"VISIONARIUM"

SEDECIM

XVI

at Tvärminne Zoological Station,
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The purpose of the Visionarium meeting is to continue in the spirit of the former "Planeringsgruppen" (Swedish Medical Council 1968-2001) by bringing together scientists in vision research to informal meetings to present on-going and planned research and to discuss and establish future projects. Projects in the planning stage are as welcome as already finished projects. Convener and organizer has since the beginning 2002 been Dr Magnus Lindström (magnus.lindstrom@helsinki.fi).

electron microscopy. In the photoreceptor layer, the more remarkable differences lie on the relative size and shape of the rod photoreceptors. On the other hand, our samples show clear regional differences in the topography of retinal layers in both genera that could be indicative of specializations of the visual field comparable to the *area centralis* albeit with a different spatial distribution. We will discuss what can be speculated about the functional significance of these specializations, and how future studies should be approached to gain a better understanding of the visual abilities linked to these retinal features.

REFINEMENT OF THE FUNCTIONAL SEGREGATION OF RETINAL GANGLION CELL PROJECTIONS IN THE GOLDFISH TECTUM BY MEANS MICROELECTRODE RECORDINGS

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Tectum opticum (TO) is the main primary visual center in fish, where 98% of all visual fibers come. We recorded single-unit responses from the axonal terminals of retinal ganglion cells (GCs) (retinal elements (REs)) in the TO of the living goldfish with help of extracellular metal in the glass microelectrode tipped with a platinum cap of 5 μm in diameter and a resistance of 300 kOm (GESTELAND, R.C. et al. 1959. Comments on microelectrodes. Proc. IRE 47: 1856–1862). We systematically recorded responses from the REs of twelve types: 6 types of direction selective detectors; two types of detectors of oriental lines (horizontal and vertical); two types of local edge detectors (detectors of light and dark spots) and REs with dark and light spontaneous activity.

This work is focused on two aspects:

1). Distribution of REs of different types in depths in the retino-recipient layer of the TO. Based on special measurements of the recording depths of the REs (with vertical penetration of the microelectrode perpendicular to the TO surface), it was shown that the responses of the direction selective detectors were recorded in the depth about 50 μm. Responses of detectors of oriented lines and spot detectors occur at depth about 100 μm. Reactions of the REs with dark and light spontaneous activity are recorded deeper than all others. The receptive fields (RFs) of consecutively recorded REs in the one track of the microelectrode overlap, and they are slightly shifted relative to each other. We can say that they analyze the same fragment of the visual scene, focused by the optics of the eye on the photoreceptor raster.

2) The mutual locations of the RFs of two units, in cases of their simultaneous recording in separate sublayers of the retino-recipient layer of TO (at the one position of the microelectrode). After analyzing of the database with several thousand files, it became clear that approximately in 1/4 of the cases we simultaneously recorded the reactions of two direction selective detectors of the caudo-rostral preferred direction of ON and OFF types. Simultaneous recording of the REs with ventro-dorsal and dorso-ventral preference, also ON and OFF types occurred, but rarely. Their RFs almost coincided. About a hundred cases of simultaneous registrations of detectors of vertical and horizontal lines have been noted. A small displacement of the microelectrode, literally by several μm in depth, succeeds in "tuning" to one of them. This suggests a very close arrangement of axonal terminals generating such reactions. Electrophysiological method, thus, allows us to indirectly clarify the morphology of the retinal projections in the TO and to establish a morpho-physiological correspondence.

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