**Comparative Vertebrate Anatomy**

**Exam 3 Study Guide**

*Focus your efforts on the lecture notes and on bold-faced terms in the text if they were mentioned in lecture. Study the following terms and concepts.*

What are hormones, what do they do and how do they do it?

Differences between hormonal and neural control

Types of hormones

What are the vertebrate endocrine glands, what hormones do they secrete?

ie. Pituitary (components, hormones secreted by them and their actions)

- Adenohypophysis
- Neurohypophysis

Biological Rhythms – entrained vs. free-running rhythms

What is the biological clock in mammals?

How do calcitonin and parathyroid hormone affect bone remodeling

How does the pancreas regulate blood glucose?

Types of diabetes

How does the gut develop? What are the three embryonic regions of the gut?

What are the components of the digestive system?

Differences between jaw function and tooth occlusion in carnivores and herbivores

Tooth anatomy – components of the tooth and how the teeth are attached to the jaw.

- Homodont, heterodont, polyphydont, dyphyodont dentition

Dental formulas – how to calculate in carnivores

- Lophodont, selenodont, bunodont dentition

Sections of the stomach and small intestine

Gut morphology and herbivory

Rumination

What is the function of the respiratory system?

Respiration across the gills

Accessory respiratory organs

Evolution of lungs in vertebrates

Morphology (rete mirabile) and functions of the swim bladder

How does the syrinx work in birds

Explain how respiration works in birds

Explain how respiration works in mammals

What is excretion?

Forms of nitrogenous wastes in fish, birds and mammals

Kidney function and structure

- Nephrons

How does absorption and excretion work along the loop of Henle

Kidney embryonic development (pronephros, mesonephros, metanephros, archinephric duct)
Function of the circulatory system
Components of the circulatory system
Arteries, veins and capillaries
What are the chambers of the primitive vertebrate heart?
Portal systems
Single vs. dual circuit circulations systems
What are the two circuits of the mammalian circulatory systems
Explain the chambers of the mammalian heart and the flow of blood through the chambers for each circuit.
Layers of the heart wall
Cardiac pacemaker
Know the basic pattern of aortic arches and variations in tetrapods, birds and mammals
Human embryonic circulation and changes in the system at birth

Modes of reproduction
Costs and benefits of sexual reproduction
Red queen hypothesis
Muller’s ratchet
Parthenogenesis
Name and define the –parities
Anisogamy what is it and how might it have evolved?
Sex determination (genotypic, temperature, hormonal, secondary sex characteristics)
Hermaphrodites
Masculinization of female genitals in spotted hyenas
Gonadal embryonic development
Cloacal subdivisions
How are male and female genital ducts and genitals differentiated during embryonic development
Where does spermatogenesis occur?
Explain why the testes are descended in mammals.
The glands of the male reproductive system
Ovaries
Variation in the vertebrate uterus
Changes in the hormones, ovaries and endometrial lining during the female menstrual cycle.