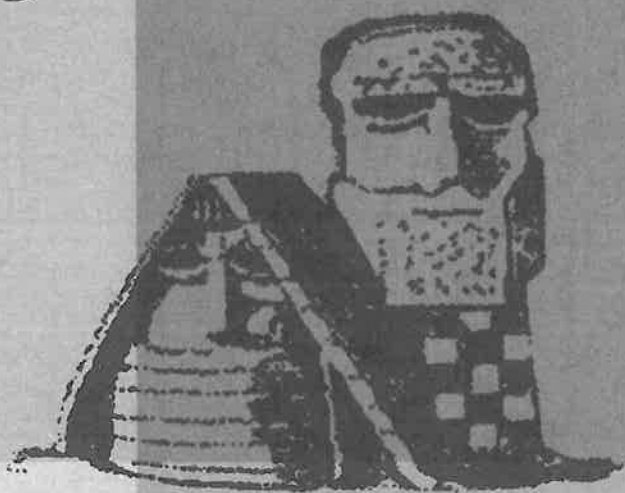


Pain Mechanisms and Management

S.N. Ayrapetyan and A.V. Apkarian

Յաւրդ տալիս



Tsavet danem

IOS
Press

Ohmsha

Foreword

*Is the pain more dangerous than the medicine we use to cure it?
Who can answer this simple flat question?
What fool?
And who can argue with pain?
What fool?
Arguing with pain is like the sea arguing with the salt.*

*From "The world's old wounds" by Barooyr Sevag, 1971,
Translation by Peter Balakian.*

This book is the result of a symposium held from 22 to 28 September 1996, in Stepanakert and Yerevan in the Nagorno Karabagh Republic (NKR) and the Republic of Armenia. For 6 days, forty-five participants enjoyed the good will and hospitality of the Armenians in both lands. Given the remoteness of the meeting site, participation had to be limited. Several of the chapters are written by scientists who could not attend the meeting. However, we were fortunate enough to attract a group of eminent scientists, and enjoyed intense discussions on the topical presentations. These plenary discussions are included with the corresponding essays.

The scope of current pain research is vast, and this book--and the symposium--could not adequately portray the field. Instead it presents some important issues in pain research, including molecular biology, pharmacology, central physiology and functional brain imaging, and portrays the most recent directions that pain research is branching into. The book is the reflection of an effort to expand the scope of discussion in pain research and therapy by cross-fertilization between western and Former Soviet Union (mainly Armenian) scientists. The special circumstances of the country of meeting prompted due consideration of pain issues largely ignored in current thinking, namely the impact of war and natural disasters on pain perception and pain management, particularly in circumstances where resources are limited. These considerations acquire great significance when we bear in mind that, at any one time, about one third of the world's nations are at war.

The topics of the papers largely represent the particular interests of the Armenian scientists, such as the mechanisms of metabolic regulation of the neuron, the role of the hypothalamus in pain, and the biochemistry of opiate drugs. Armenian scientists conducted special field studies and presented the results on biologically active substances unique to the Armenian lands that may be used for development of new pain drugs.

It is worth mentioning, in this context, that our meeting was the first international scientific meeting to be held in NKR. Many colleagues asked why we decided to conduct the meeting in such a remote place. I believe that most of the participants came to understand the scientific, political, and personal motivations underlying the effort. Unfortunately, the reader can only partake of the scientific discourse. In this space, I thought it worthwhile to share a few of the experiences of the symposium.

The amphitheater in Stepanakert where the meeting was held was renovated weeks before the meeting started. Our conference was the first event hosted there. During the war, this building had been hit by more than 700 aerial bombs. To us it was just another beautifully lit structure with facilities for seating more than 500 people. On behalf of all the

participants I thank the government of NKR and the people of NKR who presented to us a large number of such miracles.

While discussions regarding the mechanisms of Halothane anesthesia and receptor binding properties of opiates were ongoing, a small group of the participants visited Stepanakert's hospital, the main health care center of NKR. We arrived just in time to witness a surgical procedure performed on a child while the mother was restraining her because the surgery had to be done without anesthesia since the hospital had run out of the necessary drugs.

Credit for the success of the meeting is primarily due to all the participants. I want to thank all those who attended, as well as those who contributed essays despite their inability to attend the meeting. Particular thanks go to the numerous individuals that contributed variously to the success of the meeting. Many thanks go to Catherine Porter, president of the Human Rights Alliance, who dedicated her office and staff to help us procure the funds necessary for the symposium; she was unfortunately unable to attend the meeting because of health problems. We also thank Carolyn Mugar and Prof. J.M. Besson for financial assistance. We wish to acknowledge the scientific and government institutions that provided funds for the meeting, or for particular scientists, including the US NIH, Naval Research Office, the Gulbenkian Foundation in Portugal, the British MRC, the International Pharmacological Society, the International Biophysical Society, the National Academy of Science in Armenia, the International Association for the Study of Pain, the International Brain Research Organization, Monsanto Company and the Lebanese government. Personal thanks go to the organizing committees in Armenia and NKR, and to Narine Khatchatrian and Heike Newman for helping with the manuscript and the meeting. Thanks also to my sister, Gassia Apkarian, and brother, Prof. V. Ara Apkarian, for their support in this endeavor.

A. V. A.

Preface

This volume represents the materials of the International Symposium on the Application of the Theory of Metabolic Regulation to Pain, held in Stepanakert, Nagorno-Karabagh Republic and Yerevan, Republic of Armenia on the 22-28th of September, 1996. The lectures (with their discussions) of the participants from different countries, who are working on molecular, cellular, physiological, pharmacological and therapeutic aspects of pain are presented here.

The purpose of this symposium was to bring together basic researchers and clinicians to discuss mechanisms of nociception and pain. Strategies for adequate management of pain in developing countries were a major topic of discussion. The book is divided into six sections. The first section deals with the fundamental properties of the neuron, its metabolic regulation both in normal and ischemic states, and its molecular properties regarding axoplasmic transport and neurotransmission. Here, Ayrapetian introduces the notion that metabolic pathways underlying abnormal discharges of neurons may explain nociceptive transmission. The second section examines peripheral and spinal cord mechanisms of pain, with a strong emphasis on receptor dynamics, neuro-immune modulation, and cellular and metabolic pathways underlying nociceptive physiology. The third section is composed of chapters regarding the supraspinal physiology of nociception and pain. This section includes animal physiology and brain imaging and transcranial stimulation studies in humans, and a broad discussion of the correspondence between animal and human studies. The section also reflects the recent expansion in supraspinal pathways thought to be involved in pain perception and pain modulation. Chapters in section expound on the pharmacology of pain, and studies regarding molecular modeling and the use of natural resources for developing new drugs are presented. Section five deals with social issues regarding pain management, especially in disaster areas in countries with limited resources. Chapters in the sixth section are by Austrian pain researchers and clinicians who have conducted multi-centered studies regarding various approaches for clinical management of pain.

S.N.A. and A.V.A.