

REPRODUCTION, GROWTH AND DEVELOPMENT

Editors

A. Negro-Vilar G. Pérez-Palacios

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Reproduction, Growth and Development

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Preface

Reproduction, growth and development, the main subjects dealt with in this volume, represent some of the most exciting areas in biology and medicine. The explosive development of cell and molecular biology techniques and approaches that we have witnessed in recent years have contributed markedly to very rapid advances in our knowledge in these interrelated disciplines. The contents of this volume represent the major contributions to an outstanding scientific meeting held in Acapulco, Mexico in 1990. A distinguished group of internationally renowned scientists contributed to areas encompassing a wide range of topics within the central theme of the event. This group of experts included cell biologists, endocrinologists and clinicians from different disciplines, including pediatric and adult endocrinology, andrology, gynecology and reproductive endocrinology.

Early events occurring during fetal development were correlated with subsequent *perinatal* and postnatal events leading to puberty and adolescence. Concepts on cell biology of the testis were intertwined with the role of growth factors in reproduction. The increasingly important role of paracrine and autocrine mechanisms were also highlighted, in proper perspective with the more established endocrine regulatory mechanisms. Novel concepts in neuroendocrine regulation of reproductive function leading to puberty and during adult reproductive life were described in a variety of animal and human models. The evaluation and treatment of the infertile couple was discussed together with the most recent advances in diagnosis and treatment for the different reproductive disorders, including the array of techniques covered under the label of assisted fertility.

The expected cross-fertilization in a multidisciplinary event such as this is reflected in the chapters contained in this volume. The interested reader from many different disciplines should find novel and exciting information, both from basic and clinical perspectives.

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G. PÉREZ-PALACIOS

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Gonadal Morphogenesis in Mammals

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Gonadal morphogenesis involves all structural events leading first to the establishment of an undifferentiated gonad and then to its sexual differentiation to form either a testis or an ovary. These structural events occur at three levels: gross morphology (size and weight), microscopic (histological aspect as seen with a light microscope) and ultrastructural (cell and extracellular matrix as seen with an electron microscope).

It is assumed that underlying the structural events, there are important changes at both molecular and biochemical levels. During the last decade, much effort has been invested in searching for those molecular factors that might be responsible for gonadal sex differentiation (5, 8, 17 and 18). We consider, however, that a precise knowledge of gonadal morphogenesis is important to interpret some recent models of sex differentiation in eutherian mammals.

In this chapter, we will discuss the results from our laboratories which address, to a limited extent, some of the more general aspects of gonadal morphogenesis.

THE UNDIFFERENTIATED GONAD

Although classic and recent literature has centered the problem of the embryological origin of somatic and primordial germ cells (PGCs) (see reviews 12 and 27), here we only emphasize some histological and ultrastructural features of the undifferentiated gonad relevant to support our discussion on gonad sexual differentiation. Figure 1 shows a cross section of a typical mammalian genital ridge. It consists of somatic cells tightly attached to both the surface epithelium and the PGCs. At this early stage, three important morphogenetic features have to be