

Poster

A DISTRIBUTED GNRH SYSTEM IN THE CATSHARK BRAIN: FROM FOREBRAIN PATHWAYS TO NEUROENDOCRINE INTERFACES

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Gonadotropin-releasing hormone (GnRH) is an evolutionarily conserved neuropeptide central to vertebrate reproduction, while also contributing to broader neural functions. In fishes, multiple GnRH forms coexist, reflecting the evolutionary history of three paralogous lineages, GnRH1, GnRH2 and GnRH3. Cartilaginous fishes, representing the earliest-diverging extant jawed vertebrates, retain all three paralogs and therefore provide an informative model for investigating the ancestral organisation of vertebrate GnRH systems. In our study, we characterised the neuroanatomical distribution of GnRH immunoreactivity in the brain of the small-spotted catshark, *Scyliorhinus canicula*. Brains from three females were processed for immunofluorescence using a commercial polyclonal antibody raised against mammalian GnRH1 and analysed by confocal microscopy. To assess potential cross-reactivity, the antigen sequence was compared with the three catshark GnRH paralogs. The mammalian antigen differed by two amino acid residues from catshark GnRH1 and by three from GnRH2 and GnRH3, indicating that the signal cannot be unequivocally assigned to a single paralog. GnRH-immunoreactive elements formed a widespread and anatomically organised network extending from the olfactory bulb through pallial, subpallial and septal telencephalic territories. Dense fibre bundles converged toward the anterior commissure and preoptic region, where a prominent neuronal population was identified around the optic chiasm in anterior, periventricular and suprachiasmatic territories. Caudally, GnRH-immunoreactive fibres extended into hypothalamic regions, with terminal fields closely associated with ventricular surfaces and neurovascular compartments, including the inferior hypothalamic lobe and median eminence. No distinct mesencephalic GnRH-immunoreactive neuronal population was detected. The overall pattern is consistent with the predominantly forebrain-diencephalic distribution reported for previously reported GnRH1 transcripts in *S. canicula*, although contributions from other paralogs, particularly GnRH3 in telencephalic territories, cannot be excluded. These findings suggest a distributed GnRH system comprising both neuromodulatory and neuroendocrine components and provide a comparative framework for investigating the evolution of GnRH pathways in early diverging jawed vertebrates.