Preface

Acetylsalicylic acid, best known by its first trade name "Aspirin," belongs to the small number of drugs that are well known to health professionals and laymen and enjoy great popularity among both of them. Aspirin is not only one of the most intensively studied but also one of the most frequently used drugs worldwide, today with an impressive annual production rate of 8 billion tablets alone in the German Bayer plant. Actually, about 2,500–3,000 entries for the term "aspirin" (acetylsalicylic acid) can be found in the PubMed database – every year. All this happened more than 100 years after the first pharmacologist studying the compound supposed "the substance is of no value" and the first clinician who used the drug for treatment of inflammatory pain did so with "not little distress." We all know now that the reality soon became another one.

What were the reasons for these exciting developments? Around 1900, there was an urgent need for effective and well-tolerated antipyretic, antiinflammtory analgesics that were on-hand to everybody and this for a reasonable prize. In this context, aspirin became soon very popular as a household remedy for almost any condition associated with flu-like symptoms, headache or other kinds of "malaise" – "take an aspirin." The pharmacological breakthrough was the discovery of a mode of action – inhibition of prostaglandin synthesis. This offered for the first time a plausible mechanistic explanation for the multitude of pharmacological actions of the compound. Later, the antiplatelet/antithrombotic properties of aspirin came into focus and opened the door to an entirely new and still growing clinical field of aspirin usage in prevention and treatment of thrombotic vessel occlusions. Aspirin is the drug of first choice in many of these indications, most notably secondary prevention of myocardial infarction. More recently, prevention of certain forms of venous thromboembolism and preeclampsia became new clinical indications for aspirin. There are also multiple actual research topics. These include the effects of aspirin on gene regulation and transcription as well as posttranslational effects, for example its application as an adjunct in severe systemic inflammatory reactions, including acute respiratory distress syndrome, sepsis and, most recently, viral infections. Malignancies are another actual area of clinical research, in particular prevention of colorectal cancer.

This book provides an overview on all aspects of clinically relevant aspirin actions and the underlying modes of action. The pharmacological focus is on the unique structural properties of the compound, consisting of two bioactive groups, the reactive acetyl group of the intact aspirin molecule with multiple acetylation targets and the salicylate moiety with its unique physicochemical properties.

Subsequent to an introductory section on the fascinating history of the detection of aspirin and important early findings, the pharmacology, toxicology and clinical application of aspirin are discussed in three main sections, each divided into several subsections. More than 100 clinical aspirin trials are presented and critically discussed in

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more detail. A list of references is found after each subsection including a selection of papers that have been published by the end of 2021.

Subsequent to three German, two English and one Chinese edition, this is the third completely revised English edition. Many friends and colleagues worldwide have again extended their help and support to cover the issue of “aspirin” as complete as possible. I am most grateful to all of them. The continued help of Petra Rompel (Düsseldorf) in generating the illustrations and helping me with many other technical issues is particularly gratefully acknowledged.

Dresden, May 3, 2022 Karsten Schrör