Regeneration and Unusual Extensive Growth of the Neurohypophysis and Neurosecretory Axons in the Partly or Completely Hypophysectomized Goldfish

Instances of regeneration of the pituitary stalk to form a posterior lobe-like organ were reported in mammals[1–3]. Regeneration of the neural lobe in the toad *Bufo bufo* was also described[4]. The present study is based on 15 completely and 5 partly hypophysectomized fishes.

Nine hypophysectomized fishes revealed varying amounts of regeneration and growth of the neurohypophysis and neurosecretory axons. In some, the cut infundibular stalk heals up without pronounced growth, with its neurosecretory axons forming new terminations among the blood capillaries which abound in that vicinity, closely resembling the regenerated infundibular stalk of dog[2] or rat[1,2]. Occasionally, bundles of neurosecretory axons with AF-positive material grow out from the cut infundibular stalk (Figure 2). Even though several such neurosecretory axons end in close association with blood vessels, some of them enter the surrounding connective tissue or muscle bundles. Four partly hypophysectomized fishes also exhibit regeneration and axonal growth. In one the cut neurohypophysis grows down into the connective tissue as an extensive column (Figure 1). Along this columnar growth, axons with stainable neurosecretory material were also noticed. The absence of the entire or part of the pituitary seems to be responsible for this unusual growth. The removal of the glial and connective tissue barriers in these fishes might have facilitated the extensive growth.

This study demonstrates the hitherto not well known capacity of the neurohypophysis and neurosecretory axons for extensive and apparently uncontrolled growth. The regeneration of the pituitary stalk to form a neurohypophysis-like organ also seems to be evident in these fishes[5].

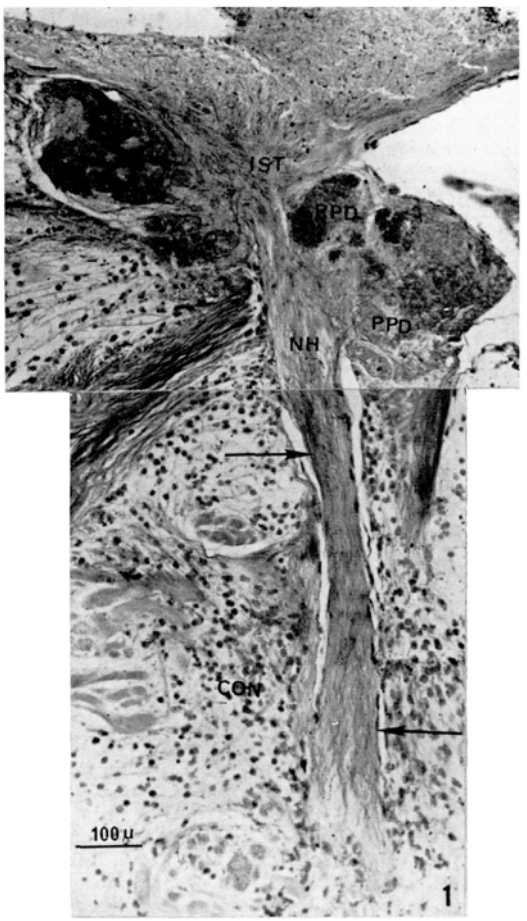

Fig. 1. Arrows show out-growing neurohypophysis, 78 days after removing pars intermedia and larger part of the proximal pars distalis. Bouin's fluid, AF. × 120. CON = connective tissue, IST = infundibular stalk, PPD = proximal pars distalis, RPD = rostral pars distalis, NH = neurohypophysis.

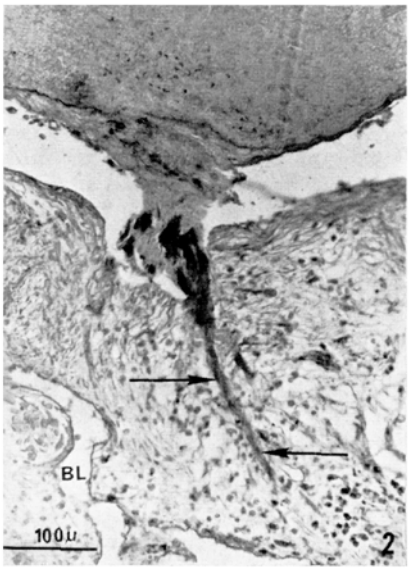

Fig. 2. Arrows show the out-growing neurosecretory axons with AF-positive material, 31 days after hypophysectomy. Bouin's fluid, AF. × 135. AF – aldehyde fuchsin, BL = blood vessel.

Résumé. Chez le Poisson rouge partiellement ou complètement hypophysectomisé, la neurohypophyse et l'axon neurosécréteur du tractus hypothalamo-hypophysaire régénère souvent et présente un accroissement considérable.

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