

PREFACE

The fish gill is an intriguing tissue because of its multifunctional nature. Gills are involved in ion and water transfer as well as oxygen, carbon dioxide, acid, and ammonia exchange, and there are many interactions between these processes. These interactions lead to exchange of information among groups of scientists who otherwise might not meet, because they are brought together by their mutual interest in gills. Many aspects of gill structure and function have been studied, and our understanding of these different systems is reasonably well advanced. This is not to say that there are not vast gaps in our knowledge. Only a relatively few species have been studied in detail, goldfish, eels, and trout being most prominent because of availability and ease of handling. Freshwater fish are much more studied than marine species for the same reasons. The range of freshwater is very broad, and we are only at the beginning of understanding the differences in gill structure and function that, for example, allow some fish to flourish in soft water but restrict others to hard waters.

This volume attempts to review the structure and function of fish gills and also makes some attempt, particularly in the final chapter, to review some of the methodology used in studying gills. The terminology concerned with the gills has grown with the studies and is often confusing. We have attempted, with the help of Drs. Hughes, Laurent, Nilsson, and many others, to arrive at some terms and abbreviations to be used with fish gills. It is always difficult to change habits but some uniformity is always an aid to understanding, particularly for those just entering the field. We would urge the adoption of these terms and abbreviations, even though we cannot persuade all contributors to do the same.

Many people advised and helped us in editing this text; in particular, the chapters were reviewed by many people, and we are most grateful for all help given. We hope the end result is a work on gills that will be of use to those interested in this fascinating organ for many years to come.

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