

Hormones as Tokens of Selection addresses deep questions in biology: How are biological systems controlled? How can one formulate general theories of homeostasis and control and instantiate such theories in mathematical models? How can one use evolutionary arguments to guide our answers to these questions, recognising that the control mechanisms themselves are a product of evolution? Biological systems are exceptionally varied and extremely difficult to understand, because they are complex and experimentation remains limited relative to the challenges at hand. Moreover, biological phenomena occur at a wide range of temporal and spatial scales.

Such a deeply convoluted subject calls for a unifying and coherent theoretical foundation — one which recognises and departs from the primary importance of mathematical modelling and key physicochemical principles to theory formation in the life sciences. This Focus monograph proposes and outlines such a foundation, departing from the deceptively simple proposition that hormones are tokens of evolutionary pressures.

FEATURES

- Provides a coherent and unified approach to a multifaceted problem
- Pays close attention to both the biological and mathematical modelling aspects of the subject matter, exploring the philosophical background where appropriate
- Written in a concise and innovative style

ABOUT THE AUTHOR

Hugo van den Berg is a mathematical biologist whose research includes work on the neuroendocrine control of hydromineral physiology in molluscs, nutrient and light limitation in microbial ecosystems, zinc homeostasis, genic selectionism, the foundations of biomathematics, the self/nonself problem in adaptive immunology, energy metabolism, diabetes, oncoprotein kinetics, bacterial cell division, transcriptomics-based prediction of electrodynamics in excitable tissues, and *in silico* reconstruction of smooth muscle tissue architecture.



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