# HOW FISH COLOR THEIR SKIN? MC2R A NEW ACTOR IN PIGMENTATION DEVELOPMENT

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The melanocortin system is a complex neuroendocrine signaling mechanism involved in numerous physiological processes in vertebrates, including pigmentation, steroidogenesis and metabolic control. In humans, five melanocortin receptors (MCR) have been cloned, identified and shown to have a wide distribution throughout the body and likely many diverse functions. It has also been shown that a high degree of identity and conservation in structural characteristics and pharmacology exists between Mcrs from fish and mammals. However, in fishes, the number, affinity, specificity, tissue distribution and physiological roles are far from defined and appear to be species-specific. A clear example is the Mcr2 subtype. In humans, it is well known that Mc2r is expressed in the adrenal gland and controls steroidogenesis and in fact the same function has also been described in fish. However, the fact that Acth (a melanocortin agonist) may have a role in regulating fish pigmentation and that Acth acts on Mc2r, the involvement of Mc2r in fish pigmentation might be a possibility. Using CRISPR/Cas9 genome engineering tools we have generated “loss-of-function” mc2r mutant zebrafish. We demonstrate that Mc2r, apart from controlling steroidogenesis, also has a direct role in regulating fish pigmentation.