

Advanced Pharmacology

Endocrine Pharmacology Part 2: Reproductive Pharmacology



Thomas W. Barkley, Jr., PhD, ACNP-BC, FAANP

President, Barkley & Associates

www.NPcourses.com

and

Professor of Nursing

Director of Nurse Practitioner Programs

California State University, Los Angeles



Robert Fellin, PharmD, BCPS

Faculty, Barkley & Associates

Pharmacist, Cedars-Sinai Medical Center

Los Angeles, CA

Unit 7: Part 2

©2014 Barkley & Associates

Hypothalamic and Pituitary Regulation: Female Reproductive Function



- Regulation achieved by hormones from the:
 - Hypothalamus
 - Pituitary
 - Ovary
- Hypothalamus → gonadotropin-releasing hormone (GnRH), which travels to the pituitary to stimulate the secretion of FSH and LH
 - Both of these hormones act on the ovary and cause immature ovarian follicles to begin developing
 - The rising and falling of pituitary hormones create two interrelated cycles that occur on a periodic, monthly basis = ovarian and uterine cycles

Unit 7: Part 2

©2014 Barkley & Associates

Hypothalamic and Pituitary Regulation: Female Reproductive Function – continued



- ❑ Under the influence of FSH and LH, several ovarian follicles begin the maturation process each month
- ❑ On approximately day 14 of the ovarian cycle, a surge of LH causes one follicle to expel its oocyte (ovulation)
- ❑ The ruptured follicle, minus its oocyte, remains in the ovary and is transformed into the hormone-secreting corpus luteum
- ❑ The oocyte begins its journey through the uterine tube and eventually reaches the uterus
- ❑ If conception does not occur, the outer lining of the uterus degenerates and is shed to the outside during menstruation

Ovarian Control of Female Reproductive Function



- ❑ As ovarian follicles mature, they secrete estrogen and progesterone
- ❑ Estrogen is a generic term for 3 different hormones
 - Estradiol
 - Estrone
 - Estriol
- ❑ Estrogen is responsible for the maturation of the female reproductive organs and for the appearance of secondary sex characteristics
- ❑ Other estrogen contributions:
 - Helps to maintain low blood cholesterol levels
 - Facilitates Ca⁺ uptake by bones

Oral Contraceptives



- ❑ In the last half of the ovarian cycle, the corpus luteum secretes a class of hormones called progestins, the most abundant is progesterone
- ❑ In combination with estrogen, progesterone promotes breast development and regulates the monthly changes in the uterine cycle
- ❑ Under influence of estrogen and progesterone, the uterine endometrium becomes vascular and thickens in preparation for receiving the fertilized egg
- ❑ High estrogen and progesterone levels in the final third of the uterine cycle provide negative feedback to shut off GnRH, FSH and LH secretion
- ❑ Without stimulation from FSH and LH, estrogen and progesterone levels fall, the endometrium is shed, and menstrual bleeding begins

Unit 7: Part 2

©2014 Barkley & Associates

Estrogens and Progestins as Oral Contraceptives



- ❑ Most contraceptives contain a combination of estrogen and progestin
 - A few contain only progestin
- ❑ Ethinyl estradiol: the most common estrogen used for contraception
- ❑ Norethindrone: the most common progestin
- ❑ Usually, drug administration of an oral contraceptive begins on day 5 of the ovarian cycle, and continues for 21 days
- ❑ During the other 7 days, the patient takes a placebo
- ❑ Missed pills? What to do?
- ❑ Estrogen-progestin oral contraceptives act by providing negative feedback to the pituitary to shut down the secretion of LH and FSH
 - Without the influence of these hormones, the ovarian follicle cannot mature and ovulation is prevented

Unit 7: Part 2

©2014 Barkley & Associates