MECHANISMS OF TOXICITY

BIOLOGICAL COUNCIL

**The Co-ordinating Committee for Symposia
on Drug Action**

A Symposium on

MECHANISMS OF TOXICITY

Edited by

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FOREWORD

Almost a hundred years ago, Claude Bernard suggested that for the physiologist 'the poison becomes an instrument which dissociates and analyses the most delicate phenomena of living structures, and by attending carefully to their mechanism in causing death, he (the physiologist) can learn indirectly much about the physiological processes of life'. It is a sad fact that relatively few have followed Bernard's advice with studies in depth. The advances in technique which have accompanied the development of knowledge of the structure of biological macromolecules has shown that in principle the interaction of toxic substances with macromolecules may now be defined. For the future, this molecular information must be integrated with our knowledge of the structure and function of cells, tissues and whole animals. Thus the toxic substance provides a logical link between the interaction at the molecular level and the tissue damage or derangement in function in the whole animal.

Such studies of the effects produced by toxic substances *in vivo* demand a multidisciplinary approach. The papers in this book illustrate the interplay between the acquisition of knowledge of toxic mechanisms and a better understanding of physiological processes.

Toxic hazards from drugs, pesticides and food additives, as well as those from chemicals in the general or occupational environment, are a cause of some current anxiety. Toxicity tests on laboratory animals provide some arbitrary measure of comparison on which an opinion on the safety of new compounds may be assessed in relation to existing ones to which exposure has occurred. However, a sound assessment about safety can only be provided when based on knowledge of the mechanisms by which a toxic substance produces its adverse effects.

Thus, the study of mechanisms of toxicity provides an example where practical needs and progress along academic lines demands the same experimental approach. It is the recurring experience of those working in this field that substances which produce a well-defined toxic effect in the whole animal are almost always specific in a chemical and biochemical sense. A detailed study at all levels of biological organization will therefore illuminate the control mechanisms so often associated with the structure of cells and upon which physiological processes depend. It is to be hoped that those who read this book will appreciate the validity of the advice quoted above of one of the world's most distinguished experimental biologists.

Carshalton
May, 1970

J. M. BARNES
W. N. ALDRIDGE

EDITOR'S ACKNOWLEDGMENTS

The symposium was organized by a Committee consisting of W. N. Aldridge, J. M. Barnes (Chairman and Secretary), M. Ginsberg, J. D. Judah, A. E. M. McLean and J. L. Mongar.

The following societies helped to sponsor the symposium: Biochemical Society, British Pharmacological Society, British Society for Cell Biology, British Society for Immunology, Pharmaceutical Society of Great Britain, Physiological Society, Royal Society of Medicine and Society for Drug Research.

The meeting was held on April 13th–14th, 1970 in the Edward Lewis Theatre, The Middlesex Hospital Medical School, London. It was attended by 228 members mainly from the societies sponsoring the symposium.

Acknowledgment is made to the Wellcome Trust for their generosity in providing a grant which enabled us to invite speakers from many distant parts of the world.

The editor is grateful to the publishers of journals for permission to reproduce some of their figures and to Macmillan & Co. Ltd. for the courteous and efficient way in which they have dealt with this publication.

*Carshalton,
May, 1970*

W. N. ALDRIDGE

CONTENTS

Session I: Reactions with Enzymes

Chairman: M. GINSBERG

	Page
Inhibition patterns of monoamine oxidase isoenzymes: clinical implications	
M. SANDLER, G. G. S. COLLINS and M. B. H. YODIM	3
<i>Discussion</i>	9
Monoamine oxidases and their inhibitors	13
K. F. TIPTON	13
<i>Discussion</i>	24
Some new effects of anticholinesterases in the whole animal, with special emphasis on the hypothermia inducing action in the rat	
E. MEETER	29
<i>Discussion</i>	39
Mechanism of inhibition of glutamine synthetase by methionine sulfoximine	
A. MEISTER, A. RONZIO, W. ROWE, D. GASS, and S. L. N. RAO	43

Session II: Reactions with Proteins

Chairman: W. N. ALDRIDGE

Effect of lathyrogenic compounds on the cross-linking of collagen and elastin <i>in vivo</i>	
C. I. LEVENE	67
<i>Discussion</i>	82
The capacity of aspirin to acetylate proteins <i>in vitro</i> and <i>in vivo</i>	
R. S. FARR	87
<i>Discussion</i>	98
Role of immune reactions in response to toxic metals	103
J. L. TURK	103
<i>Discussion</i>	109
Binding of beryllium to proteins	111
ELSA REINER	111
<i>Discussion</i>	124

Session III: Cell Injury

Chairman: J. D. JUDAH

Liver cell injury by beryllium	129
H. P. WITSCHI	129
<i>Discussion</i>	142

Ribonucleic acid polymerase in nuclear damage	F. STIRPE and F. NOVELLO	147
<i>Discussion</i>		160
Cell suicide and cell death	E. FARBER, R. S. VERBIN and M. LIEBERMAN	163
<i>Discussion</i>		171
<i>Amoeba proteus</i> as a cell model in toxicology	MURIEL J. ORD	175
<i>Discussion</i>		185

Session IV: Lethal Synthesis

Chairman: J. M. BARNES

Antimetabolic action of 6-aminonicotinamide on the pentose phosphate pathway in the brain	H. HERKEN	189
<i>Discussion</i>		200
Mode of action of hypoglycin and related compounds	H. S. A. SHERRATT, P. C. HOLLAND, JUDITH MARLEY and A. E. SENIOR	205
<i>Discussion</i>		216
Conversion by the liver of inactive molecules into toxic molecules	A. E. M. MCLEAN	219
<i>Discussion</i>		226
The role of the gut flora in the conversion of inactive compounds to active metabolites	R. L. SMITH	229
<i>Discussion</i>		245
Index		249

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xiii

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