

## ANP 213: Human Anatomy and Physiology 1

Instructor: Joel Dahms



## Introductions



- Note cards
  - Name
  - Year you graduated HS and where
  - Career goal
  - List of classes you have taken that may help prepare you for ANP 213 and WHEN you took them (e.g. BIO 101, Autumn '05)
  - List any other relevant experience you've had (job, internship, taking care of relatives, etc.).
  - Preferred email address

## Syllabus highlights - Day



- Class meets:
  - M** 1:00PM - 2:50PM in AS 1520 (lecture)
  - W** 1:00PM - 1:50PM in AS 1520 (lecture)
  - T/Th** 1:00PM - 2:50PM in AS 1615 (lab)
- M and W are lecture
- T and Th are lab

## Syllabus highlights – p.m.



- Class meets:
  - T/Th** 6:00PM - 7:40PM in AS 1521 (lecture)
  - T/Th** 7:50PM - 9:30PM in AS 1615 (lab)
- Every class period we will have lecture, then lab.

## Contact info



- Email: [jdahms@sccd.ctc.edu](mailto:jdahms@sccd.ctc.edu)
  - email is the best way to contact me
- Office: IB 2324C
- Office hours: **T 4:00 - 6:00** or by appointment
- Office Phone: 985.3940 Mailbox 1 (Voice mail only)

## Course website



Course Website:

<https://frontpage.northseattle.edu/anp213jd/>

User ID: anp213jd

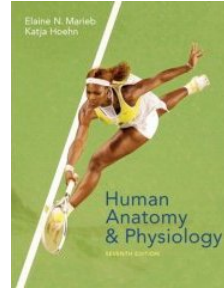
Password: neuron

## Course website

The website has:

- Syllabus
- Lecture notes
- Answer keys to tests and quizzes (not yet though)
- Objectives (learning goals) for each unit
- Resources to help you study

## Required texts:



## Required texts:

- *Human Anatomy and Physiology*, Seventh Ed., Elaine N. Marieb & Katja Hoehn, Pearson Benjamin Cummings, 2007.
- *Human Anatomy and Physiology Laboratory Manual*, Eighth Ed., Elaine N. Marieb & Susan J. Mitchell, Pearson Benjamin Cummings, 2008.
- *A Brief Atlas of the Human Body*, Second Ed., Matt Hutchinson et al., Pearson Benjamin Cummings, 2007.

## Optional texts:

- *Study Guide for Human Anatomy and Physiology*, Seventh Ed., Elaine N. Marieb & Katja Hoehn, Pearson Benjamin Cummings, 2007.
- *The Anatomy Coloring Book*, Third Ed., Wynn Kapit and Lawrence M. Elson, Benjamin Cummings, 2001.
- *The Physiology Coloring Book*, Wynn Kapit, Robert I. Macey, and Lawrence Meisami, Second Ed., Benjamin Cummings, 2000.
- *Fundamentals of Anatomy and Physiology*, Seventh Ed., Frederic H. Martini, Benjamin Cummings, 2006.

## Grading

Breakdown:

• Exams	400 points
• Lab Practicals	200 points
• Laboratory Exercises	200 points
• Quizzes & Assignments	100 points
<b>Total</b>	<b>900 points</b>

## Points

Exams:	(5) =	400 points
Lab Practicals	(4 x 50pts) =	200 points
Lab Exercises	(20 x 10pts) =	200 points
Quizzes & Assigns	=	100 points
Total	=	900 points

Your grade = points you earn  
900 points

## Grade percentages

4.0 - 3.5	A / A-	90 - 100%
3.4 - 2.9	B+ / B	80 - 89%
2.8 - 2.2	B- / C+	70 - 79%
2.1 - 1.5	C / C-	60 - 69
1.4 - 0.7	D+ / D	50 - 59%
0.0	E	below 50%

## Commitment

- This is a very difficult class that requires learning what is essentially a new language
- As a prerequisite, the class is designed by the college as an overview: lots of breadth, little depth
- Expect 20+ hours of reading and studying each week in addition to class sessions
- The pace is a little frantic so missing class is not recommended.

## Exams - Day:

Five exams

Wed 4/9	<b>Exam 1 (Chaps 1 - 3)</b>
Wed 4/23	<b>Exam 2 (Chaps 4, 5)</b>
Wed 5/7	<b>Exam 3 (Chaps 6, 7)</b>
Wed 5/21	<b>Exam 4 (Chaps 8 - 10)</b>
Wed 6/11	<b>Exam 5 (Chaps 11 - 15)</b>

- 1 - 3pm

## Exams - p.m.:

Five exams

Thurs 4/10	<b>Exam 1 (Chaps 1 - 3)</b>
Thurs 4/24	<b>Exam 2 (Chaps 4, 5)</b>
Thurs 5/8	<b>Exam 3 (Chaps 6, 7)</b>
Thurs 5/22	<b>Exam 4 (Chaps 8 - 10)</b>
Thurs 6/12	<b>Exam 5 (Chaps 11 - 15)</b>

- 6 - 8pm

## Exams

- Given in lecture
- First 4 = 75 points each
- Final = 100 points
- 1 hour+
- Final (Exam 5):
  - NOT cumulative
  - 2 hours (1- 3pm)
  - On Wed of finals week

## Exams

- A little more than half objective questions: multiple-choice, matching, true/false
- The rest: fill-in-the-blank, short answer, short essay, and diagram labeling
- You will need a Scantron form and a #2 pencil for each exam.
- Not cumulative *per se*

## Exams

- Exams may not be rescheduled or made-up due to tardiness or absence. Students with extraordinary circumstances should discuss them with the instructor as soon as the situation occurs.
- If you know ahead of time that you will miss an exam for a valid reason, we can make arrangements but let me know as far ahead of time as possible.

## Lab Practical Exams

- Thurs 5/1    **Practical 1: Histology**
- Thurs 5/15   **Practical 2: Bones**
- Thurs 5/31   **Practical 3: Muscles**
- Tues 6/10   **Practical 4: Nervous**

## Lab Practical Exams

- Four of these, worth 50 points each
- Cover the material on the “Lab Practical Study Guide”
- Given in the lab, they will involve slides, projected pictures of slides, bones, muscle models, brain models, and diagrams.

## Objectives

- List of learning goals that need to be achieved for you to do well in this class
- Contains what the I and others have deemed to be the most important things for you to know to go on in a health-related career.
- Available on the course website.

## Lectures

- Lecture slides available on course website before lecture (all are posted now)
- Do not cover ALL the material on exams (but the vast majority comes from the lectures)
- “**Objectives**” for each unit will be posted on the website at the beginning of each unit. These are a *general* idea of what you should know for the exams.

## Attendance

- Students should attend every class session. If you miss a class session, it is your responsibility to obtain the lecture notes, to make up laboratory experiments and to obtain handouts, assignments or other materials distributed in class. **ESPECIALLY** because we meet only twice a week (for p.m. class)

## Quizzes

- There will be three quizzes, the first two quizzes in the first three weeks of class
- Quizzes may cover material presented in lab or lecture
- Designed to prepare you for the types of questions on the exam (multiple choice, T/F, fill-in-the-blank, short answer).
- **QUIZ 1 will be on Wed (Thurs for p.m. class)**– on material covered this week in chapters 1 and 2.



## Labs

- Many laboratory exercises must be completed in the laboratory. Students who miss a laboratory exercise **must schedule** a make-up session with me or come in during open lab time to get credit for that exercise.
- Lab exercises will be due the following week in lab.



## Schedule of Lectures and Readings (Approximate)



## Questions?



## Introduction to the Human Body



## Anatomy

- “tome” means to cut in Greek
- Describes the **structures** of the body:
  - what they are made of
  - where they are located
  - associated structures



## Physiology

- Is the study of:
  - **functions** of anatomical structures
  - individual and cooperative functions

## KEY CONCEPT

- All physiological **functions** are performed by specific anatomical **structures**
- Principle of complementarity says that **structure** and **function** are complementary
  - Function always reflects structure
  - What a structure can do depends on its specific form

## Introduction

## Introduction

- Key to learning anatomy is understanding function
  - For example:
    - Left side of heart is larger than right.
  - Why is that?

Structure (anatomy) and function (physiology) are intimately related

## Gross Anatomy

- Structures large enough that one can see with the unaided eye
  - **Surface Anatomy** - study of superficial markings
  - **Regional Anatomy** - The study of specific areas of the body (e.g. head, trunk)
  - **Systemic Anatomy** - Study of the 11\* specific organ systems

## 11 Organ systems

Integumentary*	Lymphatic
Nervous*	Urinary
Skeletal*	Respiratory
Endocrine	Reproductive
Muscular*	Digestive
Cardiovascular	

## Microscopic Anatomy

- Cf. Gross anatomy
  - Involves studying anatomical structures that cannot be seen with the unaided eye
1. Cytology - cells
  2. Histology - tissue

## Physiology = Function

- Considers the operation of specific organ systems
  - Renal – kidney function
  - Neurophysiology – workings of the nervous system
  - Cardiovascular – operation of the heart and blood vessels
- Focuses on the functions of the body, often at the cellular or molecular level

## Anatomical Organization

- We will start from the smallest and finish with the largest

## Levels of Organization

- **Chemical Level:** - atoms (e.g. carbon) combine to form molecules (e.g. glucose)
- **Cellular level:**
  - Smallest **living** units in organisms
  - Cells contain organelles, each with a function
- **Tissue level** - different groups of cells that perform a function
- **Organ Level** - Different types of tissues that perform a common function
- **Organ system** – consists of different organs that work closely together

## Levels of Structural Organization

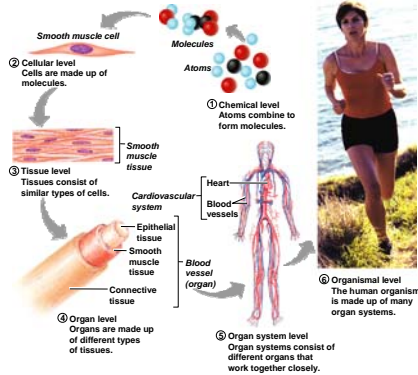
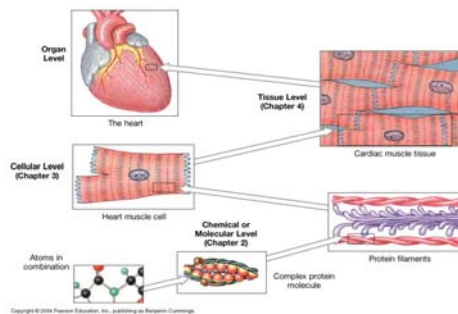


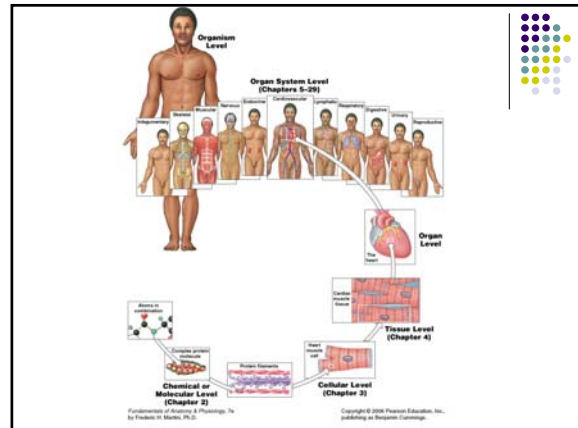
Figure 1.1

## Levels of Organization



## Other Levels

- Organismal Level - All systems working together (e.g. humans)
- Ecological level - How organisms interact with each other and their environment



## KEY CONCEPT

- The body is divided into 11 organ systems
- All organ systems work together  
→Integration

## Homeostasis

- *Homeostasis*: ability to maintain a relatively stable internal environment in an ever-changing outside world
- All body systems working together to maintain a stable internal environment, respond to external and internal changes to function within a normal range (body temperature, fluid balance)
- The internal environment of the body is in a dynamic state of equilibrium
- Failure to function within a normal range results in disease

## Homeostatic Control Mechanisms

- Variables produce a change in the body
- The three interdependent components of control mechanisms:
  - Receptor – monitors the environments and responds to changes (stimuli)
  - Control center – determines the set point at which the variable is maintained
  - Effector – provides the means to respond to stimuli

## Homeostatic Control Mechanisms

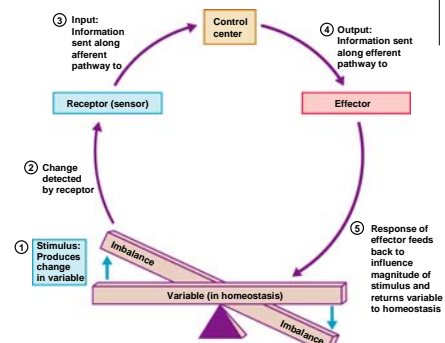


Figure 1.4

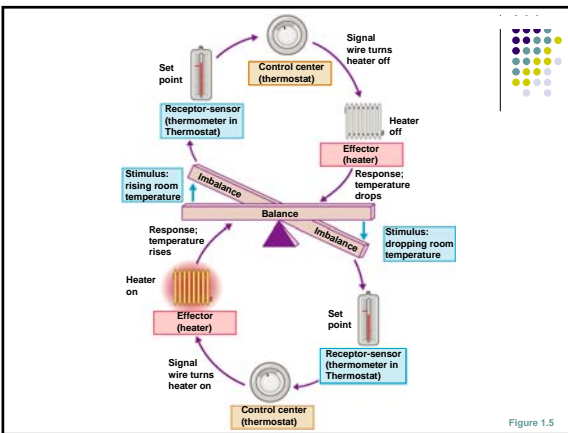


## Regulation

- Extrinsic regulation:
  - responses controlled by nervous and endocrine systems
  - E.g. brain regulates body temp
- Usually occurs by **negative feedback** which can be modeled as a thermostat

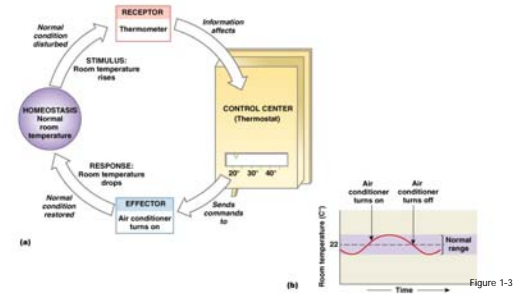
## Negative Feedback

- Most common way that homeostasis is maintained in the body
- In negative feedback systems the response of the effector *negates* or opposes the stimulus (shuts off the original stimulus)
- Example: Regulation of room temperature

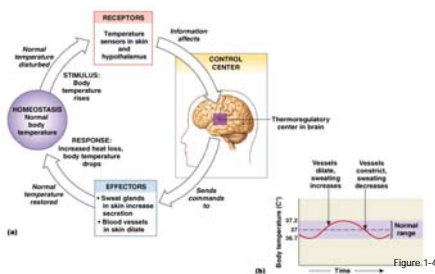


## Regulation: Maintaining Normal Limits

### Thermostat model

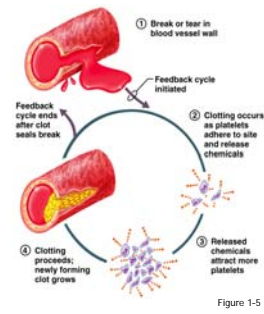


## Negative Feedback



## Positive Feedback

- Rare in nature
- The response of the effector output *reinforces or exaggerates* the stimulus (e.g. blood clotting, ovulation, action potential)
- **NOT** a way to maintain homeostasis



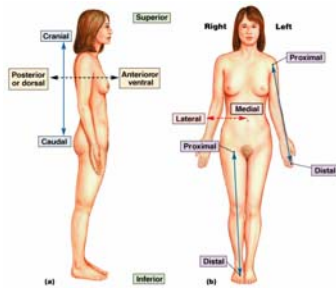
## Homeostatic Imbalance

- Disturbance of homeostasis or the body's normal equilibrium
- Overwhelming the usual negative feedback mechanisms allows destructive positive feedback mechanisms to take over

## Anatomical terms

## Anatomical Position

- Hands at sides, palms forward



## Directional Terms

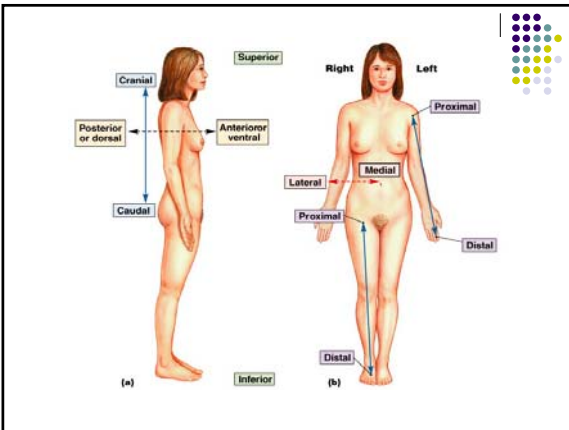
- Superior and inferior – toward and away from the head, respectively
- Anterior and posterior – toward the front and back of the body
- Medial, lateral, and intermediate – toward the midline, away from the midline, and between a more medial and lateral structure
- Proximal and distal – closer to and farther from the origin of the body part
- Superficial and deep – toward and away from the body surface

## Orientation of terms

- Note that Left/Right are reversed in anatomical figures
- WHY?

## Alternate Terms

- Ventral (= Anterior)
- Dorsal (= Posterior)
- Cranial – head
- Caudal – tail



## Body Planes

- Sometimes to gain a greater understanding of 3D images anatomists cut the image at different planes
- Three planes exist in 3D space
  - Two are parallel to the long axis of the body
  - One is perpendicular to the long axis.

## Body Planes

- **Sagittal** – parallel to long axis, divides the body into right and left parts
  - midsagittal or medial – sagittal plane that lies on the midline
- **Frontal** or **coronal** – also parallel to long axis, divides the body into anterior and posterior parts
- **Transverse** or **horizontal** (cross section) – perpendicular to long axis, divides the body into superior and inferior parts

## Body Planes

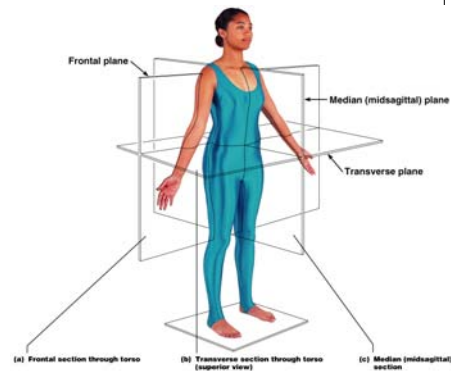


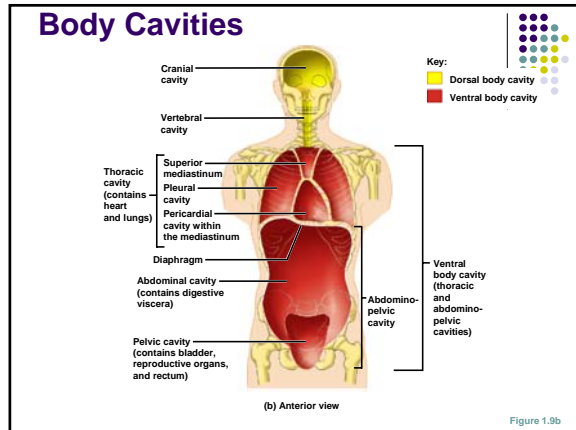
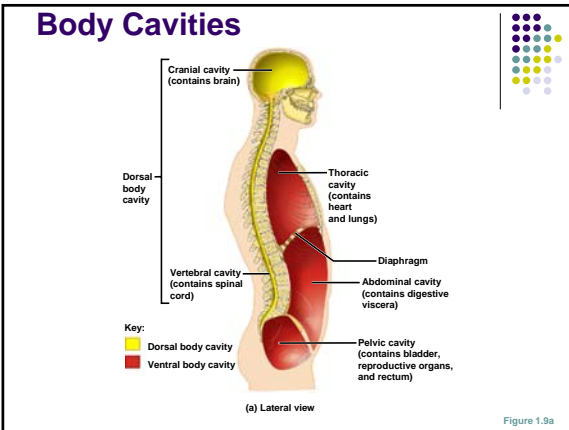
Figure 1.8

## Anatomical Variability

- Humans vary slightly in both external and internal anatomy
- Over 90% of all anatomical structures match textbook descriptions, but:
  - Nerves or blood vessels may be somewhat out of place
  - Small muscles may be missing
- Extreme anatomical variations are seldom seen

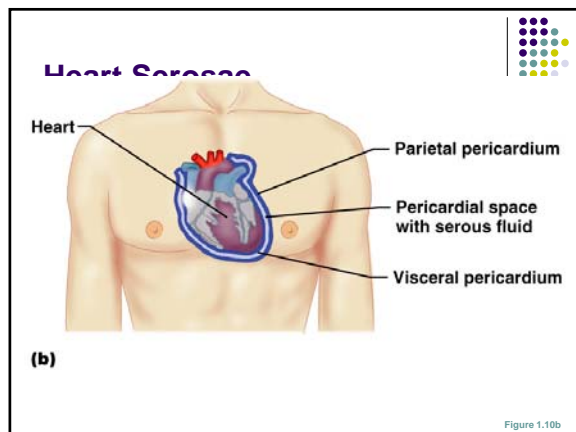
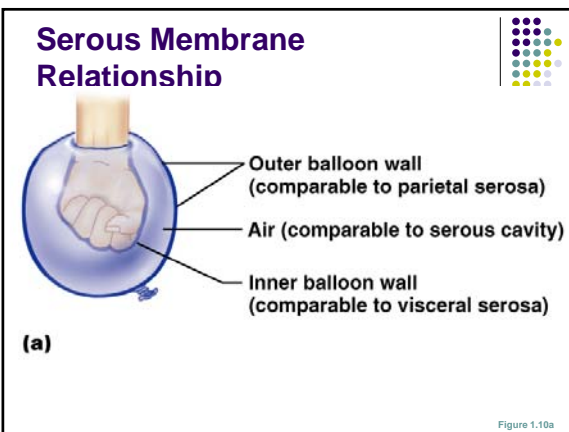
## Body Cavities

- **Dorsal cavity** protects the nervous system, and is divided into two subdivisions
  - Cranial cavity – within the skull; encases the brain
  - Vertebral cavity – runs within the vertebral column; encases the spinal cord
- **Ventral cavity** houses the internal organs (viscera), and is divided into two subdivisions
  - Thoracic
  - Abdominopelvic



- ## Ventral Body Cavity
- A. Thoracic Cavity
    - Pleural Cavity
    - Pericardial Cavity
  - B. Abdominopelvic (peritoneal) Cavity
    1. Abdominal cavity
    2. Pelvic cavity

- ## Ventral Body Cavity Membranes
- Parietal serosa lines internal body walls
  - Visceral serosa covers the internal organs
  - Serous fluid separates the serosae



## ***SUMMARY***



- Structure and function in anatomy and physiology
- Levels of physical organization
- Homeostasis and feedback
- Systems integration and equilibrium
- Anatomical terms
- Locations and functions of major cavities
- Serosa