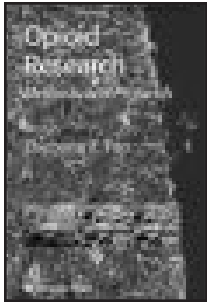# BOOK REVIEW

***Opioid Research: Methods and Protocols*. Edited by Zhizhong Z. Pan, PhD. Published by Humana Press, Totowa, NJ, 2003; 308 pp.**

Our understanding of opioid dynamics comes as a result of the molecular characterization of opioid receptors and signaling pathways. Molecular techniques include polymerase chain reactions (PCR), molecular cloning, reverse transcriptase replication (RT-PCR) of mRNA for gene expression, and modification and amplification of cDNA for splice variance of native opioid receptor genes. Techniques to study opioid receptor dynamics and secondary messenger interactions include the use of radiolabeled ATP for cyclic AMP–dependent kinases and fluorescent tagging of kinase substrates combined with chromatography for other important kinases. In situ hybridization by RT-PCA allows for in vitro analysis of functional receptor expression that are both native or derived from recombinant chimeric opioid genes. Animal models have been instrumental to our understanding of opioid responses, spinal analgesia, neuropathic pain, and opioid reinforcement (psychologic dependents). Laboratory research using these techniques is key to advancing our understanding of opioid agonist intrinsic efficacy (receptor activation relative to receptor binding), analgesic tolerance and non–cross tolerance important to opioid rotation, equianalgesia, and the unique agonist pharmacology that governs individual responses. Opioid-resistant pain, spinal opioids, neuropathic pain, and addiction are important topics in the area of cancer pain as well as noncancer pain management.

The text by Dr. Zhizhong Pan and colleagues is a laboratory manual that provides details on the techniques used for opioid receptor and agonist research and agonist-receptor dynamics. The contributors are among the most important researchers in the area of opioid receptor and agonist research. The book is divided into three parts: 1) molecular characterization of opioid receptors, 2) mapping and detection of endogenous opioids, and 3) model systems for opioid function. There is a small section, like an appendix, titled "Clinical Application." All chapters include an introduction to the clinical importance of the technique to be described, followed by a detailed "recipe" for the laboratory procedure, and, at the end, "notes" on the personal experience and preferences with regard to research technique and the pitfalls to various approaches. The text is well written and well edited. I felt that the book was full of details that at times were "over my head," but did fill in gaps to my understanding particular to the basic science of opioid pharmacology.

The two chapters at the end are "appendices" that include a brief and basic chapter on acute, chronic, and cancer pain, and a chapter on addiction and its management. The chapter on acute, chronic, and cancer pain, although well written, seems disconnected from the rest of the text and too basic for the level of the text. The chapter on addiction and its management, I surmise, ties into Chapters 18 and 19 and provides a clinical correlate to the animal research on place conditioning, drug reward, drug aversion, and opioid self-administration.

I believe the text could be expanded, particularly the last two chapters, to include chapters on the following:

1. The clinical relevance of opioid intrinsic efficacy (corresponding to Chapters 2, 4, 5, and 7), which would include a discussion on the controversial RAVE theory (receptor activation vs. endocytosis), partial agonists, and full agonists;

2. Analgesic tolerance (corresponding to Chapters 3, 5, 6, and 16);

3. Non–cross tolerance between opioids, equianalgesia, and opioid rotation (corresponding to Chapters 1, 2, 7, 9, and 13);

4. Opioid pharmacodynamics and individual responses to opioids (corresponding to Chapters 12, 13, and 14);

5. Spinal opioids in clinical practice (corresponding to Chapter 15); and

6. Management of neuropathic pain (corresponding to Chapter 17).

Connecting the text to corresponding clinically relevant subjects would make it more attractive to clinicians and stimulate a dialogue necessary for translational research.

The text is an important addition to basic science researchers. However, clinicians are likely to find little practical information. The book gave me a great appreciation for the work of these basic scientists who have contributed to our understanding of opioid responses. Hopefully, in time, what is learned in the laboratory will advance opioid practices beyond present day "trial and error" empiricism.

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