Results and discussion. With conventional staining (uranyl acetate/lead citrate) the rodlet cells show their typical inclusions. The latter display a cortex of varying density, sometimes with a flocculent and more condensed zone at the outer border. The electron dense core runs the whole length of the rodlet and ends in an apical protrusion (fig. 1). The EDTA-method is known to result in the bleaching of chromatin, while RNA containing structures retain their contrast. The investigated rodlets show in their dense cores a heavy loss of contrast (fig. 2), similar to blocks of condensed chromatin (fig. 2, inset: nucleus of an adjacent lymphocyte). Only a light shadow in the axis, possibly a proteinaceous scaffold, still exists. Because certain secretory substances also react with EDTA, DNase digestion was performed as a 2nd test. The loss of electron density in the cores after DNase treatment also supports the presence of DNA (fig. 3a). In accordance with earlier light microscopical Feulgen stainings[16,17] the dense cores of the rodlets and also the rodlets themselve, show no positive reaction by electron microscopic Feulgen technique too, although the DNA of the nuclei is well stained (fig. 3b). This seems to be contradictory to our own EDTA- and DNase-results, but Feulgen negative DNA is known in organisms from Amoeba to insects to flowering plants[20]. However, the DNA of the rodlets can be assumed to be in a totally different configuration than the chromatin of the nucleus of the rodlet cell.

In sections treated with protease-free RNase of type X-A the cores remain dense, whereas the electron density of the nucleoli is markedly diminished. This contradicts the findings of Barber et al.[6]. As these authors give no specifications of the RNase used, although the quality of the enzyme is an essential factor, their results might be caused by proteases acting on certain protein components of the inclusions (e.g. the above mentioned proteinaceous scaffold).

These results strongly indicate, that at least the core of the rodlets is constituted of condensed chromatin with extraordinary configurations. This presents the essential argument that the rodlet cells have no secretory function, either as special exocrine cell or as granulocyte type. The rodlets are seen to be transport units for genetical material. Therefore, the original presumption of Thélohan[1] seems still the most probable proposition, although the life cycle and the systematical classification of the 'rodlet cell' is open to further investigations and discussions.

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Anti-noradrenergic drugs do not interfere with the development of callosal connections in the rat

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Summary. When noradrenergic transmission was suppressed by 6-OHDA, propranolol or phentolamine callosal fibers developed the same innervation pattern as in normal rats and the density of callosal connections did not increase.

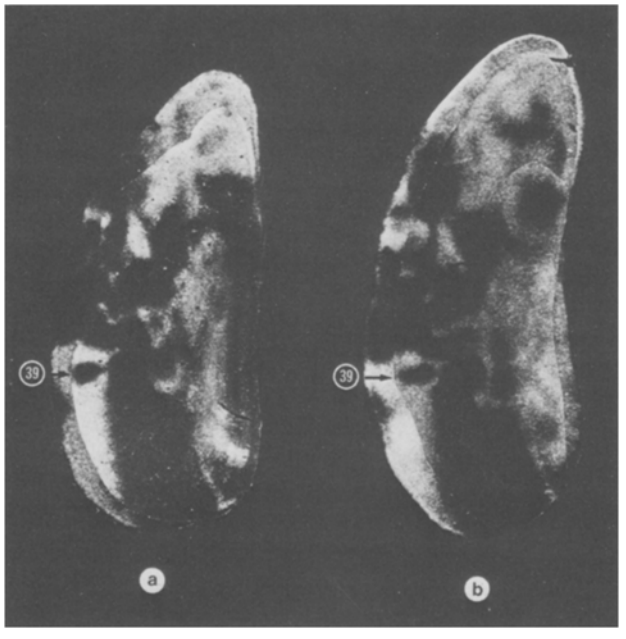
After lesions in the entorhinal cortex commissural connections of the fascia dentata expand their terminal territory by reinnervating the vacated apical dendrites (for review see Lynch et al.[2]). If neonatal rats have been treated with 6-OHDA, the commissural afferents expand farther into the outer molecular layer than in the presence of noradrenaline (NA)[3]. In fascia dentata, this reactive synaptogenesis of commissural fibers is cytologically not distinct from synaptogenesis during normal ontogenesis[4]. There is physiological evidence that NA also interferes with neuroplasticity in the neocortex[5]. Hence, it is conceivable that NA influences synaptogenetic processes in the neocortex also during normal development. In order to test this hypothesis, the effect of anti-NA-ergic drugs on the normal development of commissural connections was studied in albino rats.

25 Sprague-Dawley rats of both sexes were used in the present study. 3 types of experiments were performed: 1. 6-hydroxy-dopamine was administered s.c. on days 5, 6 and 7 after birth at a dose of 100 mg/kg, which has been shown to reduce the NA-ergic innervation predominately in the forebrain[6]. Callosotomy followed at 6 weeks of age. 2. Propranolol, a centrally acting β-receptor blocker, was applied during the 3rd postnatal week, i.e. when the callosal connections develop the characteristic distribution pattern[7] (daily injections between 14 and 20 days p.n., 0.5 mg/kg i.p.[8]). 3. During the same phase of development as in 2. phentolamine, a centrally acting α-receptor antagonist, was given at a dose of 10 mg/kg[8] per day. In the latter cases the callosotomy was performed 1 day after the last injections of drugs. The callosotomies were performed as elongated parasagittal lesions in the right hemisphere under

ether anestesia. In all experiments as well as in the controls the animals were killed by cardiac perfusion with 5% formalin under ether anestesia 3 days after callosotomy. Series of frozen sections were prepared in horizontal planes and stained according to a new and reliable method that impregnates lysosomes and degenerating terminals[9,10].

In all experiments the patterns of the callosal connections was not different from those characteristic of normal animals[11-13] (fig.).

The packing density of the impregnated particles was measured by a television image analysis system using an electronic device for detecting small black spots (Quantimet 720). From each of the 6-OHDA, the propranolol, and the control groups 2 animals were evaluated. Area 39 (according to Krieg[14]) was selected for these measurements because of its small size and the constant occupation of its borders by callosal connections in the rat[11]. We observed only small deviations from the controls. According to the Mann-Withney U-test the decrease in the density found following the 6-OHDA or propranolol treatments was not significant. The data are sufficient to exclude the possibility that the callosal connections were augmented. Hence, it can be excluded that in the neocortex of rats the inhibition of the NA-ergic transmission increases the synaptogenetic potential of the callosal fibers during the normal development. This finding is in contrast to what has been shown for the ventral hippocampal commissure after entorhinal lesion[3]. The discrepancy may be due to a different effect of NA on normal and reactive synaptogenesis or to NA acting differently in various regions of the CNS. In both cases the morphogenetic effect of NA might not be determined by a general effect at the single cell level. The specifity of NA effects could rather depend on the local structure of neuronal circuits.



Pattern of degeneration in the supragranular layers of the hemisphere contralateral to callosotomy, reconstructed from horizontal sections (darkfield illumination). *a* Control animal without any antinoradrenergic treatment, *b* animal treated with propranolol between days 14 and 20 p.n. The position of area 39 is indicated by arrows at the left border of the micrographs. Minor differences in the callosal pattern along the medial border of area 39, the anterior border of area 17, and in the frontal cortex are due to interindividual variations. The differentiation of the principal pattern of interhemispheric connections is not changed by anti-NA-ergic treatment during the development of callosal afferents in the supragranular layeres (a and b).

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Axoneme patterns of spermatozoa of Asian horseshoe crabs[1]

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Summary. Ultrastructural studies of flagella of spermatozoa of horseshoe crabs revealed that three Asian species *(Tachypleus tridentatus, T. gigas* and *Carcinoscorpius rotundicauda)* had a 9+0 axoneme pattern that was different from the usual 9+2 pattern of *Limulus polyphemus.* This difference is consistent with the phylogeny of horseshoe crabs.

Numerous studies on the spermatozoa of Arthropoda have shown wide structural diversity in this phylum[3]. The spermatozoa of the American horseshoe crab, *Limulus polyphemus,* are reported to have a unique acrosomal filament and the usual 9+2 pattern of the flagellum[4-8]. This paper is the first report on the ultrastructure of the sperm flagella of 3 Asian horseshoe crabs. Japanese horseshoe crabs, *Tachypleus tridentatus,* were collected in the vicinity of Imari,