

Contents

1 Development of the Concept of Sleep-Wake-Promoting Systems in the Brainstem and Hypothalamus.	1
References.....	5
2 Dynamic NREM Sleep Regulation Models	7
References.....	11
3 Recognition of Spontaneous and Evoked Arousal- and Sleep-Like (Antiarousal) Phasic Events	13
3.1 “Phases d’Activation Transitoire” (PAT) (First Recognition that Arousal-Like Events Are Standard Constituents of NREM Sleep)	14
3.2 K-Complexes: The First Hit in Recognition of Reactive Deltas in NREM Sleep	15
3.3 Nature of Phasic Events and Two Basic Type of Reaction to Phasic Input During NREM Sleep	20
3.4 Consequences of the Recognition Phasic Events with Contrasting Features During NREM Sleep	20
3.5 Recognition of Cyclic Alternating Pattern (CAP): A System Reflecting the Degree of NREM Sleep Instability	21
3.6 Recognition of NREM Sleep Microstructure Conceived in CAP: Theoretical and Practical Values	27
References.....	27
4 The Cyclic Structure of Sleep: Relationship Between the Macrostructural Slopes of Cycles and Microstructural Dynamics	31
4.1 Opposite Trends Across Descending and Ascending Slopes of Sleep Cycles.....	32
4.2 Distribution of Phasic Events and Micro-arousals Across the Sleep Process.....	34

4.2.1	The Distribution of PAT-Like Micro-arousals Across the Sleep Process	34
4.2.2	The Distribution and Dynamics of K-Complexes Across the Sleep Process	34
4.2.3	How Does CAP Behave Across the Cycles and During the Different Slopes of Cycles?.....	36
4.3	Tonic and Phasic Regulation in NREM Sleep: Relationship of the Macro- and Microstructure of Sleep Cycles	37
4.4	The Nature of State Transitions and Defense Mechanisms Against Transitions (Providing Stability by Permitting Lability)	39
4.5	Promoting Forces Behind (Alternating Chemical Influences and Faster Phasic Reciprocal Sleep- and Wake-Promoting Inputs)	40
	References.....	42
5	Changing Views of NREM Sleep Homeostatic Regulation	45
5.1	Discovery and First Views on Homeostatic Regulation	45
5.2	Use-Dependent Homeostatic Regulation and Local Plasticity: Sleep-Dependent Improvement of Learning and Plasticity.	47
	References.....	51
6	Homeostatic Features of the CAP System and the Physiological Mechanism of Reactive Slow Wave Activity	55
6.1	CAP System and Sleep Homeostasis: Is CAP an Instant Homeostatic Tool?.....	55
6.2	Mechanism of Sleep-Like Response in NREM: Relationship with the Late Slow Wave Components of Sensory Evoked Responses	60
6.3	Artificial Boosting Slow Oscillation During Sleep (Studying the Basic Slow Wave Producing Defense Mechanism).....	64
	References.....	68
7	Slow Wave Activity as Substrate of Homeostatic Regulation.....	73
7.1	A Short History of Slow Waves	74
7.2	Is There a Frequency-Based Typology of Slow Waves?.....	75
7.2.1	The Controversy of Below or Above 1 Hz	75
7.2.2	Below 0.1 Hz: Infralow Oscillation in Light of the Full-Band EEG Recordings	78
7.3	Up and Down States of Slow Waves	79
7.4	Imaging of Slow Waves in Sleep.....	82
7.5	Relation of K-Complexes and Sleep Slow Waves	84

7.6	Ontogenetic Aspects of Slow Wave Activity in Sleep	86
7.7	Phylogenetic Aspects of Slow Wave Activity	88
7.7.1	Peculiarities in the EEG Amplitude of Poikilotherms	88
7.7.2	Peculiarities in the Slow Waves of Poikilotherms: Vigilance Level and Responsivity	89
7.7.3	Peculiarities in the Chemical Background of Arousal in Poikilotherms	92
7.8	The Slow Waves in REM Sleep	94
	References	97
8	The Need of Slow Wave Activity and Cognitive Functions.	103
8.1	The Need of Slow Wave Sleep	104
8.2	Physiological and Pathological Human Evidences for the Relationship Between Frontal Slow Waves and Frontal Cognitive Functions.	107
8.3	CAP and Cognitive Functions	107
	References	108
9	Overview	111
9.1	Summary	111
9.2	Endeavors, Achievements, and Limitations	114
9.3	Outlook	114
	Index.	115

Dynamic Structure of NREM Sleep

Halasz, P.; Bodizs, R.

2013, XV, 125 p., Hardcover

ISBN: 978-1-4471-4332-1