Developmental Biology

Volume 245, Issue 1, 1 May 2002, Pages 1-12

Regular Article

The Major Yolk Protein in Sea Urchins Is a Transferrin-like, Iron Binding Protein

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https://doi.org/10.1006/dbio.2002.0611

Abstract

The major yolk protein (MYP) in sea urchins has historically been classified as a vitellogenin based on its abundance in the yolk platelets. Curiously, it is found in both sexes of sea urchins where it is presumed to play a physiological role in gametogenesis, embryogenesis, or both. Here we present the primary structure of MYP as predicted from cDNAs of two sea urchins species, *Strongylocentrotus purpuratus* and *Lytechinus variegatus*. The sequence from these two species share identity to one another, but bear no resemblance to other known vitellogenins. Instead the sequence shares identity to members of the transferrin superfamily of proteins. *In vitro* iron binding assays, including both ^{59}Fe overlay assays of MYP enriched coelomic fluid and immunoprecipitation of native iron-bound MYP from coelomic fluid, support this classification. We suggest that one of MYP's transferrin-like properties is to shuttle iron to developing germ cells.

Keywords

oogenesis; major yolk protein (MYP); yolk platelet; vitellogenin; transferrin; iron

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