

CHAPTER 1

An Introduction to the Structure and Function of the Body

A command of terminology is necessary for a student to be successful in any area of science. This chapter defines the terms and concepts that are basic to the field of anatomy and physiology. A firm understanding of these ideas will assist you with all future chapters.

The study of anatomy and physiology involves the structure and function of an organism and the relationship of its parts. It begins with a basic organization of the body into different structural levels. Beginning with the smallest level (the cell) and progressing to the largest, most complex level (the system), this chapter familiarizes you with the terminology and the levels of organization necessary to facilitate the study of the body both as parts and as a whole.

It is also important to be able to identify and describe specific body areas or regions as you progress in this field. The anatomical position is used as a reference position when the body is dissected into planes, regions, or cavities. The terms defined in this chapter allow you to describe these areas efficiently and accurately.

Finally, the process of homeostasis is reviewed. This state of relative constancy in the chemical composition of body fluids is necessary for good health. In fact, the very survival of the body depends on the successful maintenance of homeostasis.

TOPICS FOR REVIEW

Before progressing to Chapter 2, you should have an understanding of the structural levels of organization; the planes, regions, and cavities of the body; the terms used to describe these areas, and the concept of homeostasis as it relates to the survival of the species.

STRUCTURAL LEVELS OF ORGANIZATION

Match the term on the left with the proper selection on the right.

- | | |
|-------------------|---|
| _____ 1. Organism | A. Many similar cells that act together to perform a common function |
| _____ 2. Cells | B. The most complex units that make up the body |
| _____ 3. Tissue | C. A group of several different kinds of tissues arranged to perform a special function |
| _____ 4. Organ | D. Denotes a living thing |
| _____ 5. Systems | E. The smallest living units of structure and function in the body |



If you have had difficulty with this section, review pages 1 and 2.

ANATOMICAL POSITION

Match the term on the left with the proper selection on the right.

- | | |
|------------------|------------------|
| _____ 6. Body | A. At the sides |
| _____ 7. Arms | B. Face upward |
| _____ 8. Feet | C. Erect |
| _____ 9. Prone | D. Face downward |
| _____ 10. Supine | E. Forward |



If you have had difficulty with this section, review page 2.

ANATOMICAL DIRECTIONS PLANES OR BODY SECTIONS

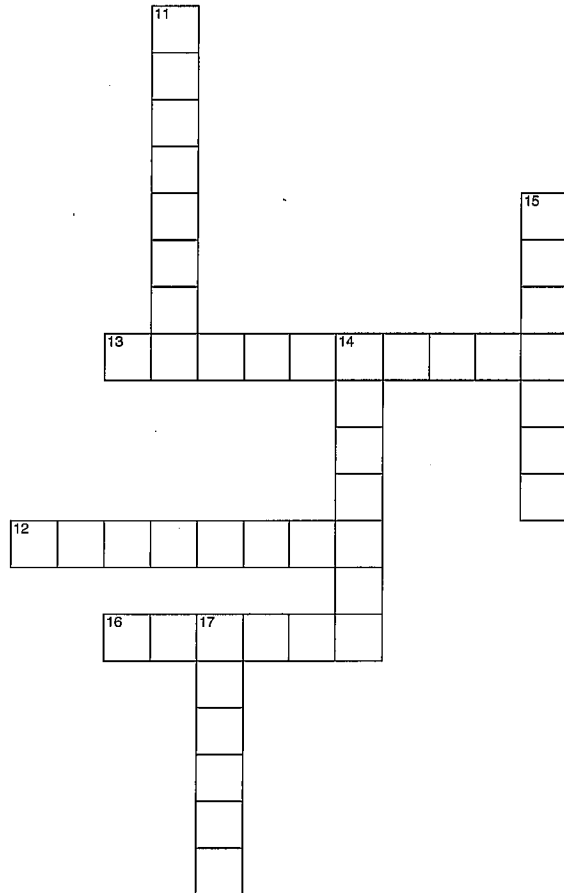
Fill in the crossword puzzle.

Across

- 12. Lower or below
- 13. Horizontal plane
- 16. Toward the midline of the body

Down

- 11. Upper or above
- 14. Front (abdominal side)
- 15. Toward the side of the body
- 17. Farthest from the point of origin of a body point



Circle the correct answer.

18. The stomach is (superior or inferior) to the diaphragm.
19. The nose is located on the (anterior or posterior) surface of the body.
20. The lungs lie (medial or lateral) to the heart.
21. The elbow lies (proximal or distal) to the forearm.
22. The skin is (superficial or deep) to the muscles below it.
23. A midsagittal plane divides the body into (equal or unequal) parts.
24. A frontal plane divides the body into (anterior and posterior or superior and inferior) sections.
25. A transverse plane divides the body into (right and left or upper and lower) sections.
26. A coronal plane may also be referred to as a (sagittal or frontal) plane.



If you have had difficulty with this section, review pages 4-6.

BODY CAVITIES

Select the correct term from the choices given and insert the letter in the answer blank.

- | | | | |
|-------|-------------------|-------|------------------|
| _____ | A. Ventral cavity | _____ | B. Dorsal cavity |
| _____ | 27. Thoracic | | |
| _____ | 28. Cranial | | |
| _____ | 29. Abdominal | | |
| _____ | 30. Pelvic | | |
| _____ | 31. Mediastinum | | |
| _____ | 32. Spinal | | |
| _____ | 33. Pleural | | |



If you have had difficulty with this section, review pages 6-7.

BODY REGIONS

Circle the one that does not belong.

- | | | | |
|--------------|-----------|----------|-------------|
| 34. Axial | Head | Trunk | Extremities |
| 35. Axillary | Cephalic | Brachial | Antecubital |
| 36. Frontal | Orbital | Plantar | Nasal |
| 37. Carpal | Crural | Plantar | Pedal |
| 38. Cranial | Occipital | Tarsal | Temporal |



If you have had difficulty with this section, review pages 8-12.

THE BALANCE OF BODY FUNCTIONS

Fill in the blanks.

39. _____ depends on the body's ability to maintain or restore homeostasis.

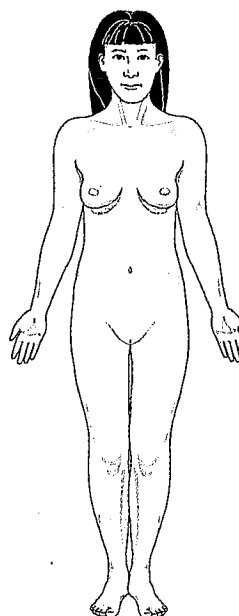
40. "Homeostasis" is the term used to describe the relative constancy of the body's _____.
41. The basic type of homeostatic control system in the body is called a _____.
42. Homeostatic control mechanisms are categorized as either _____ or _____ feedback loops.
43. Negative feedback loops tend to _____ conditions.
44. Positive feedback control loops are _____.
45. Changes and functions that occur during the early years are called _____.
46. Changes and functions that occur after young adulthood are called _____.



If you have had difficulty with this section, review pages 12-14.

APPLYING WHAT YOU KNOW

47. Mrs. Fagan has had an appendectomy, and the nurse is preparing to change the dressing. The nurse knows that the appendix is located in the right iliac inguinal region and that the distal portion extends at an angle into the hypogastric region. Place an X on the diagram where the nurse will place the dressing.
48. Mrs. Suchman noticed a lump in her breast. Dr. Reeder noted on Mrs. Suchman's chart that a small mass was located in the left breast, medial to the nipple. Place an X on the diagram where Mrs. Suchman's lump is located.
49. Heather was injured in a bicycle accident. X-ray films revealed that she had a fracture of the right patella. A cast was applied from the distal femoral region to the pedal region. Place an X on the diagram where Heather's cast begins and another where it ends.



50. WORD FIND

Can you find 18 terms from this chapter? Words may be spelled top to bottom, bottom to top, right to left, left to right, or diagonally.

N H L T E B W N G N M M Y X A
O O H A V U U C L W E P N G L
I M U N I T S A I D E M W A L
T E R T V C T S I C J S R T K
A O N O P T I A I W A T Y R H
Z S Q S I R L F A T N R G O W
I T W G P R O I R E T S O P F
N A A Z J E E X V E E H L H Z
A S N L M C T P I C P D O Y T
G I C A Y U O X U M N U I V P
R S M R T N U K B S A Y S V M
O R C U R O I R B S Q L Y U G
L H X E M P M E T S Y S H V S
U W L L Q D U Y Y N E E P J B
Q N Z P K D B O D C G I N J A

Anatomy	Organization	Superficial
Atrophy	Physiology	Superior
Homeostasis	Pleural	System
Medial	Posterior	Thoracic
Mediastinum	Proximal	Tissue
Organ	Sagittal	Ventral

DID YOU KNOW?

Many animals produce tears, but only humans weep as a result of emotional stress.

CHECK YOUR KNOWLEDGE

Multiple Choice

Circle the correct answer.

1. The body's continuous ability to respond to changes in the environment and to maintain consistency in the internal environment is called:
A. Homeostasis
B. Superficial
C. Structural levels
D. None of the above

2. The regions frequently used by health professionals to locate the pain caused by tumors divide the abdomen into four basic areas called:
 - A. Planes
 - B. Cavities
 - C. Pleural
 - D. Quadrants
3. Which of the following organs or structures does *not* lie within the mediastinum?
 - A. Aorta
 - B. Liver
 - C. Esophagus
 - D. Trachea
4. A lengthwise plane running from front to back that divides the body into right and left sides is called:
 - A. Transverse
 - B. Coronal
 - C. Frontal
 - D. Sagittal
5. The study of the functions of living organisms and their parts is called:
 - A. Physiology
 - B. Chemistry
 - C. Biology
 - D. None of the above
6. The thoracic portion of the ventral body cavity is separated from the abdominopelvic portion by a muscle called the:
 - A. Latissimus dorsi
 - B. Rectus femoris
 - C. Diaphragm
 - D. Pectoralis
7. An organization of varying numbers and kinds of organs arranged together to perform a complex function is called a:
 - A. Cell
 - B. Tissue
 - C. System
 - D. Region
8. The plane that divides superior from inferior is known as the _____ plane.
 - A. Transverse
 - B. Sagittal
 - C. Frontal
 - D. None of the above
9. Which one of the following structures does *not* lie within the abdominal cavity?
 - A. Spleen
 - B. Most of the small intestine
 - C. Urinary bladder
 - D. Stomach

10. Which of the following is an example of an upper abdominal region?
 - A. Right iliac region
 - B. Left hypochondriac region
 - C. Left lumbar region
 - D. Hypogastric region
11. The dorsal body cavity contains components of the:
 - A. Reproductive system
 - B. Digestive system
 - C. Respiratory system
 - D. Nervous system
12. What organ is *not* found in the pelvic cavity?
 - A. Bladder
 - B. Stomach
 - C. Rectum
 - D. Colon
13. Similar cells acting together to perform a common function exist at the _____ level of organization.
 - A. Organ
 - B. Chemical
 - C. Tissue
 - D. System
14. Which of the following planes would be considered coronal?
 - A. A plane that divides the body into anterior and posterior portions
 - B. A plane that divides the body into upper and lower portions
 - C. A plane that divides the body into right and left portions
 - D. A plane that divides the body into superficial and deep portions
15. If your reference point is "nearest the trunk of the body" rather than "farthest from the trunk of the body," where does the elbow lie in relation to the wrist?
 - A. Anterior
 - B. Posterior
 - C. Distal
 - D. Proximal
16. In the anatomical position:
 - A. The dorsal body cavity is anterior to the ventral
 - B. The palms face toward the back of the body
 - C. The body is erect
 - D. All of the above
17. The buttocks are often used as intramuscular injection sites. This region can be called:
 - A. Sacral
 - B. Buccal
 - C. Cutaneous
 - D. Gluteal

18. In the human body, the chest region:
- A. Can be referred to as the thoracic cavity
 - B. Is a component of the ventral body cavity
 - C. Contains the mediastinum
 - D. All of the above
19. Which of the following is *not* a component of the axial subdivision of the body?
- A. Upper extremity
 - B. Neck
 - C. Trunk
 - D. Head
20. A synonym for medial is:
- A. Toward the side
 - B. In front of
 - C. Midline
 - D. Anterior

Matching

Select the most appropriate answer from column B for each item in column A. There is only one correct answer for each item.

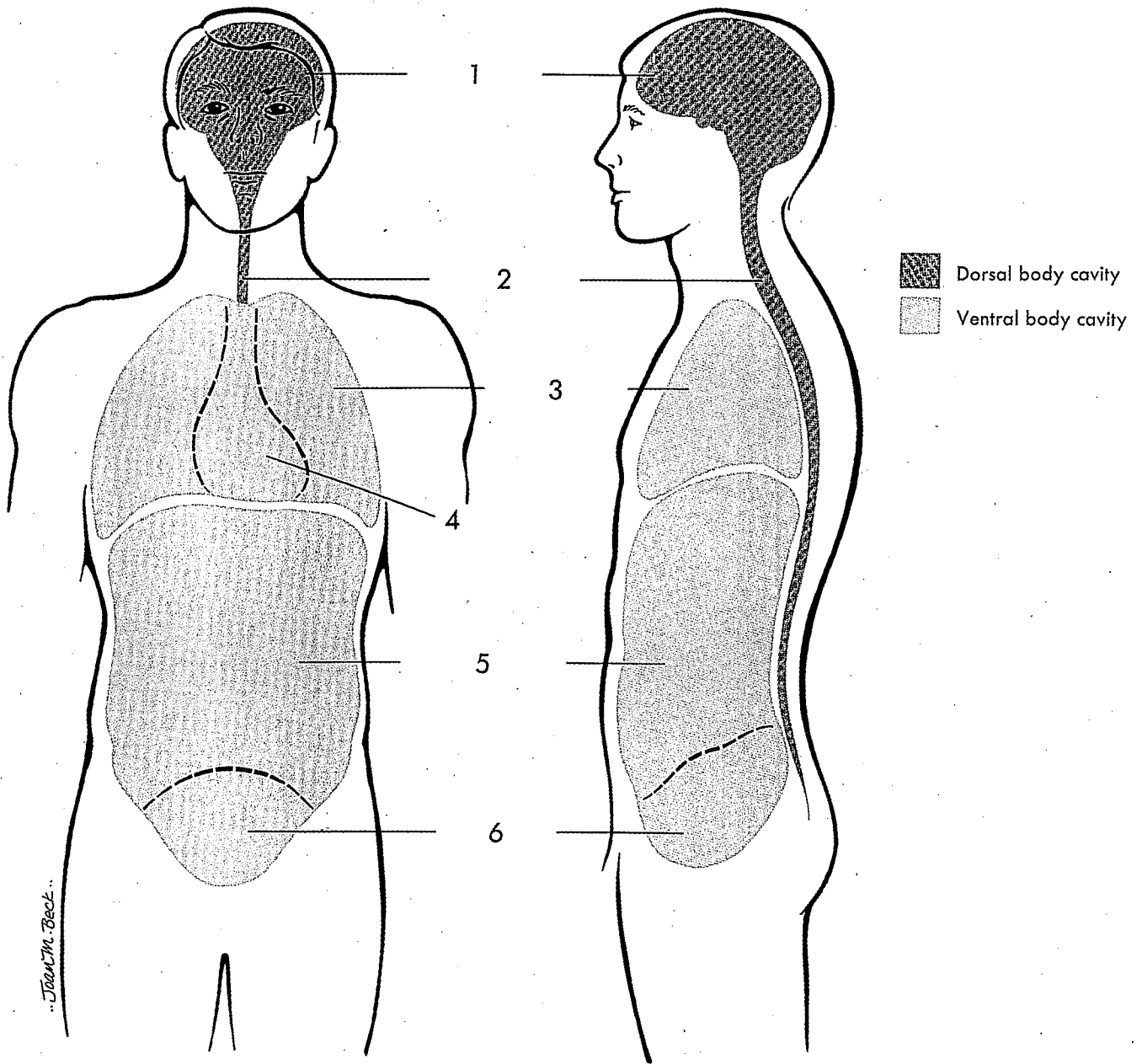
Column A

- _____ 21. Ventral
- _____ 22. Skin
- _____ 23. Transverse
- _____ 24. Anatomy
- _____ 25. Superficial
- _____ 26. Pleural
- _____ 27. Appendicular
- _____ 28. Posterior
- _____ 29. Midsagittal
- _____ 30. System

Column B

- A. Equal
- B. Cutaneous
- C. Lung
- D. Extremities
- E. Respiratory
- F. Anterior
- G. Structure
- H. Surface
- I. Back
- J. Horizontal

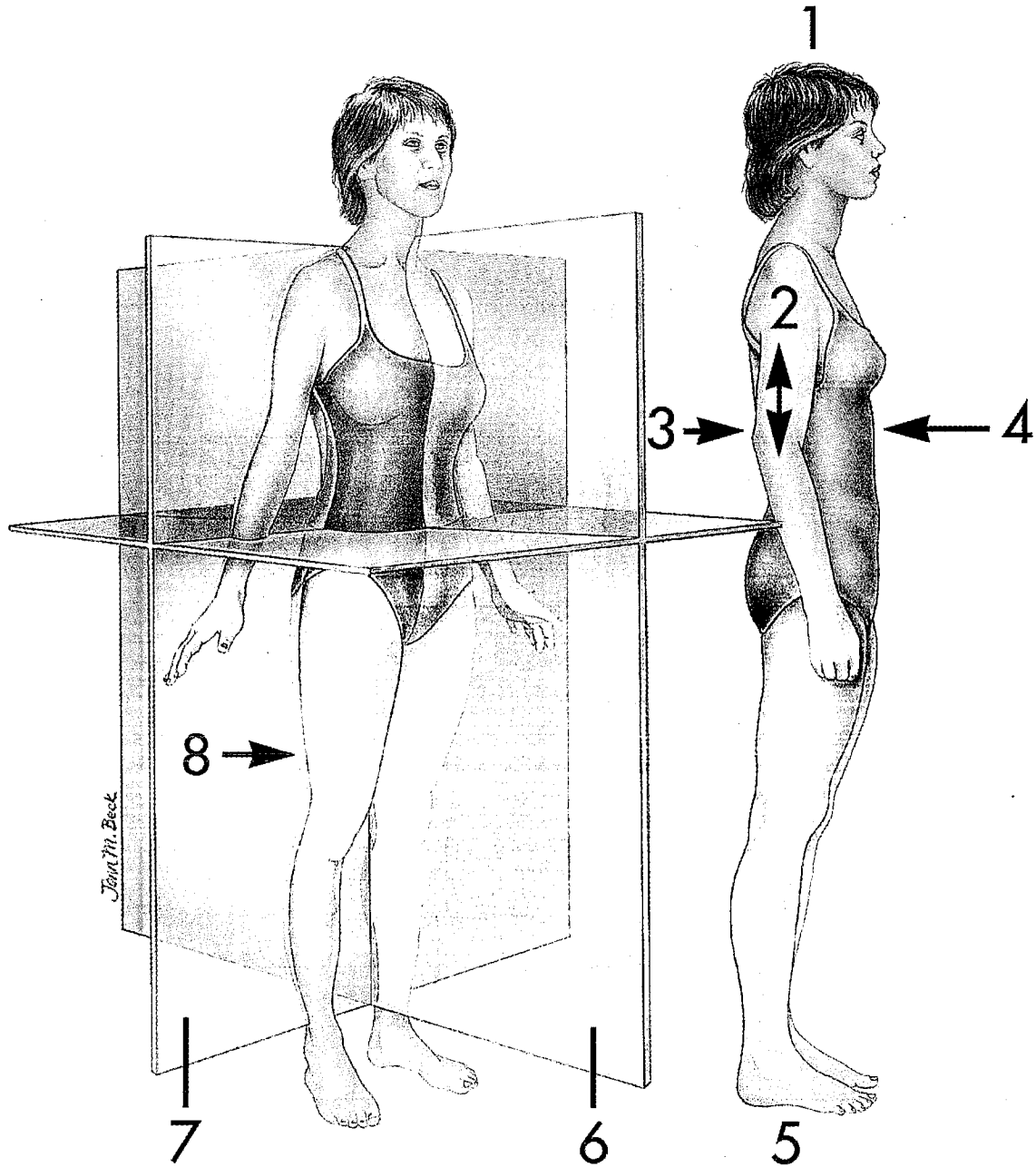
Dorsal and Ventral Body Cavities



1. _____
2. _____
3. _____

4. _____
5. _____
6. _____

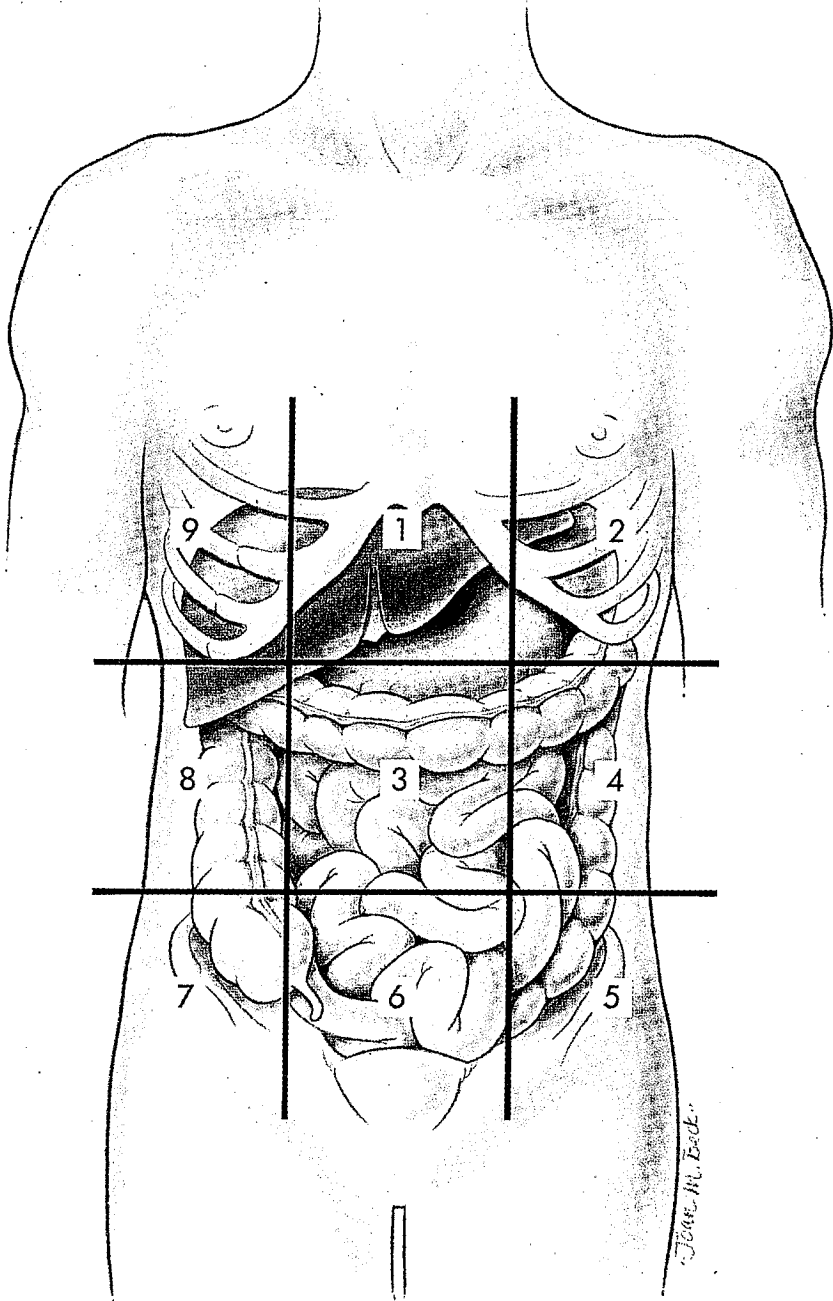
Directions and Planes of the Body



1. _____
2. _____
3. _____
4. _____

5. _____
6. _____
7. _____
8. _____

Regions of the Abdomen



- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

- 6. _____
- 7. _____
- 8. _____
- 9. _____

