

PRINCIPLES OF MAMMALIAN REPRODUCTION

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[Preface](#)

[I. Historical Perspective](#)

[Early History](#)

- generation of animals, anatomical observations, human fertility control

[Classical Period](#)

- endocrine doctrine, isolation of hormones, ovarian dynamics, male reproduction, hierarchy of control, bioassay, genetics of sex determination

[Modern Era](#)

- more on the Y chromosome, radioimmunoassay, protein hormones, prostaglandins, hormonal actions, contraception, induced abortion, assisted reproduction

[Study Questions](#)

[II. Reproductive Endocrinology Overview](#)

[Hypothalamic-Pituitary Axis](#)

- structural organization, negative steroid feedback

Reproductive Hormones

- protein synthesis and secretion, neurohormones, gonadotropins, gonadal proteins, steroidogenesis

Local Modulators

- eicosanoids, catecholamines and histamine, endogenous opiates, growth factors and cytokines

Mechanisms of Mediator Action

- membrane receptor models, intracellular receptor model

Assays of Hormones and Receptors

Study Questions

III. The Male

Functional Anatomy

- testis, the mature sperm cell, duct system, penis, accessory glands

Endocrinology

- brain-testicular interaction, testicular steroidogenesis, end-organ steroid metabolism

Spermatogenesis

- mitosis and meiosis, spermatocytogenesis, spermiogenesis, spermatogenic cycle and wave, hormonal regulation, blood-testis barrier, effect of temperature, spermiation, further maturations

Study Questions

IV. The Nonpregnant Female

Functional Anatomy

- ovary, tubular organs

Neuroendocrinology

- brain-ovarian interactions, reflex ovulation, spontaneous cycles, follicular steroidogenesis

The Estrous Cycle

- stages, reproductive tract, synchronization of estrus

The Menstrual Cycle

- phases, comparison to the estrous cycle, menstrual bleeding, premenstrual syndrome, contraceptive steroids, menopause

Ovarian Physiology

- follicular growth and atresia, ovulation, oogenesis, corpus luteum

Study Questions

V. Pathways to Pregnancy and Birth

Mating

- courtship behaviors, neuroendocrine factors, copulation, other social interactions, seasonal effects

Gamete Transport in the Female

- sperm, ova, hormonal factors, artificial insemination, barrier contraception

Fertilization

- capacitation, acrosomal reaction and fusion, zona block, in vitro fertilization

Embryo Migration

Implantation

- classifications, biochemical basis, marsupials and monotremes, delayed implantation

Embryogenesis

- indifferent stage, sexual differentiation, intersexuality, sperm/embryo sexing, micromanipulation, toxicology/embryopathy

The Placenta

- anatomy, transport processes, hormones, decidualization

Immunology of Pregnancy

Endocrinology of Pregnancy

- rescue of the corpus luteum, maintenance requirements, pseudopregnancy

Spontaneous Abortion

Pregnancy Diagnosis

- palpation, radiography and ultrasound, biochemical tests

Labor and Parturition

- stages, model, other species/theories

Parent-Offspring Interactions

- maternal responsiveness, neonatal bonding/surrogacy, paternal care

Mammary Gland

- functional anatomy, neuroendocrinology of lactation, colostrum, cancer

Resumption of Fertility Postpartum

Sexual Maturation of the Offspring

Study Questions

Appendices

[List of Abbreviations](#)

[Taxonomic Survey of Mammals](#)