

ANATOMIC PLANES & SECTIONS

MEDIAN^A

The median plane is the midline longitudinal plane dividing the head and torso into right and left halves. The presence of the sectioned midline of the vertebral column and spinal cord is characteristic of this plane. The median plane is the middle sagittal (mid-sagittal) plane.

SAGITTAL^B

The sagittal plane is a longitudinal plane dividing the head and torso into left and right parts (not halves). It is parallel to the median (not medial) plane.

CORONAL, FRONTAL^C

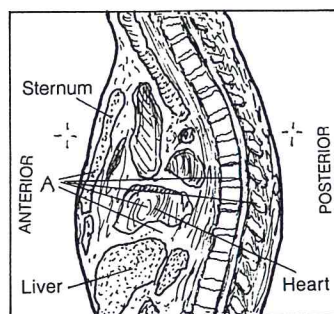
The coronal or frontal plane is a longitudinal plane dividing the body (head, torso, limbs) or its parts into front and back halves or parts.

TRANSVERSE, CROSS^D

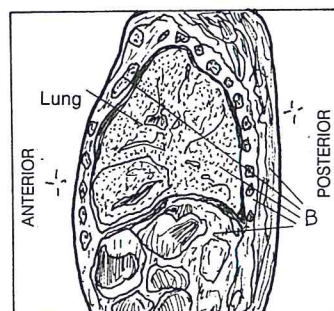
The transverse plane divides the body into upper and lower halves or parts (cross sections). It is perpendicular to the longitudinal planes. Transverse planes may be horizontal planes of the upright body. Transverse planes are called "axial" or "transaxial" sections/slices by radiologists.

CN: (1) Use your lightest colors on A-D. (2) Color a body plane in the center diagram; then color its title, related sectional view, and the sectioned body example. (3) Color everything within the dark outlines of the sectional views.

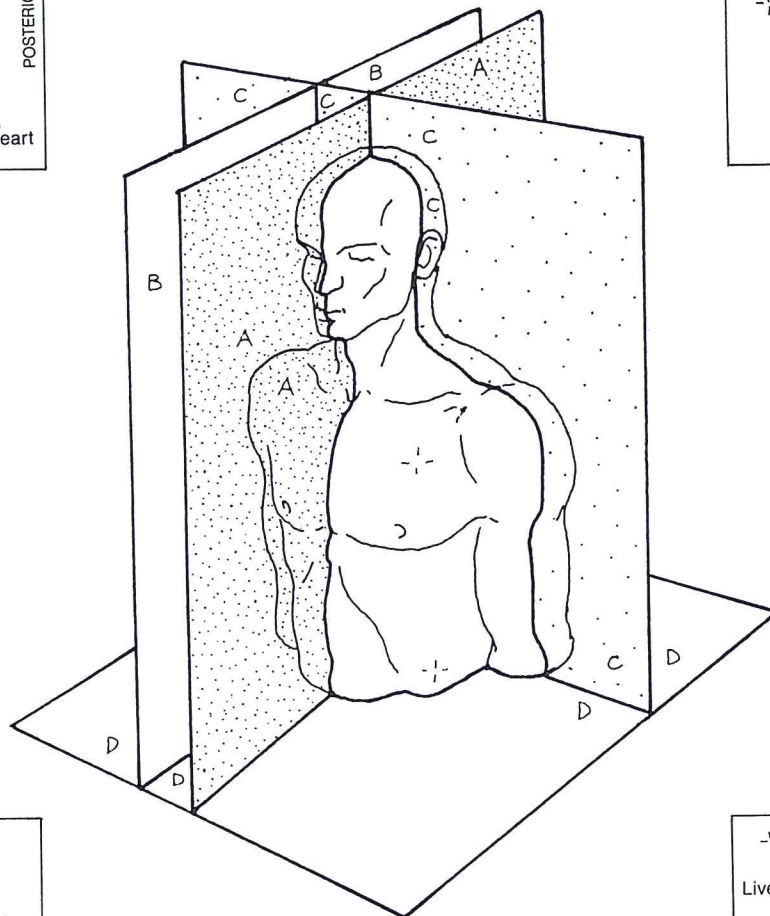
Study of the human body requires visualization of internal regions and parts. Dissection (dis, apart; sect-, cut) is the term given to preparing the body for internal inspection. One method of dissection permits consistent visual orientation by cutting the body into parts, called "sections," along the lines of reference, called "planes." The viewing and study of internal human structure in these planes is possible through medical imaging, such as computerized tomography (CT) and magnetic resonance imaging (MRI).



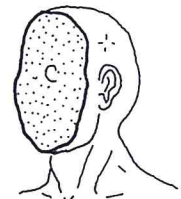
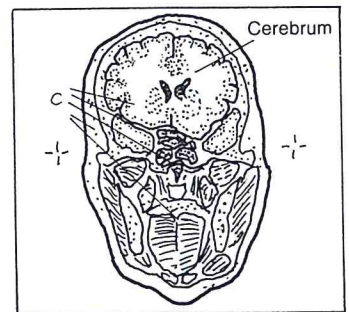
Median section through the thorax



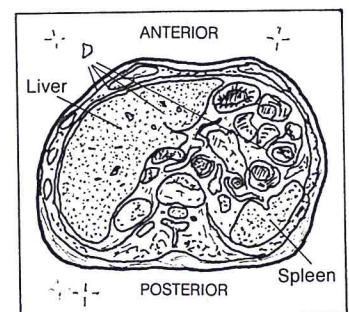
Sagittal section through the thorax



Coronal section through the head



Cross section through the abdomen



TERMS OF POSITION & DIRECTION

CN: Color the arrows and titles, but not the illustrations.

Terms of position and direction describe the relationship of one organ to another, usually along one of the three body planes illustrated in the previous plate. To avoid confusion, these terms are related to the standard anatomical position: body standing erect, limbs extended, palms of the hands forward.

CRANIAL, SUPERIOR, ROSTRAL ^A

These terms refer to a structure being closer to the head or higher than another structure of the body. These terms are not used with respect to the limbs.

ANTERIOR, VENTRAL ^B

These terms refer to a structure being more in front than another structure in the body. The term "anterior" is preferred.

POSTERIOR, DORSAL ^C

These terms refer to a structure being more in back than another structure in the body. The term "posterior" is preferred.

MEDIAL ^D

This term refers to a structure that is closer to the median plane than another structure in the body. "Medial" is not synonymous with "median."

LATERAL ^E

This term refers to a structure that is further away from the median plane than another structure in the body.

PROXIMAL ^F

Employed only with reference to the limbs, this term refers to a structure being closer to the median plane or root of the limb than another structure in the limb.

DISTAL ^G

Employed only with reference to the limbs, this term refers to a structure being further away from the median plane or the root of the limb than another structure in the limb.

CAUDAL, INFERIOR ^H

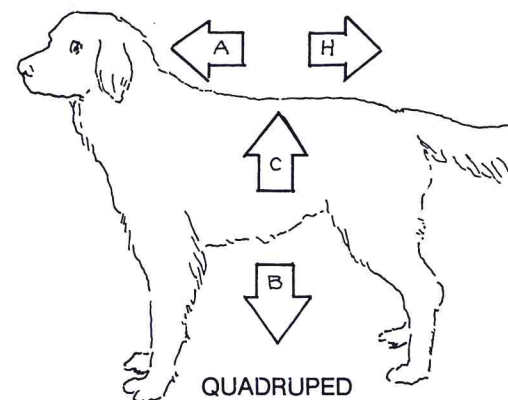
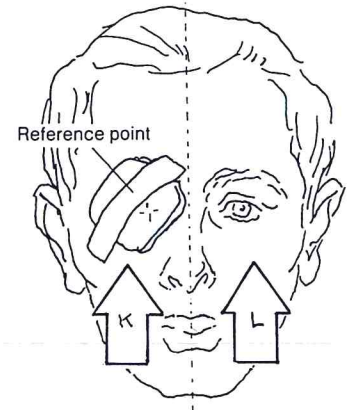
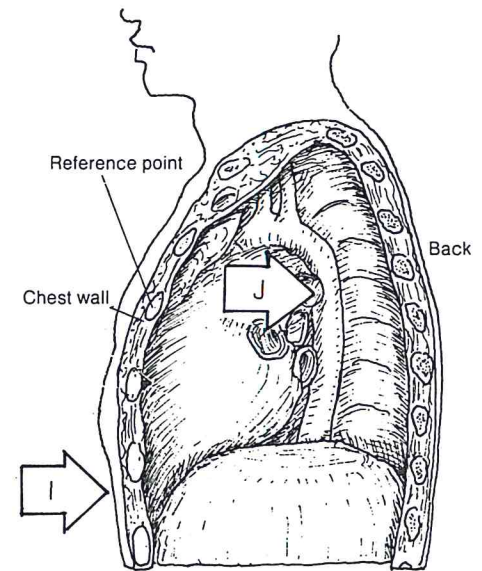
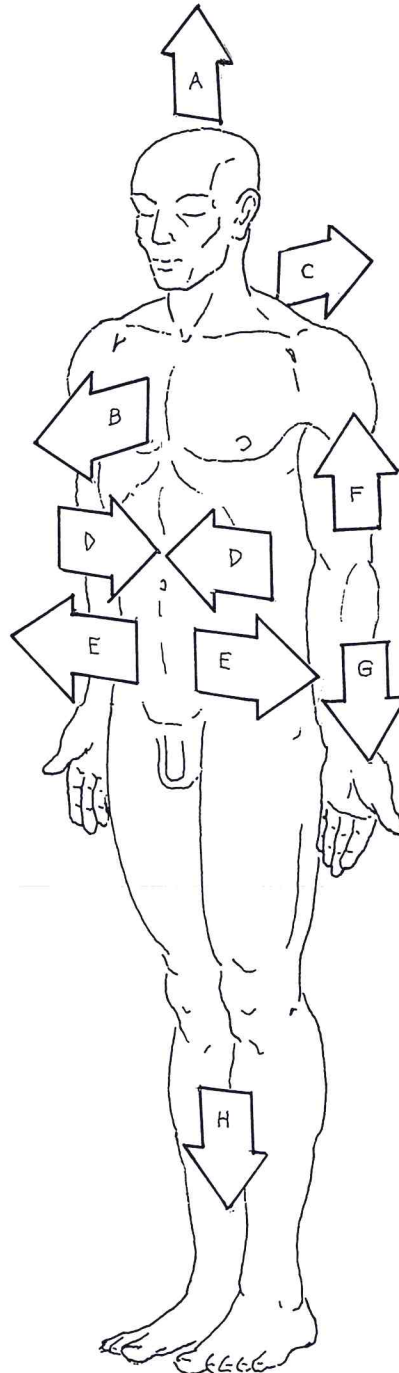
These terms refer to a structure being closer to the feet or the lower part of the body than another structure in the body. These terms are not used with respect to the limbs.

SUPERFICIAL ^I DEEP ^J

The term "superficial" is synonymous with external, the term "deep" with internal. Related to the reference point on the chest wall, a structure closer to the surface of the body is superficial; a structure further away from the surface is deep.

IPSILATERAL ^K CONTRALATERAL ^L

The term "ipsilateral" means "on the same side" (in this case, as the reference point); "contralateral" means "on the opposite side" (of the reference point).



The quadruped presents four points of direction: head end (cranial), tail end (caudal), belly side (ventral), back side (dorsal). In the biped (e.g., human), the ventral side is also anterior, the dorsal side is also posterior, the cranial end is also superior, and the caudal end is inferior.

SYSTEMS OF THE BODY (1)

follow CN carefully!

CN: Use light colors. Color the skeleton (A). Color the musculature (B) brown. Color the major arteries and heart red (with darker outlines), veins blue (C). Color all lymphatic vessels (D) green. Color nerves, brain and spinal cord (E), yellow. Color the insets representing the endocrine system (F). Pick a skin color for the integumentary system (G). Note that the latter two are independent systems, but are graphically combined here in one body.

Collections of similar cells constitute tissues. The four basic tissues are integrated into body wall and visceral structures/organs. A *system* is a collection of organs and structures sharing a common function. Organs and structures of a single system occupy diverse regions in the body and are not necessarily grouped together.

SKELETAL_A ARTICULAR_{A'}

The skeletal system consists of the skeleton of bones and their periosteum, and the ligaments that secure the bones at joints. By extension, this system could include the varied fasciae that ensheath the body wall/skeletal muscles and contribute to the body's structural stability. The *articular system* comprises the joints, both movable and fixed, and the related structures, including joint capsules, synovial membranes, and discs/menisci.

MUSCULAR_B

The muscular system includes the skeletal muscles that move the skeleton, the face, and other structures and give form to the body; the cardiac muscle of the heart walls; and the smooth muscle of the walls of viscera and vessels and in the skin.

CARDIOVASCULAR_C

The cardiovascular system consists of the four-chambered heart, arteries conducting blood to the tissues, capillaries through which nutrients, gases, and molecular material pass to and from the tissues, and veins returning blood from the tissues to the heart. Broadly interpreted, the cardiovascular system includes the lymphatic system.

LYMPHATIC_D

The lymphatic system is a system of vessels assisting the veins in recovering the body's tissue fluids and returning them to the heart. The body is about 60% water, and the veins alone are generally incapable of meeting the demands of tissue drainage. Lymph nodes, which filter lymph, are located throughout the body.

NERVOUS_E

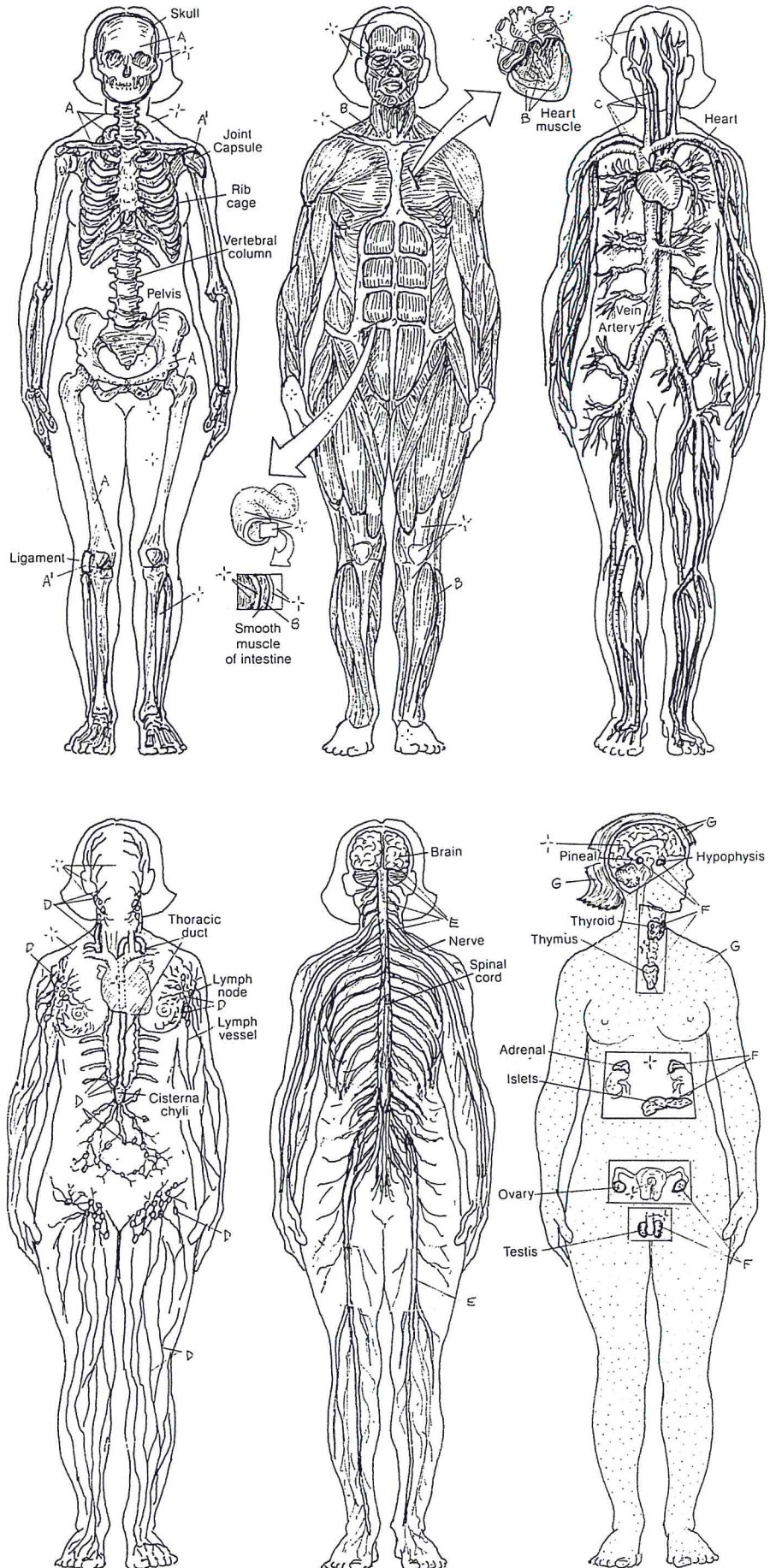
The nervous system consists of impulse-generating/conducting tissue organized into a central nervous system (brain and spinal cord) and a peripheral nervous system (nerves), which includes the visceral (autonomic) nervous system involved in involuntary "fight or flight" and vegetative responses.

ENDOCRINE_F

The endocrine system consists of glands that secrete chemical agents (hormones) into the tissue fluids and blood, affecting the function of multiple areas of the body. Many of these glands are under some control by the brain (hypothalamus). Hormones help maintain balanced metabolic functions in many of the body's systems.

INTEGUMENTARY_G

The integumentary system is the skin, replete with glands, sensory receptors, vessels, immune cells and antibodies, and layers of cells and keratin that resist environmental factors harmful to the body.



SYSTEMS OF THE BODY (2)

CN: Use different light colors from those used on the preceding plate.

RESPIRATORY_H

The respiratory system consists of the upper (nose through larynx) and lower respiratory tract (trachea through the air spaces of the lungs). Most of the tract is airway; only the air spaces (alveoli) and very small bronchioles exchange gases between alveoli and the lung capillaries.

DIGESTIVE_I

The digestive system is concerned with the breakdown, digestion, and assimilation of food as well as excretion of the residua. Its tract begins with the mouth and continues down to the abdomen, wherein it takes a convoluted course to open again at the anus. Associated glands include the liver, the pancreas, and the biliary system (gall bladder and related ducts).

URINARY_J

The urinary system is concerned with the conservation of water and maintenance of a neutral acid-base balance in the body fluids. The kidneys are the main functionaries of this system; residual fluid (urine) is excreted through ureters to the urinary bladder for retention and discharged to the outside through the urethra.

IMMUNE / LYMPHOID_K

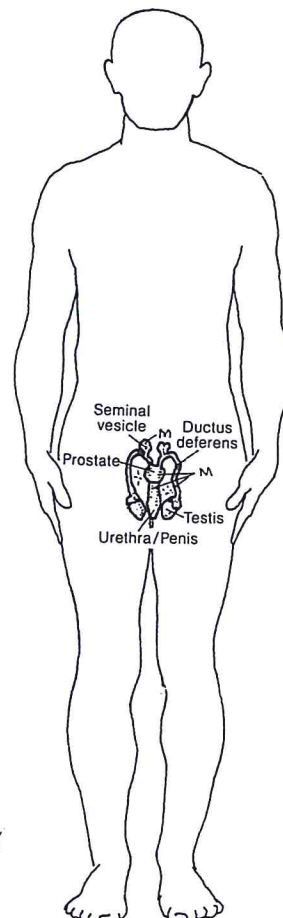
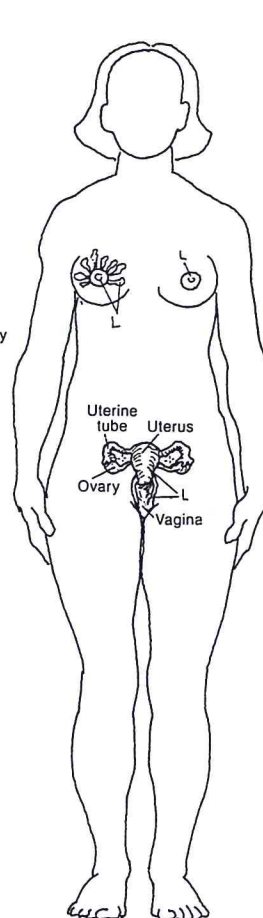
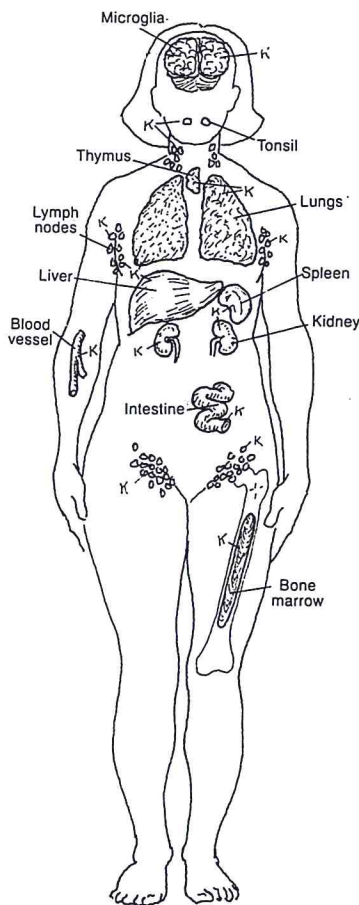
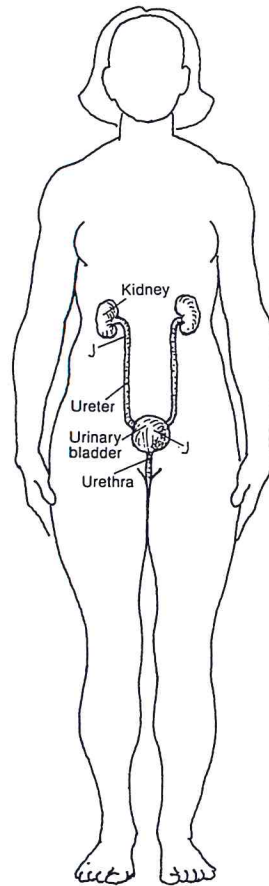
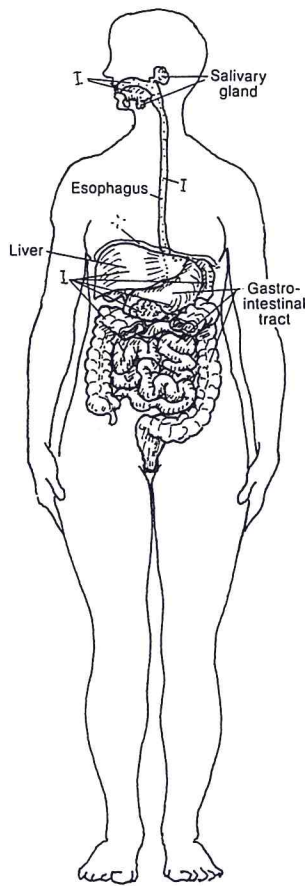
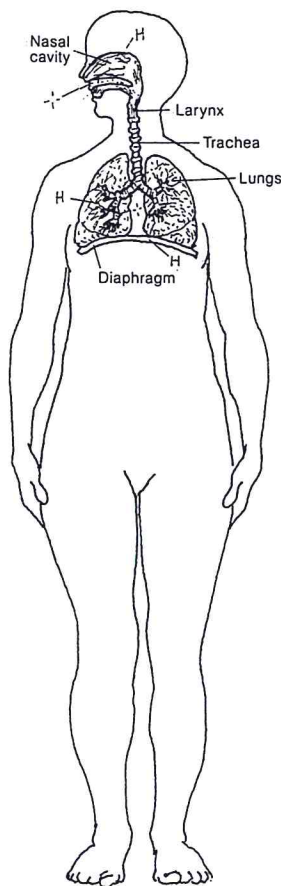
The lymphoid system consists of organs concerned with body defense: thymus, bone marrow, spleen, lymph nodes, tonsils, and smaller aggregates of lymphoid tissue. This system, including a diffuse arrangement of immune-related cells throughout the body, is concerned with resistance to invasive microorganisms and the removal of damaged or otherwise abnormal cells.

FEMALE REPRODUCTIVE_L

The female reproductive system is concerned with the secretion of sex hormones, production and transportation of germ cells (ova), receipt and transport of male germ cells to the fertilization site, maintenance of the developing embryo/fetus, and initial sustenance of the newborn.

MALE REPRODUCTIVE_M

The male reproductive system is concerned with the secretion of male sex hormones, formation and maintenance of germ cells (sperm), and transport of germ cells to the female genital tract.



REGIONS OF THE BODY (ANTERIOR)

** color starred only*

CN: The text for this and the next plate is located on the next plate. (1) The anterior/lateral regions have been grouped according to larger areas: e.g., head, neck. The regions of each area (A¹, A², etc.) all receive a single color. Color a title and the arrow pointing to its region. (2) Although the title "pudendal" (D-) is to be colored, that region, consisting of the female external genitals, is not shown (N.S.). The same is true for the perineum (D-), that region between the pubis and the coccyx, below the pelvic floor.

* HEAD A-

- FRONTAL A¹ (forehead)
- TEMPORAL A² (temple)
- * ORBITAL A³ (eye, cavity/walls)
- NASAL A⁴ (nose, cavity/walls)
- BUCCAL A⁵ (cheek)
- ORAL A⁶ (mouth cavity)
- MANDIBULAR A⁷ (lower jaw)

* NECK B-

- * ANTERIOR CERVICAL B¹ (front of neck)
- * LATERAL CERVICAL B² (side of neck)
- SUPRACLAVICULAR B³ (above clavicle)

* THORAX C-

- * PECTORAL C¹ (anterior chest)

* ABDOMINOPELVIC D-

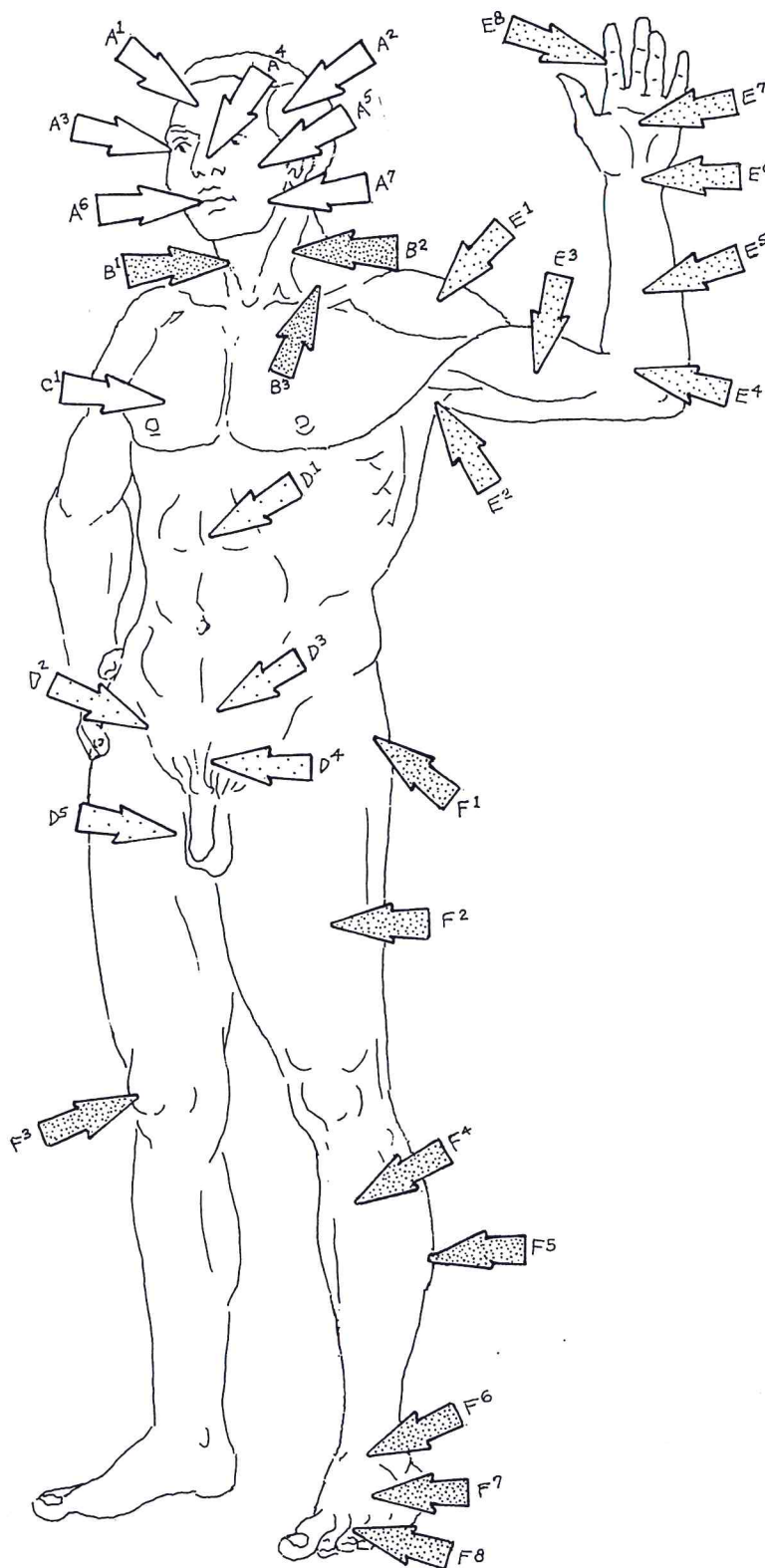
- * ABDOMINAL D¹ (abdomen)
- * INGUINAL D² (groin)
- * PELVIC D³ (pelvis)
- * PUBIC D⁴ (genital region)
- GENITAL D⁵ (reproductive organs)
- PUDENDAL D- N.S. (female genitals)
- PERINEAL D- N.S. (between pubis and coccyx)

* UPPER LIMB E-

- DELTOID E¹ (shoulder/upper arm)
- * AXILLARY E² (armpit)
- * BRACHIAL E³ (arm)
- ANTECUBITAL E⁴ (front of elbow)
- ANTEBRACHIAL E⁵ (forearm)
- CARPAL E⁶ (wrist)
- HAND: PALMAR E⁷ (palm)
- * HAND: DIGITAL E⁸ (fingers)

* LOWER LIMB F-

- * COXAL F¹ (hip)
- * FEMORAL F² (thigh)
- PATELLAR F³ (knee cap)
- CRURAL F⁴ (leg)
- FIBULAR F⁵ (lateral leg)
- TARSAL F⁶ (ankle)
- FOOT: DORSUM F⁷ (top)
- * FOOT: DIGITAL F⁸ (toes)



REGIONS OF THE BODY (POSTERIOR)

* color starred only

CN: (1) Use the same colors for divisions marked A, B, E, and F that were used for those letters on the preceding plate.

Regional anatomy is the organization of human structure by regions. Here are shown the major regions within the principal areas of the body (e.g., head, neck). There are many regions within regions, each of which includes structures from different systems, such as bone, muscles, blood vessels, and nerves. Study of the body by dissection is generally accomplished region by region. An in-depth regional awareness of human structure is fundamental for most health care providers.

* HEAD A-

* **PARIETAL** A¹ (top and sides of head)

* **OCCIPITAL** A² (back of head)

* NECK B-

POST. CERVICAL / NUCHAL B¹
(back of neck)

* BACK G-

SCAPULAR G¹ (shoulder blade)

VERTEBRAL G² (spinal column)

PARASPINAL G³ (along side spinal column)

THORACIC G⁴ (posterior chest)

LUMBAR G⁵ (lower back)

SACROILIAC G⁶ (vertebro-pelvic joint)

SACRAL G⁷ (posterior pelvis)

COCCYGEAL G⁸ ("tail bone")

* UPPER LIMB E-

ACROMIAL E¹ (top of shoulder)

DELTOID E² (shoulder/upper arm)

* **BRACHIAL** E³ (arm)

CUBITAL E⁴ (elbow)

ANTEBRACHIAL E⁵ (forearm)

CARPAL E⁶ (wrist)

HAND: DORSAL E⁷ (back of hand)

* **HAND: DIGITAL** E⁸ (fingers)

* LOWER LIMB F-

* **GLUTEAL** F¹ (buttock)

* **FEMORAL** F² (thigh)

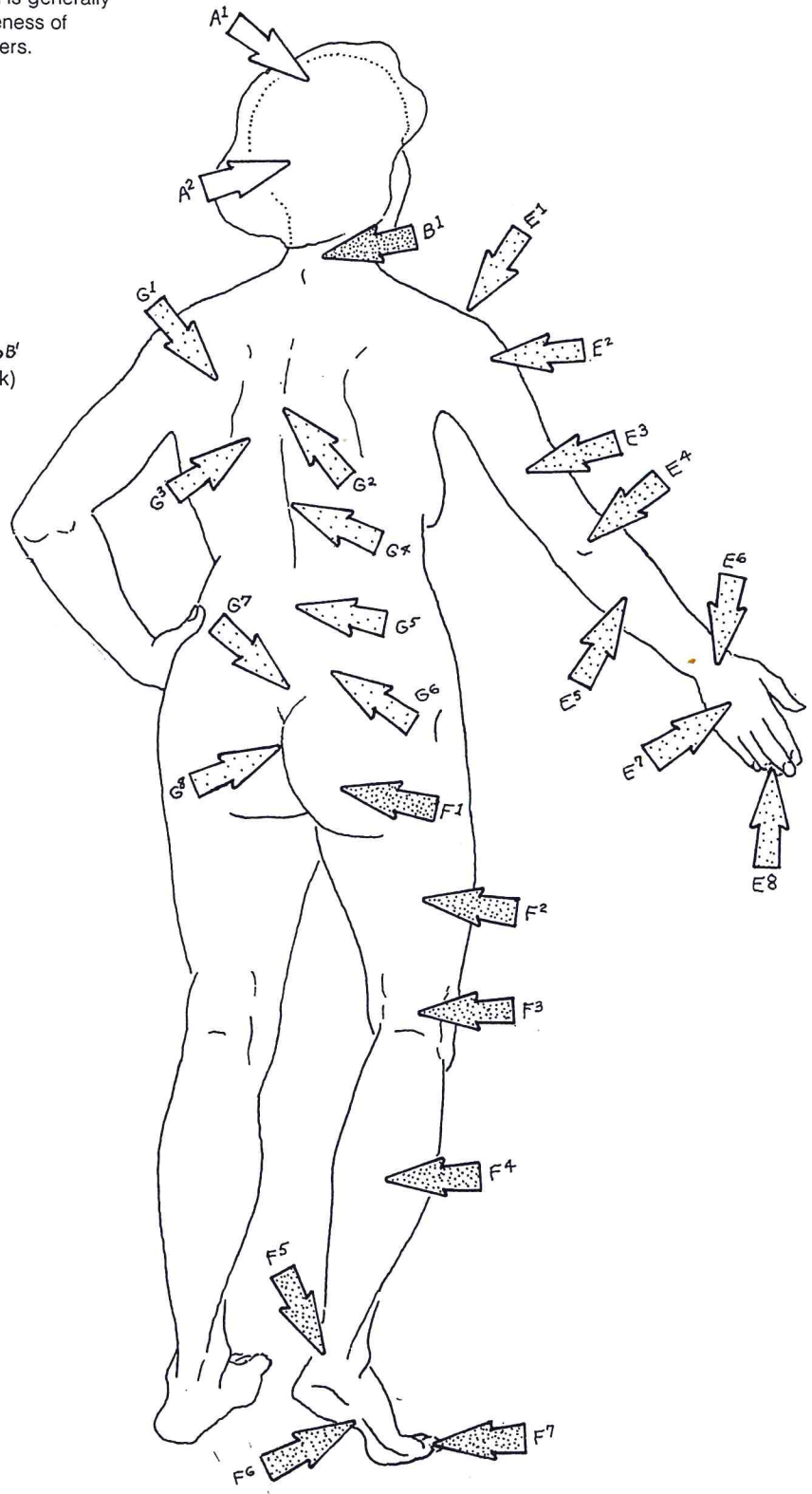
POPLITEAL F³ (back of knee)

CRURAL F⁴ (leg)

TARSAL F⁵ (ankle)

FOOT: PLANTAR F⁶ (sole)

* **FOOT: DIGITAL** F⁷ (toes)



CLOSED BODY CAVITIES:-

CRANIAL A DURA MATER A'*

VERTEBRAL B DURA MATER B'*

THORACIC C PLEURA C'*

ABDOMINOPELVIC D PERITONEUM D'*

The abdominal cavity, containing the gastrointestinal tract and related glands, the urinary tract, and great numbers of vessels and nerves, has muscular walls anterolaterally, the lower ribs and muscle laterally, and the lumbar vertebrae posteriorly. The roof of the abdominal cavity is the thoracic diaphragm. The abdominal and pelvic cavities are continuous with one another and share the muscular pelvic floor. The pelvic cavity, containing the urinary bladder, rectum, and reproductive organs, has muscular walls anteriorly, bony walls laterally, and the sacrum posteriorly. The internal surface of the abdominal wall is lined by a serous membrane, the peritoneum (Plate 140). The serous secretions enable the mobile abdominal viscera to slip and slide frictionlessly during movement. The peritoneum drapes over the pelvic viscera, does not envelop them, and does not reach the pelvic floor.

OPEN VISCERAL CAVITIES

RESPIRATORY TRACT_E
URINARY TRACT_F
DIGESTIVE TRACT.
MUCOSA_H

The diagrams illustrate the development of the meninges in a human figure. The left diagram shows a dorsal view, and the right diagram shows a lateral view. Both diagrams depict the progression from a simple cavity to a complex, multi-layered structure.

Left Diagram (Dorsal View):

- Meningeal layer:** The outermost layer of the meninges.
- A':** The innermost layer of the meninges.
- A:** The cavity of the meninges.
- Parietal layer:** The layer of the meninges that lines the parietal bone.
- Visceral layer:** The layer of the meninges that covers the surface of the brain.
- C':** The layer of the meninges that lines the cerebellum.
- C:** The cavity of the meninges.
- Diaphragm:** The structure that separates the two cavities of the meninges.
- D:** The cavity of the meninges.
- D':** The layer of the meninges that lines the diaphragm.
- D:** The cavity of the meninges.

Right Diagram (Lateral View):

- Foramen magnum:** The opening in the occipital bone through which the spinal cord passes.
- A':** The innermost layer of the meninges.
- A:** The cavity of the meninges.
- B:** The layer of the meninges that lines the foramen magnum.
- B':** The layer of the meninges that covers the surface of the brain.
- C':** The layer of the meninges that lines the cerebellum.
- C:** The cavity of the meninges.
- D':** The layer of the meninges that lines the diaphragm.
- D:** The cavity of the meninges.
- D:** The cavity of the meninges.

