BioMEDIA ASSOCIATES LLC
HIDDEN BIODIVERSITY Series
Reproduction of microorganisms

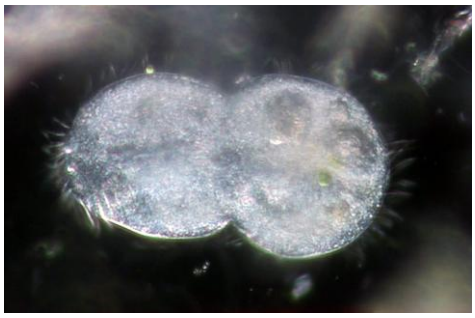
Study Guide Written and Photographed by Rubén Duro Pérez
Supplement to Video Program

One of the characteristics of living beings is their ability to reproduce. All living beings reproduce, from the tiniest, such as bacteria, to the largest, such as trees or mammals. However, throughout evolution, each group of organisms has developed different strategies to perpetuate, and microscopic organisms have been no exception to this rule.

The reproductive strategies adopted by microscopic organisms are varied. It is even possible to find organisms that do not have a single strategy but several, and use each depending on the environmental conditions. However, we could say that those found most frequently in this microscopic world are three: bipartition, budding and reproduction by eggs. Two of them, bipartition and budding, are asexual strategies, i.e. which does not involve sex, while the third, reproduction by eggs, may be sexual or asexual.

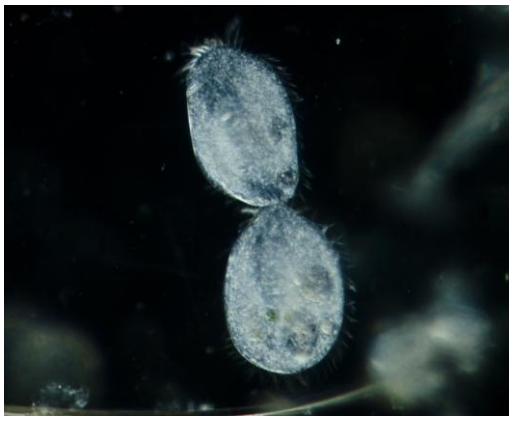
Bipartition

Bipartition is the strategy adopted by bacteria and protozoa. Organisms in which there are neither male nor female. And it is also used by cells that are part of our body.



This process consists to divide by half the cell that forms the entire organism, so the result is the creation of two identical new organisms.

During this division all the structures of the original cell are duplicated, and a complete pool of them goes to each of the new daughter cells. In this way, the two descendents are capable to develop their independent life since the very moment of their detachment.

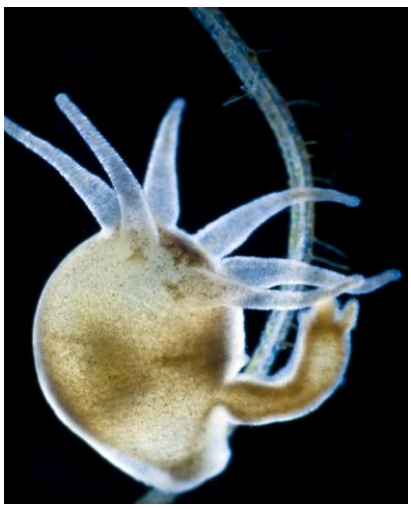


When the environmental conditions are the good ones, unicellular organisms can divide by bipartition very quickly, and this allows their population to grow enormously.

Some questions:

Which is the reason that unicellular organisms use the same reproductive strategy than the cells of our body? Do you think it is necessary the sexual interchange of material in this type of reproduction? Which is the main advantage of this reproductive strategy?

Budding, or germination, is also an asexual type of reproductive strategy, although in most cases has been adopted as an additional strategy by species in which two sexes appear.



In this process, a group of cells begins to divide and form a “gemma” from a point of the body of the parental organism. This “gemma” evolves, grows and, finally, becomes into a complete organism similar to its progenitor.

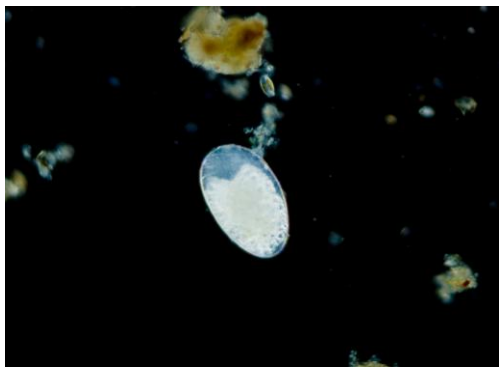
The point of gemmation varies among the species, and there is even possible to observe different gemma appearing simultaneously from different parts of the mother's body

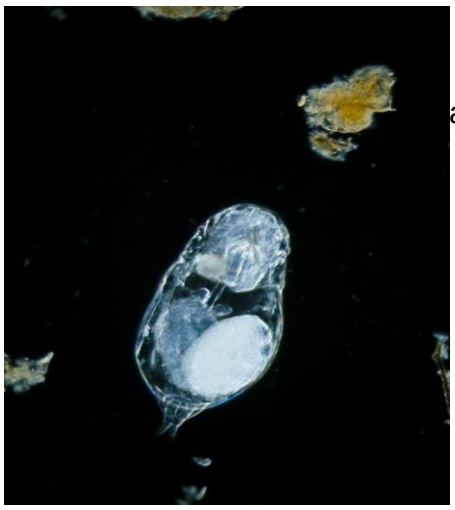
In many species, new individuals leave the mother's body to develop an independent life, but there are species in which these newly formed individuals remain joined and form colonies. This process is frequent in many species of marine corals.

Some questions:

Do you think that gemmation is an advantage to species able to reproduce also sexually? Why? In what group of organisms do you think gemmation is more frequent?

Reproduction by means of eggs is very common among the animals. Birds, amphibians and many reptiles reproduce in this way. And it is the same among the microscopical animals. However, in the microscopical world, this reproductive strategy may show some variations.





Some microscopical species, as rotifers or water fleas are, can reproduce by means of **parthenogenetic eggs** formed by females exclusively. From these no fertilized eggs do hatch only new females that are identical to their mothers.

In species without males only this type of eggs is possible. However, in species with males, as water fleas are, this is just an additional reproductive strategy that allows them to get a massive growth of their populations when their environment is plenty of food.

Some questions:

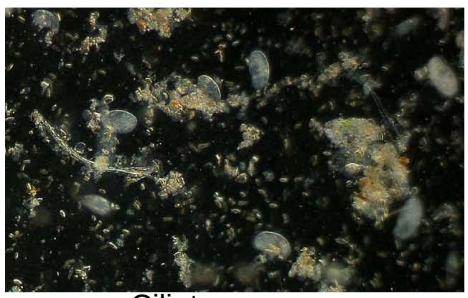
Do you know the differences between fertilized and parthenogenetic eggs? There is some advantage by adopting parthenogenesis as reproductive strategy? Which is that advantage? Do you know some parthenogenetic species among birds, mammals or reptiles?

Cows with calves *(Bos taurus)*

Golden Oriole *(Oriolus oriolus)*

Flower Beetle *(Strangalia* sp.*)*

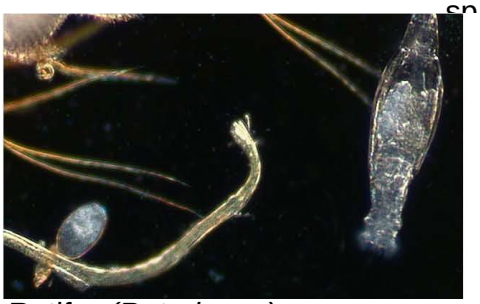
Mosquito larva *(Culex* sp.*)*



Ciliates

Ciliate *(Urostyla*

sp.)



Rotifer *(Rotaria* sp.*)*

Flatworm *(Stenostomum* sp.*)*

Fresh water Polyp *(Hydra* sp.*)*

Water fleas *(Daphnia* sp.*)*

Notes