

Abstract

Glucocorticoids, steroid hormones produced in the adrenal cortex, are essential regulators of many physiological processes and key hormones of the hypothalamus-pituitary-adrenal (HPA) axis, activated, among others, by stress. In addition to the stress response, glucocorticoid secretion exhibits a marked diurnal rhythmicity, which is key evidence of the controlling influence of the internal circadian system on the HPA axis. However, this relationship is complex and bidirectional, as glucocorticoids themselves act on some components of the biological clock and are primarily involved in adjusting the body's peripheral clock, functioning as an important humoral synchronization signal. Understanding this reciprocal regulation is crucial, as its disruption is associated with a number of pathophysiological conditions. This thesis summarizes the basic mechanisms by which the circadian system controls the rhythmic activity of the HPA axis and glucocorticoid production, and describes how glucocorticoids retroactively modulate the clock system. Finally, it briefly outlines examples of diseases, such as metabolic, endocrine, or neuropsychiatric disorders, in which deregulation of the interplay between glucocorticoids and circadian rhythms plays an important role.

Keywords: glucocorticoids, circadian clock, circadian rhythms, cortisol, HPA axis, suprachiasmatic nucleus, peripheral clock, autonomic nervous system