The Developing Testis. Physiology and Pathophysiology
The Developing Testis

Physiology and Pathophysiology

Volume Editor

Olle Söder  Stockholm

24 figures, 1 in color, and 2 tables, 2003
Contents

VII Foreword
Savage, M.O. (London)

IX Preface
Söder, O. (Stockholm)

1 Male Sex Determination and Prenatal Differentiation of the Testis
Töhönen, V.; Ritzén, E.M.; Nordqvist, K.; Wedell, A. (Stockholm)

24 Postnatal Testicular Development, Cellular Organization and Paracrine Regulation
Setchell, B.P.; Hertel, T.; Söder, O. (Stockholm)

38 Regulation of Spermatogenesis
Rey, R. (Buenos Aires)

56 Male Germ Cell Apoptosis
Pentikäinen, V.; Dunkel, L.; Erkkilä, K. (Helsinki)

81 Gonadotrophin Actions on the Testis – Genotypes and Phenotypes of Gonadotrophin and Gonadotrophin Receptor Mutations
Huhtaniemi, I. (Turku)

104 Physiology and Disorders of Testicular Descent
Toppari, J. (Turku)

110 Testicular Neoplasia in Childhood and Adolescence
Rajpert-De Meyts, E. (Copenhagen); Toppari, J. (Turku); Høi-Hansen, C.E.; Müller, J.; Skakkebaek, N.E. (Copenhagen)

124 Testicular Function after Cancer Treatment in Childhood
Jahnukainen, K. (Turku/Stockholm); Söder, O. (Stockholm)

136 Present and Future Options for the Preservation of Testis Tissue and Function
Nordhoff, V.; Schlatt, S. (Münster)

156 Subject Index
This volume maintains the objectives of the *Endocrine Development* series to present new scientific information in a clinical context. Professor Söder has assembled a distinguished group of contributors, who have covered a wide range of topics in the field of testicular development and its defects. Topics particularly relevant to basic scientists working in the fields of andrology and testicular physiology are included in the chapters on sex determination, testicular development, regulation of spermatogenesis and germ cell apoptosis. The clinical paediatric endocrinologist, concerned with disorders of testicular function, will find the chapters on gonadotrophin receptor defects, cryptorchidism, testicular neoplasia and germ cell preservation valuable for both diagnosis and clinical management.

I am very grateful to Olle Söder and the other contributors to this edition for maintaining the very high standard of previous volumes in *Endocrine Development* and for addressing important issues in such an important field of endocrine research and clinical interest.

London, November 2002

*Martin O. Savage*
Preface

The developing testis is the focus of this fifth volume in the series of books on *Endocrine Development* published by Karger.

The male gonad is a complex organ harbouring different endocrine/paracrine functions during different phases of male development and has long been associated with a mysterious glow in medical history attracting attention of the society in all its aspects. The testis has dual functions – gametogenesis and androgen biosynthesis – reflected by two distinct tissue compartments responsible for the respective roles. The testis is also one of the best illustrations of paracrine concepts in endocrinology with numerous identified local tissue messengers affecting all testicular cell types.

Although much has been unravelled during the last decades of development in molecular endocrinology much is still to be learned about the control of spermatogenesis, androgen biosynthesis and endocrine and paracrine signalling integrating these events. The area of testis research is multidisciplinary and attracts scientists with many different basic and clinical interests. The approach chosen for this volume has therefore been to bring together a group of basic scientists and clinicians mainly in the fields of physiology, endocrinology, paediatrics and andrology to sum up our current knowledge on testicular development from male sex determination to the end of puberty.

The contents of this volume span from molecular events involved in male sex determination and testis differentiation and cell biology to clinical entities such as the testis in childhood cancer, cancer of the testis and genotypes and phenotypes of gonadotropin receptor mutations. In the basic chapter on testicular morphology the concept of the blood-testis barrier is discussed and shown
to be a Sertoli cell barrier creating a border between diploid and haploid germ cells rather than a vascular barrier. One chapter reviews testicular descent and cryptorchidism from the view of paediatric medicine rather than from the traditional surgical angle. The last chapter reviews exciting recent developments in the approaches to prevent male infertility after gonadotoxic cancer treatment in prepubertal boys. Although still highly experimental, these achievements will probably be gradually translated into clinical practice and are therefore of great interest for clinicians seeing patients with late effects of cancer and cancer treatment.

Although the molecular and cellular endocrinology of the testis is a rapidly moving scientific field the basic concepts discussed in this volume will form for some time to come a solid basis of knowledge for a readership of basic scientists, general paediatricians, endocrinologists, andrologists and others interested in the function of the male gonad.

Olle Söder, Stockholm