

**BOOKS REVIEWED**

**INTEGRATIVE ACTION OF THE AUTONOMIC NERVOUS SYSTEM: NEUROBIOLOGY OF HOMEOSTASIS.** 2006. By Wilfrid Jänig. Published by Cambridge University Press. 610 pages. Price C\$200.

There have been relatively few attempts to describe, in a single volume, the complex central and peripheral neural circuitry that controls our more mundane “autonomic” functions such as the control of blood pressure, breathing and digestion. Over 15 years have passed since Arthur Loewy and Michael Spyer’s (Eds) book entitled “Central Regulation of Autonomic Functions” (1990) revealed in a multi-author volume the elegance of central autonomic control. In this book we had a comprehensive account of the degree to which the brain and spinal cord take part in the synchronicity and integration of autonomic functions, which are often thought to be merely simple reflexes. Bill Blessing did a superb job in bringing modern ideas about autonomic control to the fore in his account of “The Lower Brainstem and Bodily Homeostasis” (1997), but the ground covered was somewhat limited. Wilfrid Jänig’s account of the neurobiology of homeostasis “The Integrative Action of the Autonomic Nervous System” takes the field to a new level and despite being rather densely written it brings together a wealth of new material on all aspects of autonomic control from the target organs to the sophisticated central circuitries that control them.

This book is a tour-de-force from a person who has dedicated his career to understanding and explaining the complexity and elegance of the sympathetic nervous system. Coming from a background in pain research, Wilfrid Jänig moved into studies of the visceral nociception and the organization of the sympathetic nervous system. He championed the notion of functional specific control mechanisms in the autonomic system during the 1980s and early 1990s, based on quantitative functional neuroanatomy and painstaking electrophysiological studies, many of them in collaboration with Elspeth McLachlan. He then made seminal discoveries about the role of the autonomic nervous system (ANS) in the control of inflammation with Jon Levine at UCSF. These studies revealed new insights into the actions of the sympathetic innervation, providing some of the best examples of neuroimmune interactions and the control of inflammation and pain. More recently he has returned to pain research as a central theme, exploring sympathetic pain states and other pain syndromes with Ralf Baron as his principal collaborator. Few researchers can be said to have had such a profound and widespread impact on the field as Jänig and so it is fitting he chose to pour his boundless energies into this masterful volume.

One is immediately impressed by the precision of Jänig’s writing. His choice of language and his idiomatic style can be daunting at first, but I found it grew on me and I was constantly in awe of his depth of knowledge, evident in every section. It is clear he has taken the advice of many colleagues, whom he generously acknowledges – but this is his book and is an introspective account of the subject. Since these views are based for the most part on a balanced critical account of the field I think that most readers will be pleased with the nature of the writing.

The book is comprised of 11 chapters organized in four parts. Each chapter is well-illustrated with clever schematics and is extensively referenced. The beginning of the book deals with the

organization of the ANS and how it is structurally and functionally arranged to allow for precise homeostatic control. Autonomic transmission is discussed extensively, as are visceral afferent nerves. There is a very good chapter on the enteric nervous system that thoroughly describes the “3rd division” of the autonomic nervous system and illustrates how the only really “autonomic” part of the ANS functions to control digestion and host defence. The book then deals with spinal and supraspinal structures and how they pattern autonomic activity to precisely control the behaviours we associate with autonomic outflow – blood pressure, respiration, and gastrointestinal functions. It ends with an interesting and provocative chapter considering the higher integration of autonomic regulation and offering some insightful perspectives on future research directions.

There are certainly limitations in this book. For example, the vagal efferent cholinergic anti-inflammatory pathway is not mentioned, there is little mention of the important sympathetic innervation of bone, and the role of the ANS in energy balance is not dealt with in detail. But these shortcomings do not diminish my enthusiasm for this work. We have come a long way since Langley’s tiny book (a mere 80, 5” x 8” pages) defined the Autonomic Nervous System in 1921. Jänig’s work will stand the test of time and be an important reference work on this exciting field of neuroscience for many years to come.

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