

RADIOIMMUNOASSAY-ANALYSIS OF STRUCTURAL AND METABOLIC RELATIONSHIPS
BETWEEN GOLDFISH BRAIN PROTEINS PARTICIPATING IN FUNCTIONAL PLASTICITY
OF THE CENTRAL NERVOUS SYSTEM

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Ependymins β and γ are goldfish brain proteins, which show an enhanced synthesis, when the animals learn a new swimming pattern (Shashoua (1976) Brain Res. 111:347). Antisera obtained against them inhibit the consolidation of the newly acquired behavior when injected into the IV. brain ventricle during a critical time period after training (Shashoua & Moore (1978) Brain Res. 148:441). A sensitive (10^{-14} mol) and specific radioimmunoassay for quantitative determination of the proteins has been developed (Schmidt & Shashoua (1981) J. Neurochem., in press). Ependymins β and γ show full cross-reactivity with each other, but not with a variety of other proteins including several glycoproteins purified from goldfish brain. Scatchard-plot-analysis of the antigen-antibody-reaction revealed that β and γ share common antigenic determinants. Since β and γ also possess a similar amino acid composition, the possibility that β (Mol.wt. 32 000) is a precursor molecule of γ (26 000) was further analysed and substantiated. The Ependymins have also been isolated as stoichiometric complexes ($\beta\gamma$ and γ_2) which require unraveling of the quaternary structure before maximal interaction with the antisera becomes possible. The Ependymins were shown to constitute 14% of the total protein content of goldfish brain extracellular fluid; 4.2% of a brain cytoplasmic fraction and 0.3% of serum protein in untrained fish and to be secreted from ependymal cells in culture. Presently their subcellular distribution is further analysed.