Vertebrate Physiology 437

Chapter 14

1. Endocrine Overview

Chapter 16

2. Navigation

- Exams reviewed
- Term Paper Topics (~non Human)
Insulin and Glucagon Regulate blood [glucose]

- **Insulin** in response to high [glu]
- **Glucagon** in response to low [glu]

Both from pancreatic glands
- Insulin from **beta** cells
- Glucagon from **alpha** cells

Leads to glucose uptake into tissues ETC.

Type 1 Diabetes
- when beta cells decrease insulin production

Type 2 Diabetes
- when insulin receptor signal pathway defective

Causes glycogenolysis and glucose release from tissues (liver, muscles)

Glycogenolysis Example:
- Epi (muscle)
- Glucagon (liver)

Goal is to increase blood [glucose]
Thyroid Hormones

$T_3$ and $T_4$ (# of iodines)
Also lipid soluble

Development, maturation, protein synthesis, metabolism

Being cold can stimulate

Thyroid Hormones

- Hyperthyroidism
- Hypothyroidism
- Goiter
- Iodized table salt
Growth Hormone

Metabolic and developmental effects

From Anterior Pituitary

Often has opposite effect of insulin

- Stimulates gluconeogenesis
- Reserves glucose for NS
- Promotes use of fatty acids as fuel

Works with Thyroid hormone in growth and development → Gigantism / Dwarfism

Growth Hormones

- Gigantism
- Acromegaly

- Dwarfism
**CHOOSE ONE! Essay Answer (12.5 pts; well-organized paragraphs and diagrams).**

Diagram and describe the transduction of sound waves into action potentials in the mammalian ear. Discussion of morphological structures at many levels and description of their functions will help you receive full credit. Also, briefly discuss how lateral lines on frogs and fishes are similar in structure and function to parts of the mammalian ear.

**OR**

Discuss the similarities and differences between rods and cones in the transduction of light into electrical signals. Begin from the point of photons hitting the photoreceptor up to the point where signals are sent toward the brain from the optic nerve. Please be sure to touch on the following topics in your discussion: anatomy, acuity, sensitivity, membrane potential, light refraction, 2nd messenger cascades, relevant proteins, etc. Diagrams may be used to help illustrate your description. In your answer please also be sure to explain the mechanism behind photopigment bleaching.