Reproductive & Endocrine Systems

United States Medical Licensing Examination (USMLE) Step 1

12 to 16% of Step 1 · 9 sections · content outline and specifications

This system covers pregnancy and the newborn period, the female, male, and transgender reproductive systems, the breast, and the endocrine glands. It is one of the largest Step 1 systems, at about 12% to 16% of the exam. Questions usually give a patient with symptoms and hormone results, then ask for the mechanism, the cause, or the drug action. Many items test feedback loops: whether a hormone and the hormone that controls it move in the same or opposite directions. Others test embryology, tumor pathology, and how drugs act on hormone receptors. Learn the normal physiology first; most disease questions follow from it.

You should be able to: After this guide, a learner should be able to read a hormone pattern, find the level of the problem in the feedback loop, and link it to its pathology and drug treatment.

Every section: the key point and the trap

1 Pregnancy physiology, prenatal care, and screening

hCG from the syncytiotrophoblast keeps the corpus luteum making progesterone until the placenta takes over at about 10 weeks.

Trap: Do not read a high total T4 in pregnancy as hyperthyroidism. Check free T4 and TSH. In the first trimester, high hCG can also lower TSH a little, which is normal.

2 Obstetric complications

Preeclampsia is new hypertension after 20 weeks with proteinuria or organ damage. The cause is poor spiral artery remodeling and placental ischemia. HELLP adds hemolysis, high liver enzymes, and low platelets. Magnesium sulfate prevents eclamptic seizures.

Trap: Do not confuse previa and abruption. Ask two questions: is there pain, and where is the placenta? A digital cervical exam is avoided until ultrasonography rules out previa.

3 Labor, the puerperium, the newborn, and drugs in pregnancy

Oxytocin acts through Gq receptors to raise calcium in the myometrium. It drives contractions and milk let-down.

Trap: Postpartum blues (mild, starts in the first days, gone within 2 weeks) is not postpartum depression (2 weeks or more, with loss of function). For congenital infections, match the calcification pattern: periventricular for CMV, scattered for toxoplasmosis.

4 Menstrual cycle, amenorrhea, fertility, and menopause

Follicular phase: FSH grows follicles, and granulosa cells make estradiol from theca cell androgens (the two-cell model).

Trap: Müllerian agenesis and androgen insensitivity both lack a uterus. Pubic hair and karyotype separate them: normal hair and 46,XX in müllerian agenesis; scant hair and 46,XY in androgen insensitivity.

5 Genital infections and breast disease

Bacterial vaginosis: Gardnerella, pH above 4.5, fishy odor, clue cells, few neutrophils. Trichomoniasis: motile protozoa, pH above 4.5, strawberry cervix. Candida: normal pH, pseudohyphae, thick white discharge.

Trap: A raised vaginal pH with a bad smell fits both bacterial vaginosis and trichomoniasis. Look for neutrophils and motile organisms: they point to trichomoniasis.

6 Gynecologic neoplasms

Cervical cancer: high-risk HPV 16 and 18. E6 degrades p53; E7 inactivates the retinoblastoma protein. It starts at the transformation zone.

Trap: Postmenopausal bleeding needs evaluation for endometrial cancer. Ask what is driving the endometrium: an estrogen source such as obesity, a granulosa cell tumor, or tamoxifen.

7 Male and transgender reproductive health

Testosterone from Leydig cells (under LH) and inhibin B from Sertoli cells (under FSH) give feedback to the pituitary. DHT, made by 5-alpha reductase, drives the prostate and the external genitalia.

Trap: Interpret hormone levels in a transgender patient in light of the hormones they take, and base organ screening on the organs a person has. Do not assume that a transgender woman has no prostate or that a transgender man has no cervix.

8 Diabetes and the endocrine pancreas

Type 1: autoimmune beta-cell destruction (HLA-DR3 and DR4, anti-GAD antibodies); low insulin and C-peptide; prone to ketoacidosis.

Trap: In DKA, do not trust a normal or high serum potassium. Insulin will drive potassium into cells, so check and replace potassium before and during insulin therapy.

9 Thyroid, parathyroid, adrenal, and pituitary disorders

Thyroid: Graves disease (TSH receptor-stimulating antibody, high uptake), Hashimoto thyroiditis (anti-TPO, lymphocytes, hypothyroidism), subacute thyroiditis (painful, low uptake). Papillary carcinoma has Orphan Annie nuclei; medullary carcinoma makes calcitonin.

Trap: Pair each hormone with its controller. A high hormone with a high controller suggests a problem higher up or an ectopic source. A high hormone with a low controller suggests a problem in the gland itself.

Key terms

Negative feedback: A control loop in which a hormone reduces the signal that caused its release.

Positive feedback: A control loop in which a hormone increases the signal that caused its release, as in the LH surge.

hCG: Human chorionic gonadotropin, a placental hormone that keeps the corpus luteum active in early pregnancy.

Corpus luteum: The structure left after ovulation that makes progesterone.

Teratogen: A substance or infection that causes birth defects.

Hypergonadotropic hypogonadism: Gonadal failure with high LH and FSH because feedback is lost.

Hypogonadotropic hypogonadism: Low sex hormone output because the pituitary or hypothalamus does not send enough signal.

C-peptide: A peptide released with the body's own insulin, used to tell it apart from injected insulin.

Ectopic hormone: A hormone made by a tumor in a tissue that does not normally make it.

Virilization: Development of male physical features caused by androgens.

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