Enzyme Synthesis and Degradation in Mammalian Systems

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Preface

This treatise offers a comprehensive review of the present knowledge of the various factors that control enzyme activity as well as the regulatory mechanisms involved in enzyme synthesis and degradation, with special emphasis on the mammalian systems.

To this end it presents detailed discussions by the leading authorities in the field of such topics as the genetics of enzyme realization, the control of enzyme activity in early development and in old age, the control of enzyme activity by hormonal and nutritional factors, the regulation of enzyme activity through specific modifications in structure, enzyme induction and repression, the translational regulation of enzyme levels, enzyme turnover and the roles of synthesis and degradation in the regulation of enzyme levels, the rhythmic changes in enzyme activity and their control, factors affecting the activity and distribution and synthesis and degradation of isozymes, and synthesis and degradation of enzymes in relation to cellular structure.

The present undertaking represents a pioneer effort in the area which is relatively new but which clearly stands in the forefront of today’s biology. As such, the book should be of particular interest and assistance to both students and research workers in a wide range of disciplines including general biologists, biochemists, molecular and cell biologists, enzymologists, comparative and developmental biologists, zoologists, physiologists, pathologists, geneticists, embryologists, endocrinologists, pharmacologists and nutritionists. When reading through it should be kept in mind, however, that our purpose is not just to inform but also/or rather to stimulate the reader, be it a beginning graduate student or an advanced researcher, to explore, to question and, whenever possible, to test various hypotheses advanced herein, always keeping in mind the immortal words of Heraclitus that ‘there is nothing permanent except change’.

In order to make the publication more accessible from the point of view of a student or a researcher who are embarking on their first venture into the fascinating field of cellular regulation, the book has been appended with a thorough index and a glossary. For further reading each chapter is accompanied with numerous references.

The Editor wishes to acknowledge with deep appreciation and gratitude the generous cooperation of the individual collaborators which has made this volume a reality. He is also indebted to Dr. E. Brad Thompson who has critically read various parts of the manuscript. Mrs. Eva Rechcigl and Jack and Karen Rechcigl...
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Miloslav Rechcigl, Jr.

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Abbreviations and Symbols

ACTH Adrenocorticotrophic hormone
ADH Alcohol dehydrogenase
AIA Allylisopropylacetamide
ALA Aminolevulinic acid
AMD Actinomycin D
AMP Adenosine 5’-phosphate
AT 3-Amino-1,2,4-triazole
ATC Aspartate transcarbamylase
ATP Adenosine 5’-triphosphate
ATPase Adenosine triphosphatase

cAMP Cyclic adenosine 3’5’-monophosphate
CoA Coenzyme A

DEAE O-(diethylaminoethyl) [cellulose]
DNA Deoxyribonucleic acid

EDTA Ethylenediaminetetraacetic acid

GAT Glutamic-alanine transaminase
GTT Glutamic-tyrosine transaminase

HTC Hepatoma tissue culture

IMP Inosine 5’-monophosphate

LDH Lactate dehydrogenase

kD) First order rate constant for degradation
kS Rate constant for synthesis
kM Michaelis constant

MAO Monoamine oxidase
mRNA Messenger RNA

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NAD Nicotinamide-adenine dinucleotide
NADH Reduced nicotinamide-adenine dinucleotide
NADP Nicotinamide-adenine dinucleotide phosphate
NADPH Reduced nicotinamide-adenine dinucleotide phosphate

OMP Orotidine-5’-monophosphate
OTC Ornithine transcarbamylase

PEP Phosphoenolpyruvate
PEPCK Phosphoenolpyruvate carboxykinase
PPC Phosphopyruvate carboxylase

RNA Ribonucleic acid
RNase Ribonuclease
rRNA Ribosomal RNA

SDH Serine dehydratase

t1/2 Half-life
TAT Tyrosine aminotransferase
TCA Tricarboxylic acid
TPO Tryptophan oxygenase
tRNA Transfer RNA

UDP Uridine 5’-diphosphate

Vmax Maximal velocity

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