

HANS-WERNER VOHR (Ed.)

Encyclopedic Reference of Immunotoxicology

With 144 Figures and 105 Tables

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**To Heide, Florian,
Hannah and Lucas**

Preface

Over the last three decades, immunotoxicology has blossomed from a somewhat neglected subsidiary branch of immunology into an independent science. This process has been aided by incidents such as those involving dioxins in Italy, polybrominated biphenyls (PBBs) in Michigan and polychlorinated biphenyl (PCB) in Taiwan and Japan, which have drawn the attention of both the public and the authorities to the effects of substances on the immune system. Incidents such as these have resulted in generous financial support being made available for attempts to elucidate mechanisms potentially involved in the interaction of the immune system with chemicals. Intensified efforts to explain congenital human immunodeficiencies and the spread of acquired immunodeficiencies, for example after HIV infection, have naturally also increasingly brought the immune system to the attention of a wider public.

Many years' clinical experience of the use of immunomodulators, for example in the treatment of cancer or AIDS and in transplant recipients, have established a basis for documenting adverse effects on the immune system caused by drugs. On top of this, easy and reliable ways to identify the immunotoxicological potential of a substance were discussed for several years, aiming towards a reasonably small number of universally and easily applicable methods. Substantial information, however, was not gained until international ring trials and laboratories within the pharmacological and chemical industry started to investigate immunotoxicological aspects of new substances. Only then did the importance of specific substance requirements become clear.

Immunotoxicology therefore focuses on the undesirable effects of chemicals on the immune system. The exposure of humans or animals to such agents may be intentional (drugs) or unintentional (environment). Since the immune system is a very complex, well-regulated system, its interactions with substances, are as diverse as they are complicated. The side effects may lead to over-activation of the immune system, or equally to immunosuppression. The end points of dysregulation are therefore also varied: allergies, cancer, autoimmunity, poor resistance to infection, flu-like reactions, chronic inflammation and effects on hepatic metabolism. While some of these side-effects like allergies, flu-like reactions, or poor host resistance already appear after relatively short treatment periods, others are normally induced after longer treatments, e.g. cancer or autoimmunity. Therefore, showing proof that compounds are responsible for cancer or autoimmunity reactions by primary immunotoxicity is often difficult. On the other hand, the huge capacity of the immune system, normal immune reactions, the overall toxicological situation and beneficial therapeutic effects also have to be taken into account in the evaluation of "immunotoxic" findings.

All of these widely differing aspects are featured in this book. Without a basic knowledge of the key components of the immune system, the interactions of various organs with the immune system, and the normal reactions of the immune system to infections, it is easy to misinterpret data from immunotoxicological studies. These issues are therefore addressed in this book in their entirety. Each contribution has been written by an experienced expert in the field in question, with the result that a solid foundation of knowledge has been established.

This would not have been possible without the immense commitment of all involved. I should like to express my gratitude to them here, starting with the members of the Editorial Board: Jack Dean, Dori Germolec, Mike Holsapple, Robert House, Henk van Loveren, Mike Luster, Peter Ulrich and Kimber White jr. These people have been wonderfully supportive from the outset; they have given the project much impetus and put a lot of work into it themselves. Next, I should of course like to thank the many authors who have produced their contributions with great dedication and enthusiasm. All the reviewers' requested amendments and addenda were usually implemented in timely and very cooperative fashion. Lastly, my thanks are due to the staff of the publisher, Springer, in Heidelberg and above all to Dr. R. Lange (Editorial Director Medicine and Biomedicine) and Dr. T. Mager (Planning Drugs and Therapy), who introduced me to the book series and infected me with their enthusiasm for this encyclopaedia. It is intended not as a collection of loosely related papers but as a compact information source written by specialists in a way that is generally comprehensible – an intention that inspired me from the beginning and the objectives of which are borne out by this book. Special thanks are due to Mr. A. Spencer (Development Editor), who always kept tabs on all aspects of the book, never lost track of the progress of the many manuscripts and always managed to come up with constructive solutions to problems.

As the term itself suggests, immunotoxicology is a field that can be approached from the perspective of either immunology or toxicology. To generalize broadly, it might be said that the immunological arm deals mainly with fundamental mechanisms, while the toxicologists are concerned more with preclinical and clinical studies and so work in the field of applied immunotoxicology. It is to be hoped that the various contributions to this book manage to do justice to both groups. The book was naturally devised, structured, written and set in motion by human beings. It is therefore clear that the reader will here and there regret the absence of an entry, notice an error in a diagram or feel that certain articles are too short or too long. The prime concern of all those involved in producing this encyclopedia was to provide readers with entertaining but sound and scientifically correct information. They would therefore all welcome constructive criticism or offers of assistance with a future edition of the encyclopedia.

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