
Preface

The nonsteroidal anti-inflammatory drugs (NSAIDs) consist of more than 40 compounds, which are the most widely used group of medicines worldwide for the treatment of inflammation, pain, fever, and for the prevention of thrombosis. It was through the pivotal work of the late Professor Sir John Vane in the early 1970s that it was realized that the mechanism of pharmacological and toxicological actions of these compounds depended on the inhibition of the catalytic activity of the cyclooxygenase (COX) enzyme resulting in the reduction of prostaglandin synthesis. After the discovery of the second isoform of COX, named COX-2 in the early 1990s, it became clear that the pharmacological actions of NSAIDs were due to the inhibition of COX-2, while the toxicological actions were due to inhibition of COX-1. Thus COX-1 became known as the “house-keeping” isoform involved in prostaglandin synthesis during physiological processes such as regulation of acid release in the stomach, while COX-2 as the inducible isoform involved in pathological processes such as inflammation, pain, fever, and cancer. Eventually, this led to the development of the COX-2 selective inhibitors, of which celecoxib was the first.

Advancement in COX research and their bioactive products, the prostanoids, was made possible by the development of new techniques and improvement of existing techniques specific to COX or general techniques applied to COX research. These techniques include the purification (Chapter 3), cloning (Chapter 4), and expression (Chapters 4 and 5) of COX enzymes as well as determining the activity of COX enzymes in different experimental conditions (Chapters 6, 7, 9–11). COX activity assay techniques, especially cell based ones (Chapter 8), along with measurement of prostaglandins (Chapter 13) have been used to determine the relative potencies of NSAIDs on the inhibition of COX-1 and COX-2. In vivo models of gastrointestinal injury (Chapter 16) and of inflammation (Chapter 17) and pain (Chapter 18) have been applied to COX research and have helped in elucidating the role played by COX-1 and COX-2 in these disease processes.

Cyclooxygenases: Methods and Protocols is a collection of in vitro and in vivo techniques routinely used in COX research. This book is a laboratory manual aimed at scientists interested in applying these techniques to their research programs. *Cyclooxygenases: Methods and Protocols* is written by some of the scientists who have pioneered and have helped to shape the COX field. It is our hope, as editors, that you will find this book a useful tool.

Finally, the editors would like to thank all the contributors and in particular Professor John Walker, as Series Editor, for inviting us to edit this book and for his help in reviewing manuscripts and putting this book together.

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Cyclooxygenases

Methods and Protocols

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2010, X, 218 p. 38 illus., Hardcover

ISBN: 978-1-58829-953-6

A product of Humana Press