

PHYSIOLOGY OF SLEEP WAKE REGULATION



Process-S reflects the increase in sleep pressure, or drive, and is a function of the duration of wakefulness which starts accumulating after waking up in the morning.

Function of sleep deprivation

Sleep pressure increases during prolonged wakefulness and reduces during sleep.

Process S
Homeostatic Process

Two Process Model of Sleep Regulation

Process C
Circadian Process

SCN controlled

When light enters the eye and is translated via the retinohypothalamic tract to the suprachiasmatic nucleus within the hypothalamus, SCN signals the pineal gland to turn off melatonin production.

SCN- Suprachiasmatic Nucleus

When daylight intensity is diminished and its colour spectrum shifts from blue to red, the SCN signals the pineal gland to produce melatonin.

Rechtschaffen, A. A., Kales, S., Wittchen, A., & Peltsov, T. (1962). The two-process model of sleep regulation is essential. *Journal of Sleep Research*, 1(2), 111-119.

Sleep And Wakefulness

J Spring



Sleep And Wakefulness:

Sleep and Wakefulness Nathaniel Kleitman, 1987-09-15 For half a century Sleep and Wakefulness has been a valuable reference work It discusses phases of the sleep cycle experimental work on sleep and wakefulness sleep disorders and their treatment and such sleep like states as hypnosis and hibernation **Functional Anatomy of the Sleep-Wakefulness**

Cycle: Wakefulness Fernando Reinoso-Suárez, Isabel de Andrés, Miguel Garzón, 2010-10-13 Sleep is a necessary active diverse and periodic condition homeostatically regulated and precisely meshed with waking time into the sleep wakefulness cycle The authors present a detailed and updated review of the structures involved in the phase of wakefulness including their morphological functional and chemical characteristics as well as their anatomical connections *Local Aspects of Sleep and Wakefulness* Giulio Bernardi, Francesca Siclari, Michele Bellesi, 2020

It is now well established that sleep and wakefulness are locally regulated In fact typical sleep hallmarks such as slow waves and spindles display a clear regional modulation based on maturational and experience dependent brain plasticity Of note these regional changes have been suggested to reflect the off line processing and transformation of wake dependent brain modifications in line with a direct involvement of sleep in learning and memory consolidation In addition recent work showed that islands of wakefulness and sleep may often coexist in the same individual Indeed the incidence of local sleep like episodes during wakefulness increases following sleep restriction or deprivation but also as a consequence of the reiterated or extended use of task related brain areas Such sleep like activity seems to represent an index of functional fatigue and may have a significant impact on behavior and cognition On the other hand local wake like activity may occur during sleep and has been suggested to be involved in the generation and characterization of dream experiences Finally alterations in the balance between local aspects of sleep and wakefulness may contribute to explain symptoms commonly attributed to many sleep disorders such as insomnia or sleepwalking However preliminary evidence has also pointed to their potential involvement in neurological e g stroke and psychiatric e g major depression pathological conditions This Research Topic collects articles related to the investigation and characterization of local aspects of sleep and wakefulness **Brain Control of Wakefulness and Sleep** Mircea M.

Steriade, Robert W. McCarley, 2005-03-23 Point to the basic cellular physiology and anatomy described in earlier chapters Annotation 2005 Book News Inc Portland OR booknews com **Sleep and Wakefulness** Nathaniel Kleitman, 1939

Brainstem Control of Wakefulness and Sleep Mircea M. Steriade, Robert W. McCarley, 2013-03-09 This book is part of an ongoing history of efforts to understand the nature of waking and sleeping states from a biological point of view We believe the recent technological revolutions in anatomy and physiology make the present moment especially propitious for this effort In planning this book we had the choices of producing an edited volume with invited chapter authors or of writing the book ourselves Edited volumes offer the opportunity for expression of expertise in each chapter but we felt would not allow the development of our ideas on the potential and actual unity of the field and would not allow the expression of coherence that

can be obtained only with one or two voices but which may be quite difficult with a chorus assembled and performing together for the first time Unlike musical works there is very little precedent for rehearsals and repeated performances for authors of edited volumes or even for the existence of conductors able to induce a single rhythm and vision of the composition We thus decided on a monograph The primary goal was to communicate the current realities and the future possibilities of unifying basic studies on anatomy and cellular physiology with investigations of the behavioral and physiological events of waking and sleep In keeping with this goal we cross reference the basic cellular physiology in the latter chapters and in the last chapter we take up possible links to relevant clinical phenomenology **Sleep-Wake**

Neurobiology and Pharmacology Hans-Peter Landolt, Derk-Jan Dijk, 2019-09-03 This volume connects current ideas and concepts about sleep functions and circadian rhythms with the search for novel target selective sleep wake therapeutics To do so it provides a timely state of the art overview of sleep wake mechanisms in health and disease ongoing developments in drug discovery and their prospects for the clinical treatment of sleep disordered patients It particularly focuses on the concept that sleep and wakefulness mutually affect each other and the future therapeutic interventions with either sleep or wake promoting agents that are expected to not only improve the quality of sleep but also the waking behavior cognition mood and other sleep associated physiological functions The chapter Sleep Physiology Circadian Rhythms Waking Performance and the Development of Sleep Wake Therapeutics available open access under a CC BY 4 0 license at link [springer.com](https://www.springer.com) Sleep Research, 1989 **Cumulated Index Medicus**, 1973 Sleep '84 Werner Paul Koella, Eckart Rütger, Hartmut Schulz, 1985 **The Timing of Sleep and Wakefulness** James Thomas Enright, 1979 Neuronal Oscillations of Wakefulness and Sleep Thien Thanh Dang-Vu, Richard Courtemanche, 2020-05-29 The purpose of this work is to review recent findings highlighting the mechanisms and functions of the neuronal oscillations that structure brain activity across the sleep wake cycle An increasing number of studies conducted in humans and animals and using a variety of techniques ranging from intracellular recording to functional neuroimaging has provided important insight into the mechanisms and functional properties of these brain rhythms Studies of these rhythms are fundamental not only for basic neuroscience but also for clinical neuroscience At the basic science level neuronal oscillations shape the interactions between different areas of the brain and profoundly impact neural responses to the environment thereby mediating the processing of information in the brain At the clinical level brain oscillations are affected in numerous neurological conditions and might provide useful biomarkers that inform about patients evolution and vulnerability During sleep these brain rhythms could provide functional support to internal states that govern the basic maintenance of local circuit and systemic interactions During wake the rhythmicity of cortical and subcortical circuits have been linked with sensory processing cognitive operations and preparation for action This book will attempt to link together these sleep and wake functional roles at the level of neuroimaging and electroencephalographic measures local field potentials and even at the cellular level

The Timing of Sleep and Wakefulness J. T Enright,1980-02-01 *A Bibliography of Electrical Recordings in the CNS and Related Literature* ,1973

Neuroendocrine Correlates of Sleep/Wakefulness Daniel P. Cardinali,S. R. Pandi-Perumal,2010-03-14 As the title suggests and unlike other existing books on sleep medicine Neuroendocrine Correlates of Sleep Wakefulness will be devoted primarily to endocrine regulation of the behavioral state control It will address a wide spectrum of sleep wakefulness phenomena both animals and humans including pathogenesis diagnosis and management From molecular biology to applied clinical therapy sleep research has been transformed in the last few years from a research backwater to an important interdisciplinary field Anyone who regularly reads the literature on sleep biological rhythms or neuroendocrinology is aware that one of the subspecialties within sleep medicine the neuroendocrine correlates of sleep wakefulness has in particular experienced a growth rate that is even faster than that of the field as a whole To a significant extent this has been due to the introduction of new research technologies The widespread adoption of a range of new methods in sleep research has opened a window into activities at the cellular and molecular level which previously had been tightly closed Consequently these activities are being characterized with a degree of precision and sensitivity that is without precedent This volume invites the reader to explore the new vistas that have been opened onto the neuroendocrine frontier of sleep medicine The editors have selectively identified a number of key articles having a citation frequency which is considerably above the norm or which otherwise have contributed importantly to defining the neuroendocrine perspective This new volume on Neuroendocrine Correlates of Sleep Wakefulness is an up to date resource of research summaries and reviews written by major contributors to the fields of sleep biological rhythms and neuroendocrinology Its coverage is broad and its basic and clinical science reviews are detailed In this volume an international team of experts discuss their latest ideas concepts methods and interpretations with supporting examples This volume is intended for advanced students and specialists in psychobiology neuroscience neuroendocrinology and psychiatry but might also be interest to anyone concerned with understanding the Neuroendocrine correlates of sleep wakefulness The contributions are directed more towards providing an integrated view of the field from the perspective of the authors rather than being a compendium of recent results The intent is to provide a reference book for recent and future workers in this and related areas of medicine and biology Each topic in this volume has received the attention of a panel of authors who have responded to our request to review and place into perspective the major issues which will undoubtedly confront newcomers to the field The topics dealt with in Neuroendocrine correlates of Sleep wakefulness are both diverse and complex The editors hope that this volume will provide an authoritative summary of important issues in the neuroendocrine correlates of sleep wakefulness We also hope that it will motivate new researchers to join the quest for solutions to the problems that have been identified by our contributing authors

Sleep Bibliography ,1970

Basic Neuroscience Arthur C. Guyton,1991 This work explains how the brain functions in normal and abnormal states It emphasizes the neural tracks and functional neural interconnections

among parts of the central peripheral nervous system and explains the biophysics of nerve cell function It also features synaptic transmission and functional circuits pain processes motor function and the visual system Full colour drawings illustrate the total gross anatomy of the nervous system *The Neurosciences and Behaviour* Dale Michael Atrens,Ian Stewart Curthoys,1982 *Indexes to the Epilepsy Accessions of the Epilepsy Information System: 10001-20000* ,1978 Most of the current scientific literature on the subject as well as much of the pertinent past literature Worldwide coverage Includes monographic and serial literature Classified arrangement Each entry gives bibliographical information and classification codes **Indexes to the Epilepsy Accessions of the Epilepsy Information System** J. Kiffin Penry,1978

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