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The hunger for sodium has been used as a model system in which to study how the brain produces motivated behavior. In this account of the field, Jay Schulkin draws together information across a range of disciplines and topics, ranging from the ecology of salt ingestion to the sodium molecule and the action of various hormones. The phenomenon of sodium hunger was discovered by Curt Richter, the great American psychobiologist, over 50 years ago. Its study has been of interest for some time to naturalists, psychologists, endocrinologists, physiologists and neuroscientists. This book offers a systematic account of the behavior of the sodium hungry animal as well as the endocrine and physiological mechanisms that act to maintain sodium balance and act on the brain to promote the search for, and the ingestion of, salt. Finally, the book provides a description of a neural network that orchestrates the behavior of salt seeking and salt ingestion.

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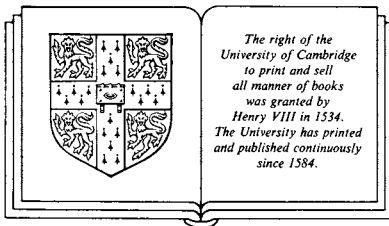
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To my science teacher, George Wolf

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Preface

When I was an undergraduate philosophy student, I heard from other students that the mind–body problem was really an issue of how the brain works. At my school, which was largely an art school, there was a neuroscientist named George Wolf. From him, I learned how the brain works. He had an interest in philosophy, so I could reciprocate and perhaps engage and nurture him in his own philosophical interests.

Within a short period of time, he handed me my first scientific project. It was not about the brain, though it quickly evolved into a project that was, because it was about a simple behavior – salt ingestion. The question was whether one hormone that generates this behavior does so by innate, as opposed to learned, mechanisms.

I was very fortunate: my first project worked. I found that mineralocorticoid-induced sodium hunger is innate. George, despite the fact that he told me what to do and how to do it (while letting me think I was doing it myself) declined to put his name on the paper. He told me that ‘if I put my name on the paper, you won’t get any credit’. In fact, it was the only paper that I have ever had accepted unconditionally.

Despite my going off to the University of Pennsylvania, George continued to be my scientific advisor, close friend and collaborator. But, at Penn and other places, I discovered and engaged a number of people who have enriched my life enormously. In fact, I have felt that I have had the best colleagues that one could hope for. I list some of them for you now: Gary Beauchamp, Linda Bartoshuk, Kent Berridge, Ted Coons, Derek Denton, Alan Epstein, Steve Fluharty, Bill Flynn, Mark Friedman, Harvey Grill, E.E. Kriekhaus, Maurizio Mass, Bruce McEwen, Rich Miselis, Ralph Norgren, Alan Rosenwasser, Paul Rozin, John Sabini, David Sarokin, Eliot Stellar and Mike Tordoff.

The data presented here reflect the laboratories I have worked in, colleagues I have been close to, and research findings I know the best. For those who, perhaps, may feel slighted I apologize. Authors, and I’m no different, stay with what they are most familiar: the work they have been involved in, or the people and research that they know well. Another factor I would like to call attention

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to is that this book emphasizes the behavioral side of sodium homeostasis. Thus, for a greater emphasis on physiological and pathological parameters, I refer the reader to Derek Denton's fine book on the subject.

Finally, I thank my friends, family, Bob and April for their encouragement and support. I have been supported by a Research Career Development Award from the National Institute of Mental Health, 00678, and by a Program Project Grant from the National Institute of Mental Health, 43787.