Respiration in the Invertebrates

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MACMILLAN EDUCATION

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To my wife, Gillian

Preface

The intention of this book is to provide the undergraduate with a comprehensive account of invertebrate respiration from both physiological and structural viewpoints; however, much information is included that will prove valuable additional reading for Advanced level students. The subject is treated in a comparative way, rather than by presenting the reader with a series of chapters working through each group of animals in turn.

All animals require a supply of energy, both for actual physical activity and for the synthesis of protoplasmic compounds from the raw materials provided by the breakdown of their food. In some animals, such as certain parasites, this energy is provided anaerobically, that is to say without the involvement of oxygen as a hydrogen acceptor. However, the vast majority obtain their energy mainly from aerobic processes requiring the utilisation of atmospheric oxygen.

We may consider aerobic respiration as being composed of several distinct phases:

- (a) The uptake of oxygen from the surrounding medium.
- (b) The transport of this oxygen to the tissues.
- (c) The production of energy (intracellular respiration).
- (d) The removal of waste products (e.g. carbon dioxide) from the tissues.
- (e) The elimination of these waste products from the animal.

The first chapter deals with general considerations, particularly the need for the development of specialised respiratory structures. The different structural devices involved in oxygen uptake and the elimination of carbon dioxide from the body are dealt with in the next three chapters. The transport of oxygen and carbon dioxide provides the basis for chapters five and six, while chapter seven is devoted to intracellular respiration. The final chapter is concerned with the nervous control of respiration. An appendix is provided with a synopsis of the classificatory system used; and suggestions for further reading are contained in the bibliography.

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