA0271; BCL2L2	46	77	35	35	28	30	47	41	35	27	42
apoptotic protease activating factor 1 (APAF1)	129	126	61	53	62	127	131	75	66	27	58
death-associated protein 3 (DAP3)	680	773	355	339	689	691	512	741	750	212	411
replication protein A 14-kDa subunit	2941	3948	2367	2285	3643	4672	2076	3302	2871	1008	1120
AP endonuclease 1	1298	1504	741	728	888	1344	886	1236	931	571	451
p58/HHR23B	872	1085	824	743	1232	633	948	1313	1324	537	706
calcineurin B subunit isoform 1	142	208	103	125	170	283	170	145	189	69	130
bone marrow stromal antigen 1 (BST-1)	6	12	5	4	9	5	9	18	7	0	15
S100 calcium-binding protein A1	168	253	212	140	158	177	255	207	161	12	65
rho GDP dissociation inhibitor 1	1759	1752	1103	934	1415	937	2404	1590	967	141	1165
TRRAP protein	581	662	338	339	514	424	602	640	552	63	378
lymphotoxin-alpha precursor (LT-alpha)	11	24	6	10	35	30	46	14	31	2	4

adenosine A1 receptor (ADORA1)	7997	10352	5353	4041	3220	5258	5208	15734	7859	2020	1917
caspase-8 precursor (CASP8)	347	319	130	150	251	301	343	276	328	77	140
apoptosis regulator bcl-x	916	1010	437	354	610	925	1143	803	798	287	574
IEX-1L anti-death protein; PRG-1; DIF-2	88	105	76	77	121	91	136	115	180	253	644
inhibitor of apoptosis protein1	10	16	11	5	4	9	3	8	6	2	2
activator 1 140-kDa subunit	151	224	98	107	99	121	139	98	143	51	47
ataxia telangiectasia (ATM)	142	148	60	57	99	130	169	115	112	33	34
DNA mismatch repair protein PMS1	149	224	164	186	147	265	175	142	175	132	122
CAM-PRP catalytic subunit	202	331	209	203	278	345	203	161	200	94	87
HCAM-1	6	8	3	6	4	20	3	5	6	0	2
interferon regulatory factor 1 (IRF1)	23	49	16	14	12	13	20	19	11	0	12
GTPase-activating protein (GAP)	58	62	41	45	32	77	44	40	51	3	24
leucine-rich repeat protein SHOC-2	92	115	92	112	87	145	83	98	122	15	134
lymphotoxin-beta (LT-beta; LTB)	6	8	4	3	3	6	2	8	4	0	3
adenosine A2A receptor (ADORA2A)	5	12	5	5	4	6	7	45	3	1	17
caspase-9 precursor (CASP9)	34	79	95	86	33	50	46	67	42	23	46
MCL-1	415	477	285	258	285	348	431	323	366	252	810
SL cytokine precursor	67	94	83	65	57	73	48	308	146	27	33
inhibitor of apoptosis protein 2	67	105	100	89	65	127	86	75	75	51	115
activator 1 40-kDa subunit	193	239	127	92	115	137	214	111	68	46	60
Ku 70-kDa subunit	595	819	452	433	552	811	606	808	738	317	419
DNA mismatch repair protein PMS2	228	175	78	81	160	185	142	246	260	49	68
PP2C-alpha	245	324	166	202	255	335	254	226	311	117	151
CAM-PDE1B	6	10	4	3	3	5	5	2	1	2	2
CRE-BP1	210	276	140	156	156	247	210	167	164	13	126
inhibitor of the RNA-activated protein kinase	41	52	30	28	23	33	38	26	25	2	33
IkkappaB kinase complex-associated protein	157	155	85	87	121	122	139	149	157	12	42
TNF-related apoptosis inducing ligand	16	16	16	14	12	13	16	18	15	0	4
adenosine A3 receptor (ADORA3)	9	26	6	5	2	8	10	3	3	1	5
caspase-10 precursor (CASP10)	1320	1712	4028	2433	628	317	1011	939	633	2088	2044
BCL-2-related protein A1 (BCL2A1)	2	16	6	3	0	8	9	0	1	1	4
cellular apoptosis susceptibility protein	2	10	3	1	1	1	0	0	3	0	1
ALG-2 calcium-binding protein	637	817	525	449	493	819	568	512	678	285	658
DNA polymerase epsilon subunit B	94	163	108	139	91	196	123	85	79	40	56
ATP-dependent DNA helicase II	502	723	424	480	385	776	402	428	483	198	272
Rad50	43	58	46	38	25	38	41	33	38	19	20
(PP-1A)	316	387	230	225	259	378	326	256	272	113	273
ephrin A4 precursor	51	47	43	33	24	9	46	21	12	17	16
NFKB3	102	129	57	63	62	92	108	87	74	10	75
cortactin; amplexin	1328	1374	997	993	1220	795	1190	1139	1429	117	1538
zyxin + zyxin-2	147	137	109	97	111	62	92	158	169	11	157
CD27 ligand (CD27LG); CD70 antigen	14	3	6	4	0	5	7	14	0	0	14
receptor interacting protein	27	48	22	27	18	37	33	30	23	7	36
interleukin-1 beta convertase precursor (IL-1BC)	4	9	4	8	5	6	7	34	2	1	4
bcl-2 interacting killer (BIK)	3	10	5	3	2	5	5	6	3	0	1
GADD153	257	323	184	261	256	293	322	251	289	120	519
DNA polymerase II subunit A	36	55	39	30	28	31	35	45	32	8	18
RFC36	190	176	111	108	105	139	113	128	113	47	49
DNA ligase I	542	705	462	537	638	485	623	543	531	188	244
DNA-repair protein complementing XP-A	20	12	6	9	9	21	15	12	8	6	7
dual-specificity protein phosphatase 2	10	8	4	2	2	5	13	5	2	0	5
DPDE3	150	209	102	152	232	258	195	124	147	64	107
STAT1	692	818	499	559	564	517	473	624	640	32	338
(PKI-alpha)	25	6	8	1	1	5	2	3	5	0	1
leukemia inhibitory factor receptor precursor	22	46	25	21	19	39	49	43	17	3	35
insulin-like growth factor I receptor (IGF1R)	120	187	104	86	107	141	150	146	142	16	109
DAXX	163	155	89	80	87	93	84	138	126	30	98
calpain 1 large (catalytic) subunit	4	5	2	3	0	2	0	2	0	0	2
NIP1 (NIP1)	29	53	33	45	21	27	27	31	29	15	28
clusterin precursor (CLU)	1199	1290	683	602	947	630	823	1066	877	242	506
MCM3 DNA replication licensing factor	304	324	182	154	124	154	192	195	199	54	56
replication factor C 38-kDa subunit	195	228	91	115	109	173	177	134	119	42	49
DNA ligase III (LIG3)	263	303	135	132	189	207	268	266	311	86	93
DNA-repair protein complementing XP-C cells	142	165	88	74	163	187	176	155	163	49	83
myotubularin	52	98	30	47	39	76	58	51	68	26	31
adenylate cyclase VII	4	20	8	1	3	4	1	6	1	0	2
STAT2	126	169	157	149	107	89	128	85	86	21	96
14-3-3n protein eta	390	473	498	422	400	645	567	554	398	22	400
junction plakoglobin (JUP)	339	358	226	197	373	163	245	417	306	18	137
retinoic acid receptor epsilon (RAR-epsilon)	36	78	28	45	13	56	10	75	49	7	19
TRADD	20	38	23	14	13	22	21	20	15	2	17
calpain 2 large (catalytic) subunit	28	30	22	20	19	28	31	28	35	11	56

NIP3 (NIP3)	551	545	600	419	373	577	464	583	761	338	413
early response protein NAK1	20	26	7	11	5	10	10	48	21	3	18
DNA polymerase alpha catalytic subunit	240	314	332	349	240	327	204	252	181	83	98
activator 1 37-kDa subunit	388	499	377	389	266	367	302	304	262	123	143
DNA ligase IV (LIG4)	42	61	49	45	28	59	45	35	61	28	42
uracil-DNA glycosylase precursor (UNG1)	1489	1428	791	769	1195	1313	1213	950	1118	265	268
DNA-repair protein XRCC1	266	244	182	133	116	208	132	181	154	67	56
GADD45	210	214	364	270	289	313	237	222	318	195	463
galanin receptor type 1	9	9	2	3	0	6	8	4	0	2	0
CHRNA2	5	12	1	1	0	3	3	5	1	0	2
low-affinity nerve growth factor receptor	6	4	4	2	2	3	6	2	1	0	2
dopamine beta-hydroxylase	10	7	2	1	2	4	2	12	7	0	4
secretogranin V	9	25	6	14	4	30	13	9	17	1	7
achaete-scute homolog 1 (ASH1)	2	12	2	1	0	3	8	0	2	0	1
myelin proteolipid protein (PLP); lipophilin	3	7	11	3	3	3	7	5	1	0	2
ataxia-telangiectasia group D-associated protein	7	8	3	1	1	4	2	1	2	0	1
KRAB-associated protein 1 (KAP1)	32	28	19	15	12	21	34	38	35	9	12
CCAAT-BINDING FACTOR (CBF).	57	53	34	28	29	61	48	59	92	24	32
E2F-3	138	161	79	108	149	163	161	162	215	46	65
CACCC-box DNA-binding protein	143	211	161	178	121	259	139	192	188	111	165
DNA-dependent protein kinase (DNA-PK)	427	470	554	385	500	530	395	334	438	252	250
muscle-specific DNase I-like precursor	31	18	31	27	24	29	14	45	36	9	27
somatostatin receptor type 2	17	19	16	21	4	16	5	31	35	3	5
serotonin-gated ion channel receptor	40	31	21	14	13	57	47	21	18	3	10
DOPA decarboxylase (DDC)	347	430	324	264	293	364	301	300	417	181	184
noradrenaline N-methyltransferase	6	8	3	3	0	5	5	3	2	0	0
neuregulin	3	16	1	1	0	3	4	3	2	1	0
brain-specific antigen PCP-4	4	9	2	0	0	0	8	2	1	0	0
peripheral myelin protein 22	57	50	54	41	31	55	61	62	55	25	28
TREB36 protein	116	114	64	59	82	76	124	159	154	34	53
transcription intermediary factor 1 (TIF1)	339	563	326	477	233	427	329	411	466	282	449
hepatic leukemia factor (HLF)	406	535	234	305	432	654	479	561	480	184	201
E2F dimerization partner 1	328	350	158	167	231	302	253	392	357	114	107
60S ribosomal protein L6 (RPL6)	8932	12472	8440	10151	8730	14167	8635	11200	10856	7930	9155
RAD52	12	12	29	6	2	4	11	8	3	2	3
melatonin receptor type 1A (MEL-1A-R)	5	5	5	5	8	1	2	3	4	0	1
prostaglandin E2	0	8	0	0	2	6	0	0	0	0	0
GABA(A) receptor	8	17	17	6	9	5	8	7	13	5	16
acetylcholinesterase precursor	11	17	6	8	2	10	14	6	3	1	5
secretogranin II precursor	6	4	3	2	1	0	4	3	2	0	0
nociceptin precursor	1	6	6	3	0	5	5	3	1	1	1
neuronatin	15	25	14	4	3	15	12	16	1	7	13
MOG	181	235	143	89	87	235	249	160	105	96	268
CCAAT transcriptionfactor gamma subunit	262	313	201	190	211	338	275	293	287	119	164
YL-1 protein	61	87	58	65	97	77	86	111	116	42	68
early growth response protein 3	3	12	2	3	0	2	12	1	1	0	0
interferon regulatory factor 2 (IRF2)	95	121	73	58	58	98	84	93	126	57	56
cellular nucleic acid binding protein	3046	2998	1636	1552	3298	3780	3169	3799	3487	868	1850
UV excision repair protein protein	661	614	739	534	734	600	474	1262	913	457	618
5-hydroxytryptamine 1A receptor	3	8	2	1	2	3	43	2	4	0	0
GRM5	4	16	3	5	1	6	7	6	3	1	3
(GABA(A) receptor)	3	9	5	1	0	2	2	2	1	0	0
choline O-acetyltransferase	6	14	3	1	2	7	12	2	0	0	1
neurotensin/neuromedin N precursor	5	6	3	1	0	4	6	0	1	0	3
leptin precursor; obesity factor; obese protein	7	9	5	6	0	7	8	2	2	0	1
roundabout 2 (ROBO2)	5	6	4	1	1	2	2	2	1	0	1
myelin basic protein (MBP)	10	0	73	1	4	5	7	6	4	1	4
(C/EBP alpha)	396	351	219	149	605	339	396	683	654	90	312
metal-regulatory transcription factor	41	70	49	52	50	69	60	64	61	39	88
(HIV-EP2)	10	19	5	4	2	7	5	8	4	2	0
LYL-1 protein	2	6	1	2	2	14	7	2	2	2	2
basic transcription factor 2 44-kDa subunit	483	641	285	322	535	628	627	626	555	214	273
ubiquitin-conjugating enzyme E2 17-kDa	428	483	313	255	365	507	412	385	335	176	371
serotonin receptor type 2	3	12	0	3	0	4	5	2	0	1	0
orexin receptor 2	5	12	6	3	2	5	10	1	1	1	0
GABA-B receptor 1A subunit (GABA-BR1A)	4	4	5	2	1	5	6	0	0	0	1
glutamate decarboxylase 67-kDa isoform	5	9	4	3	1	2	4	2	4	1	0
neuromedin B precursor	28	27	24	19	21	26	16	31	31	18	23
neuronal pentraxin II precursor (NP2)	14	6	13	2	1	3	1	0	0	0	0
veli-1	30	48	41	24	27	30	36	34	25	20	20
neuroglycan C precursor	3	9	6	3	5	5	6	8	5	2	1
hepatocyte nuclear factor 4 (HNF4)	740	967	663	617	1024	998	802	1427	1891	652	883

(MITF)	4	6	2	6	1	7	6	7	2	2	1
ets-related gene transforming protein (ERG1)	7	11	10	13	2	7	6	11	9	0	2
nuclear factor NF-kappa-B p100 subunit	39	48	28	28	20	61	53	64	39	32	51
estrogen receptor hSNF2b	1282	1462	861	811	1335	1462	1415	1632	1685	564	1014
translin; recombination hotspot binding protein	464	605	455	418	380	434	419	471	568	330	289
mu-type opioid receptor (MOR-1)	12	15	4	2	2	10	13	1	2	1	0
P2X purinoceptor 1; ATP receptor P2X1	3	6	7	4	1	2	3	3	2	2	3
GABA-B receptor 2 subunit (GABA-BR2)	3	10	2	3	0	4	7	4	1	2	2
glutamate decarboxylase 65-kDa isoform	33	51	44	45	19	29	27	62	43	7	17
preprotachykinin beta	7	9	2	0	1	4	4	6	0	0	1
survival of motor neuron (hSMN)	303	397	207	195	244	573	324	432	483	208	330
43-kDa postsynaptic protein	1	8	3	2	1	6	6	6	0	0	0
parkin	1	8	4	1	2	11	4	2	1	0	1
TIS11B protein; EGF response factor 1	224	338	220	196	235	335	295	323	416	341	512
transcription repressor protein PRDI-BF1	7	14	4	3	0	1	8	5	3	1	1
transcription factor GATA-4	89	92	49	45	68	47	65	120	99	34	40
octamer-binding transcription factor 1	98	101	65	55	71	144	116	124	125	42	68
transcriptional repressor NF-X1	182	217	130	135	103	220	215	185	199	104	162
recA-like protein HsRad51	203	223	196	182	213	211	150	166	146	89	66
nociceptin receptor	9	10	15	7	2	10	5	9	6	1	2
P2X purinoceptor 3	1	4	5	1	1	6	1	1	0	0	0
glutamate receptor 5 precursor	3	6	4	2	1	4	3	3	0	1	0
neuroendocrine convertase 1 precursor	8	11	2	3	1	3	3	2	2	2	1
proenkephalin A precursor	16	24	2	2	2	2	13	4	3	0	2
lissencephalin X; doublecortin (DCX)	13	23	16	5	3	8	17	8	3	1	5
synaptosomal-associated protein 25	10	17	3	7	4	10	5	6	3	1	2
Huntington's disease protein (HD protein)	52	67	45	31	41	59	66	65	53	31	28
HIV-1 TATA element modulatory factor	122	185	117	107	125	290	146	168	158	104	154
PCAF-associated factor 65 beta	122	138	75	79	132	184	139	193	158	62	106
glucocorticoid receptor repression factor 1	170	202	259	204	157	259	169	253	148	172	277
pre-B-cell leukemia transcription factor-1	5	11	5	2	2	3	9	2	3	1	2
cAMP-responsive element-binding protein	5	9	10	3	2	8	7	3	2	3	8
V(D)J recombination activating protein 1	3	9	4	2	2	0	4	0	2	0	1
prostaglandin E2 receptor EP3 subtype	9	5	17	2	2	2	5	0	1	0	1
(GABA(A) receptor)	7	4	16	3	1	2	0	1	1	1	1
neuronal acetylcholine receptor	5	9	4	2	1	3	1	1	2	0	0
neuroendocrine convertase 2 precursor	19	8	53	11	9	13	10	22	12	3	4
beta-neoendorphin-dynorphin precursor	129	13	104	6	5	10	13	8	5	7	4
roundabout 1 (ROBO1)	254	439	326	344	307	472	380	330	275	240	205
synaptophysin (SYP)	2	11	4	2	0	6	9	9	1	0	2
major prion protein precursor	639	682	674	562	598	1115	808	1027	901	590	1018
hypoxia-inducible factor 1 alpha	191	247	194	180	189	383	283	222	222	173	244
PCAF-associated factor 65 alpha	37	55	23	30	28	32	38	44	39	17	17
homeobox protein HOX-A5; HOX-1C	97	119	57	50	42	86	98	144	122	29	38
endothelial transcription factor GATA2	139	145	133	106	116	185	137	152	143	67	116
GA-binding protein alpha subunit	115	92	76	96	116	239	119	119	114	57	72
V(D)J recombination activating protein 2	1	5	1	2	1	2	3	1	0	0	1
substance-P receptor (SPR)	11	18	4	10	7	3	14	7	4	1	3
(GABA(A) receptor)	3	2	3	3	0	5	8	2	1	1	0
(CHRN4; NACHRB4)	8	31	5	21	10	39	11	32	46	1	14
(COMT)	2330	2616	1257	1116	2535	1701	2114	3508	3043	1386	1659
acyl-CoA-binding protein (ACBP)	6912	7517	5991	6197	9297	8684	6265	9843	11247	4423	5873
CASK	51	67	36	36	39	91	62	72	73	33	42
presynaptic density protein 95 (PSD95)	9	23	5	12	7	14	6	20	19	8	10
Alzheimer's disease amyloid A4 protein	190	218	162	126	173	289	178	213	225	127	182
jun activation domain binding protein	295	414	176	183	179	409	322	301	383	177	219
SPT3-like protein	108	103	104	79	74	128	90	63	67	73	55
interferon regulatory factor 7 (IRF-7)	6	21	7	5	3	5	4	9	6	1	1
GC-box binding protein 2	48	70	26	22	16	38	54	40	24	11	28
GA-binding protein beta-2 subunit	248	258	203	175	279	417	282	392	309	129	121
telomerase reverse transcriptase (hTRT)	3	11	10	6	10	8	14	9	6	5	2
substance-K receptor (SKR)	7	13	6	4	3	7	9	5	6	7	3
glutamate receptor 1 precursor	3	4	3	2	2	1	6	3	2	0	0
NMDAR2B	4	8	2	2	33	3	5	4	8	1	1
tryptophan 5-monooxygenase	17	15	26	21	14	13	12	10	9	6	7
nerve growth factor 2 (NGF-2)	1180	1655	1507	1419	2025	1041	1351	2550	2410	1077	1244
neuromodulin	11	7	11	4	5	9	12	10	8	3	4
synapsin IIIA	22	25	21	14	11	20	27	8	10	8	8
atrophin-1	87	95	53	42	86	73	94	140	125	29	46
ets domain protein elk-3	22	24	27	18	12	25	11	26	21	19	40
ADA3-like protein	171	203	184	155	153	161	146	275	260	141	161
interleukin enhancer binding factor 3 (ILF3)	455	407	191	163	421	502	473	603	475	136	268

basic transcription factor 62-kDa subunit	26	31	22	17	19	27	19	39	39	21	27
transcription factor AREB6	16	13	6	16	12	26	5	17	19	10	13
TRF1-interacting tankyrase	145	119	58	51	149	98	160	136	160	43	46
neuromedin K receptor (NKR)	7	6	4	4	2	6	7	3	6	0	1
glutamate receptor 2 precursor	2	5	3	1	3	7	10	3	1	1	0
NMDAR2C; NR2C	5	10	3	4	15	7	10	5	5	3	0
monoamine oxidase (MAO-A)	511	593	493	496	573	794	478	610	520	360	227
neurotrophin-4 (NT-4)	66	77	35	27	27	53	85	46	23	11	18
axonin-1 precursor	4	10	5	30	2	7	6	3	3	3	1
CHAPSYN 110	4	9	15	3	2	4	6	6	2	0	0
HU-antigen D	4	16	19	16	5	9	7	19	5	5	8
retinoblastoma-binding protein 7	647	898	527	574	598	1056	672	781	887	377	361
ADA2-like protein	126	129	99	106	90	160	109	110	123	64	62
RBP2 retinoblastoma binding protein	102	93	44	33	73	64	74	104	103	26	45
DNA-binding protein inhibitor Id-2	1425	2283	1889	1424	1019	1084	1192	1785	1742	1641	3024
transcription factor ZFM1	893	765	386	403	558	663	905	738	584	362	591
delta lactoferrin	6	3	29	1	2	4	7	1	2	0	0
neuropeptide Y receptor type 1	5	6	4	3	2	7	9	2	1	1	0
strychnine binding subunit	1	2	4	0	2	4	2	2	2	0	1
P2X purinoceptor 5 (P2X5)	21	19	8	5	85	5	74	6	84	2	1
histidine decarboxylase (HDC)	87	129	154	133	67	98	89	195	156	75	71
neuropeptide Y precursor (NPY)	6	2	3	3	4	6	6	3	1	3	1
glia maturation factor beta (GMF-beta)	294	422	251	310	246	418	346	327	320	168	177
amphiphysin (AMPH)	4	10	2	0	1	2	4	4	0	1	1
Machado-Joseph disease protein 1	52	55	52	39	38	74	45	63	47	37	33
BRCA1-associated ring domain protein	21	14	11	3	9	11	18	16	9	8	6
B-cell lymphoma 3-encoded protein (bcl-3)	7	9	5	5	4	8	9	12	10	8	14
BRCA1-associated ring domain protein	71	76	47	53	33	65	43	49	35	27	15
DNA-binding protein SMBP-2	45	56	36	39	29	56	46	58	47	35	54
ZFM1 protein alternatively spliced product	331	518	243	244	186	287	372	299	251	152	134
deoxyribonuclease I (DNase I)	9	10	5	4	3	10	16	6	3	3	4
metabotropic glutamate receptor 1	4	5	3	2	2	0	6	2	3	2	2
glycine receptor beta subunit precursor	3	12	4	2	11	0	5	1	2	1	1
P2X purinoceptor 6 (P2X6)	38	67	99	97	66	60	52	196	123	35	32
phenylalanine-4-hydroxylase (PAH)	742	1131	923	805	820	669	908	771	724	636	288
5-hydroxytryptamine 1D receptor	11	15	16	18	9	12	4	10	10	8	29
MAPKK7	74	62	60	38	75	60	86	133	66	32	44
neurexin III alpha	3	11	6	2	0	2	6	4	1	1	2
Kallmann syndrome protein precursor	3	11	3	2	2	4	0	2	1	1	0
serum response factor (SRF)	75	72	35	18	37	43	82	59	56	28	34
B-cell lymphoma 6 protein (bcl-6)	45	78	45	41	28	38	49	52	50	48	45
transcriptional repressor CTCF	73	111	110	95	77	82	96	85	58	56	37
global transcription activator SNF2L1	486	600	467	599	392	655	408	459	538	485	256
transcription factor RZR-alpha	24	37	18	24	17	30	13	23	28	34	22
deoxyribonuclease II (DNase II)	230	353	270	326	264	272	216	382	351	161	144
D2 dopamine receptor (DRD2)	4	7	7	4	1	10	5	2	2	1	1
cholinergic receptor (CHRNA3)	4	9	1	12	4	2	5	4	2	2	3
leptin receptor precursor	6	3	8	3	8	10	16	6	5	3	8
tyrosine 3-monooxygenase isozymes	4	17	3	2	1	2	7	4	3	0	3
glial cell line-derived neurotrophic factor precursor	2	3	6	2	16	0	13	4	2	1	0
myelin-associated glycoprotein precursor (MAG)	0	11	4	1	1	4	7	3	0	2	2
synapse-associated protein 97 (SAP97)	105	137	121	132	100	160	109	103	95	80	58
FCMD; fukutin	43	27	49	51	43	64	54	57	68	25	25
PC4	3327	3917	3142	3798	3012	5558	2808	3349	3892	2163	1623
ATF-3 (ACTIVATING FACTOR 3)	8	6	5	4	9	14	11	6	4	3	11
PRB-binding protein E2F1	589	493	222	192	286	258	448	337	203	114	119
ICSBP	3	6	2	3	0	1	7	1	0	0	0
paired box homeotic protein	2	6	1	2	2	5	14	6	0	0	1
octamer binding transcription factor 1	36	58	17	14	17	27	57	21	13	10	13
transcription factor TFIIIB	88	123	76	85	104	94	100	99	130	64	93
transcription factor NF-ATc	50	96	37	48	38	58	46	143	78	19	18
ets transcription factor	13	11	19	15	14	21	15	14	17	7	7
CCAAT displacement protein	37	49	38	40	67	53	50	82	58	27	31
Ini1	861	951	946	871	750	708	746	894	975	660	542
osteoblast specific factor 2	12	6	5	2	1	5	1	5	1	2	0
leukosialin precursor	10	5	8	2	2	5	7	7	9	1	3
integrin beta 5 subunit precursor	98	71	48	44	38	51	83	80	54	38	61
beta catenin (CTNNB)	668	505	278	236	281	587	454	571	560	160	170
CD114 antigen	24	40	29	23	19	28	21	17	23	15	6
IL-2 receptor alpha subunit	2111	3097	4233	3393	1250	2123	2152	2251	1706	2265	1906
interleukin-12 receptor precursor	6	6	4	2	0	3	9	3	1	1	2
(GADD45 gamma)	47	74	53	37	33	39	70	49	46	42	79

nuclear factor I (NFI); NFI-X	182	211	136	167	218	132	129	191	131	81	46
transcription factor HTF4	162	208	194	184	183	378	181	199	138	125	155
R kappa B DNA-binding protein	478	377	189	144	211	308	291	408	341	153	161
TRAF-interacting protein (I-TRAF)	47	74	55	71	67	106	69	65	53	50	81
cAMP-dependent transcription factor ATF-4	2435	3128	3835	3432	4466	3237	3965	2870	2532	3303	4454
(DNA metase; MCMT)	9	10	8	4	4	9	8	10	2	2	2
cadherin 3 (CDH3)	2	8	4	4	1	1	7	1	1	0	1
corneodesmosin precursor	3	7	4	2	1	9	6	5	2	0	0
integrin alpha 4 precursor	223	249	98	76	78	221	188	164	77	51	79
semaphorin; CD100	5	7	5	0	1	0	8	47	1	0	34
C5a anaphylatoxin receptor	6	12	6	4	2	7	4	7	1	1	3
IL-6R-alpha	187	213	91	133	332	358	396	467	409	152	475
(IL-1R2)	10	15	12	12	8	10	13	9	15	8	1
(GADD45 beta)	3	10	3	1	3	3	7	1	4	3	4
RNA polymerase II elongation factor	233	235	156	177	266	271	226	264	215	118	156
transcription elongation factor SII	499	403	383	321	481	490	416	544	460	225	272
transcription factor 11 (TCF11)	442	382	186	136	237	330	382	380	360	164	149
TAFII31; TAF2G	504	607	427	496	475	704	629	525	603	318	335
heat shock transcription factor 1	607	557	363	317	510	578	715	577	673	355	446
DNA-binding protein A	441	503	358	325	532	307	450	588	727	297	410
cadherin 5 (CDH5)	7	3	2	3	1	2	4	3	3	1	0
(V-CAM 1)	4	8	5	2	1	2	4	4	0	0	3
CD18 antigen	11	18	8	14	12	7	11	9	14	20	17
T-cell surface glycoprotein T4/leu-3	59	58	36	43	21	67	41	111	67	14	23
neuromedin B receptor	338	343	106	103	117	285	324	146	66	65	44
(IFN-alpha receptor; IFNAR)	22	31	19	18	19	45	15	34	31	17	26
IL-8 receptor type 1	2	11	4	0	0	5	7	2	0	0	2
UK114 antigen homolog	179	224	167	194	129	237	165	183	204	119	155
homeobox protein HOXB7	23	9	28	14	27	9	41	17	20	9	3
NSEP	7253	7841	7002	7845	10400	4016	6834	7900	8944	5298	5701
nuclear factor NF45	279	356	179	144	145	176	183	176	197	77	50
helix-loop-helix DNA-binding protein	25	45	36	27	31	30	40	48	36	14	8
transcriptional activator hSNF2-alpha	397	441	428	353	370	198	339	282	262	253	173
telomeric repeat binding factor 1	87	114	86	102	77	119	88	74	102	52	44
cadherin 11 precursor	3	1	1	2	1	8	9	0	2	1	0
E-selectin precursor	7	9	4	3	2	3	8	2	0	1	0
CD41 antigen	8	15	7	6	1	7	5	6	2	2	1
B-lymphocyte surface antigen B4	58	89	49	48	25	36	51	86	58	15	20
Duffy blood group antigen	3	7	4	1	0	3	6	3	2	0	0
IL-2 receptor beta	3	7	3	1	0	3	8	2	0	0	1
androgen receptor (AR)	1	7	2	3	7	4	8	4	1	0	0
beta-defensin 2 precursor	2	8	3	0	0	3	4	3	1	0	0
transcription factor E2-alpha	242	327	312	333	271	471	311	310	252	250	389
(IFN-alpha) responsive transcription factor subunit	29	54	63	47	49	51	54	51	42	49	93
nuclear factor NF90	82	90	61	61	73	86	65	113	117	39	43
C-ets-2	42	21	48	22	43	23	36	41	56	31	26
putative transcription activator DB1	448	514	412	417	404	259	385	512	528	277	297
TTAGGG repeat binding factor 2	412	325	227	185	427	515	370	530	492	152	187
muscle cadherin precursor (M-cadherin)	5	8	7	0	2	8	7	11	1	0	4
cell adhesion protein SQM1	1249	1925	1135	1238	1138	1269	1026	5575	3450	548	641
integrin beta 6 precursor (ITGB6)	1	11	6	3	1	6	11	6	1	2	1
myeloid cell surface CD33 antigen precursor	5	8	3	1	3	5	7	2	2	0	1
(MCP-1RA)	8	28	24	18	5	7	9	1	3	12	0
IL-3R-alpha	9	14	5	4	2	9	11	5	1	1	1
angiotensin II type 1A receptor	6	10	2	3	1	3	4	2	1	1	1
defensin 6 precursor	1	5	6	0	0	2	3	2	0	0	1
transcription initiation factor IID	20	43	31	26	23	29	39	33	38	25	34
homeobox 2.1 protein	8	12	7	6	5	8	9	17	11	2	2
homeobox A1 protein	23	39	130	74	39	45	25	62	37	59	89
raf-responsive zinc finger protein	65	60	70	41	64	32	67	70	63	52	56
DNA-binding protein TAXREB302	187	261	122	122	108	223	181	103	76	69	64
polyadenylate binding protein-interacting protein	632	668	637	547	455	914	499	522	624	366	288
cadherin 8 (CDH8)	10	18	5	9	2	6	9	8	3	0	2
neural-cadherin precursor	9	14	15	16	11	18	13	13	4	3	2
integrin alpha 3 (ITGA3)	8	15	7	5	2	13	10	9	5	0	3
polycystin precursor	61	72	48	39	43	63	57	66	64	30	29
keratinocyte growth factor receptor	21	21	11	4	2	9	31	17	4	3	3
IL-4R-alpha	36	46	28	22	30	20	46	41	53	27	55
follicle stimulating hormone receptor	7	7	11	10	1	6	4	9	3	1	2
cytochrome P450 1A2	68	64	43	20	18	10	90	26	19	10	16
octamer-binding transcription factor 2	4	5	6	1	3	6	6	3	3	1	1

fli-1 oncogene; ergB transcription factor	9	20	5	4	2	5	8	2	1	1	1
homeobox protein hLim1; LHX1	17	19	17	11	14	21	11	31	21	7	5
orphan hormone nuclear receptor	7	19	6	2	5	5	4	5	5	6	2
zinc finger protein 91 (ZNF92)	306	421	246	323	219	207	306	242	214	190	135
RPD3 protein	717	497	287	216	442	334	532	474	542	195	148
intercellular adhesion molecule 2 precursor	17	27	19	10	4	6	7	6	6	7	3
B-cell differentiation CD72 antigen	4	10	3	1	0	4	14	0	0	1	0
leukocyte adhesion glycoprotein p150	7	10	5	3	1	10	8	20	4	2	5
ciliary neurotropic factor receptor	3	5	6	1	0	3	4	3	0	1	2
actinin type I receptor	63	95	69	69	55	92	83	83	70	66	70
IL-5R-alpha	137	158	66	64	72	157	148	73	57	41	40
calcitonin receptor	7	2	4	1	1	7	9	2	3	0	1
cytochrome P450 IVB1	4	2	3	2	1	5	6	5	0	0	1
transcription factor AP-2	4	7	7	2	1	3	7	4	1	1	2
paired box protein PAX-5	309	424	187	186	190	317	261	171	121	94	91
T-cell specific transcription factor GATA3	8	25	8	26	11	32	11	15	21	5	8
NF-kappaB	136	126	140	94	139	103	167	139	108	80	53
adenylate cyclase-stimulating G alpha protein	3402	4255	3414	3499	5307	2868	3230	6103	5078	2972	3470
high mobility group protein	1933	1863	785	774	1279	1346	1440	1857	1728	787	581
integrin alpha E precursor	11	16	8	4	5	11	11	8	6	3	12
CD44 antigen hematopoietic form precursor	4	11	4	4	0	8	4	0	1	0	2
fibronectin receptor alpha subunit	5	13	3	4	3	4	6	0	2	3	2
erythropoietin receptor (EPOR)	12	16	7	3	0	7	3	5	0	2	1
GM-CSFR-alpha	33	28	23	13	4	13	22	47	26	3	8
(IFN-alpha-R)	37	61	48	44	29	67	49	39	41	28	36
beta-2 adrenergic receptor	4	13	2	2	1	1	3	4	2	2	2
soluble epoxide hydrolase	59	51	39	32	27	34	52	36	35	21	15
mitochondrial transcription factor 1	494	750	736	850	635	998	601	697	485	680	516
special AT-rich sequence binding protein 1	835	1359	3112	2761	1753	1289	1296	2243	1295	2115	1930
transcription factor Sp1 (TSFP1)	163	205	103	117	127	147	131	153	132	71	51
zinc-finger DNA-binding protein	55	115	114	135	124	139	109	88	79	74	103
stem cell protein (SCL)	8	15	14	6	3	7	5	9	6	3	5
procollagen alpha subunit precursor	7	19	15	17	4	13	36	16	5	4	3
integrin beta 8 precursor (ITGB8)	22	26	45	21	4	22	12	20	20	9	7
neural cell adhesion molecule L1 precursor	0	4	2	2	0	17	12	6	2	0	5
fibronectin receptor beta subunit	1501	1632	1419	1384	1199	1854	1383	1374	1212	1085	1263
platelet-activating factor receptor	2	5	1	3	1	4	4	1	1	1	2
CDW40 antigen	14	13	16	15	4	16	10	16	15	9	9
interleukin-2 receptor gamma subunit	8	17	4	6	1	16	8	14	3	0	1
alpha 1A adrenergic receptor	3	13	4	9	1	4	2	5	2	3	1
dimethylaniline monooxygenase	5	4	3	2	0	3	4	3	1	1	0
early growth response protein 1	83	158	702	581	245	149	104	896	549	441	1034
MSX-1 homeobox protein; HOX7	494	597	484	549	598	1255	951	815	806	801	1210
I-rel (RELB)	5	10	3	1	3	8	4	2	3	3	3
26S protease regulatory subunit 6A	1217	1410	905	1070	1189	832	1095	1280	1096	666	616
neural retina-specific leucine zipper protein	29	43	22	29	43	52	53	62	50	14	23
bystin	55	73	31	26	42	42	48	68	52	23	27
thrombospondin 2 precursor	64	75	73	68	47	56	62	251	80	31	33
contactin precursor	3	7	4	5	1	1	1	3	2	2	0
integrin alpha 6 precursor	317	434	198	233	216	304	303	396	316	167	140
endothelin receptor type A	2	6	1	1	2	3	3	5	1	4	0
corticotropin releasing factor	257	500	534	518	229	298	268	1596	693	239	235
interferon-gamma receptor	190	244	231	196	153	180	215	157	162	152	206
protoheme ferro-lyase; heme synthetase	88	94	41	55	138	140	263	237	213	52	60
glutathione reductase (GRase; GSR; GR)	300	289	187	201	269	519	561	562	540	254	293
transcription factor ETR101	197	206	187	142	182	152	167	240	240	247	330
PAX3/forkhead transcription factor fusion	291	324	199	211	308	222	209	221	298	164	121
Sp2 protein	72	74	59	55	81	48	74	96	50	38	35
DNA-binding protein alpha (PURA)	226	198	158	134	263	205	187	346	313	97	132
tristetraproline (TTP)	15	40	15	19	18	27	18	26	34	41	54
dominant polycystic kidney disease II	12	28	11	12	12	31	12	20	18	7	12
bone proteoglycan II precursor	2	6	3	4	0	1	1	1	2	0	1
(NCAM120); CD56 antigen	6	5	3	2	8	4	6	4	1	0	1
integrin beta 4 (ITGB4); CD104 antigen	28	37	35	30	21	19	11	55	28	17	10
endothelin receptor type B	7	6	4	4	1	6	6	8	4	2	1
cytokine receptor EBI3	7	9	3	4	0	7	6	2	3	1	1
interleukin-9 receptor precursor (IL-9R)	7	4	3	0	1	5	6	3	3	0	2
(microsomal GSTII)	811	1055	818	813	991	1053	1125	893	911	638	645
(GST12; MGST1)	700	762	471	496	467	891	997	804	906	448	343
transcriptional enhancer factor (TEF1)	112	132	62	80	133	175	126	131	134	39	47
transcription factor IIC box B-binding subunit	17	49	12	17	14	29	35	36	28	9	11
Sp3 protein	209	211	148	174	193	227	187	203	238	127	101

cell cycle gene 1 protein (CCG1)	42	58	37	31	37	28	37	54	55	25	20
nucleobindin precursor (NUC)	1063	1542	706	834	1073	930	1295	1153	934	864	858
tastin	9	18	27	28	19	20	20	25	20	12	16
vitronectin receptor alpha subunit	210	317	159	223	173	284	227	197	186	145	150
desmoglein 2 precursor (DSG2); HDGC	89	103	72	77	74	84	79	94	103	72	70
integrin alpha 1 (ITGA1)	69	63	52	55	67	92	72	63	64	27	14
insulin receptor precursor (INSR)	772	759	507	460	705	665	808	1309	1165	279	306
CC chemokine receptor type 2	9	6	5	4	0	2	7	5	3	1	0
interleukin 10 receptor (IL-10R)	4	15	2	1	3	2	5	0	3	2	1
selenium-binding protein	22	41	35	34	13	19	33	60	33	15	14
glutathione S-transferase pi (GSTP1; GST3)	8	12	11	6	2	11	9	9	3	2	2
homeobox protein HOX-11	4	12	3	1	2	8	3	1	3	4	5
nuclear respiratory factor 1	67	62	41	38	62	57	82	85	55	27	31
homeobox protein HOX-D3; HOX-4A	22	49	83	75	34	38	36	108	67	23	31
CCAAT-binding transcription factor subunit B	555	582	589	579	510	715	588	468	450	301	244
neu differentiation factor	6	11	2	2	2	10	4	1	2	2	1
trophinin	16	23	13	14	4	7	8	10	15	14	9
alpha1 catenin (CTNNA1)	2370	3404	2781	3765	4563	2985	2195	3904	4379	2558	3247
platelet membrane glycoprotein IIIa precursor	8	7	3	3	2	7	3	4	3	4	1
integrin alpha 7B precursor (IGA7B)	154	145	61	105	67	168	147	104	85	32	33
platelet-derived growth factor receptor beta subunit	23	20	23	21	10	24	12	46	26	9	11
N-sam	2977	2716	1391	1298	1526	2482	1981	2602	2240	685	648
interferon gamma receptor (IFNGR)	22	17	18	6	4	36	19	61	28	1	3
microsomal stress 70 protein	149	128	76	65	136	177	179	173	243	50	83
glutathione S-transferase theta 1 (GSTT1)	1235	987	1146	855	727	831	853	1008	1059	509	454
transcriptional repressor protein yin & yang 1	2823	2954	2641	2491	2322	4129	2091	3630	2851	1425	1713
FUSE binding protein	627	693	571	609	647	541	499	525	550	368	336
transcription factor TFIIIB 90 kDa subunit	222	283	202	218	214	324	221	891	555	88	118
DNA-binding protein HIP116	143	176	70	83	70	86	152	63	67	54	33
transcription factor LSF	102	157	57	76	82	79	112	90	95	44	40
Herpes virus entry protein C (HVEC)	94	90	49	55	80	62	73	133	123	23	32
intercellular adhesion molecule-1 precursor	421	618	446	451	298	295	349	445	444	650	911
CR3A	6	5	6	5	1	8	3	2	3	3	3
LFA-1 alpha subunit precursor	1534	2221	9338	5709	1131	1113	1570	1637	1112	5499	4792
hyaluronate-binding protein	1	11	7	4	0	5	1	3	1	2	3
interleukin-7 receptor alpha subunit precursor	5	0	1	4	1	5	6	5	0	0	3
interleukin-1 receptor type I precursor	371	403	289	275	315	509	389	619	519	266	582
thiosulfate sulfurtransferase; rhodanese	39	40	18	15	25	24	54	47	36	14	41
heme oxygenase 1 (HO1); HSOXYGR	1282	829	612	485	945	2730	1863	1529	1307	479	2020
heme oxygenase 2 (HO2)	520	463	96	92	146	420	275	348	451	78	90
quinone oxidoreductase	345	328	252	273	297	490	323	360	499	229	271
MPV17 protein	58	71	96	82	83	48	61	79	68	52	69
bone morphogenetic protein 4	1421	1895	1133	1329	1555	1681	1431	1968	1739	1061	1211
thrombomodulin precursor	5	8	6	11	5	8	7	20	15	4	5
insulin-like growth factor binding protein 1	381	353	782	357	509	726	336	219	444	2485	2848
teratocarcinoma-derived growth factor 1	211	396	1348	791	113	313	248	226	156	289	468
insulin-like growth factor IA precursor	20	48	31	45	15	81	8	54	34	9	16
glycoprotein hormone alpha subunit precursor	2	8	0	1	0	4	4	0	4	2	1
interferon-beta	54	81	29	18	17	33	81	33	7	10	21
folistatin-related protein precursor	12	14	4	6	3	12	12	7	9	1	2
proteasome component C2	1229	1706	1143	1586	1257	1645	1386	1475	2035	1064	1194
25-kDa trypsin inhibitor	7	12	11	5	0	3	7	1	1	1	0
plasminogen precursor (PLG)	17	24	15	14	7	13	8	12	5	8	3
heat shock cognate 71-kDa protein	6154	9583	6262	7614	8570	17170	13234	9268	7796	6716	4176
heat-shock protein 40 (HSP40)	259	287	168	127	237	319	359	256	206	104	171
alpha-1-acid glycoprotein 1 precursor	8527	12923	10162	13690	13807	9716	8075	10182	10712	9847	7041
bone morphogenetic protein 5 precursor	12	18	7	8	5	10	12	16	4	4	8
FMLP-related receptor I (FMLPRII)	5	4	1	1	4	9	10	7	8	3	48
vascular endothelial growth factor precursor	843	901	736	736	762	1230	1054	972	1672	2197	1582
endothelial-monocyte activating polypeptide II	1722	1879	755	1255	1693	2265	1484	2806	2477	714	1107
delta-like protein precursor (DLK)	734	1089	851	1088	696	780	801	1129	937	1072	1026
alpha calcitonin precursor	4	7	0	1	0	1	11	1	3	0	1
interferon-alpha2 precursor	4	9	12	6	2	10	8	3	7	0	1
complement component 5 (C5)	20	36	24	24	18	28	17	23	16	9	17
proteasome component C3	1114	1413	881	1074	923	1535	1179	1256	1787	850	797
matrix metalloproteinase 1 (MMP1)	6	9	4	3	2	7	14	9	6	2	4
protein C inhibitor (PROCI; PCI)	2108	2001	1421	1149	1675	1224	1373	1400	1634	583	457
heat shock 70-kDa protein 6	6	12	5	8	7	14	10	8	5	14	12
HSPD1	5258	4940	2999	2696	5189	6673	5618	5617	5413	2113	2320
alpha-1-antichymotrypsin precursor	385	444	395	281	181	327	324	219	141	244	143
bone morphogenetic protein 6 precursor	10	8	6	6	5	5	8	14	3	5	11

(CSF-1; MCSF)	890	1264	358	506	392	1536	931	669	412	335	359
heparin-binding growth factor 8 (HBGF-8)	6	9	6	13	3	10	6	10	7	4	5
FLT4 ligand	6	17	5	5	1	4	8	10	5	1	5
(MIP1-beta)	5	14	15	6	1	0	2	5	1	2	15
parathyroid hormone-related protein precursor	8	17	2	4	1	7	8	6	2	2	4
interleukin-10 precursor (IL-10)	301	327	345	218	123	361	352	176	126	94	136
puromycin-sensitive aminopeptidase (PSA)	230	334	245	332	220	385	256	232	276	216	180
proteasome component C5	1600	2268	1459	2011	1107	2645	1509	1590	1927	1405	1504
matrix metalloproteinase 2 (MMP2)	5	11	4	3	3	7	14	4	5	1	2
endothelial plasminogen activator inhibitor-1	9	10	2	1	2	5	4	3	2	0	1
heat shock-related 70-kDa protein 2	9	20	5	6	14	24	65	64	18	7	27
heat shock 90-kDa protein A	10090	11754	6572	8486	10937	13775	12334	17200	18647	6712	8709
B94 protein	30	28	6	11	4	12	12	15	5	8	6
bone morphogenetic protein 8	16	26	3	5	6	10	10	7	5	5	4
hepatocyte growth factor activator	109	128	78	74	92	107	111	136	125	90	121
T-cell-secreted protein I-309 precursor	6	5	3	3	2	8	3	5	1	2	5
interferon gamma-induced protein precursor	5	15	2	2	0	52	4	684	1	2	243
ribonuclease/angiogenin inhibitor	713	755	354	458	466	492	433	861	833	448	464
interleukin-16 (IL-16)	3	16	3	3	1	5	0	0	3	1	4
interleukin-13 precursor (IL-13); NC30	39	105	114	163	34	77	40	138	143	43	99
heregulin-beta3	19	10	8	10	11	11	16	10	10	7	13
proteasome component C8	1104	1301	873	922	770	1648	1147	1367	1531	680	887
matrix metalloproteinase 3 (MMP3)	6	11	6	3	2	4	2	6	4	4	11
placental plasminogen activator inhibitor 2	6	11	5	3	0	2	9	2	2	2	1
glutathione peroxidase (GSHPX1; GPX1)	152	255	403	403	332	166	194	321	177	307	153
27-kDa heat-shock protein (HSP27)	3430	4933	3356	3685	4386	5048	2712	4442	3952	2029	2397
C-reactive protein precursor	17	14	5	8	4	10	19	11	4	6	3
bone-derived growth factor 1 (BPGF1)	8	14	3	6	1	7	6	4	2	14	3
hepatoma-derived growth factor (HDGF)	1616	1758	767	923	1257	1549	1320	1993	1778	565	945
stem cell factor precursor (SCF)	352	473	189	268	278	403	225	231	240	88	59
migration inhibitory factor-related protein 14	11	10	4	12	5	28	5	13	11	1	11
erythroid differentiation protein	7	10	3	4	0	7	2	5	3	1	2
interleukin-18 precursor (IL-18)	38	83	83	93	65	38	57	118	97	67	65
interleukin-14 precursor (IL-14)	64	66	43	32	33	30	66	70	56	26	41
alpha-1-antitrypsin precursor	30319	36182	33651	32678	24331	22614	25619	33324	34414	26790	39600
proteasome component C9	223	170	235	263	126	138	166	117	181	170	215
matrix metalloproteinase 7 (MMP7)	16	7	12	3	1	4	6	6	10	3	6
metalloproteinase inhibitor 1 precursor (TIMP1)	942	772	550	477	318	567	475	1182	996	219	607
glutathione peroxidase-gastrointestinal	1611	2600	2140	2225	1662	3051	1983	2979	2384	2567	1039
70-kDa heat shock protein 1	254	482	287	240	483	1669	1965	952	585	395	622
eosinophil granule major basic protein precursor	56	42	24	22	22	17	73	20	14	10	22
insulin-like growth factor II	6510	5688	3763	2367	4771	5203	4403	5401	6585	3579	3082
endothelin 3 (EDN3; ET3)	11	10	8	2	2	6	7	4	3	3	3
heparin-binding EGF-like growth factor	11	11	3	3	1	11	7	8	3	2	4
migration inhibitory factor-related protein 8	4	8	5	1	1	3	10	4	0	0	1
angiotensin-converting enzyme (ACE)	19	25	23	26	7	25	19	28	9	7	13
interferon gamma precursor	56	82	49	72	27	87	62	105	88	16	33
interleukin-11 (IL-11)	8	15	5	20	9	13	12	13	11	8	13
carboxypeptidase H precursor (CPH)	1556	1897	1497	1542	1297	1631	1846	1896	2198	1498	1864
acrosin precursor	37	14	56	5	3	8	3	5	4	8	9
matrix metalloproteinase 8 (MMP8)	14	16	13	6	2	11	12	14	8	3	3
tissue inhibitor of metalloproteinases 2	88	58	33	27	30	46	65	42	41	15	35
thioredoxin peroxidase 1 (TDPX1)	3362	3844	2927	2685	3131	3542	3779	3937	3065	2388	2774
cytosolic superoxide dismutase 1 (SOD1)	1255	1853	1287	1371	1076	1254	1371	1565	1498	1304	2030
monocyte chemotactic protein 4 precursor (MCP4)	10	15	6	3	3	3	9	2	2	5	2
pbacplermin; c-sis	83	150	42	41	39	59	90	46	39	29	29
neuroleukin (NLK)	2903	3846	1400	1764	3103	2341	3442	3353	4545	1994	1681
hepatocyte growth factor (HGF)	7	4	3	3	0	4	5	3	3	1	0
platelet-derived growth factor A subunit precursor	122	151	107	88	51	142	112	149	76	51	97
prorelaxin H2 precursor (RLN2)	6	7	4	2	0	3	11	0	2	1	1
interleukin-7 (IL-7)	62	90	28	18	21	34	76	32	14	11	18
interleukin-12 beta subunit precursor (IL-12B)	72	86	30	24	18	38	71	31	15	12	15
dipeptidyl-peptidase I precursor (DPP-I)	646	699	495	522	414	506	647	563	810	503	326
acrosin-trypsin inhibitor II precursor; HUSI II	16	8	7	3	1	0	9	6	4	2	2
matrix metalloproteinase 9 (MMP9)	79	114	53	70	30	84	57	228	157	25	38
tissue inhibitor of metalloproteinase 4 (TIMP4)	5	2	2	4	1	1	15	0	6	1	2
thioredoxin peroxidase 2 (TDPX2)	2097	2456	1377	1776	1417	1805	1807	1972	2691	1461	1894
glutaredoxin	336	323	193	166	292	293	318	364	630	377	632
pancreatitis-associated protein 1 precursor (GM-CSF); CSF2	5	22	13	12	3	7	13	8	10	12	5
thrombopoietin precursor (THPO)	26	25	46	40	26	30	22	35	45	43	38

keratinocyte growth factor (KGF)	5	10	6	2	2	6	5	2	2	1	3
leukemia inhibitory factor precursor (LIF)	61	63	49	49	54	70	89	94	94	84	287
renin-binding protein (RENBP; RNBP)	103	105	55	54	59	112	113	80	87	32	59
interleukin-2 precursor (IL-2)	36	25	8	6	3	21	40	15	4	4	12
interleukin-12 alpha subunit precursor (IL-12A)	9	19	1	4	0	5	6	0	5	0	3
cathepsin H precursor	447	667	462	527	410	376	490	521	609	419	599
leukocyte elastase inhibitor (LEI)	186	159	102	90	66	162	102	100	137	85	72
matrix metalloproteinase 12 (MMP12)	6	14	7	6	1	13	13	8	6	3	3
matrix metalloproteinase 17 (MMP17)	125	159	57	57	37	95	126	56	44	28	26
cytochrome P450 IIF1 (CYP2F1)	6	12	8	4	7	9	8	8	8	3	8
thioredoxin reductase	615	471	156	247	1070	1370	1789	1907	1638	269	506
osteoclast stimulating factor	73	108	56	60	58	68	79	65	97	51	48
transforming growth factor-alpha	7	12	8	3	2	2	6	4	4	1	1
uromodulin	7	12	7	3	1	4	5	3	3	1	4
brain-derived neurotrophic factor (BDNF)	0	10	2	3	1	6	3	1	1	0	2
acidic fibroblast growth factor (AFGF)	1	8	1	2	0	8	3	7	0	0	2
glucagon precursor (GCG)	4	11	1	1	1	5	3	3	0	0	3
interleukin-1 alpha precursor	8	14	4	2	1	3	9	4	2	1	3
interleukin-15 (IL-15)	0	6	2	2	0	2	7	1	1	1	0
cystatin-related epididymal spermatogenic	5	8	2	3	0	7	7	4	0	1	3
inter-alpha-trypsin inhibitor heavy chain H2 precursor	2185	2611	1307	1508	1227	2232	1727	1509	1725	934	778
matrix metalloproteinase 14 precursor	28	31	27	24	16	21	29	47	25	12	48
tripeptidyl-peptidase I precursor	101	147	165	124	73	68	158	97	61	150	291
dioxin-inducible cytochrome P450 1B1	3	11	3	4	1	7	7	3	0	0	3
NAD(P)H dehydrogenase	231	357	335	256	208	220	379	461	338	326	280
CXC chemokine precursor	6	5	1	2	3	7	6	4	2	2	3
transforming growth factor-beta	109	181	1102	710	44	77	114	86	85	216	356
T-cell-specific rantes protein precursor	1332	1454	5341	2893	448	1051	950	645	625	1639	1716
embryonic growth/differentiation factor 1 (MIP2-alpha)	9	13	5	6	3	5	5	8	7	3	4
inhibin alpha subunit precursor (INH4)	0	6	4	4	1	7	4	5	3	0	1
interleukin-1 beta precursor	39	24	77	37	26	20	21	43	49	46	20
interleukin-9 precursor (IL-9)	800	943	431	393	431	917	756	525	463	265	298
major epididymis-specific protein E4 precursor (ITI heavy chain H3)	8	5	4	3	0	4	5	3	1	0	1
matrix metalloproteinase 15 (MMP15)	2	3	2	3	0	6	3	3	2	1	1
dipeptidyl peptidase IV (DPP IV; DPP4)	182	218	157	115	97	131	120	137	146	84	69
S-mephenytoin 4 hydroxylase	114	95	59	28	33	73	95	90	84	24	26
2 P450VD1-alpha	219	171	244	200	156	207	229	205	216	138	188
bone morphogenetic protein 3B precursor (G-CSF); pluripoinetin; CSF3 (MIP1-alpha)	2	5	3	4	0	5	16	2	0	0	1
(G-CSF); pluripoinetin; CSF3 (MIP1-alpha)	11	29	14	13	5	9	16	12	4	7	9
endothelin 2 (ET2)	7	17	7	6	2	9	16	2	0	1	0
placenta growth factors 1 + 2	4	7	6	3	1	5	2	2	2	2	3
estrogen sulfotransferase	4	11	13	14	2	7	0	8	3	1	5
interleukin-3 precursor (IL-3)	570	716	371	414	223	513	397	990	679	123	159
interleukin-17 precursor (IL-17)	71	113	32	37	24	65	75	50	40	23	53
insulin-degrading enzyme	84	95	47	47	58	89	92	119	110	68	123
(ITI heavy chain H4)	8	20	4	1	2	9	9	2	2	0	0
membrane-type matrix metalloproteinase 3	4	9	6	2	0	4	5	2	1	0	3
myeloblastin precursor (MBN)	275	265	122	127	198	342	270	380	395	93	125
P450(SCC)	13	13	6	6	1	6	4	5	2	1	2
glutathione synthetase	13	20	5	7	2	13	11	22	9	2	3
bone morphogenetic protein 1 (BMP1)	2	6	4	1	1	3	8	3	0	2	1
transforming growth factor beta2 precursor	23	26	22	24	13	8	9	5	9	10	12
monocyte chemotactic protein 1 precursor	392	505	251	299	281	355	383	522	464	177	223
hepatocyte growth factor-like protein	44	24	56	33	36	22	42	64	39	28	72
granulocyte chemotactic protein 2 (IGF-binding protein 3; IGFBP3; IBP3)	388	501	247	329	157	223	267	318	271	111	137
interleukin-4 precursor (IL-4)	4	2	2	3	0	2	5	7	1	3	3
parathymosin	1156	1324	836	628	622	553	751	885	982	684	844
methionine aminopeptidase 2	16	15	16	6	2	8	7	3	3	6	3
neuroserpin precursor	3	5	4	3	0	8	7	3	2	0	5
matrix metalloproteinase 13 (MMP13)	6	9	7	0	0	6	3	1	2	1	4
cathepsin L precursor	205	383	693	459	260	280	297	321	245	423	590
polymorphic arylamine N-acetyltransferase	1241	1297	1027	1215	1022	1337	1035	1177	1394	640	847
glutathione S-transferase mu1	26	27	18	25	11	31	18	22	19	11	19
bone morphogenetic protein 2A	5	6	4	20	0	7	4	3	1	0	1
kidney epidermal growth factor	122	105	59	60	55	97	106	110	147	49	180
oncostatin M (OSM)	4	11	2	5	6	6	8	5	10	0	2
thymosin beta-10	117	159	138	104	89	167	157	140	105	54	62
	128	158	67	74	32	45	110	172	97	24	33
	5	15	5	5	1	10	14	6	12	2	4
	41	70	36	40	15	13	11	69	48	15	3
	4417	4762	3080	2387	2062	4910	3532	4359	3594	2083	5119

OX40 ligand (OX40L)	37	34	16	8	3	19	16	23	7	7	14
cellular retinoic acid-binding protein II	8	23	3	3	1	43	7	3	2	1	5
interleukin-6 precursor (IL-6)	228	361	466	434	111	331	161	483	301	108	214
thymosin beta 4; FX	57	74	35	31	32	88	64	37	26	9	23
proteasome activator HPA28 subunit beta	301	339	174	143	149	227	293	231	233	95	117
cytoplasmic antiproteinase 2	9	12	6	7	1	8	8	6	4	1	15
cathepsin D precursor (CTSD)	581	644	430	432	314	595	643	586	536	471	709
activator of RNA decay (ARD-1)	128	127	44	44	49	129	114	91	94	23	37
serum paraoxonase/arylesterase 1	6	12	13	16	9	10	16	3	16	3	3
glutathione S-transferase A1	319	345	223	217	251	465	510	499	639	292	447
bone morphogenetic protein 3 (BMP3)	3	11	3	1	1	2	4	2	1	0	1
cytokine humig	4	9	5	4	1	2	2	2	0	0	1
amphiregulin (AR)	5	26	5	5	5	6	16	6	5	2	4
connective tissue growth factor precursor	39	93	40	40	22	31	79	34	26	1	14
interleukin-8 precursor (IL-8)	19	31	14	10	2	9	3	5	8	7	5
corticotropin-releasing factor-binding protein	8	11	33	2	1	2	6	1	1	1	2
interleukin-5 precursor	5	7	3	3	0	10	6	2	3	0	4
Wnt-13	6	12	8	4	1	7	1	7	4	1	2
proteasome inhibitor HPI31 subunit	687	743	297	278	347	363	452	599	675	177	384
bikunin	16	27	13	6	29	19	26	6	4	2	4
metalloprotease	105	89	71	66	66	96	121	101	114	65	133
zinc finger X-chromosomal protein	503	475	460	604	274	482	460	378	465	283	210
ubiquitin	8504	8550	8261	8799	10892	7929	12243	13097	9711	8021	12522
phospholipase A2	576	722	517	732	583	714	763	609	651	531	548
hypoxanthine-guanine phosphoribosyltransferase	179	255	139	192	134	266	207	166	240	169	116
(GAPDH)	33702	41573	43727	45218	28657	35722	42271	36131	38081	45043	30328
brain-specific tubulin alpha 1 subunit	42858	35715	32549	31240	39968	27333	37204	38223	36594	12576	16113
HLA class I histocompatibility antigen	532	552	590	282	237	447	742	421	366	300	317
cytoplasmic beta-actin (ACTB)	1694	1750	799	620	635	1808	1819	912	674	423	486
23-kDa highly basic protein	24324	27516	16784	20476	15560	37373	23002	17105	16055	9798	8615
40S ribosomal protein S9	4877	4413	2797	2225	2383	2573	4667	3273	1497	1805	1671