It is, unfortunately, true that the number of scientists who work on prokaryotes has declined significantly in recent years. There is a danger that prokaryotic biology will suffer and decline if young scientists, in considering research systems, choose the more glamorous newcomers to the biological repertoire. This would be tragic, since there is much important work still to be done with prokaryotes, and they will undoubtedly continue to provide the most accessible entry to many problems of fundamental importance. One hopes that these books will help convince young investigators of the wisdom of studying prokaryotes.

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Endocrine Systems

Endocrinology of Selected Invertebrate Types. HANS LAUFER and ROGER G. H. DOWNER, Eds. Liss, New York, 1988. xxii, 500 pp., illus. $195; paper, $75. Invertebrate Endocrinology, vol. 2.

Invertebrate endocrine systems operate largely through neurosecretions and depend relatively less on the epithelial glands characteristic of vertebrates. In recent years the field of invertebrate endocrinology has grown in scope and gained rigor as a result of the application of contemporary technologies for isolation, sequencing, synthesis, and immunodetection of neuropeptides, as well as recombinant DNA technology for identification of peptide gene families.

This volume focuses on invertebrates other than insects, that group having been covered in the first volume. After an introductory account of concepts in comparative endocrinology, there are 19 contributions in five sections that treat different taxonomic groups. Although 60 percent of the volume is devoted, rightly, to crustaceans and mollusks, there are adequate descriptions of endocrine mechanisms in less intensively studied groups such as coelenterates, turbellarians, trematodes, cestodes, nemerteans, nematodes, and echinoderms. Additionally, three arthropod groups (merostomates, myriapods, and arachnids), often neglected in accounts of invertebrate endocrinology, are included.

In invertebrates other than mollusks and arthropods, much remains to be known about the chemistry of implicated hormones. An exception to this is the identification of an undecapeptide neurosecretory product that stimulates head and bud formation in hydra. An identical peptide has been found in mammalian hypothalamic and intestinal tissues, plasma, and tumors and tumor cell lines of neural and endocrine origin. This peptide represents an extraordinary case of structural conservation and widespread distribution. Equally interesting is the apparent role of thyroxine in the regulation of metagenesis, especially initiation of the transformation of polyp to medusa in jellyfish.

One of the best-studied invertebrate peptidergic systems is involved in the regulation of stereotyped behaviors associated with egg-laying in the sea hare *Aplysia* and the pond snail *Lymnaea*. This system is described in an extensive chapter containing excellent accounts of neurophysiological and ultrastructural characteristics of secretory cells; structure of bioactive peptides as well as their precursors and corresponding genes; post-translational processing of egg-laying hormones; and the role of various peptides on neuronal and non-neuronal targets that produce covert and overt behaviors associated with egg-laying.

Another well-studied molluscan peptide system includes FMRFamide and related peptides. This peptide family is known for its myotropic and neurotropic actions, relationship to opioid peptides, and widespread distribution; yet it is not covered in chapters dealing with molluscan endocrinology. The occurrence of FMRFamide-like peptides in arthropods and their role in the regulation of *Limulus* heart and crustacean stomatogastric system are discussed elsewhere in the book.

Crustacean endocrinology is presented in nine chapters, and the documented progress enhances understanding of the comparative organization and function of arthropod endocrine systems. Proctolin (a pentapeptide), first isolated from insects, is found in Crustacea, and in both cases it displays myotropic and neurotropic actions. The red pigment concentrating–adipokinetic hormone family is common to arthropods, but the identified members have distinct functions: chromatophoral pigment concentration in crustaceans and hyperglycemia, hypertrehalosemia, hyperlipemia, or cardioacceleration in insects. More recent work from our laboratory has shown that another neuropeptide family, composed of octadecapeptide pigment-dispersing hormones (which act on chromatophores and also cause light-adaptational eye pigment movements in crustaceans), is common to crustaceans and insects; the function of these peptides in insects remains unknown.

This book clearly shows that ecdysteroids serve as molting hormones in various arthropods. The regulation of ecdysone secretion may vary: crustaceans and chilopods utilize a neurosecretory molt-inhibiting hormone, whereas insects depend on the stimulatory prothoracicotropic hormone. Although the role of juvenile hormones (JH) in insects is well known, their occurrence and role in Crustacea remain unclear. This book presents recent findings of JH-analog, methylfarnesoate, which is secreted by mandibular organs in crustaceans and whose role is being examined.

Even though this is a multiauthored book with chapters that vary in organization and length (9 to 90 pages), it is marked by clarity of figures and text. It is an impressive record of recent progress, and it foreshadows exciting prospects for increased utilization of invertebrate models for endocrine research.

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