

Fundamentals of behavioral neuroscience and experimental research techniques

Nevzat Yüksel¹

¹Prof., Ankara, Turkey, <https://orcid.org/0000-0002-9448-4987>

Book Title: “Fundamentals of behavioral neuroscience and experimental research techniques”

Author Prof. Dr. İsmail Tayfun Uzbay

Press House WOPPHO (World Physicians Publishing House (Ankara Nobel Tıp Kitabevleri LTD ŞTİ) 462 pages

The author is currently the advisor to the rector, head of the Department of Internal Medicine at the Faculty of Medicine and director of the Neuropsychopharmacology Application and Research Center at Üsküdar University.

The book begins with a preface including a brief history. In the preface, it is stated that Hippocrates, who lived in Antiquity, emphasized that the source of emotions was the brain in his work Sacred Disease, Arateus, who lived in Cappadocia, defined the symptoms of mania, depression and schizophrenia as abnormal behavioral patterns, and Ibn-i Sina mentioned experimental psychology in the early 9th century. Descartes recognized the connection of abstract behaviors with the brain. The first observations of experimental medicine date back to the early 20th century. The Italian pathologist Camillo Golgi discovered the intracellular structure that bears his name. The discovery of neurons and their communication with each other formed the basis for the study of behavioral neuroscience. Diseases such as stroke, autism, schizophrenia, substance abuse and Alzheimer's disease cause serious workforce losses and increase the burden of these diseases on society. This has led to an accelerating interest in neuroscience. Research has reached and surpassed the molecular genetics stage.

Apart from this introduction, the book consists of two main sections, an introduction, 21 sub-chapters, references and an index. The first main part is entitled Foundations of Behavioral Neuroscience and consists of seven sub-chapters.

The introduction lists the disciplines to which behavioral neuroscience is related and discusses the behavioral implications of these connections.

The first chapter of the first main section deals with the microscopic structure of the nervous system. In this section, the microscopy of the neuron, its extensions and their structures, cell membrane and ion channels, types of neurons according to differences in function, types of neurons according to differences in appearance and structure, and the structure and functions of glial cells are described. In addition, the blood-brain barrier, which regulates the passage of blood to the central nervous system and protects the brain from external factors, is covered in detail and the information is supported by schematic illustrations.

The second chapter is titled Nervous System and deals with the peripheral and central nervous system separately. The peripheral nervous system is divided into somatic and autonomic systems and basic information about the functions of these structures is presented. Under the title of central nervous system, the anatomical structures and connections of the brain are explained.

The third chapter is titled Inter-neuronal Transmission in the Nervous System. In this chapter, the structures that mediate the transmission of information between neurons, the concepts of post-synaptic excitation and inhibition, receptors and their subtypes, and the classification and functions



of chemical transmitters are discussed.

In the fourth chapter, the structure, connections and functions of neurotransmitter systems are examined. In this context, noradrenaline and noradrenergic system, dopaminergic system, serotonergic system, cholinergic system and polyamines are discussed in detail. Polyamines are given special importance in the book. The main reason for this is that agmatine was identified by the author as a separate pathway in schizophrenia apart from the dopamine system. This is a new avenue for developing new drugs. The chapter discusses their synthesis and metabolism pathways as well as their role in neuropsychiatric disorders and states that agmatine has modeled schizophrenia in experimental studies. The chapter continues with the GABAergic system, purinergic system, adenosinergic system and peptidergic systems.

The fifth chapter focuses on brain development, explaining how developmental processes develop and what kind of problems can be encountered.

The sixth chapter is titled Neuroplasticity. The concept of neuroplasticity describes the ability of the nervous system to change its structure and function by learning from experience. The chapter includes the systems involved in these processes, learning processes and their functions.

The seventh chapter is titled Brain Reward System. This chapter highlights the importance of pleasure and reward in mammalian behavior and describes in detail the discovery, history, anatomy and role of

dopamine in this system.

The second main part of the book is devoted to experimental techniques and animal models used in behavioral neuroscience research. After a brief introduction, the chapter continues with a general information section. In this chapter, ethical principles to be followed in research, laboratory infrastructure and infrastructure of experimental animals and breeding of animals, general rules of studies, classification of animal models and new drug development are explained.

In the following chapters, motor activity and motor coordination tests, tests for learning and memory measurement, experimental models for Alzheimer's disease; studies on anxiety, pain and pain mechanisms, experimental models for Parkinson's disease, substance abuse, attention deficit hyperactivity disorder and autism spectrum disorder, optogenetics and intestinal microbiota studies are included and the book is completed with references and index.

I congratulate the author for bringing such a book into our language.

Correspondence Address: Prof., Nevzat Yüksel, Ankara, Turkey
nyuksel@gazi.edu.tr
