

Molecular Mechanisms in Spermatogenesis

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Molecular Mechanisms in Spermatogenesis

Edited by

C. Yan Cheng, PhD

*Center for Biomedical Research, The Population Council, New York,
New York, USA*

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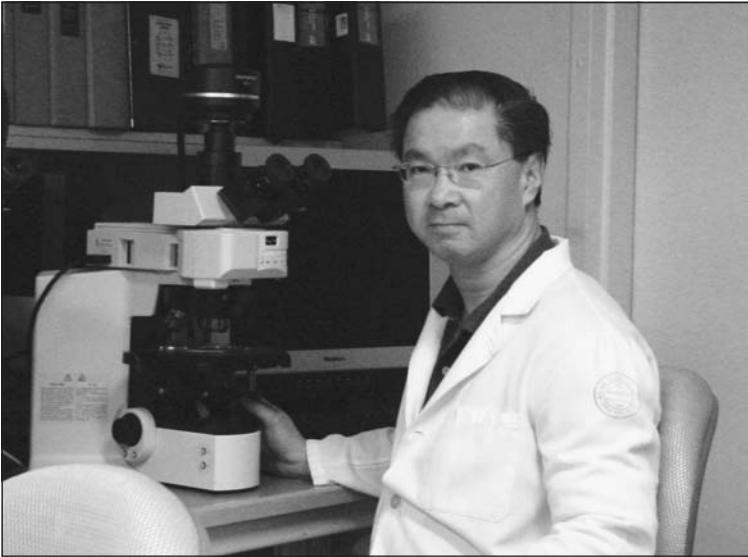
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ABOUT THE EDITOR...



C. YAN CHENG, PhD, is a Senior Scientist at the Population Council's Center for Biomedical Research, inside the campus of the Rockefeller University in New York City. Dr. Cheng is a native of Hong Kong, graduated from the Chinese University of Hong Kong, and received his PhD in biochemistry and cell biology in the Laboratory of Professor Barry Boettcher at the University of Newcastle. He then received postdoctoral training in the laboratory of Drs. Wayne Bardin, Neal Musto and Glen Gunsalus at the Population Council in New York City. He has since stayed there, becoming a Senior Scientist in 1990. His studies in recent decades are focused mostly on the biology of the apical ectoplasmic specialization and the blood-testis barrier in the seminiferous epithelium. Working with a team of young scientists and collaborating with Professor Will M. Lee at the School of Biological Sciences, The University of Hong Kong, Dr. Cheng and his colleagues, Drs. Dolores Mruk, Helen Yan and Elissa Wong and Professor Will Lee have recently identified a novel autocrine regulatory loop in the seminiferous epithelium. This new autocrine-based loop utilizes laminin chains, polarity complex proteins and integrins to functionally link the apical ectoplasmic specialization, the blood-testis barrier and the hemidesmosome together to coordinate the events of spermiation and BTB restructuring to facilitate spermatid and preleptotene spermatocyte movement, respectively, that occur at stage VIII of the seminiferous epithelial cycle. These findings have now provided a framework for investigators in the field to design functional studies to understand the biology of spermatogenesis. Dr. Cheng is the recipient of several NIH grants and the CONRAD Program, and he serves as ad hoc reviewer for a number of leading journals in the field, such as *Journal of Cell Biology*, *Nature Cell Biology*, *PNAS*, *Molecular Endocrinology*, and *Endocrinology*.

PREFACE

In the past thirty years, significant advances have been made in the field of reproductive biology in “unlocking” the molecular and biochemical events that regulate spermatogenesis in the mammalian testis. It was possible because of the unprecedented breakthroughs in molecular biology, cell biology, immunology and biochemistry. I am fortunate to have personally witnessed such rapid changes in the field since I was a graduate student and a postdoctoral fellow in the late '70s through the early '80s. In this book, entitled *Molecular Mechanisms in Spermatogenesis*, I have included a collection of chapters written by colleagues on the latest developments in the field using genomic and proteomic approaches to study spermatogenesis, as well as different mechanisms and/or molecules including environmental toxicants and transcription factors that regulate and/or affect spermatogenesis.

The book begins with a chapter that provides the basic concept of cellular regulation of spermatogenesis. A few chapters are also dedicated to some of the latest findings on the Sertoli cell cytoskeleton and other molecules (e.g., proteases, adhesion proteins) that regulate spermatogenesis. These chapters contain thought-provoking discussions and concepts which shall be welcomed by investigators in the field. It is obvious that many of these “concepts” will be updated and some may be amended in the years to come. However, they will serve as a guide and the basis for investigation by scientists in the field. Due to the page limit, I could not cover all areas of interest in this monograph; instead, I tried to present this subject area with a balanced approach.

I hope this book will be helpful to young investigators who consider entering reproductive biology to get a balanced view of the latest developments in the field. For established investigators, these chapters will be helpful for their studies in the laboratory.

I am indebted to members of my laboratory who have provided insightful and critical discussion in the course of preparing this book. I am also grateful to all the staff at Landes Bioscience, in particular Cynthia Conomos, Celeste Carlton, Kristen Shumaker, and Megan Klein, who have helped me to work on this book from its inception through publication. Furthermore, I am grateful to my colleagues who have taken their time and worked with me these past two years on their chapters amidst the intensive day-to-day routines in their laboratories: teaching, administration, research and writing manuscripts and grant applications. Finally, I also want to thank my former mentors and friends Drs. Wayne Bardin, Barry Boettcher, Neal Musto,

Glen Gunsalus and Bruno Silvestrini for their critiques, help, encouragement and discussion during my graduate student and postdoctoral years in their laboratories in different parts of the world, who have introduced me to the fascinating areas of research in reproductive biology and animal/pharmaceutical models, set up a high standard of quality research, and unknowingly shaped my scientific personality and my approach to science.

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