DOI:
10.1016/B978-0-12-809324-5.06868-1

Link to publication record in King's Research Portal

Citation for published version (APA):

Citing this paper
Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights
Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the Research Portal

Take down policy
If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 16. May. 2024
There is increasing public interest in neuroscience. Particular attention is paid to the cognitive, motor, and sensory systems, and their pathologies. But staying alive requires much more from our neurons. The mechanisms by which the brain and spinal cord control the basic life-sustaining functions are classified as regulatory. These include the neuronal networks that govern cardiovascular, respiratory, thermoregulatory, and gastrointestinal functions; hormone release from the various endocrine organs; energy and water balance; the sleep/wake cycle; growth, reproduction, responses to stress; and all the associated behaviors. Such processes are subject to little, if any, voluntary control, and in most cases we remain unaware of their status—conspicuous exceptions include blushing, sweating, sexual arousal, and hunger. “I didn’t realise the brain does that” is a familiar comment about many of the regulatory processes.

Whatever takes place within the central nervous system, all ensuing outputs depend on muscle activity or hormone release. These are the sole means by which the brain and spinal cord can act beyond their bony casings. Stephen Hawking’s thoughts would remain private without his residual control of a cheek muscle and the technology to which it is linked. For the regulatory systems, the muscle-mediated functions that can be seen externally range from simple reflexes, such as shivering, to elaborate appetite-driven sequences of behavior. In contrast, neuromuscular effects on blood flow are visible only when the vessels are superficial. For the brain’s control of hormone release—whether indirectly via the anterior pituitary gland or directly from the posterior pituitary gland or adrenal medulla—there are fewer outward signs. Visible indications of neuroendocrine activity include the onset of puberty and milk ejection.

A vast range of signals reach the brain from other parts of the body and beyond the body. For many regulatory systems, the principal signals entering or leaving the brain are blood-borne (Coen, 2015). Selected peptides gain entry through active transport mechanisms, but steroids, being lipophilic, enter by free diffusion. Vanishingly few cerebral functions are impervious to the endocapital signals entering or leaving the brain are blood-borne (Coen, 2015). Selected peptides gain entry through active transport static. Nevertheless, homeostasis or adrenal medulla and neurochemical heterogeneity (Thompson and Swanson, 2003).

As concerns grow about our stewardship of the global environment, it seems timely to draw attention to the neuronal systems that keep our internal environments functioning. These lifeguarding systems are comprehensively covered in the Regulatory Systems section of the Reference Module in Neuroscience and Biobehavioral Psychology. The articles, which have been designed for a wide readership, show that regulatory is a term denoting much more than basic housekeeping. The regulatory systems are essential not only for the life of the individual and the survival of the species, but also for the capacity to flourish in a wide range of environments. Such features make this field of research particularly exciting and fundamentally important for our understanding of health and disease.
References

