

# ADVANCES IN NEUROLOGY

# Advances in Neurology

## Volume 4

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International Symposium on

# PAIN

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## Foreword

The field of pain research and theory, which lay conceptually stagnant for almost a century, has suddenly become alive—full of new controversy and renewed fascination. The simple-minded answers of the past are being critically examined, and new questions are constantly being raised that challenge the investigator and point the way to new approaches to control pain. Furthermore, important advances in research and theory are being translated into effective clinical techniques. There are few problems that are more worthy of human endeavor than the puzzle of pain. Its solution is compelled by the human desire to relieve pain and suffering, for those who will recover and go on to lead useful lives, and for those whose lives are coming to an end.

Dr. John J. Bonica, the editor of this volume, is at the forefront of those who have focused specifically on pain as a major human problem and have brought about the recent revolution in pain research and clinical approaches. Dr. Bonica is one of the world's outstanding authorities on the treatment of pathological pain. His famous Pain Clinic at the University of Washington School of Medicine serves as a model for all such clinics. He has also pioneered the use of regional anesthetic blocks as powerful diagnostic and therapeutic tools in the attack on pain. Dr. Bonica's complete dedication and devotion to the discovery of ways to relieve pain and suffering led to the conception and organization of the first truly *International Symposium on Pain*. His organizational ability gave the conference substance and format, and brought it to full bloom; it has come to fruition in the form of this book.

The attendance at an international meeting is necessarily limited. Now, with the publication of this volume, all physicians and scientists interested in the field have the papers presented at the meeting available to them—in succinct, comprehensible form. No other book on pain has the range and scope of this one. It comes, moreover, at a remarkably opportune time—when the breakthroughs are occurring, and new approaches are being developed—including electrical stimulation of peripheral nerves and spinal cord, acupuncture, and new psychiatric, pharmacological, and neurosurgical approaches. It reflects all of the excitement of a field undergoing rapid change—and, as the pieces of the puzzle of pain are seen to fall into place, it provides the pleasure and excitement that comes with growing insight into a major problem.

The Symposium and this volume represent a milestone in pain research, theory, and therapy. The monograph fulfills a long-standing need for a comprehensive summary that covers the full gamut of problems in the field of pain. It provides the physician and scientist with the most recent research and clinical approaches to the problem of pain. This is an important book

that is certain to have a powerful impact on the development of the field, particularly for those practicing physicians, research scientists, and medical students who want to begin work on one of the most important problems in medicine and the biological sciences.

Ronald Melzack, Ph.D.  
*McGill University*  
*Montreal, Quebec, Canada*

## Preface

Pain is a major human concern influencing every aspect of life; it is the most common symptom of disease which compels patients to seek medical counsel. Whereas acute symptomatic pain serves the useful purpose of warning the individual of something wrong and is a useful diagnostic aid for the physician, in its chronic pathologic form, pain is a malefic force which often imposes severe emotional, physical, and economic stresses on the patient, on his family, and on society.

Chronic pain is the most disabling disease, and thus constitutes a serious national and world health and economic problem. Although accurate statistics are not available, data from a variety of sources suggest that chronic pain states cost the American people many billions of dollars annually. Costs include those of hospital and health services, loss of work productivity, compensation payments, and litigation. For example, in 1971, low back pain alone cost the people of California \$200 million. Some of the patients referred to the Pain Clinic of the University of Washington have spent over \$25,000 in health services, have had as many as 10 to 15 operations for their chronic pain problem, and have been disabled for as long as 10 years, so that the total cost to society could be estimated to run as high as \$100,000 per patient.

Even more important is the cost in terms of human suffering. It is a distressing fact that in this age of marvelous scientific and technologic advances which permit us to send people to the moon, there are still hundreds of thousands, and indeed millions, of suffering patients who are not getting the relief they deserve. Many of these patients are exposed to a high risk of iatrogenic complications from improper therapy, including narcotic addiction, or are subjected to multiple, often useless, and at times mutilating operations. A significant number give up medical care and consult quacks who not only deplete the patient's financial resources, but often do harm; some patients with severe, intractable pain become so desperate as to commit suicide.

Why do these deficiencies exist which seriously detract from our biomedical scientific achievements? The many reasons can be grouped into two categories: one is the great void in our knowledge of the mechanisms and physiopathology of pain and other information essential to proper therapy. Although it is true that a great mass of new information has been adduced from numerous anatomic, neurophysiologic, biochemical, and psychologic studies during the past century, most of this information has not been as beneficial to patients with chronic pain as one might anticipate. This less-than-optimal payoff from the many research efforts is due, in turn,

to the fact that little attention has been paid to application of new knowledge and technology to the study of chronic pain states.

The second major reason for the deficiencies in managing patients with chronic pain has been the improper or inadequate application of knowledge currently available to the care of patients. The reasons for this include the lack of organized teaching of medical students and physicians in the management of patients with chronic pain, the progressive trend toward specialization which is conducive to each specialist viewing pain in a very narrow, tubular fashion, and the inability or unwillingness of some practitioners to devote the necessary time and effort to the care of these patients.

A matrix common to all of these causative factors has been the poor and, indeed, at times, total lack of communication among investigators and between this group and clinicians. The usual mechanism of disseminating new information—publications in highly specialized journals limited to specific fields and meetings generally limited to a specific group—has precluded cross-fertilization and dissemination of information among the various basic science groups and clinicians. The poor interaction among basic scientists of different disciplines has virtually precluded the application of vitally important new information acquired by neurophysiologists, for example, to the research programs of other scientific disciplines. Moreover, it has impaired cooperation among various basic science and clinical investigators—a condition necessary to solve clinical problems. This has also resulted in a great lag in the clinical application of new information useful and pertinent to the care of patients with chronic pain.

Other major communication problems include lack of an international standard terminology for pain syndromes, no epidemiologic data on pain as a disease state, and the lack of national and international pain data bases or data pools—essential requisites to optimal communication and evaluation of old and new methods of therapy.

During the past few years there have been serious efforts to help rectify some of these deficiencies. For one thing, there has been an impressive surge of interest among some basic scientists in studying mechanisms of chronic pain syndromes and in collaborating with clinical investigators and practitioners to solve some of the major problems. Another has been the development by some investigators of animal models which simulate such chronic pain syndromes. Still another important recent development has been the creation of multidisciplinary pain groups which include basic scientists and a variety of clinicians collaborating in research, teaching, and patient care.

This monograph contains the proceedings of the International Symposium on Pain held on May 21–26, 1973, at the Providence Heights Conference Center, Issaquah (Seattle), Washington. During the five-and-a-half day meeting, a total of 89 formal papers were presented, discussions were held after each session, and, in addition, at the end of each day persons interested

in each specific area met for group discussions for further questions, comments, and informal discussions.

The program consisted of two major parts. During the first three days, reports of basic and clinical studies were given, and the last two and a half days were devoted to diagnosis and therapy of pain. The research papers dealt with the neuroanatomic, neurophysiologic, and biochemical substrates of pain, and the physiopathology of a variety of pain syndromes. The papers dealing with diagnosis and therapy contained recent information on new techniques or reappraisal of older ones.

The discussion held after each session has been edited by the chairman of the session. Space limitations made it necessary to include only points and comments which were particularly relevant to the topic. Notwithstanding the "trimming," I believe the summaries contain the main points made during the conference.

The Symposium was attended by more than 350 physicians, scientists, and other health professionals from 13 countries, representing virtually every basic science and clinical discipline involved in pain research and therapy. It was the consensus of all participants that the Symposium fulfilled its objectives. Various factors, particularly the interest generated among the participants and the location of the Conference Center, encouraged persons with diverse research and clinical interest to listen to each other: the clinician had an opportunity to listen to reports of basic scientists and basic scientists had occasion to learn firsthand the clinical problems which need solution.

A very important development was the unanimous endorsement by the group to found "The International Association for the Study of Pain" with the following objectives: (1) to stimulate progress in the study of pain mechanisms and management of chronic pain; (2) to hold international symposia or meetings at appropriate intervals in different countries; (3) to facilitate publication of significant new information in the field of pain; and (4) to recommend standards relating to use of drugs, appliances, and other procedures in the treatment of pain. After the organizing committee completes the necessary procedures for the formal founding of the association, applications for membership will be considered. Membership in the association will be open to scientists, physicians, and other health professionals, and other persons interested in the objectives of the association. A committee, chaired by Madame Albe-Fessard was appointed to develop plans for the scientific program for the first meeting of the Association which will be held in September 1975 in Florence, Italy. Another committee, chaired by Professor Patrick Wall, is exploring mechanisms for the publication of proceedings and the founding of a journal on pain. Inquiries about the association should be directed to me.

We hope this volume will stimulate greater research efforts and help define new areas and new directions for future investigation and also stimulate



new collaborative research and clinical programs. It should provide academicians, clinicians, and other health professionals with new information which hopefully will be used to enhance the education of those concerned with care of the patient with pain and promote the rapid application of the information for better and more scientific care of patients with chronic pain.

Finally, we hope that this volume will help to bring national and international attention and proper focus to this important health problem. In this way, we hope that we will help to improve the welfare of man which, in the final analysis, is the primary responsibility, a very important objective, and the crowning achievement of every biomedical scientist and clinician.

I want to thank Dean Van Citters for the support he has given to the Symposium. I also wish to express our appreciation to the National Institutes of Health and especially to Drs. Kreshover, Ganz, and Driscoll of the National Institute of Dental Research, Drs. Stetten, von Euler, Heming, and Black of the National Institute of General Medical Sciences, and Dr. John Decker of the National Institute of Arthritis and Metabolic Diseases. Special thanks are due to the various companies for their financial support, without which it would have been impossible to have such a large number of speakers come to Seattle. I also express sincere appreciation and thanks to the members of the Organizing Committee for their contribution. The chairman of each session and the group leaders are to be commended for keeping a full program on schedule and for coordinating and editing the discussions.

I express very special thanks and utmost appreciation to Miss Louisa Jones, Publications Editor of the Department of Anesthesiology at the University of Washington, for her truly magnificent contributions to the Symposium and the publication of the monograph. She provided invaluable help in efficiently carrying out the literally hundreds of details and procedures inherent in planning, coordinating, and running such a large meeting. Many, many participants expressed to me their great appreciation of not only her efficient help but also the warm and friendly attitude she manifested throughout the Symposium. Finally, her editorial talents played a critical role in the publication of this monograph.

John J. Bonica, M.D.

*The Organizing Committee expresses appreciation for the financial support given the International Symposium on Pain by the following:*

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# Introductory Remarks

On behalf of Dr. DeWitt Stetten and the National Institute of General Medical Sciences, I bring best wishes for a successful conference.

The Institute has two major missions within the NIH: to support non-categorical basic biomedical research, and to support and develop multi-categorical research of interest to two or more separate institutes. The latter includes our clinical and physiological sciences program through which research in the areas of anesthesiology and trauma is supported. Among the important goals is the relief of pain. To advance toward this goal, we believe support for many different disciplines is necessary, including not only anesthesiology and trauma research but also pharmacology, physiology, and behavioral science.

Although there is a natural route for support of pain research through these programs, very few project applications directly related to studies on pain have been submitted. At the present time, specific investigations on pain are supported through the anesthesiology research centers, especially at the University of Washington Medical School and at Harvard University. It seems obvious that the amount of research on the nature and control of pain is in no way commensurate with the problem: there are 25 million surgical procedures a year requiring anesthesia and millions of people suffering from chronic pain.

Dr. Bonica ranks chronic pain as the most common disabling symptom and estimates that, as a result, millions of man-hours are lost each year. While scientists seek the causes and cures of major diseases, they pay relatively little attention to the extent and nature of the pain associated with these diseases. To discover the elusive mechanisms of pain and therapeutic measures for its relief, we believe that greater support for research in this area is needed.

Emilie A. Black, M.D.

*Chief, Clinical Sciences Section*

*National Institute of General Medical Sciences*

On behalf of the School of Medicine of the University of Washington, it is my honor to welcome you to this International Symposium on Pain. I am particularly proud of Dr. John J. Bonica for having conceived and organized this great meeting, and I thank him for the great efforts he has expended

to bring together this impressive assembly of experts. I offer my personal greeting to each participant and my best wishes for what promises to be a very stimulating, informative, and professionally rewarding conference.

Robert L. Van Citters, M.D.  
*Dean, School of Medicine*  
*University of Washington*

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