Neuroendocrinology
An Integrated Approach

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For my teachers

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## Contents

<table>
<thead>
<tr>
<th>Preface</th>
<th>xi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>xiii</td>
</tr>
</tbody>
</table>

### 1 History of Neuroendocrinology and Neurohormones 1
- Introduction 1
- Early history of physiology 2
- Renaissance and the growth of western science 12
- Scientific revolution 20
- The 19th-century physiology and medicine 25
- Neurosecretion and the hypothalamus-pituitary regulation 31
- Chapter summary 34

### 2 Origin of Life and the First Signalling Molecules 37
- Introduction 37
- Theories of the evolution of the first cells 38
- The first cells 47
- The first true signalling molecules 57
- Chapter summary 60

### 3 Rise of Metazoans and the Elaboration of Signalling Systems 61
- Introduction 61
- Colonialism and multicellularity 62
- The elaboration of hormone pathways 67
- Nervous systems and rudimentary neuroendocrine systems 78
- Increase in genetic complexity and the rise of triploblastic organisms 82
- Chapter summary 83

### 4 Elaboration of Neuroendocrine Systems 85
- Introduction 85
- Elaboration of nervous system and development of organismal complexity 86
- Nervous and neuroendocrine systems in phylogenetically younger invertebrates 91
- Nervous and neuroendocrine systems in the deuterostomes 95
Peripheral and autonomic nervous systems 99
Blood–brain barriers 100
Cerebrospinal fluid and the choroid plexus 103
Neurohaemal and circumventricular organs: Neurovascular interfaces 104
Hypothalamus–pituitary gland complex 106
Chapter summary 115

5 Neurohormones and Receptors: Structure, Function and Co-evolution 119
Introduction 119
Orthology and paralogy 120
Structural description of non-peptide ligands 122
Peptide and polypeptide signalling molecules 131
Structure and classes of receptors 137
Receptor–ligand interactions 145
Receptor–ligand co-evolution 146
Chapter summary 148

6 Osmoregulation, Metabolism and Energy Production 149
Introduction 149
Osmoregulation 150
Role of prolactin 161
Feeding and appetite regulation 166
Neural circuitry associated with feeding 173
Chapter summary 183

7 Growth and Development 189
Introduction 189
Growth and the growth hormone, prolactin, somatolactin superfamily 190
Metamorphosis and development 198
Sexual differentiation 205
Mechanisms of ageing 208
Chapter summary 211

8 Biological Rhythms 215
Introduction 215
Origin of biological clocks 216
Circadian rhythms 217
Infradian rhythms 220
Clock circuitry in vertebrates 224
The role of melatonin 228
Chapter summary 239

9 Stress, Arousal and Homeostatic Challenge 243
Introduction 243
Physiology and behaviour associated with stress 244
Components of the stress-response system 246
Contents ix

Corticotrophin-releasing factor superfamily of peptides 254
Proopiomelanocortin and adrenocorticotrophic hormone 261
Integration of HPA/I components with other systems 262
Complementary neuroendocrine circuits associated
with stress 265
Chapter summary 272

10 Reproduction 275
Introduction 275
Selection of sexual reproduction 276
Regulation of reproduction 276
Gonadotrophin-releasing hormone 282
Gonadotrophins and their regulation 288
Neuroendocrine regulation of the HPG axis 295
Pregnancy, parturition and lactation 298
Seasonal reproduction 300
Reproduction and stress 301
Chapter summary 305

11 Behaviour, Learning and Memory 307
Introduction 307
Basic behavioural circuits 307
Memory 310
Motivation: Reward and fear 310
Stress and the modulation of learning
and behaviour 314
Hormonal facilitation of behaviour 316
Galanin modulation of neurological circuits 323
An integrated approach to behavioural modulation 324
Neurodegeneration and trauma 325
Chapter summary 327

12 Pheromones and Chemo-attractants 329
Introduction 329
Evolution of pheromones 330
Classification of pheromones 332
Pheromones in invertebrates 332
Pheromones in vertebrates 337
Physiological actions of vertebrate pheromones 340
Pheromones in mammals 342
Chapter summary 344

13 Xenobiotics and Hormone Mimics 345
Introduction 345
Types of xenobiotics 345
Vertebrate toxins and defences 348
Toxins and xenobiotics in invertebrates 353
Although the conservation of mass and energy and the transduction of one to the other has been explored in relatively great detail in science, the qualities of information flow has only been investigated until relatively recently. This has perhaps been stimulated with the vast quantities of information humans have begun accumulating. The disciplines of information technology and bioinformatics have helped stimulate new philosophies of understanding information flow.

Neuroendocrinology might be considered as the science that transduces information from both the environment (external milieu) and the organism (internal milieu) via sensory systems into a form that can be processed by the cells, tissues and organs of an organism to develop an ‘informed’ and integrated response to a particular stimulus. In practice, neuroendocrinology involves four basic areas of study. These include the actions of the nervous system on the functions of the endocrine processes, the reciprocal actions of hormones on nervous functions and behaviour, and the neurosecretions by the brain into the blood stream, and more recently, the function of neuromodulators and neurotransmitters inside the brain that ultimately act to direct actions outside of the brain.

Although neuroendocrinology is a relatively new science, it has expanded exponentially over the last 50 years. This book is intended to be used at the undergraduate level to introduce students to neuroendocrinology from an evolutionary and comparative point of view. Clearly, it is not possible to discuss every neurohormone system and its role in every physiological system; however, the major concepts of neurohormonal regulation, origin and evolution can be introduced. Thus this book is unique in the sense that we begin the study of neuroendocrinology with the origin of life to investigate where the first hormones came from. The development of neural signalling systems is traced from the first multicellular organisms to the most complex living organisms living today. Finally we end the book with how the neuroendocrine system integrates the organism with its environment, whether it is a human in a shopping mall or an insect in its ecosystem.

David A. Lovejoy