BIREFRINGENT CHROMOSOMES IN DINOFLAGELLATES, GYRODINIUM SUGASHIMANI.

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Chromosomes in some resting or dividing dinoflagellates such as Gyrodinium sugashimani or G. fulcatum remained in a condensed states and revealed strong birefringence (BR). The coefficient of BR, $(n_e - n_o)$, was estimated as $+10^{-2}$, almost identical value of pure DNA gel. These chromosomes never formed metaphase plate and segregated to both poles in anaphase. Nature of chrosomal BR is intrinsic and sign of BR is positive. Because of the lack of histone or alternate basic protein from the chromosome structure, we believe they were comparable to the bacterial nucleoid eventhough the DNA concentration was exceedingly higher than bacteria. Bouligand et al ('72,84) suggested that the dinoflagellate's DNA might be packed in a state of liquid crystal but this hypothesis is hardly acceptable knowing their rapid cell cycle. Rather, DNA replication in the dinoflagellate's chromosomes could be occur synchronal way alomg the molecular orientation direction. Otherwise, presence of mitotic microtubules could not explain their roles in mitosis. Based on the varieties of chromosomal BR, sign of BR and their fine structure, we found dinoflagellates could be classified into three groups. Their evolutional relation and supporting data will be presented and discussed.

EFFECTS OF VINBLASTINE IN NUCLEAR DIFFERENTIATION IN PARAMECIUM TETRAURELIA

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To examine the determination of nuclear differentiation exconjugant cells were treated for 30 mins with 25 μ g/ml vinblastine after 0~ 5 and 30 mins from separation of pairs for 30 mins. When the treatment was finished, the cell lenth became shorter than that of a control cell and the nuclei were found in the midway to antero-postero position. These cells were cultured for 17 hrs and it was observed that the nuclei consisted of a various combination of micronuclei(MI) and macronuclear anlagen(MA). After becoming the shortest in 30 mins from separation of pairs, these cells were treated for 30 mins and then cultured for 17 hrs. The number of MI and MA in these cells was the same as that of the control cell. Ultrastructural difference between the nuclei located in both ends was not observed after 30 mins from separation of pairs but the difference between MI and MA was noticed after 60 mins from separation of pairs in control and treated cells. These results suggest that because vinblastine inhibits the formation of spindles and stops the migration of nuclei to normal antero-postero position, the nuclear differentiation may be disturbed.

BEHAVIOR OF MICRONUCLEI TRANSPLANTED BETWEEN THE TWO DIFFERENT SPECIES OF EUPLOTES.

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Micronuclear transplantation was performed reciprocally between the two different species of Euplotes (E. octocarinatus, E. patella). The survival rate was about 10-20% in both combinations. The time when the operated cells could grow into clones was usually longer. While, the survival rate was about 50% when the micronuclei of one species were transplanted into the same species in each case. As it is known that the amicronuclear cells provided by removing the micronuclei died out in both Euplotes, the micronuclei of one species can supplement the micronuclear function of the other species. The vegetative micronuclear behavior was observed in the transplanted cells. Though normal micronuclei in the shape were observed (10-30%), various shapes of micronuclei were observed (large, small, ribbon-like etc.). The micronuclear observations at cellular division suggest that the timing of transplanted micronuclear division is different form that of the cellular division. Thus, cellular division may be controlled by the macronuclei in these Euplotes. As the daughter cells which can not receive the micronuclei die out, the growing rate of clones may be low.

ULTRASTRUCTURE OF THE CORTICAL FIBER SYSTEM AND MECHANISM OF CELL MOVEMENT IN A CILIATE Blepharisma.

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Scanning electron microscopical observation revealed that the distance between two neighboring cilia elongated in posterior part of the cell body during light-induced cell elongation. The cell which was extracted with a medium containing of 0.001% Triton X-100 elongated by addition of 4 mM Mg-ATP. The elongation beween two neighboring kinetosomal complexes was also observed in the cell model. Ultrastructure of the kinetosomal complex and its associated fibrous components was clearly observed in the cell model. Especially, bridges between the postciliary microtubular sheets were observed in intervals of about 40 or 80 nm. An immuno-electron microscopical observation showed that an anti-Tetrahymena dynein antibody reacted with the inter-microtubular bridges. These results suggest that the photo-induced cell elongation of Blepharisma might be attributed to the energy-dependent sliding of the adjacent microtubular sheets and that dynein ATPase might be involved in this system.