

QUANTITATIVE ANALYSIS OF THE DISTRIBUTION OF TWO GOLDFISH
BRAIN PROTEINS INVOLVED IN BEHAVIOURAL PLASTICITY. THE
INFLUENCE OF LEARNING ON THE DISTRIBUTION. R. Schmidt.
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When goldfish adopt a new swimming behaviour, two glycoproteins, ependymins β and γ , exhibit an enhanced rate of synthesis in the brain (Shashoua; 1976). Antisera against them prevent permanent fixation of the newly learned behaviour when they are injected into the IV. brain ventricle between 4 and 24 hours after training (Shashoua & Moore, 1978). We have shown that ependymin γ is derived by proteolytic cleavage from ependymin β by a protease activity present in the brain extracellular fluid after the protein has been secreted from its cells of origin in a dimeric form (Schmidt & Shashoua, J. Neurochem. 1983, in press). A very specific and sensitive radioimmunoassay has been developed for quantitative determination of the ependymins (Schmidt & Shashoua, J. Neurochem. 36 (1981), 1368-1377). This assay has now been applied to analyse the proteins' distribution in untrained goldfish. They are highly enriched in the cerebrospinal fluid and the cytoplasm from various brain regions, but occur in small amounts only in the particulate subcellular fractions. It has also been demonstrated that the ependymins are synthesized and secreted from cells of the ependymal zone in culture (together with Dr. Majocha, Boston). During the critical time period after learning, the steady-state concentrations of ependymins in the brain cytoplasm and the extracellular fluid were increased. Furthermore, immunohistological methods were applied to investigate the distribution of the proteins in goldfish and other animals (see Baumgartner & Schmidt, Immunohistochemical localization ..., this volume).

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