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Inheritance of mating types in *Paramecium calkinsi*

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The system of mating types (MT) has appeared multiple times in evolution of eukaryotes. MT form a sexual compatibility system in ciliates which is used to prevent self-fertilization and to increase genetic exchange within a population. Various kinds of MT systems, different numbers of MT, and diverse mating type genes are present in different groups of Ciliophora. Ciliates are a perfect example for MT investigation because they easily proceed through mating under laboratory conditions. However, mechanisms of mating type determination and inheritance are highly diverse even among closely related species. *Paramecium* (Oligohymenophorea) is the best-known model ciliate. MT determination and expression patterns for some species were described recently (Singh et al. 2014; Orias et al. 2017; Sawka-Gadek et al. 2020). For instance, three different types of MT inheritance (mendelian, maternal, and stochastic) are known in 16 sibling species of the *P. aurelia* complex. *Paramecium bursaria* and *P. putrinum* have a system of multiple MT. At the same time, the MT systems of many *Paramecium* species have not been sufficiently studied yet. The less known group - the species of *Cypriostomum* subgenus. *Paramecium polycaryum* was even thought to be incapable of mating, while data on other species remain fragmentary. We manage to figure out the mode of MT inheritance for *Paramecium calkinsi*. We established the synchronization protocol allowing to obtain sexually reactive *P. calkinsi* cultures. The cells become capable of mating after mild starvation at 25°C. Several rounds of conjugation revealed that *P. calkinsi* is characterized by maternally inherited determination of MT. It is the first case of maternal inheritance outside of *Paramecium* subgenus. This type of inheritance was previously described only for some species of the *P. aurelia* complex which are not closely related to *P. calkinsi*. Thus, our finding is important to understand the MT evolution within *Paramecium* genus. Supported by RFBR 19-04-00710a.