Endocrine System

1) What are the primary functions of the endocrine system?
Regulation of: -growth -reproduction
-development -metabolism
-homeostasis

2) The two components of the endocrine system are hormones and endocrine glands

3) Endocrine glands release hormones that circulate throughout the body to specific cells causing a physiological response. Endocrine glands are ductless. They release products directly into the bloodstream.

4) Imbalances in the endocrine system can disrupt function and cause disease. The body uses positive and negative feedback loops to restore homeostasis by turning on/off the production of hormones. Define and give an example of each type of feedback loop.
Negative Feedback Loop: The response inhibits the system
↳ Regulation of blood glucose
Positive Feedback Loop: The response amplifies the system
↳ Contractions during birth

5) Hormones are also known as... chemical messengers

6) What are the three classes of hormones?
Peptides
Steroids
Amines

7) Hormones are protein chains. They have a lock and key relationship with their receptors.

8) There are 3 modes of hormone transmission. What are they? How far does each one have to travel?
Endocrine: Travels through bloodstream to different tissue
↳ Far
Paracrine: Secreted in close proximity to target tissue
↳ Local
Autocrine: Same cell that secretes it is the target
↳ Same cell

9) What is half-life in reference to hormones?
half of
Time required for total amount of hormone secreted to be metabolized

10) Hormones have two classes of biochemical structures.
   a. Steroid hormones (lipid)
      i. Cholesterol-based (hydro phobic)
      ii. Faster response due to simple diffusion into cells
      iii. longer half-life
      iv. Examples
         1. Sex steroids: estrogen, testosterone, & estradiol (sex drive hormones)
         2. Cortisol & aldosterone

   b. Peptide hormones (protein)
      i. Amino Acid derived (hydro philic)
      ii. Bind to receptors on the outside of a cell. Then they utilize a 2nd messenger pathway which kicks off a signal cascade inside of the cell.
      iii. shorter half-life
      iv. Examples
         1. Epinephrine, Gonadotropins, Growth Hormone (GH)

11) The hypothalamus serves as the interface between the nervous and endocrine systems. The three hormones associated with it are dopamine (nervous system related), gonadotropin releasing (GnRH), and thyroid releasing (TRH) Releasing hormones stimulate other hormones to be released.

12) The pituitary gland is split into the anterior and posterior pituitary glands. What hormones are associated with each part?

anterior:
- GH
- Adrenocortiotrophoic
- Prolactin, Thyroid Stimulating
- Gonadotropins (FSH & LH)

posterior:
- Oxytocin (smooth muscle contractions)
- Antidurietic

13) How does chronic stress affect an animal in relation to hormones and body function?

↑ Cortisol = ↓ fertility

14) The thyroid gland's function is metabolism. It helps to regulate oxygen use and ATP generation. It secretes both peptide-based and amine-based hormones. What are examples of each type?

Calcitonin
↳ Blood Ca^+ levels
↳ Antagonistic towards PTH

T4 & T3
↳ Thyroid hormones that regulate metabolic processes

15) The parathyroid gland has both internal and external glands. The parathyroid gland releases parathyroid hormone (PTH). What does this hormone do?

- Stimulates increase in plasma Ca^+ due to low blood Ca^+ levels
- Regulates blood Phosphorus (P) levels as well
- Secondary effect on vitamin D
  ↳ Need ~~[illegible]~~ to absorb dietary Ca^+

16) The adrenal glands sit on top of the kidneys. What hormones are released from the cortex and what do they do? Which hormones are released by the medulla and what part of the nervous system do they control?

Cortex
Cortisol: Stress
Aldosterone: Na, K balance

Medulla
Epinephrine → Sympathetic NS
Norepinephrine → Sympathetic NS

17) Hormones work together to maintain homeostasis.

18) The gonads as sex dependent structures that produce hormones which affect the tissues known as gonadotropins. The gonads are the primary producers of sex steroids which affect sex characteristics. What are the male and female gonads and what hormones do they produce?

Ovaries (female)
- Oestrogens
- Progesterone

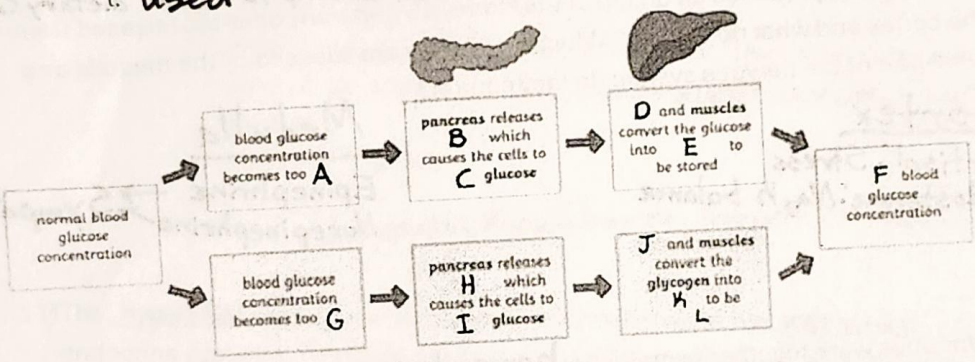
Testes (male)
- Androgens
  ↳ Testosterone

19) The pancreas is both an endocrine and exocrine gland. It produces three types of hormones. What are they and what do they do?

- Alpha → glucagon secretion
- Beta → insulin secretion
- Delta → secretes somatosin

20) Explain how blood glucose is regulated.

a. high
b. insulin
c. store
d. liver
e. glycogen
f. returns to normal
g. low
h. glucagon
i. release/breakdown
j. liver
k. glucose
l. used



21) Common endocrine disorders

a. Diabetes → Insulin
b. Cushing's Disease → Cortisol
c. Goiter → Thyroid