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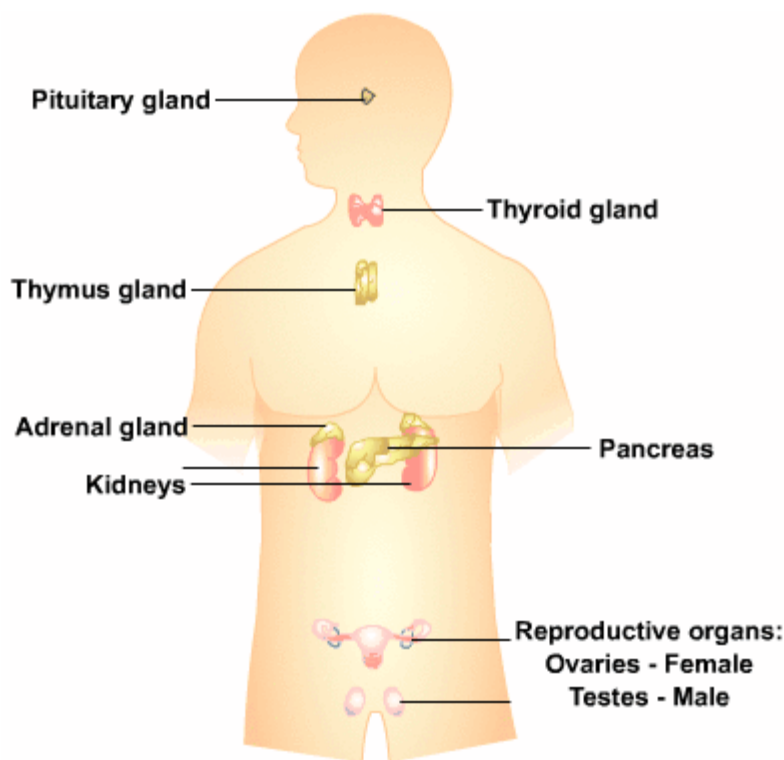
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## The Role of the Endocannabinoid System in Restoring Balance to the Endocrine System

Over the last few years, cannabis and the endocannabinoid system have emerged as a topic of interest among both patients and within the scientific community. The involvement of endocannabinoids in several diseases and conditions where the suspected cause is an underlying physiological dysfunction has attracted intense scrutiny. The endogenous cannabinoid system (ECS), named after the cannabis plant that led to its discovery, is one of the most important physiological systems involved in establishing and maintaining human health. Endocannabinoids and their receptors, CB1 and CB2, are found throughout the body: in the brain, organs, connective tissues, glands, and immune cells. In each tissue, the ECS performs different tasks with the goal of maintaining homeostasis, the maintenance of a stable internal environment despite fluctuations in the external environment.

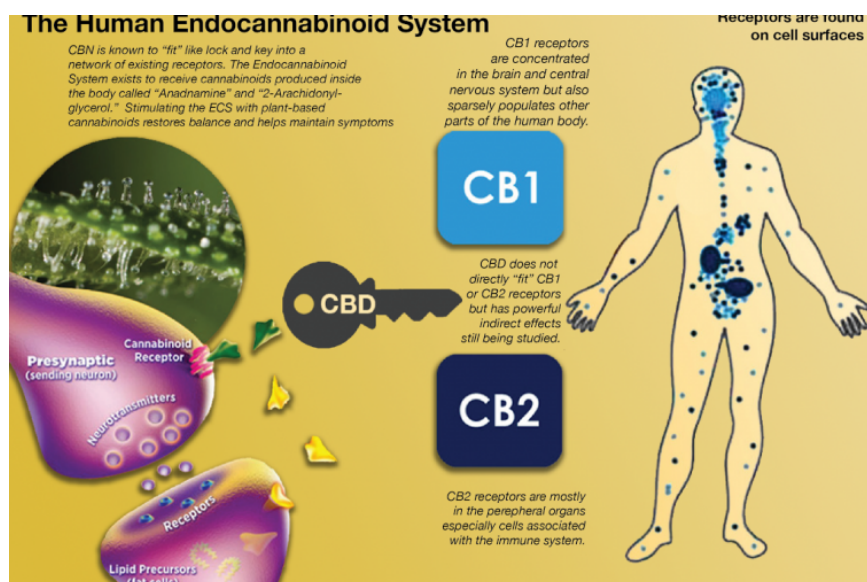
### The Endocrine System



The endocrine system is the collection of glands in the body that secrete hormones into the bloodstream to be carried towards distant target organs. The central neuroendocrine system is the interface between the brain and the rest of the endocrine systems. The part of the brain that balances the release of hormones in the body is called the hypothalamus and sits right on top of the pituitary gland where it regulates stress, metabolism, growth, reproduction, and lactation. All of these processes are regulated by the hypothalamus releasing or inhibiting the release of hormones by the pituitary gland. The release of pituitary hormones affects downstream physiological functions. Other hypothalamic neuroendocrine cells control water/salt balance, and lactation and childbirth, through the release of vasopressin and oxytocin. Together, these hypothalamic neuroendocrine functions enable the central nervous system to respond rapidly to internal or external environmental change, and to maintain a response through endocrine hormonal transducers. The endocannabinoid system modulates the regulation of the neuroendocrine system, which regulates organ function and stress response and helps maintain a healthy balance across the neuroendocrine system and related physiological body system.

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### Targeting the Endocannabinoid System for Endocrine Regulation



Cannabinoids in cannabis have long been known to be able to affect the secretion of pituitary hormones. By way of the ECS we regulate our hormonal balance, both up and down, through a direct effect on the organs themselves. The stimulation of the hypothalamic-pituitary-adrenal (HPA) axis is a crucial neuroendocrine response to stress and is dependent on CB1 receptor-mediated signaling. Activating the CB1 receptors in the hypothalamus results in a signaling cascade that

ultimately inhibits overall neuroendocrine function. Stress is well known to affect endocrine function and a poorly regulated endocrine system can lead to major health problems. The endocrine response, as part of the HPA axis, is central to its regulation.

Up until a few years ago, the stimulatory effects of cannabinoids on the HPA axis was considered as an exception. The commonly accepted view of the ECS was that it played a general inhibitory role on neuroendocrine functions. We now understand that cannabinoids can have both stimulatory and inhibitory effects on the HPA axis which is how it's able to modulate its regulation. These biphasic effects of cannabinoids, both stimulatory and inhibitory, are increasingly revealing themselves as we look closer at the interactions between the ECS and the endocrine system.

### **Cannabidiol (CBD)**

This brings us to the cannabinoid du jour, cannabidiol or CBD. Long playing the second fiddle to the more active tetrahydrocannabinol (THC). CBD does not interact strongly with either the CB1 or CB2 receptors. Instead, it is able to increase endocannabinoid tone by inhibiting fatty acid amide hydrolase (FAAH), and enzyme that breaks down cannabinoids in the body. FAAH inhibitors may be helpful for people with anxiety-related disorders because they appear to improve the regulation of the HPA axis. It's unknown precisely how this happens, how this happens but it appears they help to modulate the sensitivity of the cannabinoid receptors in the body.

In addition to its stimulatory effects on HPA, the ECS also plays a critical inhibitory role in regulating HPA functions. Researchers found that endocannabinoid signaling negatively modulates the stress-induced activation of the HPA axis, confirming the notion that an increase in endocannabinoid signaling activity may constitute a novel approach to improving the lives of people with anxiety-related disorders.

Currently, the best way to boost endocannabinoid signaling, improve the regulation of the HPA, and promote a healthy endocrine system is the use of a dietary cannabinoid supplement made from hemp. These products contain naturally occurring cannabinoids, including CBD, which have been shown to naturally increase ECS tone which helps to

improve the regulation of homeostasis across the HPA axis. This will improve both the physiological and psychological responses to stress making us more likely to resist the cascade that leads to HPA dysfunction and endocrine-related health problems. Enjoy a cannabinoid supplement every day!

Source: Uberto Pagotto, Giovanni Marsicano, Daniela Cota, Beat Lutz, Renato Pasquali; The Emerging Role of the Endocannabinoid System in Endocrine Regulation and Energy Balance, *Endocrine Reviews*, Volume 27, Issue 1, 1 February 2006, Pages 73–100, <https://doi.org/10.1210/er.2005-0009>

