

# Autonomic Nervous System: Chapter 15. The circadian system and the balance of the autonomic nervous system (Handbook of Clinical Neurology)

Ruud M. Buijs, Carolina Escobar, Dick F. Swaab

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Autonomic Nervous System: Chapter 15. The circadian system and the balance of the autonomic nervous system (Handbook of Clinical Neurology) Ruud M. Buijs, Carolina Escobar, Dick F. Swaab Our biological clock, the suprachiasmatic nucleus (SCN), sets the pace of our life: it provides a rhythmic function to our sleep-wake cycle. In order to do so properly the SCN synchronizes our physiology to behavioral patterns by directing the autonomic and hormonal output of the hypothalamus to the different organs of the body that require a different setting – activity or inactivity – during particular phases of the day or night. In this chapter we show that this delicate balance requires that the SCN should not only provide an output to these organs but also be informed about the physiological state of the organs in order to adapt its output. This occurs via a hypothalamic neuronal network that provides the necessary input to the SCN. We argue that the feedback that the SCN receives from its hypothalamic target structures is essential to maintain a balance in our physiological functions, which fluctuate during the sleep-wake cycle. We propose that this crucial role of the hypothalamus in the homeostatic response is the reason why, e.g., in aging or depression, changes in the functioning of the biological clock, the SCN, lead to the development of pathology. In addition, if this balance is not adequately organized, for example, if the signals of the biological clock are violated by being active and eating during the night, as in shift work, one will be more susceptible to diseases such as hypertension, obesity, diabetes, and metabolic syndrome.



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