

# SODIUM HUNGER

The Search for a Salty Taste

JAY SCHULKIN



# Sodium Hunger The Search For A Salty Taste

**David M. Buss**



## **Sodium Hunger The Search For A Salty Taste:**

**Sodium Hunger** Jay Schulkin, 1991 The hunger for sodium has been used as a model system in which to study how the brain produces motivated behaviour 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 behaviour of the sodium hungry animal the endocrine and physiological mechanisms that act to maintain sodium balance and then 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 behaviour of salt seeking and salt ingestion Graduate students and research workers in psychology physiology and neuroscience will find valuable information in this review

*Reducing Salt in Foods* David Kilcast, Fiona Angus, 2007-02-14 Concerns have grown that consumption levels of salt are well above those needed for nutritional purposes and that this can lead to adverse effects on health in particular cardiovascular disease Consumers are increasingly looking to reduce their salt intake making salt reduction a priority for food manufacturers This is not straightforward though as salt plays an important role in food preservation taste and processability Written by a team of international experts *Reducing salt in foods* provides a unique review of current knowledge in this field This book is divided into three parts and discusses the major issues concerned with salt reduction and how it may be achieved Part one reviews the key health issues driving efforts to reduce salt government action regarding salt reduction and the implications of salt labelling Consumer perception of salt and views on salt reduction and are also discussed The second part focuses on the technological microbiological and sensory functions of salt and strategies that can be taken to reduce salt The final part of the book outlines strategies which have been taken to reduce salt in particular food groups meat and poultry seafood bread snack foods dairy products and canned foods *Reducing salt in foods* is an essential reference for health professionals governments and food manufacturers Discusses methods to reduce salt while maintaining food sensory quality shelf life and processability Provides a unique review of current knowledge in this field An essential reference for health professionals governments and food manufacturers

**Reducing Salt in Foods** Cindy Beeren, Kathy Groves, Pretima M. Titoria, 2019-06-18 *Reducing Salt in Foods* Second Edition presents updated strategies for reducing salt intake The book contains comprehensive information on a wide range of topics including the key health issues driving efforts to reduce salt government action regarding salt reduction and the implications of salt labeling Consumer perceptions of salt and views on salt reduction in different countries are also discussed as are taste processing and preservation functions of salt and salt reduction strategies Final sections discuss salt reduction in particular food groups including meat and poultry seafood bread snack foods dairy products and canned foods each one including a case study This updated edition also

includes a new section on the future of salt reduction the development of new ingredients to replace salt salt reduction in catering and how to teach new generations to adjust salt levels from an early age Completely revised and updated with an overview of the latest developments in salt reduction Presents guidelines to help with reducing salt in specific product groups Presents a new section on the future of salt reduction development of new ingredients to replace salt salt reduction in catering and how to teach new generations to adjust salt levels from an early age Contains new chapters on preservation issues taste issues and processing issues when reducing salt in food along with case studies that illustrate salt reduction

**Calcium Hunger** Jay Schulkin, 2001 This book brings together the behavioral physiological and neuroendocrine regulation of calcium An understanding of how the brain orchestrates whole body demands for calcium is introduced The approach is one in which behavior in addition to physiology serves bodily maintenance The book links basic and clinical literature surrounding calcium homeostasis as a wide variety of clinical syndromes are tied to calcium metabolism Because calcium is so important during life stages particular to women an emphasis is placed on the relevance of calcium to women's health throughout the book though not exclusively since calcium is fundamental to both sexes

**The Scientific Basis of Eating** Roger W. A. Linden, 1998 Eating is defined as the act of taking food into the mouth chewing and then swallowing it for nourishment The purpose of this volume is to present a number of up to date scientific reviews on the mechanisms involved in the process of eating and to introduce the reader to some of the problems encountered when these complex processes malfunction Topics include a discussion on the peripheral mechanisms of taste and smell taste and olfactory processing in the brain and its relation to the control of eating and a section on mastication with an account of the scientific basis of masticatory disorders The control mechanisms involved in salivation and swallowing are also extensively reviewed Because this book reviews the fundamental understanding of the physiological mechanisms involved in eating and includes an insight into the scientific basis of the malfunction of these mechanisms it will be of equal value to both clinical and basic scientists In particular basic and clinical oral biologists and neurophysiologists dental and medical researchers and postgraduate students will find it a valuable source of information

**Conditioned Taste Aversion** Jan Bures, F. Bermudez-Rattoni, T. Yamamoto, 1998-05-28 Conditioned taste aversion CTA is a robust defence device protecting animals against repeated consumption of toxic food It is characterised by the ability of many animals to learn to avoid certain substances by their sight smell or taste after experiencing an unpleasant or harmful reaction to them CTA is encountered at all levels of evolution with similar forms of food aversion learning found in vertebrate and invertebrate species whose ancestral lines diverged more than 500 million years ago CTA has a number of unusual properties contrasting sharply with the basic assumptions of traditional learning theories which has brought it increasingly to the attention of neurobiologists interested in neural plasticity In CTA the usual time parameters between stimulus and aversion are relaxed considerably frequently with delays of hours rather than seconds Moreover the critical stage of CTA acquisition may proceed under deep

anaesthesia incompatible with other forms of learning In the past decade several pivotal discoveries have considerably advanced our understanding of the neural processes underlying CTA and opened new possibilities for their analysis at the molecular and cellular levels This book written by three of the world's leading researchers in the subject comprehensively reviews the current state of research into conditioned taste aversion The first book of its kind to provide an up to date summary of research into the neuroanatomy pharmacology electrophysiology and functional morphology of CTA it will be welcomed by all researchers and graduate students in the field

#### **The Clinical Biology of Sodium** A. R.

Michell, 2014-04-08 The Clinical Biology of Sodium The Physiology and Pathophysiology of Sodium in Mammals presents a comparative view of mammalian sodium regulation and its clinical disturbances This book covers a wide range of topics including the physiological basis of fluid therapy oral rehydration for diarrhea the pathogenesis of edema hypovolemia endocrine regulation and disturbances and nutritional requirement Organized into 12 chapters this book begins with an overview of the distribution and physiological functions of sodium This text then explores the two processes that provide the basis of most of the non endocrine functions of the kidneys namely glomerular filtration and tubular reabsorption of sodium Other chapters consider the avoidable human and material costs of hypertension This book discusses as well the molecular biology of sodium transport The final chapter deals with the three mechanisms capable of detecting changes in cardiovascular filling This book is a valuable resource for doctors nurses and veterinarians

#### **The Physiology of Thirst**

**and Sodium Appetite** G. de Caro, A.N. Epstein, M. Massi, 2013-12-11 The behavioral neuroscience of thirst and sodium appetite are research ventures that have expanded dramatically in recent years Work done in the mid 1950s and early 1960s made it clear that drinking behavior could be affected by direct manipulations of the brain especially by brain damage and by pharmacological treatments Since that time experimental approaches have diversified and the research enterprise has attracted the interest of a broad international community of scientists Many aspects of both thirst and sodium appetite are being studied The most prominent of these are 1 phylogenetic and ontogenetic aspects of the phenomena of drinking behavior 2 the mechanisms of a variety of dipsogenic and antidipsogenic treatments both drugs and hormones 3 the biological controls of drinking and their interaction with the regulation of blood volume and blood pressure 4 the peripheral signals of drinking including the role of the baro and volume receptors 5 the receptor systems within the brain and the neuroanatomical circuitry for thirst and sodium appetite and 6 the possible roles of brain sodium and of the hormones of sodium conservation In the arousal of sodium appetite This acceleration of basic research activity has given insights into the clinical disorders of thirst and salt appetite and has produced pharmacological agents of potential therapeutic use

Comparative Psychology Gary Greenberg, Maury M. Haraway, 1998-09-01 Are bird songs learned or genetically programmed How do animals attract the opposite sex How does play affect development How do wolves signal surrender Which animals have been observed using tools Do squirrels ever forget food caches How do bees differentiate between hives

Can some animals count Examines the state of the art and its evolution Exploring the full range of animal behavior studies this authoritative Handbook covers the current state of the art as well as important historical developments in the field since its beginnings over a century ago It features original essays by comparative psychologists and other animal behavior researchers in experimental psychology who examine and report on the latest research and discoveries in the areas of evolution development and species typical behavior Discusses all other major approaches to animal behavior The Handbook is the only major reference work to offer a unique psychological perspective of the field It is also the only one to provide numerous examples of other major approaches to animal behavior and to discuss and compare them Arranged in eight major sections for quick and efficient information retrieval the Handbook Covers the history and philosophical foundations of comparative psychology spotlights key figures and provides international perspectives Surveys all the important concepts issues and theoretical developments in the field Addresses the latest methodology focusing on apparatus research design statistical techniques and zoo research Deals with physiological correlates of behavior hormones pheromones sensation and perception and sleep Provides intensive examinations of the behavior of a wide variety of species and groups of animals from cephalopods and insects to wolves and primates Covers the key psychological processes of learning and development of behavior a major emphasis of the field that distinguishes it from other approaches Treats the full range of functional behaviors by which individuals and species ensure survival and reproductive success Analyzes cognitive processes describing complex patterns of behavior in terms of information processing and use Ideal as a source book for students in comparative psychology ethology sociobiology anthropology and evolutionary psychology the Handbook is also a handy reference for scientists working in these fields and for the lay person who wants to understand animal behavior

*The Handbook of Evolutionary Psychology, Volume 1* David M. Buss, 2015-09-29 The indispensable reference tool for the groundbreaking science of evolutionary psychology Why is the mind designed the way it is How does input from the environment interact with the mind to produce behavior These are the big unanswered questions that the field of evolutionary psychology seeks to explore The Handbook of Evolutionary Psychology is the seminal work in this vibrant quickly developing new discipline In this thorough revision and expansion luminaries in the field provide an in depth exploration of the foundations of evolutionary psychology and explain the new empirical discoveries and theoretical developments that continue at a breathtaking pace Evolutionary psychologists posit that the mind has a specialized and complex structure just as the body has a specialized and complex structure From this important theoretical concept arises the vast array of possibilities that are at the core of the field which seeks to examine such traits as perception language and memory from an evolutionary perspective This examination is intended to determine the human psychological traits that are the products of sexual and natural selection and as such to chart and understand human nature Join the discussion of the big questions addressed by the burgeoning field of evolutionary psychology Explore the foundations of evolutionary psychology from theory and methods to the thoughts of

EP critics Discover the psychology of human survival mating parenting cooperation and conflict culture and more Identify how evolutionary psychology is interwoven with other academic subjects and traditional psychological disciplines The Handbook of Evolutionary Psychology is the definitive guide for every psychologist and student interested in keeping abreast of new ideas in this quickly developing field      **Encyclopedia of Neuroscience, Volume 1** Larry R. Squire,2009-06-12 The Encyclopedia of the Neuroscience explores all areas of the discipline in its focused entries on a wide variety of topics in neurology neurosurgery psychiatry and other related areas of neuroscience Each article is written by an expert in that specific domain and peer reviewed by the advisory board before acceptance into the encyclopedia Each article contains a glossary introduction a reference section and cross references to other related encyclopedia articles Written at a level suitable for university undergraduates the breadth and depth of coverage will appeal beyond undergraduates to professionals and academics in related fields      *Well-Being* Daniel Kahneman,Edward Diener,Norbert Schwarz,1999-07-08 The nature of well being is one of the most enduring and elusive subjects of human inquiry Well Being draws upon the latest scientific research to transform our understanding of this ancient question With contributions from leading authorities in psychology social psychology and neuroscience this volume presents the definitive account of current scientific efforts to understand human pleasure and pain contentment and despair The distinguished contributors to this volume combine a rigorous analysis of human sensations emotions and moods with a broad assessment of the many factors from heredity to nationality that bear on our well being Using the tools of experimental science the contributors confront the puzzles of human likes and dislikes Why do we grow accustomed and desensitized to changes in our lives both good and bad Does our happiness reflect the circumstances of our lives or is it determined by our temperament and personality Why do humans acquire tastes for sensations that are initially painful or unpleasant By examining the roots of our everyday likes and dislikes the book also sheds light on some of the more extreme examples of attraction and aversion such as addiction and depression Among its wide ranging inquiries Well Being examines systematic differences in moods and behaviors between genders explaining why women suffer higher rates of depression and anxiety than men but are also more inclined to express positive emotions The book also makes international comparisons finding that some countries populations report higher levels of happiness than others The contributors deploy an array of methods from the surveys and questionnaires of social science to psychological and physiological experiments to develop a comprehensive new approach to the study of well being They show how the sensory pleasures of the body can tell us something about the higher pleasures of the mind and even how the effectiveness of our immune system can depend upon the health of our social relationships      **Hormonally Induced Changes to the Mind and Brain** Bozzano G Luisa,2012-12-02 Describing the latest findings in both clinical and laboratory research this volume investigates the behavioral and neural affects of endocrine activity in animals and humans Each chapter discusses the relationship between normal endocrine control of behavior and the pathological consequences that result from endocrine

abnormalities The relevance to mental health and basic regulatory homeostatic events are balanced with a basic understanding of how hormones affect behavior and the brain The book is written to appeal to a wide audience of readers from the educated lay person to the seasoned M D and research scientist Chapter topics include the effects of endocrine activity on homeostasis sexual behavior aggression circadian rhythms and affective disorders in addition to discussing steroid abuse adrenal steroid effects on the brain and a detailed investigation on the effects of cholecystokinin and oxytocin

**Neurobiology of Food and Fluid Intake** Edward M. Stricker, Stephen Woods, 2006-05-04 Like previous handbooks the present volume is an authoritative and up to date compendium of information and perspective on the neurobiology of ingestive behaviors It is intended to be stimulating and informative to the practitioner whether neophyte or senior scholar It is also intended to be accessible to others who do not investigate the biological bases of food and uid ingestion who may teach aspects of this material or simply wonder about the current state of the eld To all readers we present this handbook as a progress report recognizing that the present state of the eld is much farther along than it was the last time a handbook was published but mindful of the likelihood that it is not as far along as it will be when the next handbook is prepared This eld has witnessed a spectacular accretion of scienti c information since the rst handbook was published in 1967 During the generation of science between then and the publication of the second handbook in 1990 numerous scienti c reports have substantially changed the perspective and informational base of the eld *Mind Ecologies* Matthew Crippen, Jay Schulkin, 2020-10-06 Pragmatism a pluralistic philosophy with kinships to phenomenology Gestalt psychology and embodied cognitive science is resurging across disciplines It has growing relevance to literary studies the arts and religious scholarship along with branches of political theory not to mention our understanding of science But philosophies and sciences of mind have lagged behind this pragmatic turn for the most part retaining a central nervous system orientation which pragmatists reject as too narrow Matthew Crippen a philosopher of mind and Jay Schulkin a behavioral neuroscientist offer an innovative interdisciplinary theory of mind They argue that pragmatism in combination with phenomenology is not only able to give an unusually persuasive rendering of how we think feel experience and act in the world but also provides the account most consistent with current evidence from cognitive science and neurobiology Crippen and Schulkin contend that cognition emotion and perception are incomplete without action and in action they fuse together Not only are we embodied subjects whose thoughts emotions and capacities comprise one integrated system we are living ecologies inseparable from our surroundings our cultures and our world Ranging from social coordination to the role of gut bacteria and visceral organs in mental activity and touching upon fields such as robotics artificial intelligence and plant cognition Crippen and Schulkin stress the role of aesthetics emotions interests and moods in the ongoing enactment of experience Synthesizing philosophy neurobiology psychology and the history of science *Mind Ecologies* offers a broad and deep exploration of evidence for the embodied embedded enacted and extended nature of mind Role of Calcium and Comparable Cations in Animal Behaviour



Patricia Wilkins, Ralph G Wilkins, 2007-10-31 Calcium and comparable cations are fast being recognised for their role as vital components of animal physiology When trying to answer questions such as why salmon can adjust to life in fresh water as well as seawater or why chilli peppers taste hot to humans but evoke little response from chickens we often find the answers lie in patterns of movement of these ions and their roles in sensing transmitting and collecting messages Bringing together scattered literature on calcium sodium potassium and magnesium in biology this book examines important biological contributions of these ions including enzyme activation effects in all types of muscle and biomineralization Attention is focused on channel construction and ion movement calcium as a second messenger and in the construction of solids and ion channelopathies with the help of personalities such as Agatha Christie van Gogh and Captain Cook *The Role of Calcium and Comparable Cations in Animal Behaviour* will be valued by a wide range of readers including students of bioinorganic chemistry and animal behavioural studies teachers and other professionals in academia *Thirst and Sodium Appetite*

Sebastian Grossman, 2012-12-02 *Thirst and Sodium Appetite* Physiological Basis describes the phenomenon of thirst and the mechanisms that define the need for water Thirst and appetite has generated much study and research about the physiological endocrinological and pharmacological mechanisms that influence water intake However in this book other concerns have been emphasized such as the significance of brain mechanisms in the subject matter This book consisting of 11 chapters starts with a basic description of thirst then to an analysis of basic physiological mechanisms that determine water intake Another topic also discussed in this book is various experimental paradigms that resulted to the dual depletion theory of thirst The neuroanatomical neuroendocrinological and neuropharmacological brain mechanisms are covered in three chapters of this book These brain mechanisms respond to different peripheral signals that stimulate the thirst The final chapters are dedicated to sodium appetite Although it has lesser literature than thirst has there have been significant developments in the understanding of the role of sodium appetite in extracellular thirst The last chapter reviews the questions that has kept investigators at bay and recommends direction of where future research may go *The*

*Pharmacology of Taste* R. Kyle Palmer, Guy Servant, 2022-06-13 *The Pharmacology of Taste* is comprised of contributions by leading scientists from the field of chemosensory research presented all together in the context of pharmacological principles of receptor function The chapters cover all levels of scientific inquiry from molecular and physiological mechanisms underlying taste signaling to its manifestation in overt behavior The overarching objective of this volume is to inspire the application of concepts and methods of pharmacology to the study of the chemosenses **Feeding in Domestic**

**Vertebrates** V. L. Bels, 2006 Domestication of vertebrates is based on the understanding of the needs of animals in their natural environment Thus the success of this domestication throughout human history is largely dependant of the knowledge of the animal feeding behaviour The aim of this volume is to provide advanced students and researchers with a review of current knowledge of feeding in domestic mammals and birds The book also presents chapters on feeding behaviour in

particular species the scope is wide covering not only ruminants poultry and pigs but also more specifically horses rabbits and ostrich Contributors include leading research workers from Europe USA Australia and South Africa

**Pleasures of the Brain** Morten L. Kringelbach, Kent C. Berridge, 2010 Pleasure is fundamental to well being and the quality of life but until recently was barely explored by science Current research on pleasure has brought about ground breaking developments on several fronts and new data on pleasure and the brain have begun to converge from many disparate fields The time is ripe to present these important findings in a single volume and so Morten Kringelbach and Kent Berridge have brought together the leading researchers to provides a comprehensive review of our current scientific understanding of pleasure The authors present their latest neuroscientific research into pleasure describing studies on the brain s role in pleasure and reward in animals and humans including brain mechanisms neuroimaging data and psychological analyses as well as how their findings have been applied to clinical problems such as depression and other disorders of hedonic well being To clarify the differences between their views the researchers also provide short answers to a set of fundamental questions about pleasure and its relation to the brain This book is intended to serve as both a starting point for readers new to the field and as a reference for more experienced graduate students and scientists from fields such as neuroscience psychology psychiatry neurology and neurosurgery

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