The Opisthokonts: Salpingoeca rosetta

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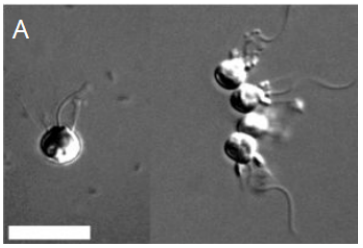
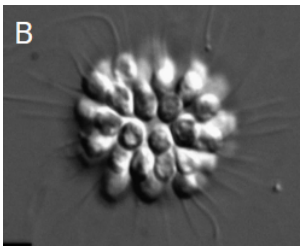
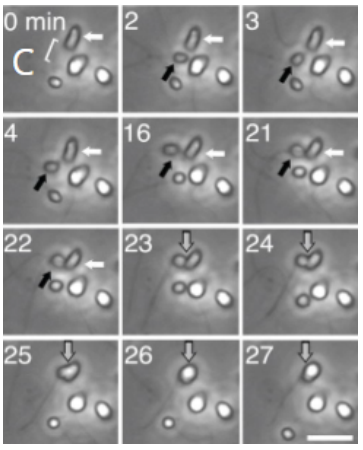
Uppsala University Fall Semester 2023

Opisthokonta is a highly diverse supergroup that gives rise to the lineages Holomycota, the relatives to true fungi and Holozoa, the relatives to animals. *Salpingoeca rosetta* is a unicellular species belonging to the salpingoecidae family, in the class Choanoflagellatea. With the use of molecular phylogeny, choanoflagellates have been deemed the closest living relatives to Metazoa, which is referred to as the animal kingdom. Choanoflagellates have a unique morphology, consisting of an anterior flagellum that is surrounded by a collar-like structure with microvilli. The flagellum creates a water current that passes through the filtering collar, which enables feeding. This makes choanoflagellates, filter-feeding phagotrophs. Throughout their lifecycle, *Salpingoeca rosetta* are able to take on a colonial form as well as a solitary form. Figure A, depicts two different forms: single-celled (left) or a linear chain (right). Additionally, they are able to form multicellular rosettes, as depicted in figure B. The rosette formation is induced by sulfonolipids produced by the bacterial species *Algoriphagus machipongonensis,* where it acts as a rosette-inducing-factor (RIF). The cells within a rosette are then held together by filopodia, intracellular cytoplasmic bridges and an extracellular matrix. Furthermore, these compounds show similarities to adhesion proteins that connect cells together in animal tissue. Having a genome of 55 MBp, *Salpingoeca rosetta* is vastly used as a model organism when studying the evolution of the metazoan ancestry, as well as the origin of multicellularity. In terms of the evolution of multicellularity, researchers have touched upon the morphological similarities between the feeding structure of Porifera, choanocytes, and those of choanoflagellates — suggesting that animals may have evolved from a choanoflagellate-like ancestor. Whilst choanoflagellates are one of the sister-groups to the animal kingdom, they express genes that are highly prominent in animal multicellularity. This includes cadherins, C-type lectin as well as tyrosine kinases. The sexual cycle of *Salpingoeca rosetta* differs from any other Holozoan due to their ability to transition between haploid and diploid states. The fusion of a male gamete (black arrow) with a female gamete (white arrow) is depicted in figure C. The transition from haploid-to-diploid was believed to be induced by nutrient-poor conditions while diploid-to-haploid transitions occurred during nutrient-rich conditions.







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