

Probes into the clock of aging in *Paramecium tetraurelia* by the microinjection technique

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In the ciliate *Paramecium tetraurelia*, the fission rate decreases with each cell cycle after conjugation or autogamy. Finally, it reaches zero and this results in clonal death. The lifespan after autogamy is generally about 200 fissions. Experiments with macronuclear transplantation showed that the lifespan and the decrease of fission rate are due to the age of the macronucleus. The result was supported by the transplantation of macronuclear chromatin. When the chromatin of a young cell was transferred into an aged cell, the cell recovered its fission rate and acquired a longer lifespan. Some of the clones survived for about 50 extra fissions. This evidence means that the clock for counting fission number must be in the karyoplasm of the macronucleus or in the chromosomes. We have attempted to transplant macronuclear DNA from a young cell into an aged cell but have so far failed in rejuvenation.