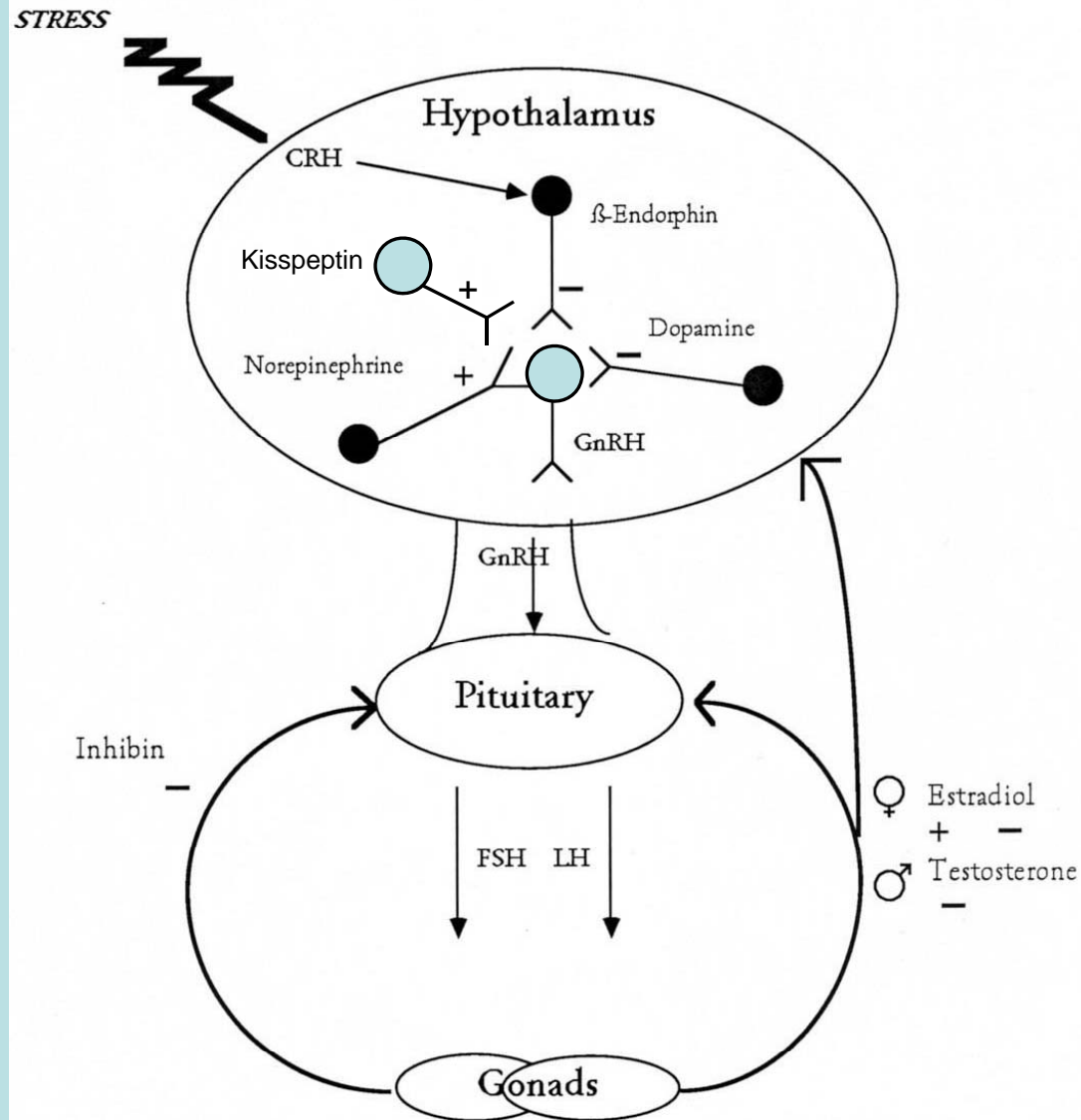
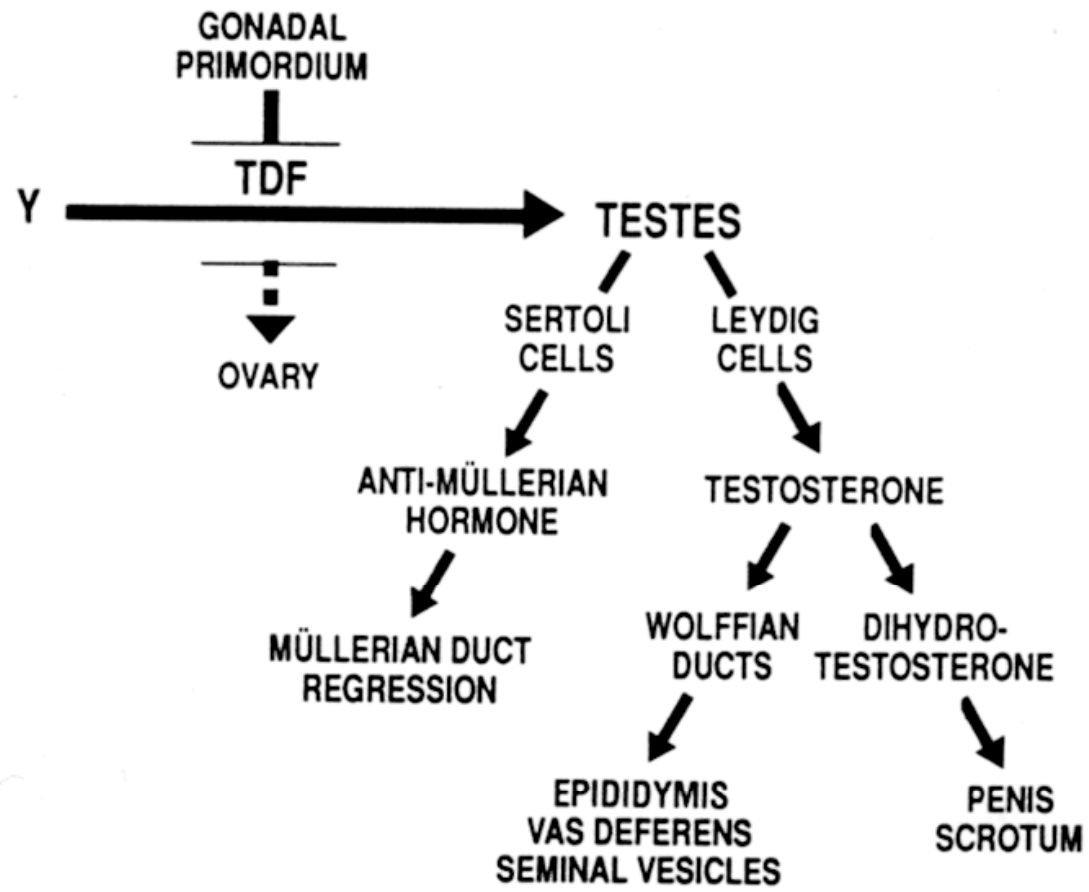


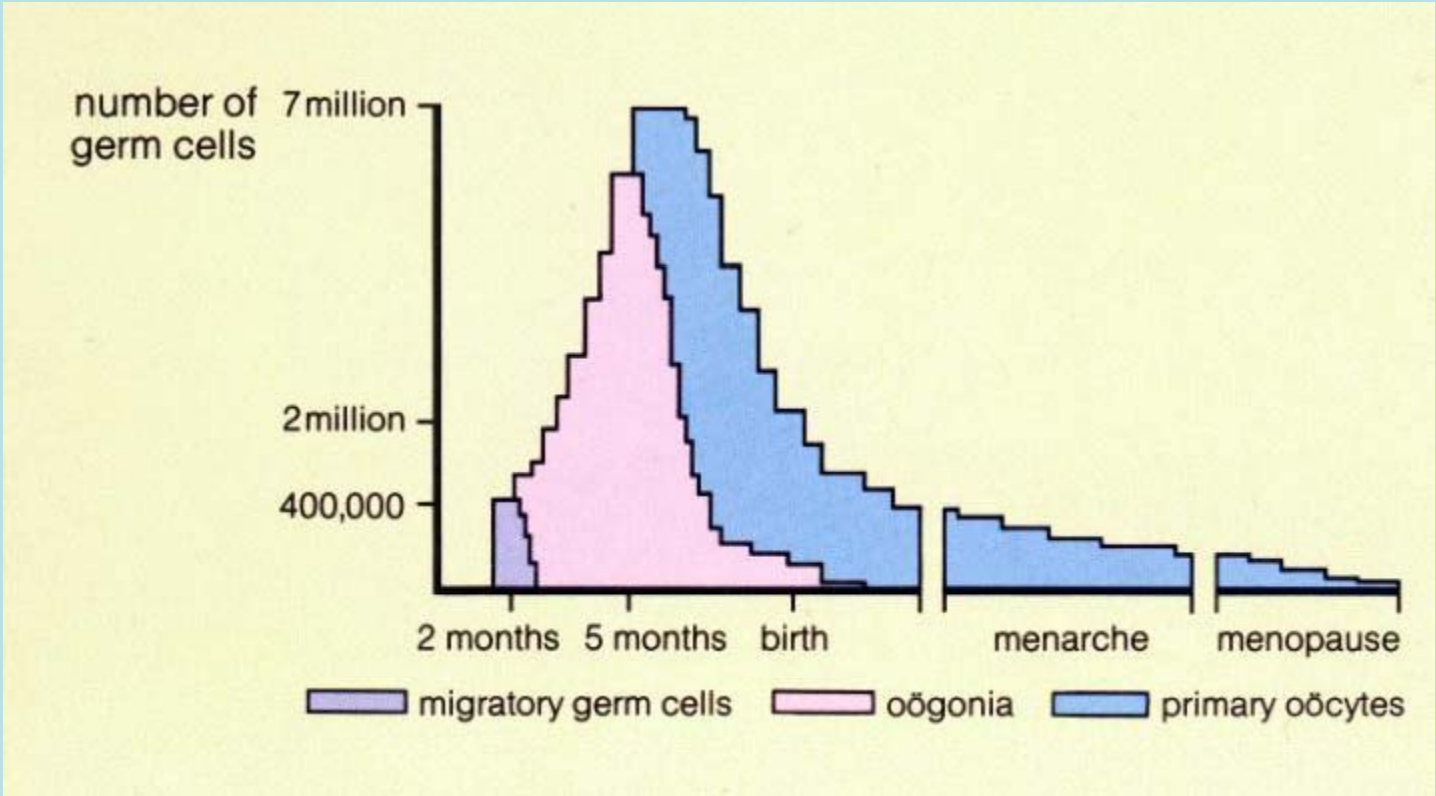
Hypothalamic-Pituitary-Gonadal Axis



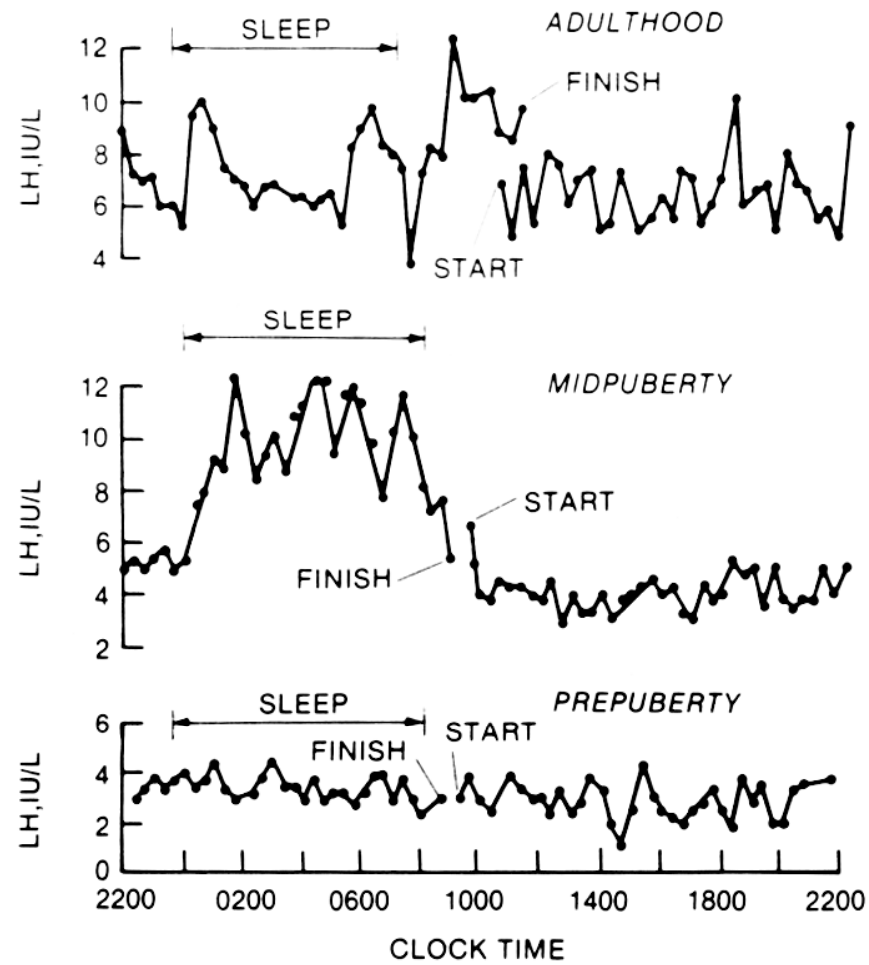


(Modified from Grumbach MM. Genetic mechanisms of sex development.)

Germ Cells in the Ovary Throughout Life



Puberty and Pattern of LH Secretion



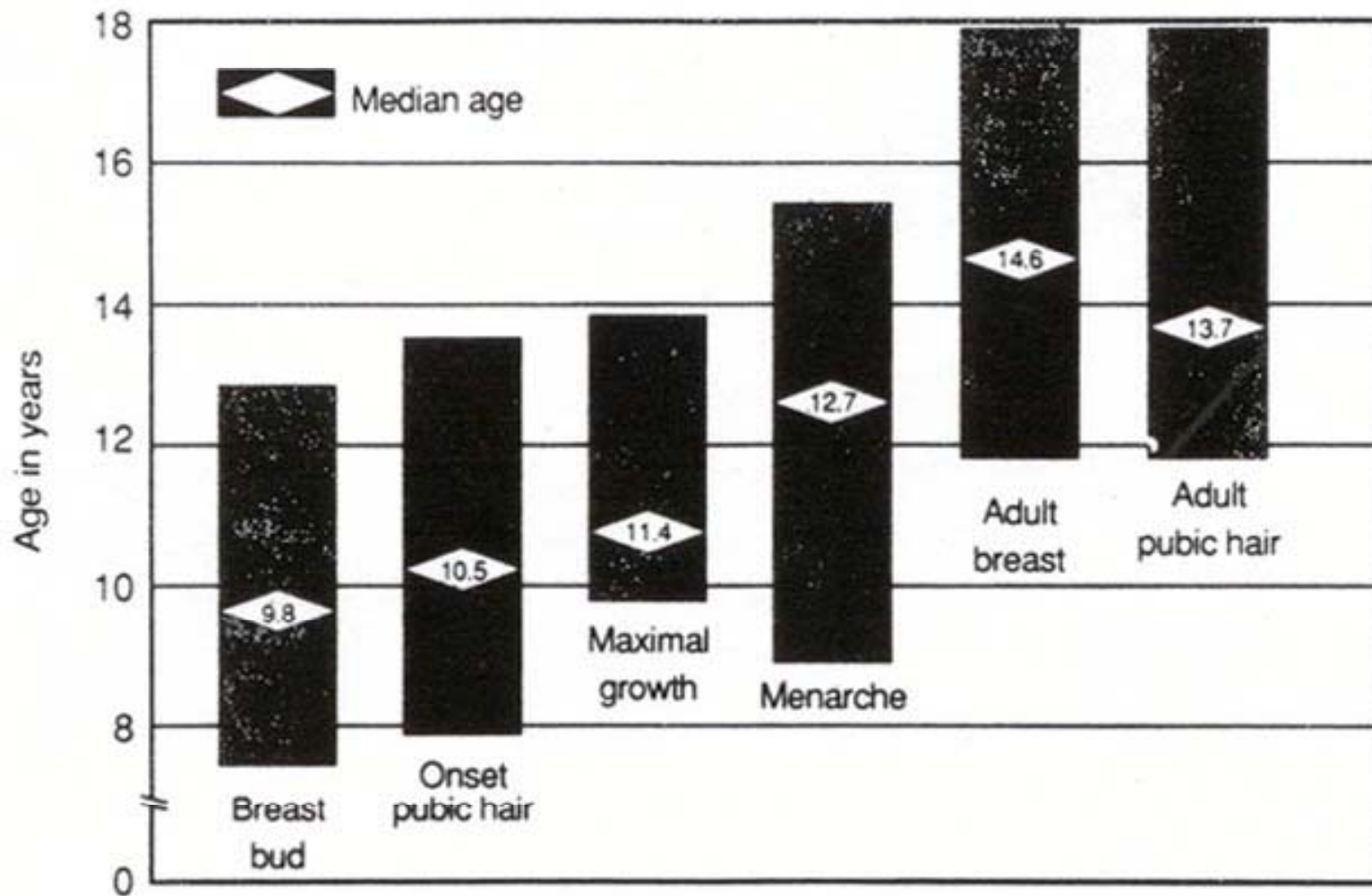


Figure 12-11. Median age and range of the signs of female sexual development during puberty. (Adapted from Speroff L, Glass RH, Kase NG. *Clinical Gynecologic Endocrinology and Infertility*. 4th ed. Baltimore: Williams & Wilkins, 1989: 1-688. © 1989, the Williams & Wilkins Co., Baltimore.)

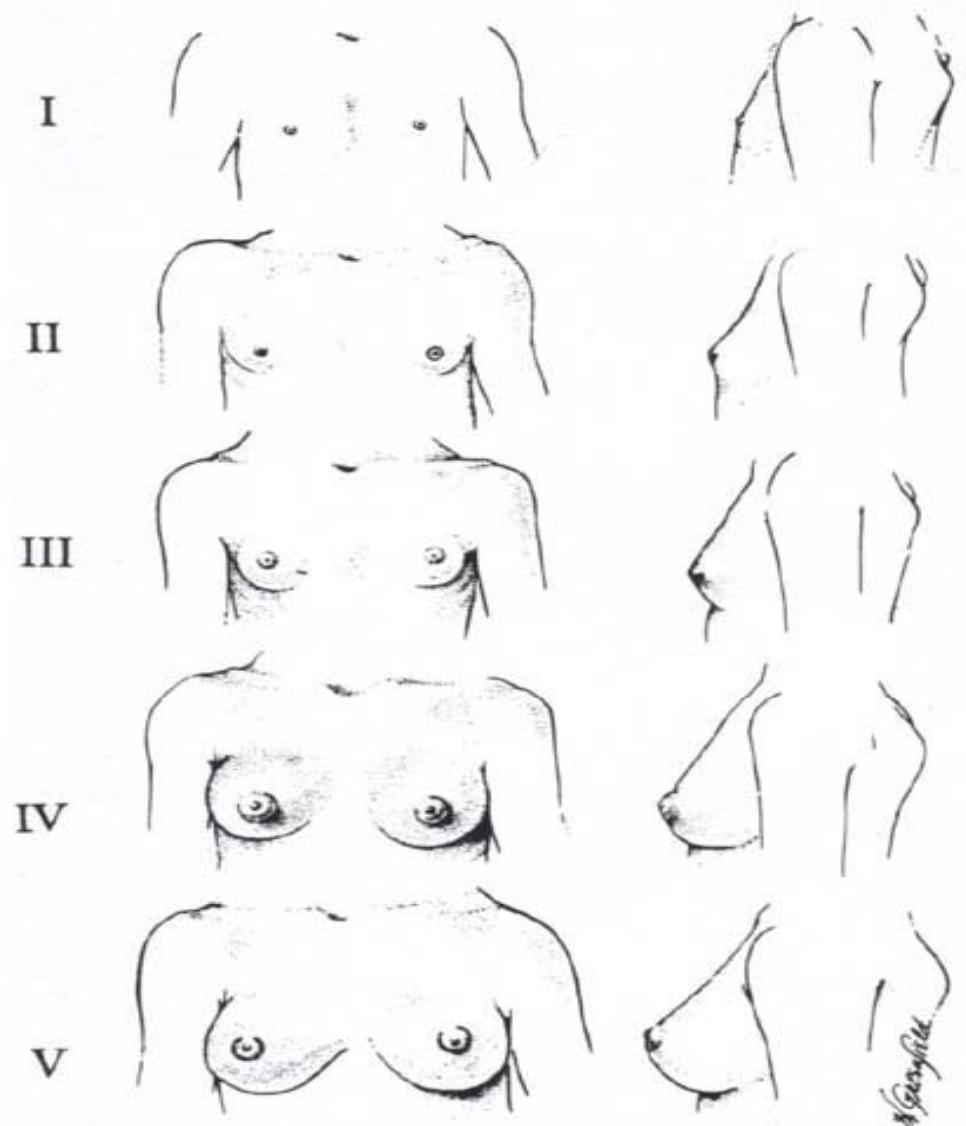
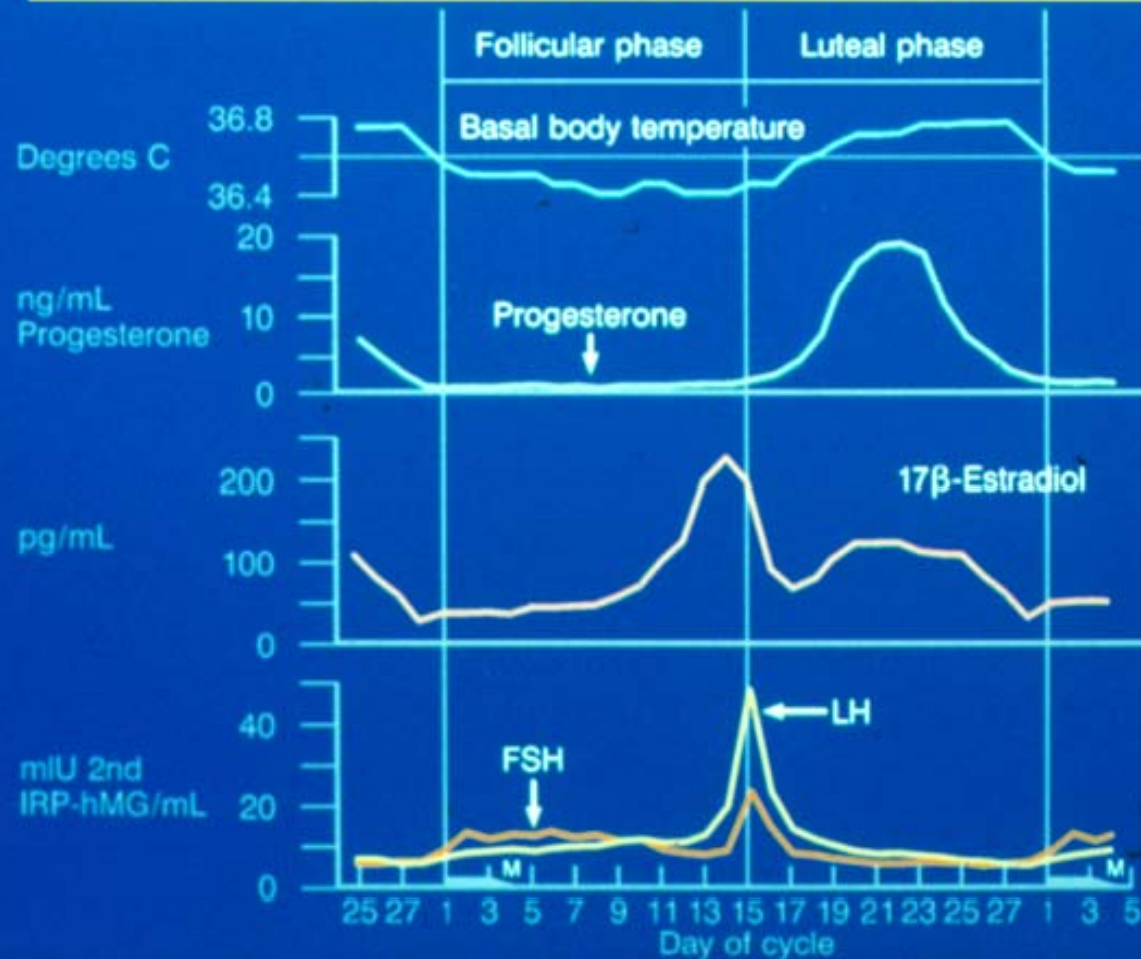


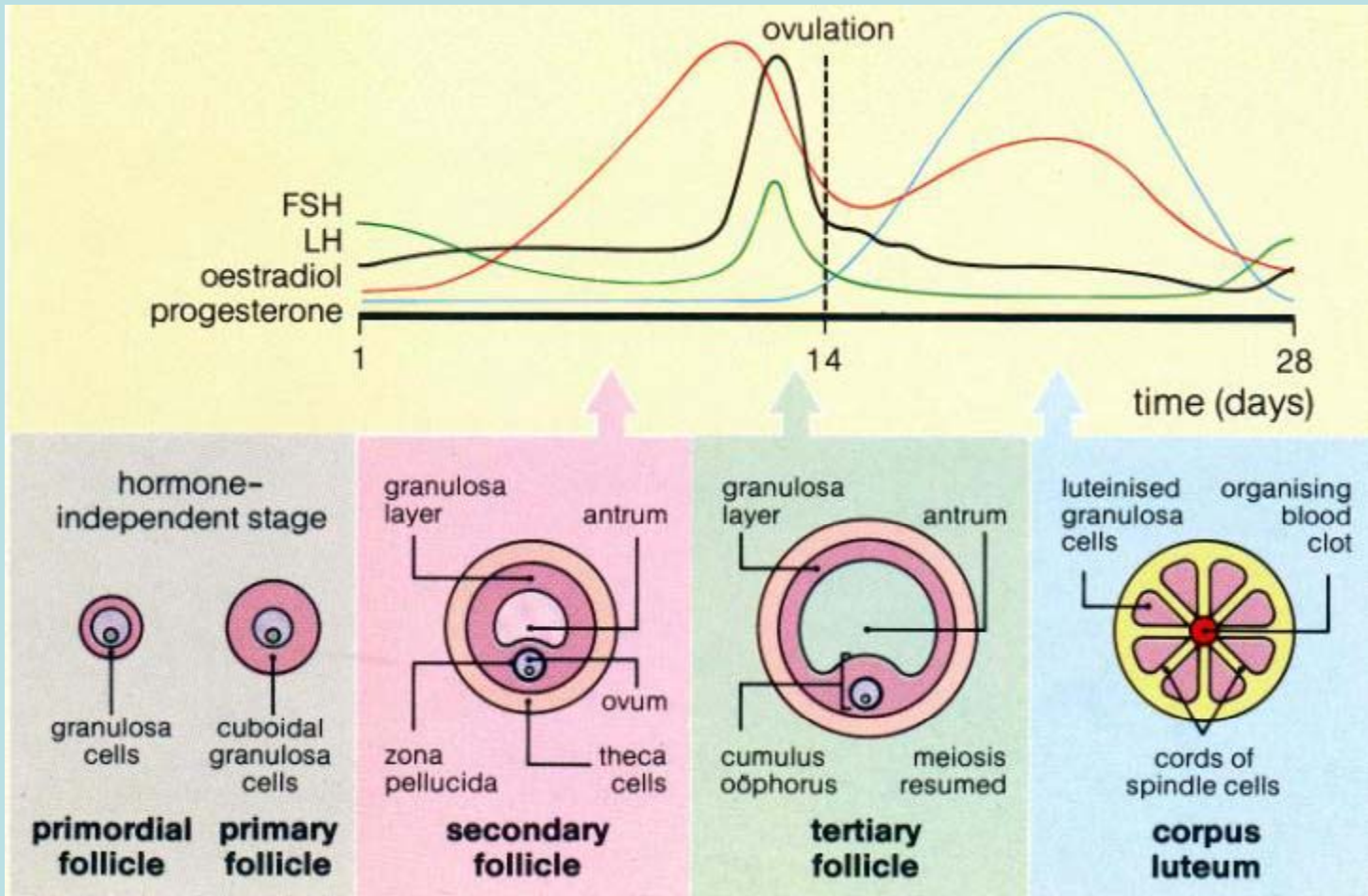
Figure 12-12. Diagrammatic representation of Tanner stages I to V of human breast maturation. (Adapted from Marshall WA, Tanner JM. Variations in patterns of pubertal changes in girls. Arch Dis Child 1969; 44:291-303.)

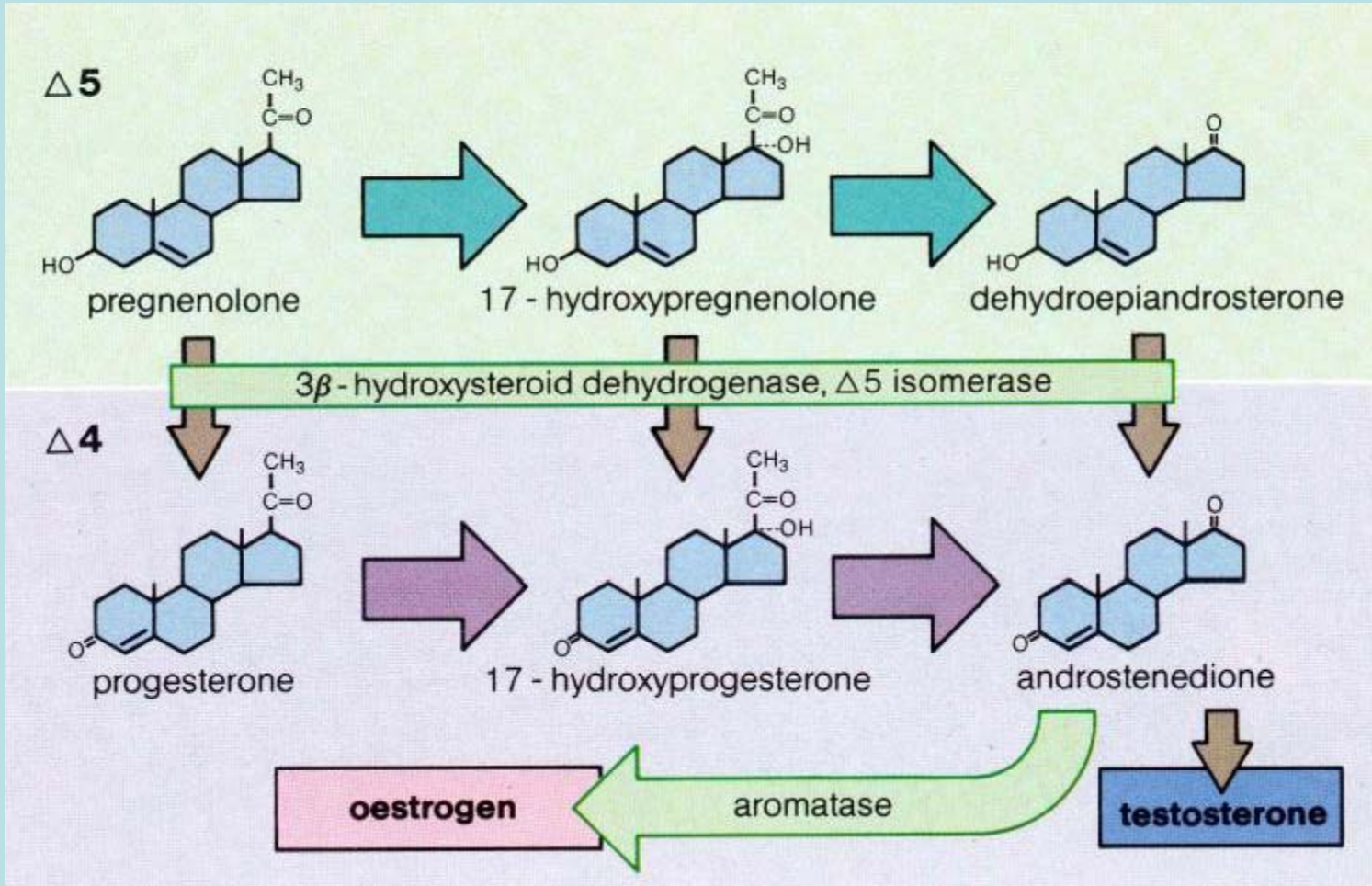
The Menstrual Cycle: Fluctuations in Basal Body Temperature and Hormone Levels



Ganong WF: *Review of Medical Physiology*, ed 10. Los Altos, California, Lange Medical Publications, 1981, pp 340-342.

Follicular Development





EVALUATION OF AMENORRHEA

- Is the patient pregnant?
- Is she making estrogen?
- If low estrogen, are gonadotropins high indicating ovarian failure or low indicating a hypothalamic or pituitary problem?
- If high estrogen, does she make progesterone? Are there disorders of the uterus or outflow tract? Are androgens elevated?

INDICES OF ESTROGEN SECRETION

- Breast development
- Body fat distribution
- Bone maturation
- Vaginal cell cornification
- Cervical mucus
- Proliferative endometrium
- Withdrawal bleeding after progesterone

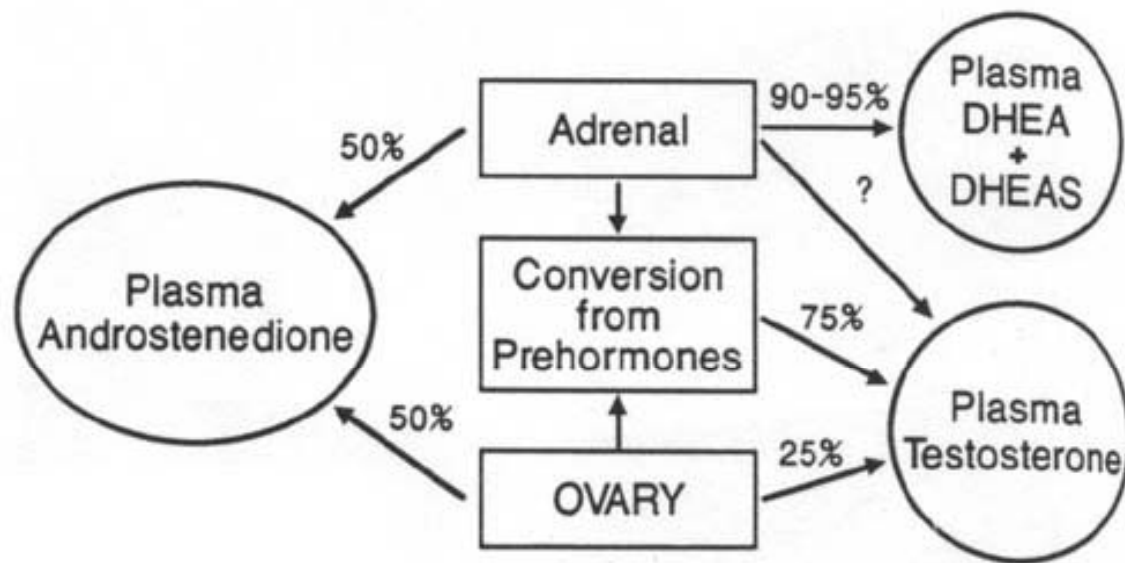
INDICES OF PROGESTERONE SECRETION

- Increase in basal body temperature
- Cervical mucus becomes more viscous
- Secretory endometrium

INDICES OF ANDROGEN SECRETION

- Hirsutism
- Acne
- Temporal balding
- Voice deepening
- Changes in body habitus
- Clitoromegaly
- Menstrual dysfunction

Sources Of Circulating Androgens In Normal Women



CAUSES OF INCREASED ANDROGEN SECRETION

- Polycystic ovarian disease
- Androgen producing tumors of the ovary
- Cushing's syndrome
- Adrenal hyperplasia

CLINICAL SYMPTOMS OF POLYCYSTIC OVARIAN DISEASE

- Amenorrhea
- Dysfunctional bleeding
- Hirsutism
- Infertility
- Obesity

Polycystic Ovarian Syndrome

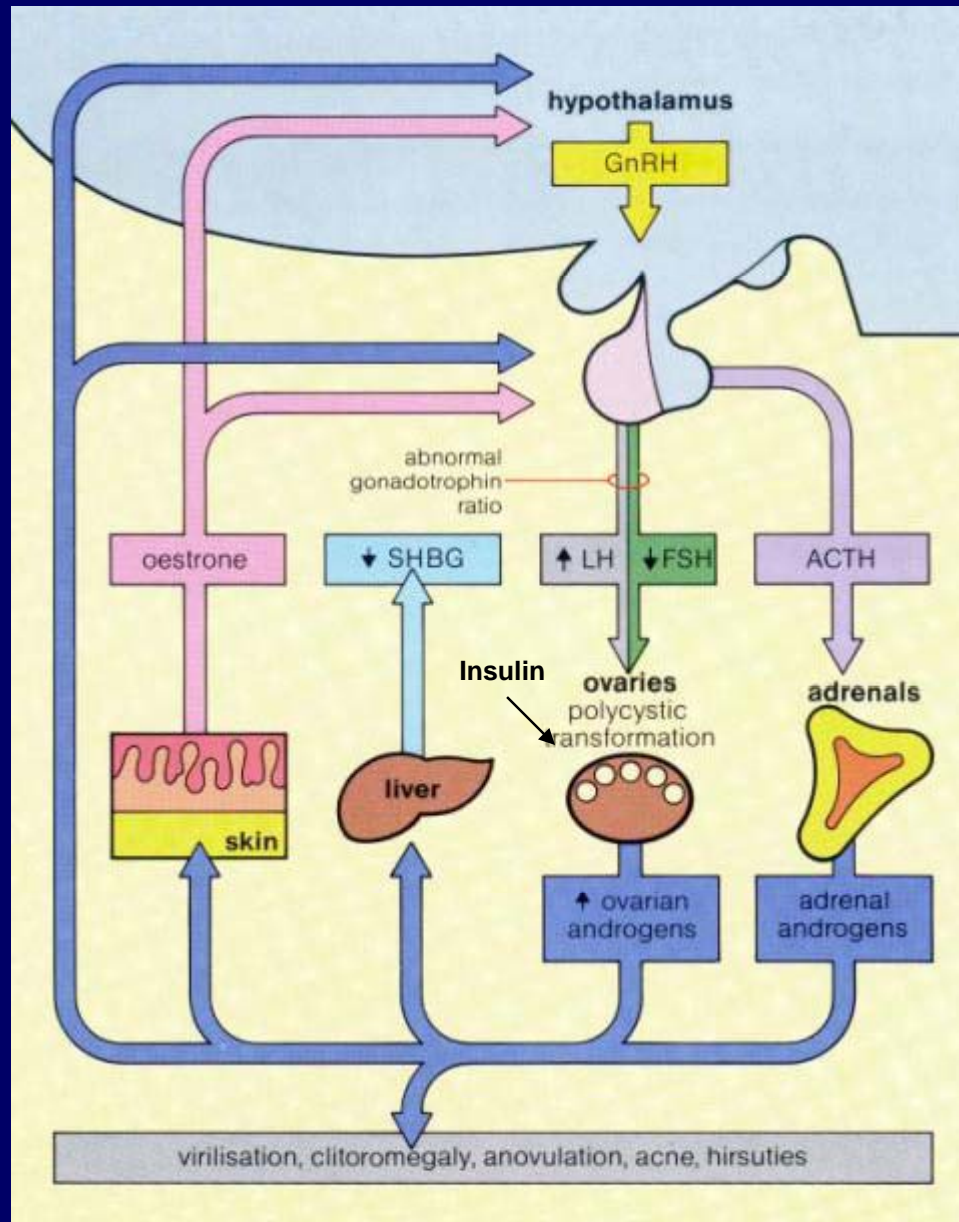


FIGURE 98-10. Twenty-three-year-old woman with the syndrome characterized by massive obesity, severe hirsutism, acanthosis nigricans (*arrow*), glucose intolerance with insulin resistance, hyperandrogenism, and hyperuricemia.

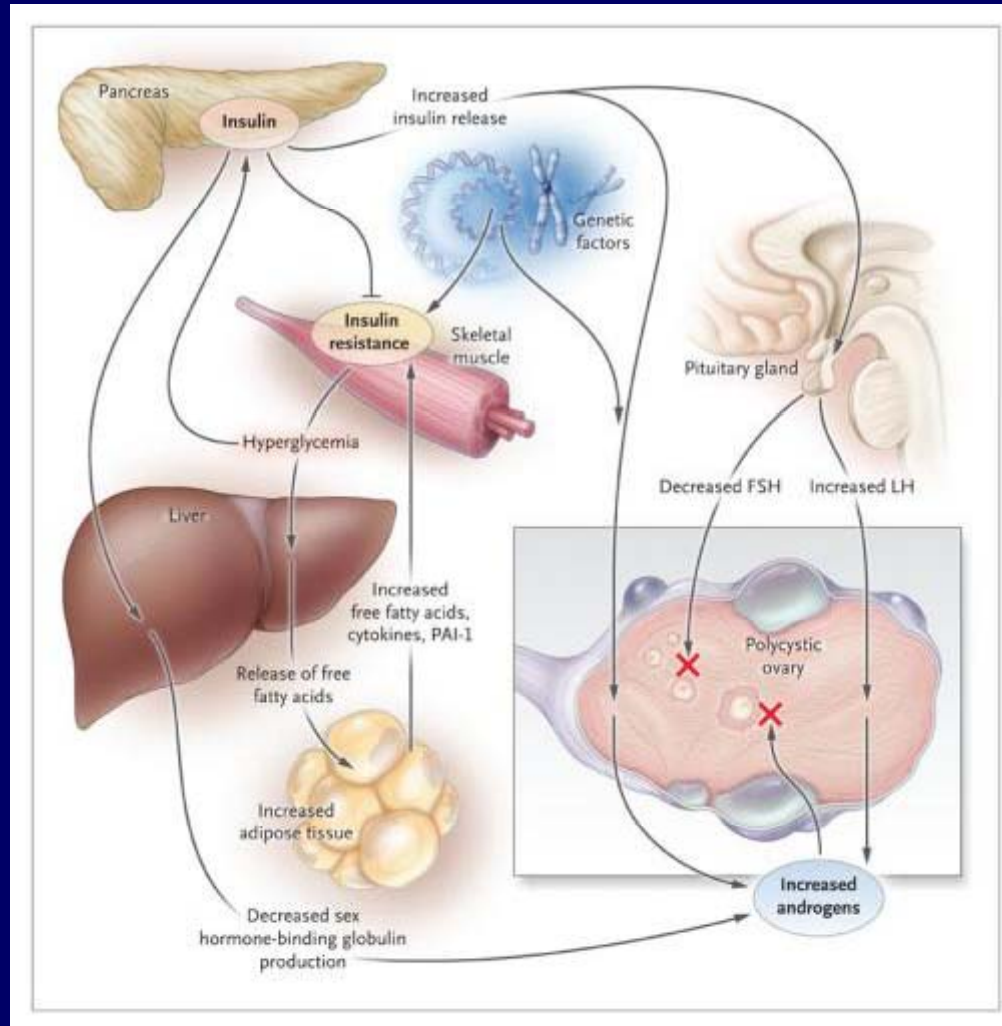
BIOCHEMICAL FEATURES OF POLYCYSTIC OVARIAN DISEASE

- ↑ LH:FSH ratio
- ↑ Estrogen
- ↑ Androgens
- ↓ Sex hormone binding globulin
- Insulin resistance

Pathophysiological Characteristics of the Polycystic Ovary Syndrome



Pathophysiological Characteristics of the Polycystic Ovary Syndrome



Nestler J. N Engl J Med 2008;358:47-54

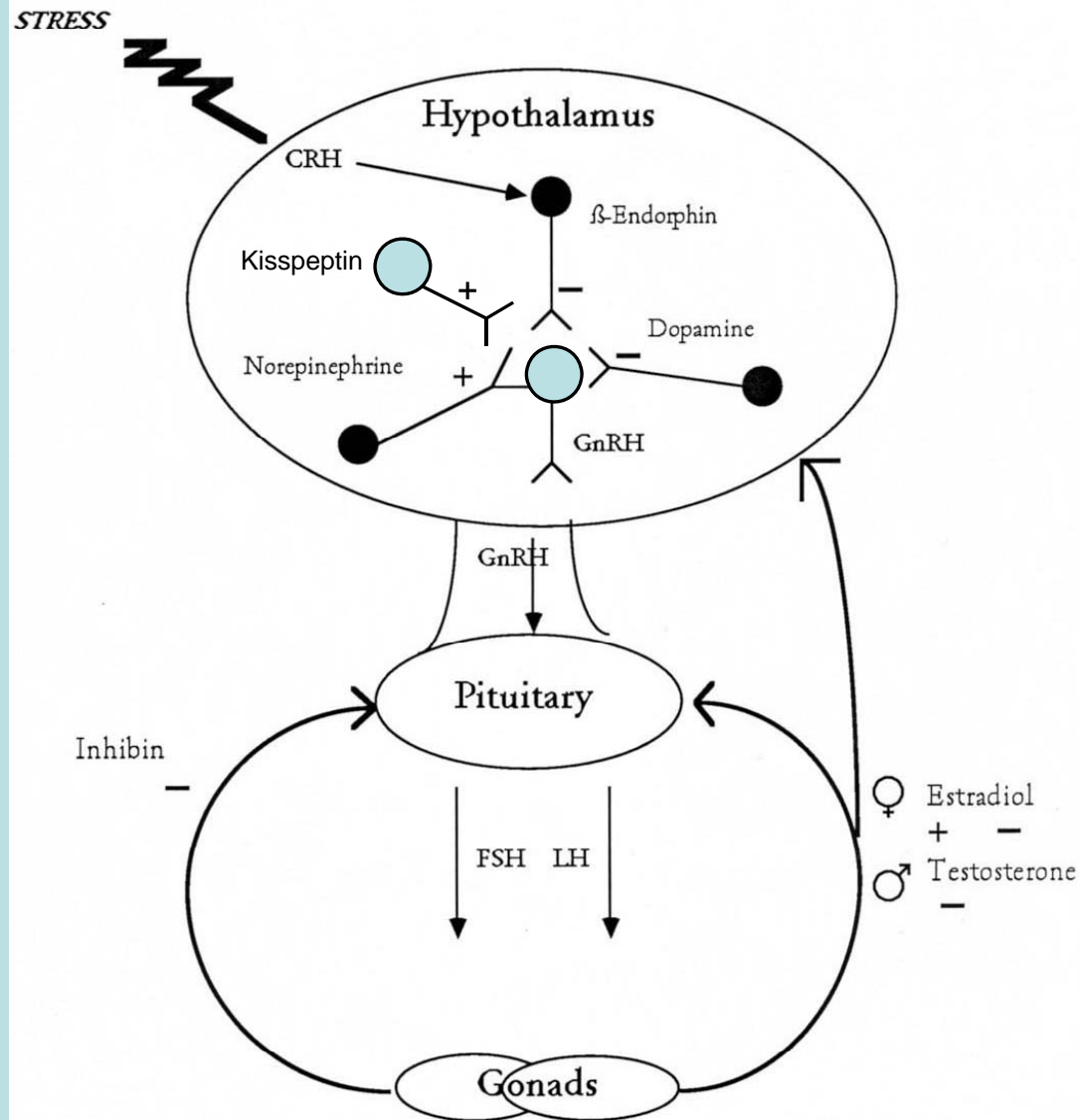


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OBJECTIVES IN TREATMENT OF POLYCYSTIC OVARIAN DISEASE

- Restoration of fertility
- Treatment of hirsutism
- Treatment of endometrial hyperplasia
- Treatment of metabolic syndrome

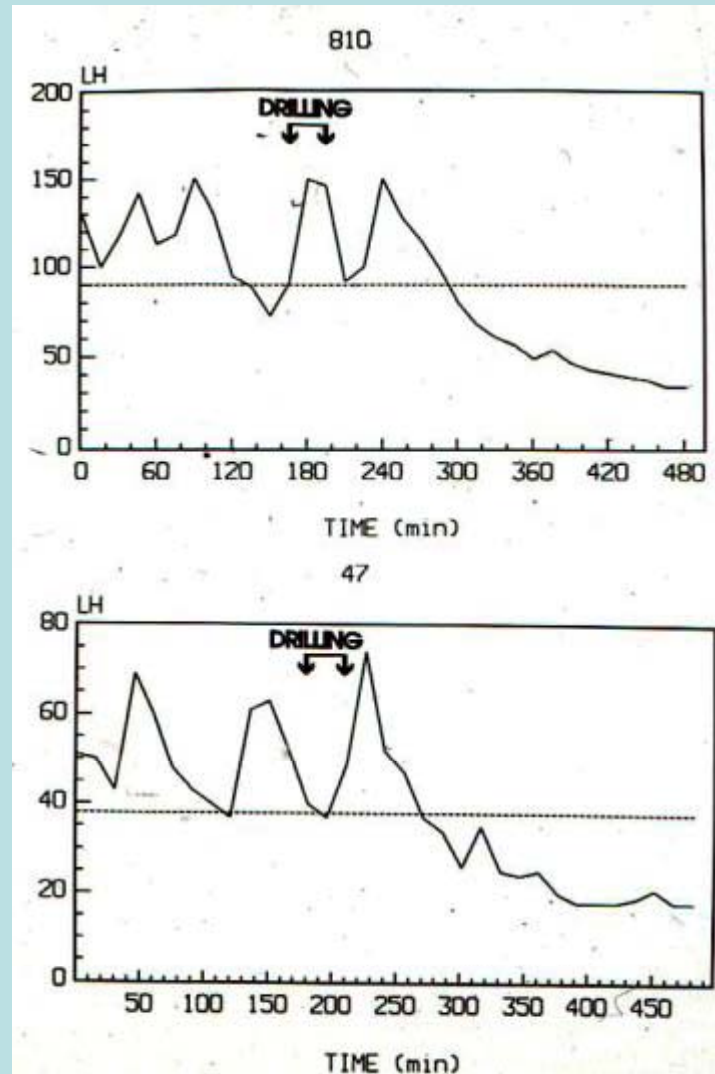
Hypothalamic-Pituitary-Gonadal Axis



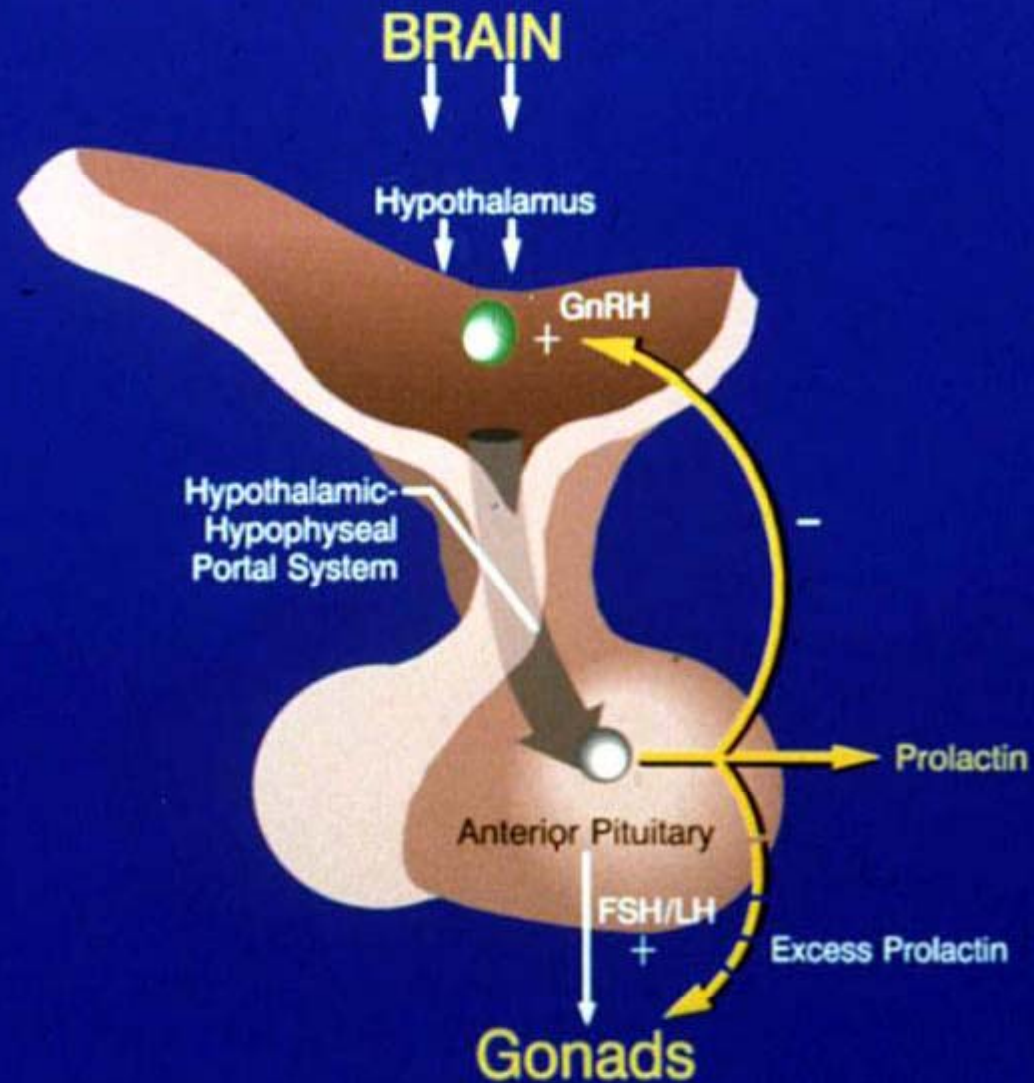
CAUSES OF HYPOTHALAMIC AMENORRHEA

- Diet/Weight Loss
- Exercise
- Stress
- Hyperprolactinemia

Effect of Stress (Noise of Drilling) on LH Secretion in Ovariectomized Monkeys



Disruption of Gonadotropin Secretion by Prolactin



Turner Syndrome: 45X Gonadal Dysgenesis

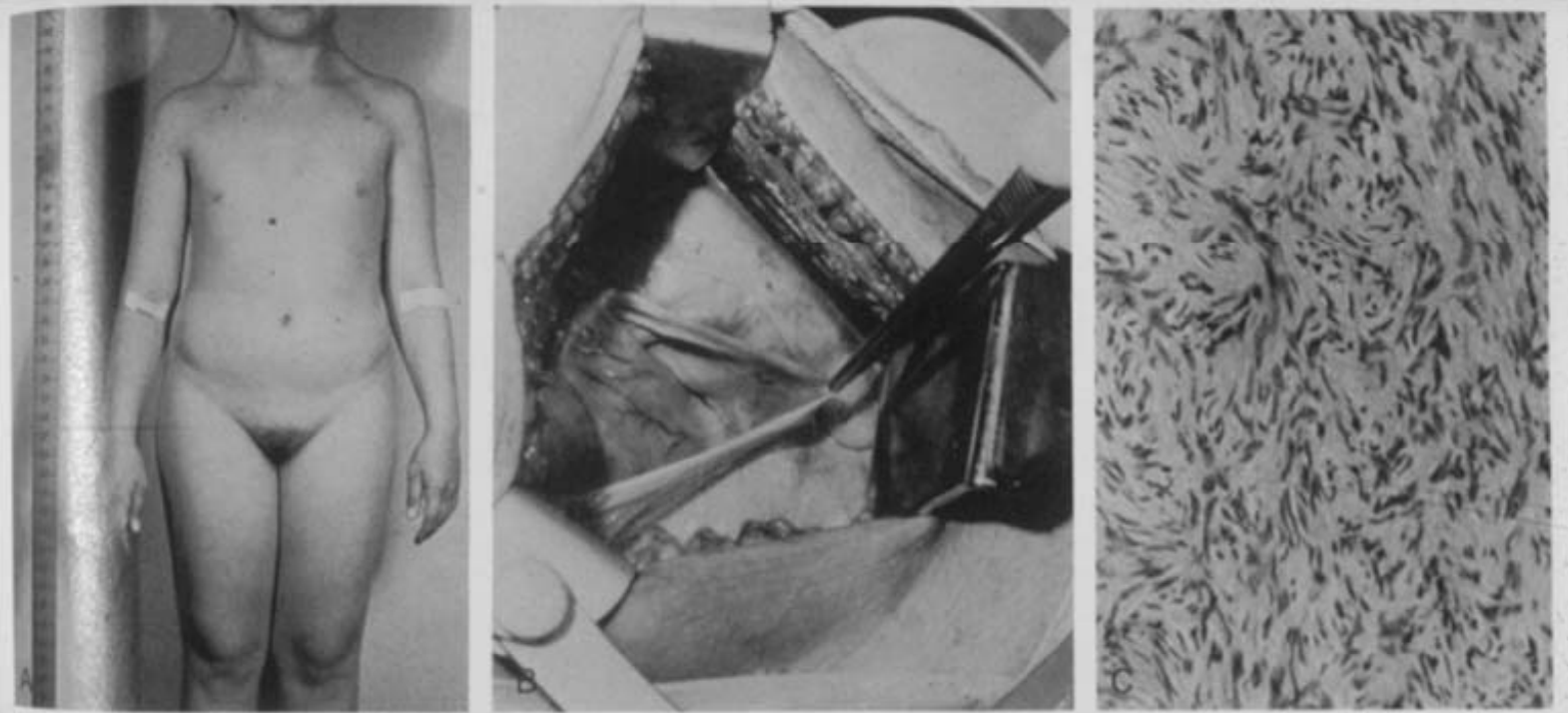
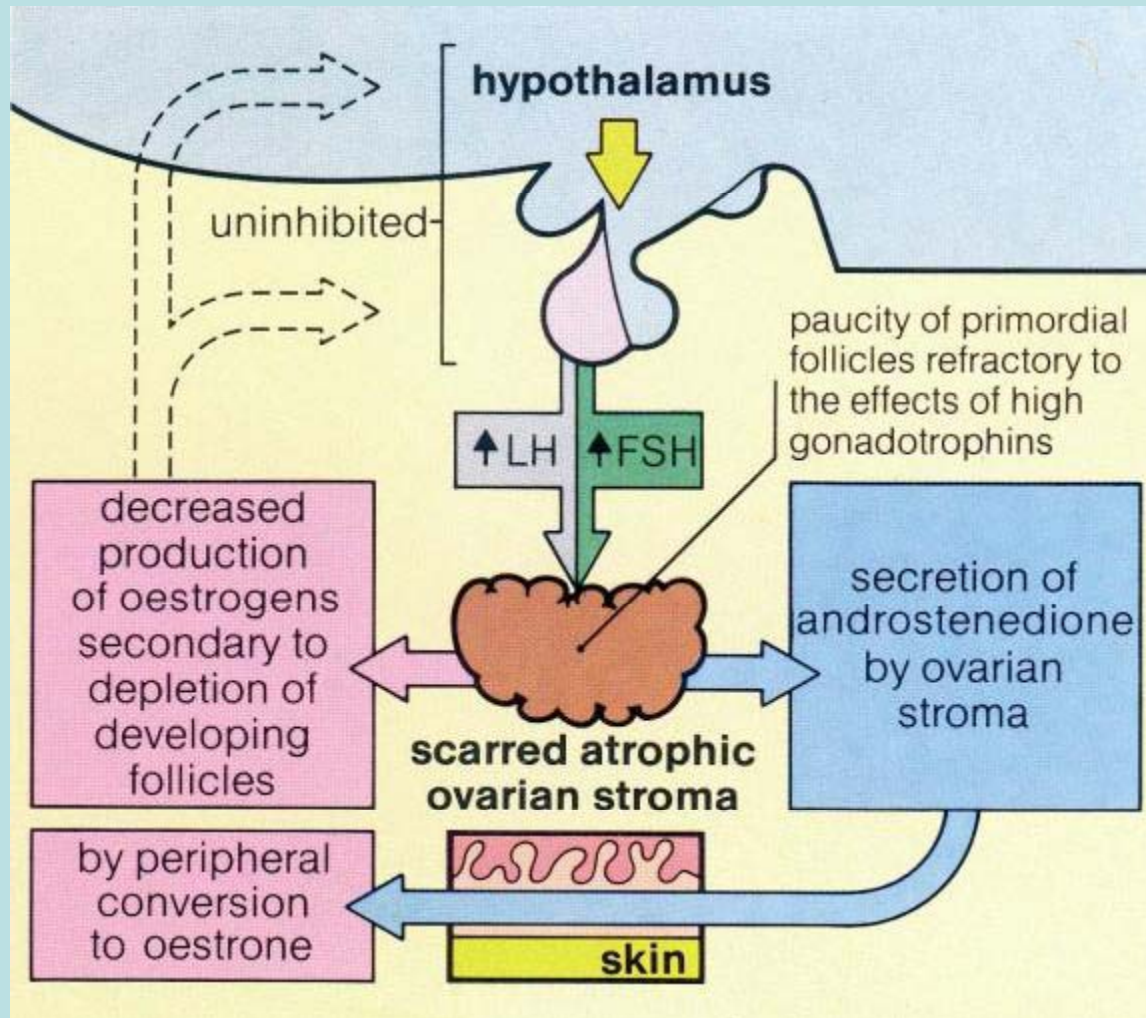


Figure 12-40. Gonadal dysgenesis. A, Patient with stigmata of gonadal dysgenesis, including short stature, sexual infantilism, webbed neck, and broadly spaced nipples. B, Streak ovary (held by forceps). C, Microscopic section of a streak ovary demonstrating fibrous replacement of ovarian structures and the absence of germ cells and follicles.



CLINICAL PROBLEMS ASSOCIATED WITH ESTROGEN DEFICIENCY

- Vasomotor symptoms
- Genitourinary changes
- Osteoporosis
- Lipid and cardiovascular effects
- ? CNS effects

CONSIDERATIONS FOR ESTROGEN REPLACEMENT

- Clinical symptoms
- Risk of osteoporosis
- Risk of breast cancer
- Risk of endometrial cancer
- Risk of cardiovascular disease