INTRACELLULAR ENZYMES: A COURSE OF LECTURES GIVEN IN THE PHYSIOLOGICAL LABORATORY UNIVERSITY OF LONDON

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A COURSE OF LECTURES GIVEN IN THE PHYSIOLOGICAL LABORATORY UNIVERSITY OF LONDON - Univ.

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PREFACE

THE subject of these lectures might at first sight be regarded as too small and unimportant to warrant their reproduction in book form, but I hope that such an opinion may be dispelled by a study of the lectures themselves. The progress of research renders it more and more evident that the cellular protoplasm of all living organisms is made up very largely of ferments or enzymes, and that many or most of its properties are dependent upon their activities. The literature dealing with these intracellular enzymes is scattered and somewhat fragmentary, and comparatively little of it has as yet found its way into text-books. This is partly because of its recent origin, for reference to the authorities cited at the foot of these pages will show that almost the whole of the research work described has been carried out during the course of the last decade. If such rapid rate of progress be continued in the future, the subject of intracellular enzymes bids fair to become, if it has not already become, one of the most important branches of biochemistry, for it alone seems to offer a clue to the solution of the most fundamental of all biological problems, the nature and constitution of protoplasm.

The matter in this book closely follows that of the spoken lectures, with some amplification of detail. I take this opportunity of thanking Dr A. D. Waller for his kindness in inviting me to give the course of lectures in the Physiological Laboratory of the University of London, for I should scarcely have had the energy to collect and publish the material without the stimulus of such an invitation. Also, I am indebted to Dr W. M. Bayliss for his kindness in looking through the MS., and offering valuable criticism.

H. M. V.

September 1908.

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INTRACELLULAR ENZYMES

LECTURE I

PROTEOLYTIC ENDOENZYMES

Dependence of chemical activities of living tissues on endoenzymes. Liberation of endoenzymes on death of cells: gradually, if tissues be kept intact; immediately, if minced up. Methods of extracting endoenzymes. Classification of proteolytic endoenzymes. Proteases, endoerepsins, arginase, urease. Action of enzymes on polypeptides. Amide nitrogen in relation to enzymes and acids.

OF the numerous subjects included under the head of Physiological Chemistry, or Bio-Chemistry, few have attracted so much attention within recent years as that of Enzymes. And great as has been the increase in our knowledge of the nature and mode of action of these substances, the further we advance the wider becomes the field of research opening out before us. This is especially true in respect of the group of enzymes known as Intracellular or Endo-enzymes. These enzymes differ from the exo-enzymes, such as are found in many of the secretions of living organisms, by reason of the fact that they are bound up in the protoplasm of the cells, and, so long as these cells retain their vitality, can only exert their activity intracellularly. On death of the cells, the protoplasm disintegrates, and many of the constituent enzyme groupings gradually split off and pass into solution. It is inferred, though strict proof of the inference is wanting, that any zymolysing powers possessed by such solutions were, in all probability, possessed by the protoplasm before disintegration. And as a living tissue would scarcely elaborate and store up within itself enzymes which were useless to it, it is supposed that any enzyme which can be extracted from a tissue after death—apart from