densed lipo-protein tanned by quinones, and cannot be discerned with certainty in histological preparations.

When the exuviæ of a giant crab-spider (Heteropoda) were placed in chlorated nitric acid, part dissolved leaving a thin colourless membrane apparently identical with that obtained from millipedes, and which again disappeared on heating, leaving oily droplets. Similar epicuticles have been demonstrated in spiders of a number of genera including *Tegenaria*, *Salticus*, *Aranea* and *Linyphia*; in a scorpion (*Euscorpius*), a tick (*Aponomma*), a harvester (*Leiobunum*), and in the centipedes *Lithobius*, *Geophilus*, *Cryptops*, etc. They are evidently widespread.

It is probable that an epicuticle composed of 'cuticulin' is present in arthropods, whether additional epicuticular layers are present as in insects and ticks, or not.

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Chromatin Elimination in *Glaucoma pyriformis* (Ehrb.)

Chromatin elimination at the end of each division from the macronucleus was reported by Kidder[1] in *Concophthirius mytili*. Later, Kidder and Diller[2] observed post-divisional chromatin elimination in *Urocentrum turbo*, *Colpidium colpoda*, *Colpidium campylum* and *Glaucoma scintillans*. Again, in 1936, Diller[3] recorded a peculiar type of chromatin elimination in *Paramecium aurelia* which he termed 'hemixis'. Seshachar[4] confirmed this in three species of *Epistylis*. The present note embodies certain interesting features concerning the behaviour of the macronucleus during binary fission in *Glaucoma pyriformis*.

In a fully grown *G. pyriformis* the macronucleus is large and granular while the micronucleus is small and compact and is situated very close to the former. The division of the micronucleus is coincident with the appearance of a darkly staining body in the macronucleus. No chromosomes are discernible during the division of the micronucleus. The daughter micronuclei migrate to the two ends of the organism while the macronucleus elongates in the antero-posterior axis. The darkly staining body mentioned above is now observed in the centre of the elongated macronucleus. Division of the cytoplasm is accompanied by the division of the macronucleus as well as that of the dark body into two. As the daughter individuals separate, this body breaks up into three to six smaller ones. They now spread in the cytoplasm and ultimately disappear, and the macronucleus gradually becomes compact.

In discussing the meaning of the elimination of chromatin from the macronucleus, Kidder and Diller[2] believe that this chromatin represents a form of effete material which is thrown into the cytoplasm at the end of each vegetative division. In support of their conclusion they say that as conjugation is rare in these forms, re-organisation of the macronucleus takes place at the end of each growth phase. However, the recent work of Painter[5], Caspersson, Brachet[6] and Seshachar[4] would appear to indicate that the phenomenon of post-divisional chromatin elimination requires a new interpretation.

The main constituent of the ciliate macronucleus is desoxyribose nucleic acid and, according to Seshachar and Srinath[7], the abundance of this component is responsible for the loss of its mitotic potency. The present observations on the behaviour of the macronucleus in *G. pyriformis* provide confirmation of this view. It is now established beyond doubt that in growing tissues the cytoplasm of the cell has large quantities of ribose nucleic acid[8,9]. The source of ribose nucleic acid for the growing cell is varied: in *Rhœo discolor* the tapetal cells provide the microspore cytoplasm with the necessary ribose nucleic acid, which is used during the formation of the pollen tube[5]; in *Drosophila* the oocyte gets its supply from the highly endopolyploid nurse-cells[10]. There is now sufficient experimental evidence to show that the desoxyribose nucleic acid and ribose nucleic acid are interconvertible.

On the basis of the observations made in *G. pyriformis* it is suggested that the phenomenon of post-divisional chromatin elimination is a process of transference of surplus desoxyribose nucleic acid present in the macronucleus back to the cytoplasm, where it is converted into the ribose form. Here the latter acts as a centre for protein synthesis in the newly formed individual. This initial supply of ribose nucleic acid seems necessary because, during growth, the parent organism will have utilized all the available ribose nucleic acid in the cytoplasm for the synthesis of proteins and formation of new nucleotides. It seems reasonable to assume that at the end of the growth-phase the ribose nucleic acid content of the cytoplasm will be very low. The growth of the daughter individuals would undoubtedly depend upon the presence of a minimum amount of ribose nucleic acid in the cytoplasm. This is supplied in the form of unpolymerized desoxyribose nucleic acid (heterochromatin ? of Muller and Painter[11]) eliminated at the end of each division. Kidder[1], in *C. mytili*, reports that there is no chromatin elimination in a few divisions immediately after conjugation. This behaviour may be attributed to the fact that the dissolution of the original macronucleus before the conjugation will leave an excess of ribose nucleic acid in the cytoplasm, and an immediate need for a fresh supply would not therefore arise. Further, the rapid growth and division-rate, as also the infrequency of conjugation in these forms, support this view.

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