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An overview on kisspeptins in European sea bass

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Kisspeptin 1-10, encoded by the *kiss1* gene has emerged as a major actor in the neuroendocrine regulation of the reproductive axis in mammals. Although the existence of two kiss genes (*kiss1* and *kiss2*) and to kiss receptors (*kissr1* and *kissr2*), issued from early whole genome duplication events, is well-documented in teleosts, the functions of kisspeptins are still very unclear in fishes. This is partly due to the existence of several model species, belonging to orders that have diverged evolutionary over a long period of time. This lecture intends to summarize the information that we have obtained in a well-studied fish model, the European seabass (*Dicentrarchus labrax*) a fish of high commercial interest in Europe. In this species, the neuroanatomical distribution of kiss neurons has been studied in details showing the widespread distribution in the forebrain, notably in the habenula the preoptic area and the mediobasal hypothalamus. This expression is subject to changes according to the reproductive activity, which is not surprising as populations of kiss neurons express estrogen receptors. Interestingly, *kiss2* fibres exhibit a widespread distribution that overlaps quite well with the distribution of *kissr2*. Kiss1. The relationships between the kiss systems and the GnRH neurons have received much attention showing that while *kissr2* are expressed in a variety of neurons, notably in somatostatinergic neurons, none of the GnRH1, GnRH2 or GnRH3 neurons was shown to express *kissr2*. This result is surprising as there is recent evidence that kiss2-12 given intracerebrally is able to stimulate gonadotrophin release and the expression of *gnrh1*. These results indicate that kisspeptins probably have a wide spectrum of actions in the brain of teleosts including some indirect actions on the reproductive axis that could involve intermediate neurons, potentially NO synthase expressing cells. On another hand, *kiss1* mRNAs and *kiss2* fibres are present in the pituitary where direct effects of kisspeptins on gonadotrophin release have been documented.

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