O63  BRAIN ARGinine Vasotocin (AVT) AND Isotocin (IT) AND Reproductive Behaviour of the Three-Spined Stickleback

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AVT and IT are produced in separate parvocellular and magnocellular preoptic neurones of hypothalamus in fish. The peptides, while bind to the receptors in the central nervous system, may influence sex-specific behaviours, as mating, courtship, parental care, territoriality and aggression. The three-spined stickleback (Gasterosteus aculeatus) is a common model-fish to study reproductive behaviour and social interactions. The goal of the present study was to determine whether brain AVT and IT contents are related to specific phase of spawning behaviour of males and females and show seasonal variation. The concentrations of the two neuropeptides in whole brain of breeding sticklebacks were measured using high-performance liquid chromatography with derivatization and fluorescence detection. The lowest neuropeptides’ contents were observed in December, at time of quiescence, and the highest in July, during stickleback’s reproduction. Seasonal fluctuations of peptides in the brain indicate that they are involved in reproduction and probably play a physiological role in internal calendar controlling seasonal breeding in this species. AVT and IT production appear to be controlled independently. The different pattern of AVT and IT changes found in both sexes, point to the sex-dependent regulation and sex-specific action of neuropeptides related to particular sexual behaviour during reproduction. The mechanism of AVT and IT regulation may be linked to sex steroids or independent.

O64  Function for the Opioid System during Inflammation in Teleost Fish

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In mammals the opioid system is involved in modulation of both innate and acquired immune responses, thus altering resistance to a variety of infectious agents. Opioids can affect immune responses either indirectly, when they stimulate release of corticosteroids and/or catecholamines and directly via opioid receptors on leukocytes. Interestingly, specific opioid receptor types have been identified on non-mammalian immunocytes. We have studied the effects of different opioid ligands on innate immune responses of common carp. We sequenced and characterised carp mu, delta and kappa opioid receptors. Moreover, expression profiles of these receptors in different lymphoid organs and specific leukocyte cell populations were studied. In in vitro conditions morphine (agonist of mu3 opioid receptor) reduced gene expression of pro-inflammatory cytokines/chemokines, NO production, chemotaxis and apoptosis of head kidney leukocytes, but did not affect respiratory burst. Furthermore, morphine injected locally to the focus of inflammation during peritonitis reduced the influx of inflammatory leukocytes and downregulated expression of pro-inflammatory mediators (e.g. TNF-a, chemokines, iNOS) and chemokine. Also delta (deltorphine II) and kappa (U50, 488H) opioid receptor agonists modified in vitro leukocyte activity.

Our experiments led to the hypothesis that the phylogenetically conserved anti-inflammatory function of opioids includes release of endogenous opioid peptides. Such opioid-dependent modifications of the inflammatory process will be advantageous to the host, because inflammation-related cells and molecules are double-edged nd their high concentration and/or prolonged action may be detrimental.