INTRODUCTION
ANATOMIC PLANES & SECTIONS

CN: (1) Color the four body planes and related sections of the body in very light colors. (2) Take care not to color in areas marked by "do not color" (-'-) symbols.

Study of the human body (anatomy) requires visualization of internal regions or parts. Dissection (dis, apart; sect-, cut) is the name given to preparing the body for internal inspection. One method of dissection permits consistent visual orientation by cutting the body into parts or sections along fixed lines of reference called planes. Two of these planes are oriented along the long axis of the body or body part, one perpendicular to the other (longitudinal sections). The third plane is oriented perpendicular to or across the long axis of the body or body part (cross section). Such planes have application in medical imaging studies, such as computerized tomography (CT) and magnetic resonance imaging (MRI). Here the body interior is imaged as computerized "slices" of the body in sagittal, coronal and transverse planes.

MEDIAN A

The midline, longitudinal plane dividing the head and torso into right/left halves. The presence of the vertebral column and spinal cord is characteristic of the median plane of the torso. The median plane is the middle sagittal plane.

SAGITTAL B

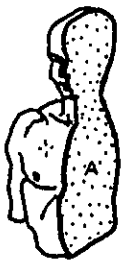
The longitudinal plane dividing the body into left and right parts. It is parallel to the median plane and may be applied to the head, torso and limbs.

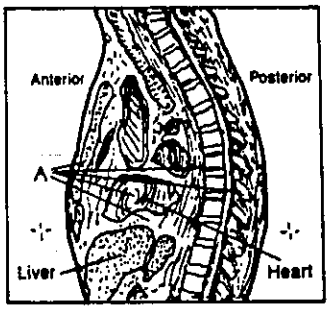
CORONAL, FRONTAL C

The longitudinal plane dividing the body into equal or unequal front and back parts. In CT and MRI, the term "coronal" is used by radiologists.

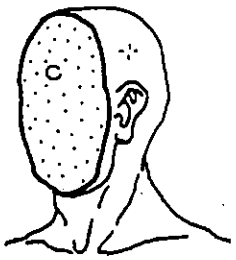
CROSS, TRANSVERSE D

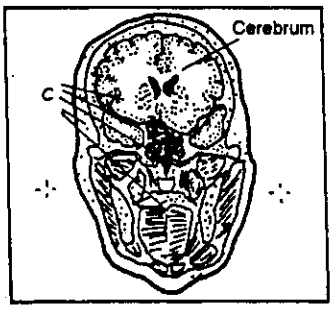
The transverse plane dividing the body or body parts into upper and lower segments. This plane is a cross section perpendicular to the longitudinal planes. Transverse planes of the body, called axial or transaxial sections by radiologists, are commonly seen in CT and MRI studies of the body.



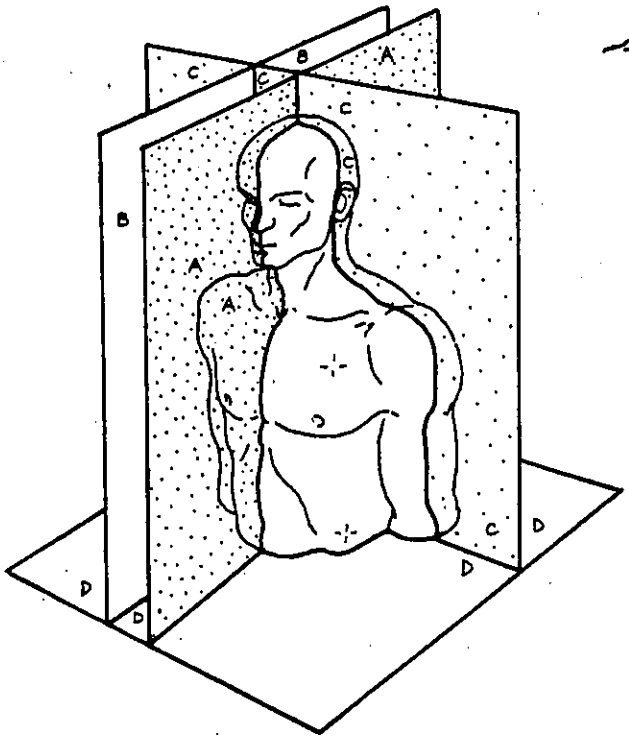


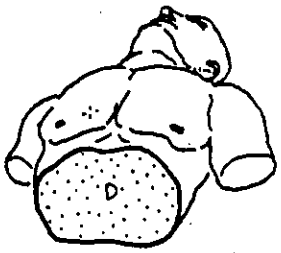
Median section through the thorax.

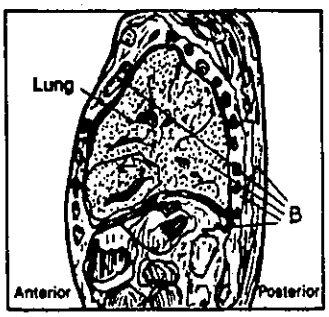




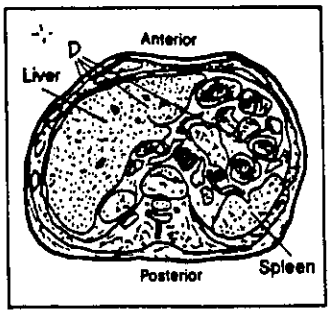
Coronal section through the head.







Sagittal section through the thorax.



Cross section through the abdomen.

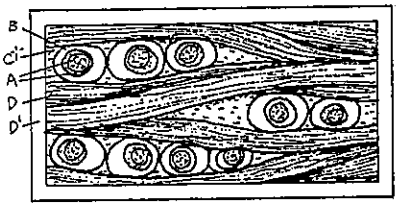
TISSUES: SUPPORTING CONNECTIVE TISSUES

CN: Use the same colors as used on the previous plate for collagen (D) and elastic (E) fibers. Use a light tan or yellow for F and red for L. Use light colors for A, B, G, I, and M. Complete the upper material before coloring the bone section.

CARTILAGE

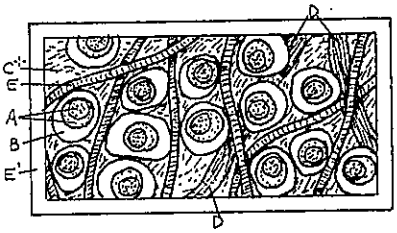
CHONDROCYTE A
LACUNA B
MATRIX C'
COLLAGEN FIBER D
ELASTIC FIBER E

Microscopic sections of cartilage tissue reveal cells (chondrocytes) in small cavities (lacunae) surrounded by a hard but flexible matrix of water bound to proteoglycans and collagen fibers. Avascular cartilage receives its nutrition by diffusion from vessels in the perichondrium. For that reason, cartilage does not repair well after injury, yet it is often a part of a temporary framework (callus) in the healing process of fractured bone. There are three types of cartilage.



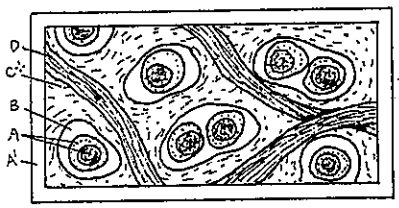
FIBROCARTILAGE D'

Fibrocartilage offers strength with flexibility, resisting both impact and tensile forces. The best example of this tissue is the intervertebral disc. It consists of dense fibrous tissue interspersed with cartilage cells and a relatively small amount of intercellular matrix.



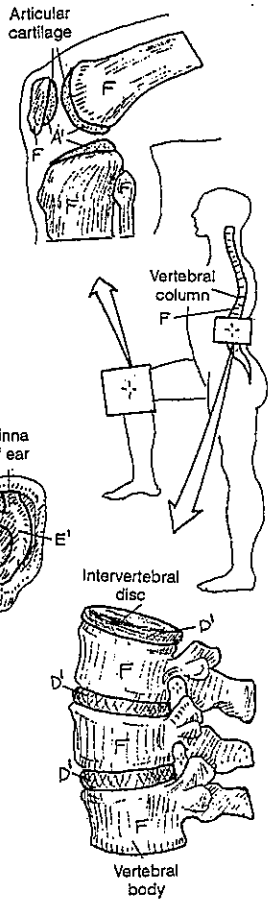
ELASTIC CARTILAGE E'

This tissue is essentially hyaline cartilage with elastic fibers and some collagen. It supports the external ear and the epiglottis of the larynx. Feel its unique flexibility in your own external ear.



HYALINE CARTILAGE A'

Well known as the covering at bone ends (articular cartilage), hyaline cartilage is avascular, insensitive, and compressible. It is porous, enhancing absorption of nutrients and oxygen. It supports the external nose (feel and compare with the elastic cartilage of the ear). It is the main structural support of the larynx and much of the lower respiratory tract. It forms the model for most early developing bone (Plate 168).



BONE F

PERIOSTEUM F'
COMPACT BONE G
HAVERSIAN SYS. D*
HAV. CANAL H
LAMELLAE G'
OSTEOCYTE I
OSTEOCLAST I'
LACUNA B
CANALICULI J
VOLKMANN CANAL K
BLOOD VESSEL L
SPONGY BONE G²

As you read, check Plate 20. Bone has compact and cancellous forms. Compact bone is the impact-resistant, weight-bearing shell of bone lined by a sheath of life-supporting fibrous periosteum. Compact bone consists of columns called haversian systems or osteons: concentric layers (lamellae) of mineralized, collagenous matrix around a central (haversian) canal containing blood vessels. Volkmann's canals interconnect the haversian canals. Note the interstitial lamellae between columns and the circumferential lamellae enclosing the columns. Between lamellae are small cavities (lacunae) interconnected by little canals (canaliculi). Bone cells (osteocytes) and their multiple extensions fill these spaces, which connect with the haversian canal. In areas of resorbing bone matrix, large, multinucleated, avidly phagocytic osteoclasts can be seen with multiple cytoplasmic projections facing the matrix they are destroying. Bone-forming cells (osteoblasts) can be seen in Plate 168. Cancellous bone is internal to compact bone and is especially well seen at the ends of long bones. It consists of irregularly-shaped, interwoven beams (trabeculae) of bone, lacking haversian systems.