

Paramecium tetraurelia

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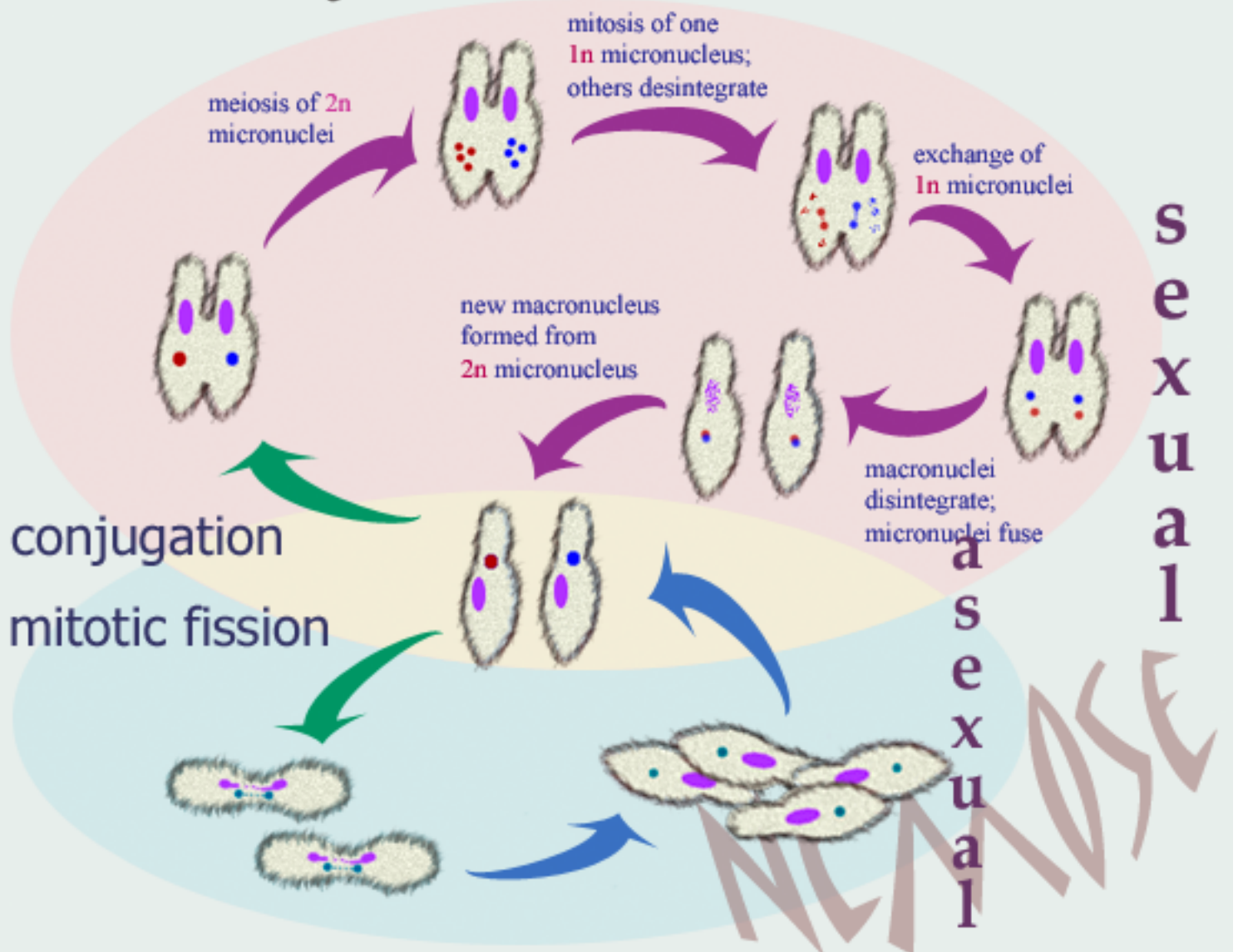
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Brief facts

- *Paramecium tetraurelia* is a large unicellular protozoan covered with vibrating cilia.
- *Paramecium tetraurelia* belongs to *Ciliophora*, a group related to the unicellular parasites named apicomplexans, which include *Plasmodium falciparum*, the main causative agent of malaria.
- *Paramecium* are found in stagnant warm freshwater. In their natural habitat these organisms are heavily preyed upon by another ciliate, *Didinium*.
- As all Ciliates, *Paramecium* 's cells possess two nuclei. A **germinal nucleus** (the **micronucleus**) is responsible for the transmission of genetic information via sexual processes, whereas a **somatic nucleus** (the **macronucleus**) ensures expression of this information. At each sexual generation, a new somatic nucleus is produced by programmed rearrangements of the whole genome contained in the germinal nucleus. Both the macronucleus and the micronucleus are derived from copies of the **zygotic nucleus**.
- As other ciliates *P. tetraurelia* may serve as a host for numerous

endosymbiotic bacteria. Being relatively large, the ciliate cell represents a well-structured econiche for the bacteria. By infecting macronucleus or other cell compartments they avoid danger of lytic enzymes contained in lysosomes and get access to substances and energy required for their life activities. One of most intriguing and interesting aspects of the bacteria-ciliate symbiosis is that a number of ciliate endosymbionts, mostly cytoplasmic ones, confer killer traits on the host - the ability to kill the cells of clones lacking these bacteria either at a distance or upon a contact (for example, during conjugation). The genus *Caedibacter* includes four species of such cytoplasmic bacteria wide-spread in the populations of *P. tetraurelia*. These bacteria form so-called **R-bodies** inside their host. The R-bodies look like proteinaceous ribbons coiled inside the ciliate cell that form a hollow cylindrical structure. Namely, the R-bodies are believed to play a critical role in killing mediation.

Life cycle of *Paramecium*



Life cycle

Life Cycle Stages

- vegetative

or **asexual** reproduction by **fission**: splitting in two by pinching of in the middle of the long axis of the cell; the **macronucleus** does not divide by mitosis: it splits in two, roughly equal parts which are going into each of the daughter cells

- sexual

sexual pathway in paramecia can be entered in two ways: via cell interaction leading to mating (conjugation) or via an endogenous processing leading to autogamy (self-fertilization)

- autogamy

autogamy is a process of meiosis and fertilization which takes place in unpaired *Paramecium* cells, and which is triggered by starvation

- conjugation

mating between two individuals of different mating strains; two paramecia line up side by side and then fuse together; each of the micronuclei of the fused cells divide meiotically into four; all but one disintegrate in the both groups; each remaining haploid micronucleus divides mitotically and one of the resultant pair goes into partner paramecium; cells separate, their macronuclei disintegrate and their haploid micronuclei fuse; new macronuclei are formed

References

PubMed articles

- Berger JD. Autogamy in *Paramecium*. Cell cycle stage-specific commitment to meiosis. *Exp Cell Res.* 1986 Oct; 166(2): 475-85. **PMID: 3743667**
- Fokin SI. Bacterial endocytobionts of ciliophora and their interactions with the host cell. *Int Rev Cytol.* 2004; 236: 181-249. **PMID: 15261739**
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Websites

- **Genoscope: *Paramecium tetraurelia***
- **Wikipedia: *Paramecium***



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