**ORGANIZATION AND REORGANIZATION OF THE MAIN NERVE CORD IN UNTREATED AND REGENERATING TENTACLES OF THE CEPHALOPOD *SEPIA OFFICINALIS* L.**

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The regeneration of treated arms and tentacles of cephalopods was proved in studies on *Ommastrephes bartrami* Lesueur (Murata et al 1981) and on *Architeuthis dux* Steenstrup (Aldrich F A & Aldrich M M 1968) which are similar to the one presented on *Sepia officinalis* L.. Macroscopic examinations on *Sepia officinalis'* L. capability of regenerating its tentacles (Hielscher B et al 1996) reveal a completely new shape which might be divided into six separate stages: protrusion of the central main nerve cord, scarring of the wounded tissue, formation of a semicircular bud at first, later developing into a cone-like shape and finally the formation of suckers. These findings correspond with those of another study on the regeneration of the arms of *Sepia* (Féral J P 1979).

The centrally and axially running main nerve cord in the tentacle is formed of an inner neuropil and a cortex. Inside this cortex can be found the tractus cerebrotentacularis consists of two fibres of different thickness, one on the oral the other on the aboral side of the nerve cord. Enzyme histochemical slide examinations performed by means of glyoxylic acid induced fluorescense on 25 day- old regenerates indicated the presence of catecholamines primarily in the main nerve cord. This corresponds with other findings demonstrating the presence of catecholamines in the nervous system of *Sepia* ( Kling G 1984).

The use of confocal laser scanning microscopy (clsm) permits a nearly complete characterization of the neural network in the untreated tentacle as well as detailed descriptions of the neuronal organization during the regenerative phases in treated tentacles. For incubation antibodies against – amongst others - serotonin (5-HT) and FMRFamid were used, for marking the fluorescense a second antibody. The nervous network of a untreated tentacle consists of the main nerve cord and six fibres arranged peripherally. In a regenerated stump of a treated tentacle there are no serotonin fluorescences during the first two phases of regeneration (0. – 20. day).

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