

## Case Report

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### Allergy to lingonberry: A case report

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### Abstract

Past few years cranberry/lingonberry products have been incorporated as healthy products to the US and European market as prophylaxis of recurrent urinary tract infections in young women as well as in chronic infections in elderly which because of there are many biological activities attributed to the that fruit is a very popular additive to the new diets. To the best of our knowledge, this is the first case of allergy to lingonberry. We speculate that previous exposure to lingonberry products could be sensitising. The symptoms, timing of the episode, positive skin test, IgE-ELISA and western-blot strongly support the role of lingonberry as the causative agent.

### Background

Lingonberry (*Vaccinium vitis-idaea* L.), small cranberry (*Vaccinium microcarpum*) and bigger cranberry (*Vaccinium oxycoccos* L.) are popular berries in Nordic countries and Russia, which are used in gravies, dressing and pantry products. Furthermore, past few years cranberry/lingonberry products have been increasingly marketed as a natural solution to avoid recurrent urinary infections [1-4]. Cranberry/lingonberry juice or cranberry-concentrate tablets, which appear to inhibit the attachment of pathogens to uroepithelium [5,6], have been incorporated to the prophylaxis of chronic urinary tract infections in elderly as well as the prophylaxis of recurrent acute uncomplicated urinary tract infection in sexually active women [2,7].

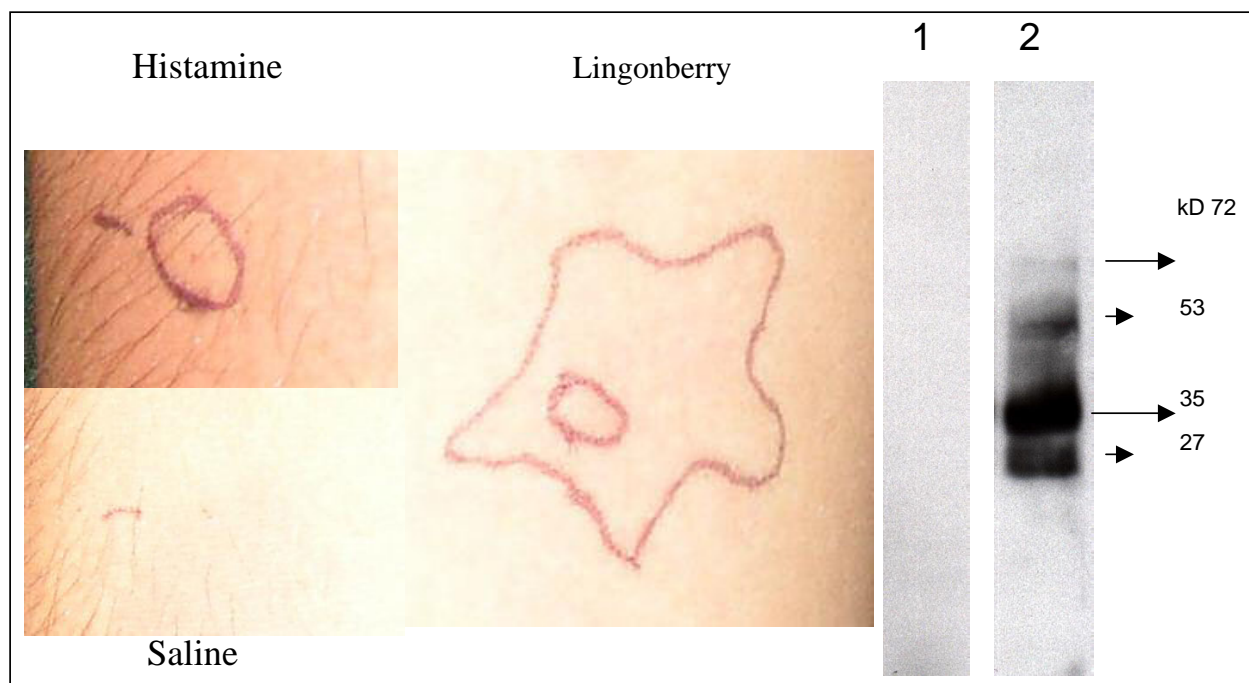
### Case presentation

We herein describe a case of allergy to lingonberry in a 25-year-old woman with a history of mite allergic rhinitis, but no food allergies. She entered a restaurant and then

ate meatballs, baked potatoes and lingonberry jam. During the meal, itching wheals developed around her mouth. Symptoms were solved without treatment. The patient was not under any treatment on that time. Skin prick testing by prick-prick method with fresh lingonberry revealed mean wheal diameter of 5 mm and mean flare diameter of 20 mm (Figure 1a). Skin tests either with the foodstuffs involved in the episode or other berries showed no reaction. On her responsibility and against medical advice, she subsequently took a very little amount of lingonberry jam several days later. She immediately noticed more intense symptoms with intense itching on mouth, tongue and throat and wheals over her mouth. Symptoms were solved in an hour without treatment.

### Methods

We prepared a protein extract of 0.6 mg/ml in phosphate buffered saline using frozen lingonberries in the presence of protease inhibitors. After informed consent patient's serum was obtained. Two independent lingonberry



**Figure 1**

**Left:** Skin prick test with a positive response to lingonberry fruit **Right:** Immunoblotting of lingonberry extract. Autoradiograph of specific IgE immunoblot of the control (**Lane 1**) and the patient (**Lane 2**).

allergen extract-coated IgE ELISAs using goat anti-human IgE-labelled-peroxidase (Sigma-Aldrich, ST Louis, MO, USA) showed positive results. (OD 495): 0.343 (patient) vs 0.017 (control) (Mean values from 2 different assays).

SDS-PAGE[8] was performed with a 12% polyacrylamide gel and a stacking gel of 4%. It was applied 19.2 µg of lingonberry extract to every lane and electrophoresis was performed (Mini Protean II System, Bio-Rad laboratories, Richmond, USA). Then, proteins were electrophoretically transferred from the separating gel to Immobilon-P™ (PVDF, Millipore Corporation, Billerica, MA, USA) membranes in a transfer buffer. After blocking with a solution of gelatine 3% for 1 hour, the membranes were washed and incubated overnight with patient's and normal control sera. Next day, membranes were washed and incubated with goat anti-human IgE-labelled-peroxidase as

mentioned above. Detection was performed with a chemiluminescence substrate (Pierce Chemical Company, Rockford, Illinois). The western-blot revealed IgE in the patient's serum that bound to some medium/high-molecular-weight protein bands (Figure 1b). Control sera were negative.

## Discussion

Lingonberry's native home is in the woods of Norway, Sweden and Finland. The Nordic countries' people pick and use about 50 million kg of lingonberries per year[9], which they use in jams, jellies, preserves, concentrates, and liquors; the berries are also sold fresh. Interest of lingonberry in the possible health benefits is not only due to the inhibition of the attachment of pathogens to uroepithelium[5], but also to the total content of flavonoids, which is higher than that in the commonly consumed

fruits or vegetables. Some flavonoids, such as quercetin[10], in which lingonberries are an excellent source, have potent antioxidant and free-radical scavenging activities observed in vitro. Some studies support a protective effect of flavonoid consumption in cardiovascular disease and cancer. Because there are many biological activities attributed to the flavonoids further studies in both the laboratory and clinic are running.

To the best of our knowledge, this is the first case reported of allergy to lingonberry. It is tempting to speculate that previous exposure by means of lingonberry products was sensitizing. The positive skin test, IgE-ELISA, western-blot and the symptoms and timing of the episode strongly implicate lingonberry. This report indicates that the lingonberry products might be allergenic when ingested. Further studies would be needed to characterize the allergenic component or components in lingonberry.

### Competing interests

None declared.

### List of abbreviation

ELISA; Enzyme-linked Immunosorbent Assay

### Authors' contributions

VM evaluated the patient, performed skin tests and wrote the manuscript. MLB & JMZ, made lingonberry extract and performed enzymeimmunoassay and immunoblotting. YB evaluated the patient, provided care at initial and made the first diagnosis. All authors read and approved the final manuscript.

### Acknowledgment

Written consent was obtained from the patient for publication.

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