

INVOLVEMENT AND FUNCTION OF SPECIFIC GOLDFISH BRAIN GLYCO-
PROTEINS (EPENDYMINS) IN TWO DIFFERENT LEARNING PARADIGMS.

Rupert Schmidt, Dept. of Zoology, J.W.-Goethe-University,
D-6000 Frankfurt, Federal Republic of Germany.

Ependymins β and γ are glycoproteins specific for the goldfish nervous system. Immunohistologically they were located to cells of the ependymal layer and to granular cells of the optic tectum and the vagal lobes. By a combination of subcellular fractionation and radioimmunoassay techniques ependymins are shown to be highly enriched in the cytoplasmic and extracellular compartments. Smaller amounts are also contained in synaptosomal and microsomal fractions. They become secreted both, in vivo and in cell culture. After an operant avoidance learning paradigm (float-training) ependymin concentrations decrease temporarily in the extracellular brain fluid, before their rate of synthesis and steady state concentration in the cytoplasm increase over control values. Ependymin β is the physiological precursor molecule of the γ -polypeptide chain.- The same proteins are also involved in memory consolidation after a classical avoidance conditioning (shuttle-box-training). When antisera against ependymins are injected into the cerebrospinal fluid immediately after the acquisition of the shuttle-box task, goldfish are found unable to remember the new behaviour three days later. Control experiments with preimmune sera and with fish which had already consolidated their avoidance response have been performed.- It is suggested, that the antisera interfere with synaptic events during memory consolidation, since isolated ependymins possess substantial calcium binding capacity. They also demonstrate immunological cross-reactivity with S-100 protein. (Supported by the Deutsche Forschungsgemeinschaft, grant Schm 478).