

**GENERAL BIOLOGY Lecture 29 - Endocrine**

- I. Endocrine system - why is it important?**
  - A. Endocrine system controls bodily functions - through hormones**
    - 1. Turns body functions on and off
  - B. Endocrine system - system of cells, tissues, and organs functionally linked to the nervous system that produces hormones to control bodily functions**
- II. How the endocrine system is controlled - one mechanism (posterior lobe of pituitary)**
  - A. Hypothalamus (sensory neurons) synthesize special hormones (antidiuretic hormone and oxytocin), hormones move down axons and accumulate in axonal endings, hormones are released to blood capillaries in pituitary, hormones leave pituitary and go into blood**
  - B. Key point: hypothalamus controls the pituitary and the pituitary exerts a major control over the rest of the endocrine system**
- III. Components of the endocrine system - pituitary, parathyroid, thyroid, thymus, adrenal, pancreas, ovary (female), and testis (male)**
  - A. The glands, (hormones formed), - and functions**
    - 1. Pituitary (overall control of other glands as well as growth-stimulating hormones) - overall regulation and growth: giants & dwarfs
    - 2. Parathyroid (parathormone) - regulation of calcium levels in bone, kidneys: nerve and muscle abnormalities
    - 3. Thyroid (thyroxine) - growth & development: goiter (and active) & sluggishness
    - 4. Thymus (thymosin) - immune responses: antibody production deficiencies in embryo
    - 5. Adrenal cortex & medulla (epinephrine [adrenalin], sex hormones w/sex glands) - fight-or-flight response, sexual characteristics, metabolic activity: sex traits (bearded woman), sensitivity to alarm (?)
    - 6. Pancreas (insulin and glucagon) - insulin lowers blood sugar (by putting it into cells for metabolism) and glucagon raises blood sugar: diabetes (obese people may be more susceptible because obesity decreases insulin sensitivity)
    - 7. Ovary (estrogens and progesterone) - female stuff like menstruation, pregnancy, and breast development: female traits
    - 8. Testis (testosterone) - guy stuff like spermatogenesis and organ development: male traits
- IV. Signaling mechanisms**
  - A. Not all cells can respond to all types of signals**
  - B. Categories of hormones and mechanisms**
    - 1. Steroids - estrogen, testosterone, and others
      - a) Change transcription (new RNAs - new proteins)
    - 2. Non-steroids - others like epinephrine and insulin
      - a) Hormone activates cyclic AMP
      - b) Cyclic AMP activates special enzymes to alter cell activity