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Locating CRF Receptors in the Rat Amygdala

Corticotropin-releasing factor (CRF), a neuropeptide, is released throughout the brain as part of the body's response to stress or anxiety. Indeed, it has also been shown that the concentration of CRF in the brain increases when an animal is anxious. Similarly, when CRF is injected into the brain, anxiety increases, whereas if CRF receptors are blocked in the brain, anxiety decreases. CRF also appears to enhance several types of learning. For example, when CRF is injected into the amygdala, rats more quickly learn fear extinction, which is a decrease in conditioned fear responses that occurs when a conditioned stimulus (a tone) is repeatedly presented in the absence of the aversive unconditioned stimulus (a shock). Determining which neurons in the amygdala express CRF receptors would contribute to an explanation of this observed phenomenon at the cellular level, as well as increase our understanding of the relationship between anxiety and learning. In this study, we used immunohistochemistry to determine whether CRF receptors are located on inhibitory cells or excitatory cells in the rat amygdala. We located inhibitory cells by labeling for GAD67, an enzyme that is necessary to synthesize GABA, an inhibitory neurotransmitter released by all inhibitory cells. We located excitatory cells by labeling for CaMKII, a kinase that is only found in excitatory cells of the amygdala. By double labeling for CRF receptors and GAD67, and CRF receptors and CamKII, we discovered that CRF receptors appear to be located on both inhibitory and excitatory cells in the rat amygdala.