Handbook of Andrology

Table of Contents

Preface

Bernard Robaire and Peter Chan

List of Contributors

Foreword

Philip Troen

What are the components of the male reproductive system?

CNS, pituitary, testis, epididymis, prostate, seminal vesicles, scrotum, penis

Kenneth P. Roberts

2. What is the relationship among the various endocrine components of the male reproductive system?

Hypothalamic-pituitary-testicular axis-feedback loops

Ronald S. Swerdloff

3. How are communication signals read in the male reproductive system?

Receptors for gonadotropins and androgens

Ilpo Huhtaniemi

4. What compounds mediate communication within the testis? Where and how are male-associated hormones produced?

Integration of the hypothalamus, pituitary and testis

Barry R. Zirkin and Michael D. Griswold

5. How is the synthesis of testosterone regulated?

Samuel Garza, Martine Culty and Vassilios Papadopoulos

6. Are there other hormonal signals regulating testicular functions?

Role of adrenal steroids and estrogens

Maria Christina W. Avellar

7. What are the multiple roles of the Sertoli cell?

Supporting spermatogenesis and immune regulation

Jannette M. Dufour

8. What are male germline stem cells?

Factors controlling germ cell production

Makoto Nagano

9. What makes the process of spermatogenesis unique?

Stefan Schlatt and Swati Sharma

10. How do sperm get the correct number of chromosomes?

Mary Ann Handel

11. What are the roles of androgens and FSH in the hormonal regulation of sperm production?

Robert I. McLachlan and Liza O'Donnell

12. Can sperm be produced in vitro?

Heather Steele and Ina Dobrinski

13. Do DNA methylation patterns change during spermatogenesis? What is the role of imprinting of male germ cells?

Gurbet Karahan and Jacquetta M. Trasler

14. Do chromatin dynamics in spermatogenesis have implications for fertility and epigenetic inheritance?

Anne-Sophie Pépin and Sarah Kimmins

xxiv xxv

15. What are sperm-borne RNAs and do they play a role in germ cell function?

Wei Yan

16. How are epigenetic marks transmitted from one generation to the next?

Epigenetics, intergenerational inheritance, transgenerational inheritance, chromatin, DNA methylation, histone modifications, noncoding RNAs, germ cells, gametes, embryos

John R. McCarrey

17. What are the efferent ductules?

Rex A. Hess

18. What does the epididymis do and how does it do it?

Clémence Belleannée and Barry T. Hinton

19. What is the impact of the immune system on male reproductive function?

Mark P. Hedger and Rukmali Wijayarathna

20. What is the prostate and what are its functions?

Gail S. Prins

21. What are the seminal vesicles?

Development, secretions and functions

Paul S. Cooke and William H. Walker

22. How does semen analysis assist in understanding the reproductive status of the male?

Christina Wang

23. How is sperm chromatin structure quality assessed? What is the value of doing such assessments?

Bernard Robaire

24. What is sperm banking? When and how is it (or should it be) used in humans? Animals?

Sperm banking, consequences of its use in clinical and animal practice

Susan A. Rothmann, William C. Baird III, Matthew C. Hudnall and William C. Baird IV

25. How are the sperm and egg prepared for fertilization and how does fertilization take place?

Janice P. Evans, James A. Foster and Janice L. Bailey

26. What determines biological maleness?

Sex determination, testis formation and development of the male phenotype

Nicolas Pilon and Robert S. Viger

27. How do environmental cues affect male reproduction?

William W. Wright

28. What activates puberty in the male? What causes early or delayed puberty?

Mary M. Lee

29. How do paternal factors such as diet, smoking, stress, and environmental chemical exposures affect germ cell mutations?

Jonatan Axelsson, Habiballah Shojaeisaadi, Francesco Marchetti and Carole Yauk

30. What male contraceptives currently exist and what is the outlook for male hormonal contraception?

John K. Amory and Stephanie T. Page

31. What are the current approaches to non-hormonal male contraception?

John K. Amory

xxvi xxvii

32. How is male infertility defined? How is it diagnosed?

Epidemiology, causes, work-up

Peter N. Dietrich and Jay I. Sandlow

33. Why evaluate the infertile male in the era of ART?

Medical and surgical therapies for male infertility

Marc Goldstein

34. Can empiric medical treatments improve idiopathic male infertility?

Jared M. Bieniek and Kirk C. Lo

35. What are the assisted reproductive technologies for male infertility?

Indications for IVF/ICSI/IUI. surgical sperm retrieval techniques

Peter N. Schlegel

36. Genetic factors likely cause a large percentage of male infertility

Dolores J. Lamb

37. What is Klinefelter Syndrome and how best to care for these patients

Samuel R. Donnenfeld and Akanksha Mehta

38. What is known about the health of ART-conceived offspring?

Sarah R. Catford

39. What should I know about artificial insemination of animals? How is male fertility assessed in domestic animals and why is this important?

Peter Sutovsky and Lauren E. Hamilton

40. Are sperm counts declining with time, to what extent and what are the consequences of this decline?

Géraldine Delbès

41. Do environmental contaminants including endocrine disruptors impair human sperm production and fertility?

Identification and regulation of man-made chemicals that may have adverse reproductive effects in men

Sally Perreault Darney

42. Can spermatozoa be targets for drugs? If so, what are the consequences of such drug exposures?

Drugs that affect sperm structure or function, malemediated developmental toxicity

Bernard Robaire and Barbara F. Hales

43. Can we protect germ cells against testicular insults?

Male reproductive toxicology

Marvin L. Meistrich

44. What types of testicular tumors occur in men? How effective are existing therapeutic approaches and what is the prognosis?

Ewa Rajpert-De Meyts, Lise Aksglaede and Niels E. Skakkebæk

45. What do we know about the origin of germ cell tumours?

Kate L. Loveland and Daniela Fietz

46. Can we preserve testicular germ cells of prepubertal patients for later fertility?

Next generation therapies to preserve fertility and treat infertility

Sarah K. Munyoki and Kyle E. Orwig

47. What is the impact of cytotoxic and surgical therapy on sperm and fertility preservation in cancer patients?

Corey A. Faw and Robert E. Brannigan

xxviii xxix

48. What is the role of the penis in male reproduction?

Muhammed A. Moukhtar Hammad, Adnan El-Achkar, David W. Barham and Faysal A. Yafi

49. The potential reproductive effects of male circumcision

Nahid Punjani and Phillip S. Li

50. How do erections occur? How common is erectile dysfunction, what is its etiology, and how do you evaluate men with this problem?

Logan B. Galansky, Phillip M. Pierorazio and Arthur L. Burnett

51. How to treat erectile dysfunction?

Wael S. Almajed, Gilad A. Hampel and Waye J.G. Hellstrom

52. Is there an andropause, more appropriately named Late Onset Hypogonadism, and if so, what tissues are affected and how?

Mitch Kim, Roei Golan, Manish Narasimman and Ranjith Ramasamy

53. Are there reproductive consequences associated with advanced paternal age?

Peter Chan and Bernard Robaire

54. Should there be hormone replacement therapy for aging men?

Austin Kinley and Mohit Khera

55. What is the place of psychosocial issues in andrology?

William Petok

56. What is benign prostatic hyperplasia and how is it treated?

Manuel Belmonte Chico Goerne, Abdulghani Khogeer, Melanie Aubé-Peterkin and Serge Carrier 57. What is prostate cancer? How is it to diagnosed? What is its prevalence?

Joseph Alukal

58. What are the treatments for organ-confined prostate cancer and how effective are they?

Partha P. Banerjee

59. How is castration-resistant prostate cancer now understood and treated?

Lara Rodriguez-Sanchez and Rafael Sanchez-Salas

60. What is an andrologist now? What does an andrologist do? What will an andrologist do in the future?

Peter N. Schlegel

61. What is the role of the andrologist with respect to the LGBTQQIA2S+ community?

Alan W. Shindel

62. How is social media changing andrology?

Heather E. Fice

63. What is the impact of COVID-19 and vaccines for COVID-19 on sexual and reproductive health?

R. John Aitken

64. Is male reproductive dysfunction a window on general male health?

Federico Belladelli and Michael L. Eisenberg

xxx xxxi