

Preface

The *Handbook of Experimental Pharmacology* is regarded as “one of the most authoritative and influential book series in pharmacology”. It is said to provide “critical and comprehensive discussions of the most significant areas of pharmacological research”. Obviously, this mission has already been followed for quite a while, the present volume being number 197. It all started in the first half of the twentieth century as *Handbuch der Experimentellen Pharmakologie*, founded by Dr. A. Heffter who, among other things, acted as the first Chairman of the German Society of Pharmacologists and as Rector of Berlin University in 1922. His pharmacological interests included among other things a crystalline glycoside from *Strophanthus kombe*. Accordingly, most volumes so far have covered various active pharmaceutical ingredients (principles), or rather groups thereof.

Recently, the scope has become broader. This is reflected by the flanking volumes and their subjects, namely Volume 196 which is on “Adverse Drug Reactions” and Volume 198 on “Fertility Control”. Nevertheless, “Drug Delivery” is certainly a topic which might not have been included in the series during the first decades of the existence of the handbook. The problem in this context would not be “drug”, although this would appear to be too broad a term in the context of a particular volume of a handbook on pharmacology. The point really is “delivery”. Certainly, today everybody and every institution has to deliver, the word being used in the meaning of fulfilling expectations or reaching goals. The latter, in fact, comes close to what is meant here. The term “delivery” in general life is used in many contexts. In particular, it is related to commercial activity where goods have to be transported, essentially from the producer to the user. In this context, for centuries a major role has been played by vehicles, which can therefore be dubbed delivery vehicles. While as late as the nineteenth century such vehicles were still carriages moved by horse power, in a stricter sense today we might rather think in this context of fast self-propelled objects such as rather small goods vehicles which virtually dominate today’s motorways.

Indeed, in modern drug treatment also, routes (of application) and exact time frames have become critical for success in an era in which surrogate parameters for efficacy are increasingly replaced by true outcome parameters.

The “Fundamentals” section of the table of contents of this present volume introduces three terms which can be called key words of our time. In first place is “targeting”. Active principles must definitely get to where they should be. This has been familiar to the military for thousands of years, and more recently been highlighted in this field, coining the term “surgical warfare”. The idea is to increase benefit-to-risk ratios by preventing what soldiers now call “collateral damage”.

The next term is “nanomedicine”. This word reflects a broader term, which is “nanotechnology”. The term and the concept behind it have been greatly influenced by the book *The Coming Era of Nanotechnology*, published in 1986 by Dr. E. Drexler. This work reflected an earlier one by Dr. N. Taniguchi, who had defined nanotechnology as early as 1974. The point in our context is that nanotechnology can, among other things, provide minute particles called nanoparticles as potential carriers for active pharmaceutical ingredients. This approach in a way reflects a natural approach used by the mammalian body, which is protein targeting. Whatever the primary material for production might look like, we are talking about carriers. One of the meanings of a “carrier” is a human being carrying goods for third parties, another term being “porter”. Today, the term carrier is used in many different contexts, one being aircraft carrier, essentially a ship from which military fighter aircraft can be launched. In this way targets can be reached which would be beyond the range of the aircraft alone.

The third term is “biosensing”. This means the use of biosensors, biological structures capable of identifying particular analytes. Using metaphors from the military field for the final time, we might think of the radar systems which help both the aircraft carrier and the carried aircraft to perform their mission.

By now it has become obvious that very specific devices are essential to perform the task of drug delivery as well as possible – often to save lives and quality of life. Indeed, today there is a wide spectrum to be covered here, ranging from liposomes to drug-delivering medical devices. When it comes to details, it is certainly important whether drug delivery is considered in the context of therapeutics for systemic or topical use. At least with one particular organ, namely the skin, there is something which could be called the dual use option: while carriers can be required simply to optimize topical treatment of skin disease, transdermal delivery is also a relevant option in everyday drug treatment today when aiming for systemic drug effects.

When planning the present volume, I was impressed by the breadth and depth of current knowledge on drug delivery. Shortly before finally handing over the manuscript to the publisher for printing, I have to admit that I am even now most impressed – and I do hope that this enthusiasm will also be felt by the relevant scientific community when looking at this new book. Certainly, the book would not in the least have been possible without the support of 16 pre-eminent contributors (and in some cases their collaborators) from various specialties or sub-specialties of the life sciences. This could only happen because of the invitation and the

continuing support from the series editor-in-chief, my distinguished colleague Dr. Walter Rosenthal from Berlin, to whom I am indeed most grateful. Moreover, thanks are due to Ms. Susanne Dathe from Springer Heidelberg for continuous editorial support. Finally, I would like to thank for technical assistance Ms. Barbara Brüggener, who helped me with the handling of the manuscripts.

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