

Anatomy & Physiology I

Class Notes

8/21/14

Chapter 1: Major Themes of Anatomy & Physiology

- Anatomy is form; Physiology is function
 - o Anatomy = the study of human structure
 - o Physiology = the study of the body functions
- Observation is key to understanding Anatomy
- Anatomy
 - o Examining the structure of the Human body through
 - Inspection
 - Palpation: using fingers to feel body
 - Auscultation: stethoscope
 - Percussion: listening to sounds made when different parts of the body are hit (i.e. stomach)
 - o Cadaver Anatomy - dissecting dead bodies
 - o Comparative Anatomy - scientists often use animals that are anatomically similar to humans to learn more about human anatomy (dogs are very anatomically similar to humans)
 - o Inspection
 - Exploratory surgery
 - Gross anatomy: observable with the naked eye
 - Medical imaging
 - Radiology - x-rays
 - Cytology - observation of cells
 - Histology - microscopic anatomy
 - Histopathology - study of tissue under a microscope
 - Ultrastructure - electron microscope to look at detail in cell (mostly only used in research)

Random: increased white blood cells are always indicative of an infection

- Physiology
 - o Sub-disciplines
 - Neurophysiology – physiology of nervous system
 - Endocrinology – physiology of hormones
 - Pathophysiology – physiology of disease
 - o Comparative Physiology
 - Used like in anatomy because there are limitations on human experiments

- Scientific method (uniform approach to experimentation)
 - o Driven by observations
 - Make observation (based on previous experiments, inductive reasoning and questions)
 - Come up with hypothesis – must be testable
 - Carry out experiments
 - Start to make predictions (deductions) to test and eliminate some predictions
 - o Francis Bacon (England) & Rene Descartes (France) were key in forming the scientific method
 - o Science and Scientific method
 - Set standard for truth (must be repeatable)

- The inductive method (used in anatomy)
 - o Described by Francis Bacon
 - Make numerous observations (i.e. clinical studies)
 - Knowledge of Obtaining was obtained from this method

- Hypothetical Deductive Method (used in physiology)
 - o Investigator asks question
 - o Forms hypothesis
 - o Characteristics of a good hypothesis
 - Consistent with previous knowledge
 - Testable and possibly falsifiable with evidence

- The Hierarchy of Complexity – the tier system of things in body going from simple to complex
 - o Microscopic → Macroscopic
 - o Atom → Molecule → Macromolecule → Organelle → cell → tissue → organ → organ system → organism
 - o Reductionism – theory that a large complex system can be understood by studying small components
 - Proposed by Aristotle
 - o Holism – theory that there are “emergent properties” of the whole organism
 - Humans are more than the sum of their parts
 - o We use a combination of reductionism and holism

- Anatomical Variation
 - o No two humans are exactly alike
 - There is a most common structure for humans but individuals can vary from this structure
 - (i.e. missing muscles, extra vertebrae, renal arteries, etc.)
 - Variation in organ locations
 - o Pelvic kidney – kidneys start out low and migrate upwards during development; in humans with pelvic kidney, one might not migrate upward
 - o Heart – variations of the branches of the aorta
 - o Abdominal aorta & common iliac – can become bent & twisted

- Characteristics of Life – things that distinguish living things from the nonliving
 - o Organization
 - o Evolution