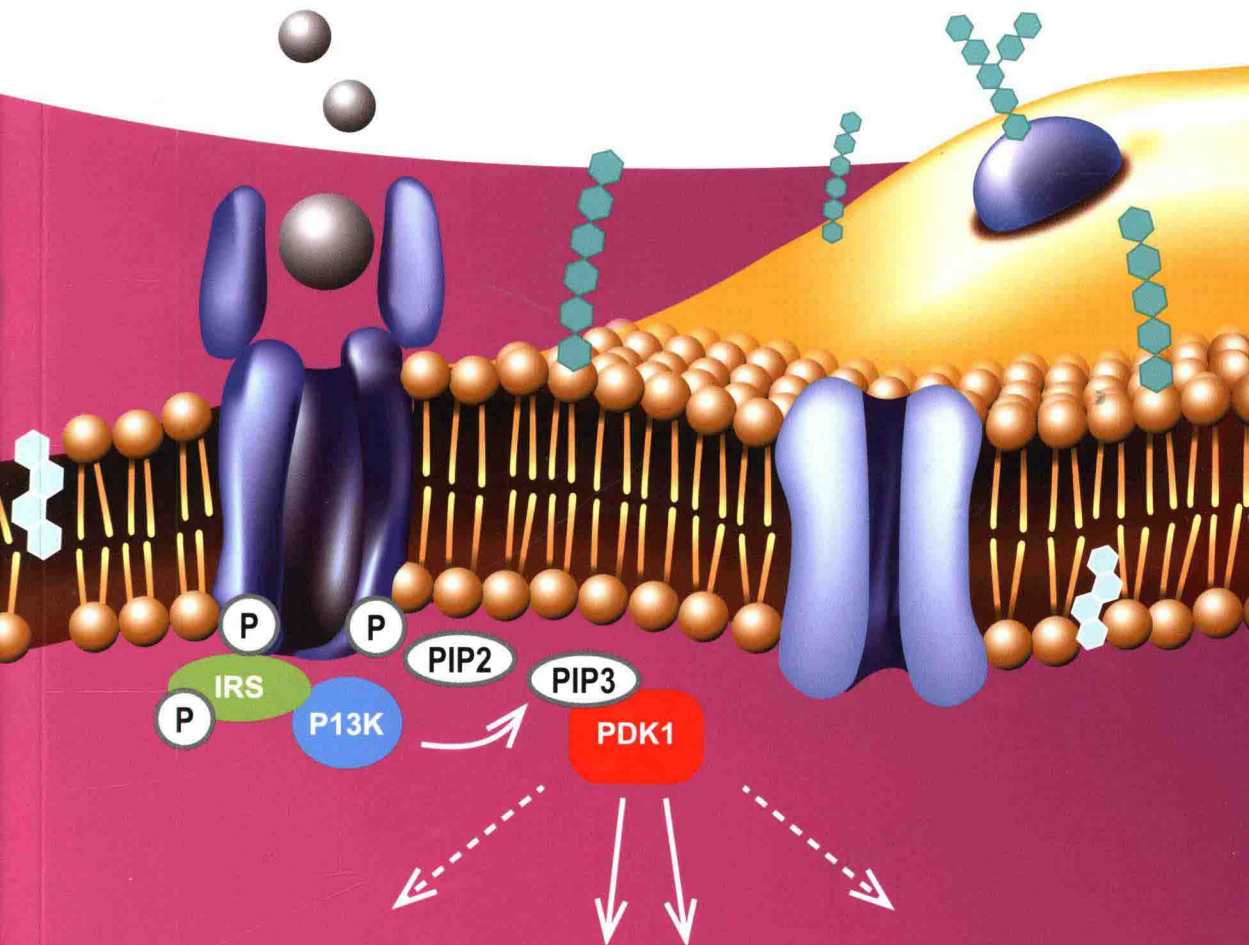


Gerhard Krauss

# Biocnemistry of Signal Transduction and Regulation

Fifth, Completely Revised Edition



*Gerhard Krauss*

# **Biochemistry of Signal Transduction and Regulation**

Fifth, Completely Revised Edition

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## Preface

When the first edition of this book appeared in 1997 it was written in German, but it was then substituted by four English editions that are now followed by the Fifth edition that includes data and references up to 2012. Due to the huge number of publications available on signal transduction, the majority of the citations in the book are in fact reviews, with original articles having been selected on a more-or-less subjective basis.

The past two decades have witnessed an explosion in information on signal transduction that has been based mainly on the progress in genome sequencing and on the ability to analyze signaling proteins with respect to their function, structure, chemical modification and subcellular localization. Today, with such huge amounts of data available it is increasingly difficult – if not impossible – to follow all new developments in the “jungle of signal transduction.” Hence, it is the aim of this book to provide advanced students of biology, biochemistry and chemistry, as well as teachers and researchers, with an overview of – and an orientation within – this highly complicated area of research. Perhaps the most impressive progress has been achieved during the past few years in studies of post-translational modification, interaction partners and macromolecular associations of signaling proteins. Indeed, when taken together these data have revealed an extensive interplay and networking of signaling pathways and their components, and attempts have been made to address this aspect in this new edition of the book.

The vast progress that has been made recently in the area of signal transduction makes it increasingly necessary to concentrate on the best-studied components and core reactions in cellular signaling, with special emphasis placed on human systems. Due to the species- and cell-type specificity of many signaling paths, and the extensive crosstalk and networking, I have not attempted to describe distinct signaling pathways in a complete way; rather, I have concentrated on the main classes of signaling proteins and on well-characterized core processes. Consequently, in an attempt to guide students through this complex research area, I have included chapter introductions and summaries on all important topics. Questions have also been added to nearly all of the chapters to aid the learning process.

Another major change is the addition of two new chapters – Chapters 2 and 3 – as an introductory section. Chapter 2 provides an extended overview of the properties

and organization of signaling proteins, with strong emphasis placed on their post-translational modifications and interaction partners. At present, there is no comparable overview of these features available in the literature. In Chapter 3, I have summarized the structural organization of signaling paths, as well as their crosstalk and networking properties. By introducing the basic features of signaling paths and their interactions at the start of the book, these new chapters should facilitate an understanding of the central signaling paths presented in the following chapters. Unfortunately, the addition of these two new chapters has made it necessary to restrict the total volume of the book, and the chapters on 'Regulation of the Cell Cycle' and 'Apoptosis' have been shortened accordingly such that only the very basic regulatory features of these processes are now presented.

I am grateful to all of the people who have encouraged me to complete this extensive update of the book. In particular, I wish to thank Prof. Clemens Steegborn and Prof. Oliver Hobert for reviewing parts of the book, and I am also very grateful to Christine Diederichs, Dr Sebastien Moniot, Dr Hannes Krauss and Enno Krauss for their help in producing the figures.

Bayreuth, January 2014

*Gerhard Krauss*

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