

MIX AND MATCH EXAM #3

ANATOMY AND PHYSIOLOGY I

1. **Abduction** – Movement of a bone away from the midline of the body.
2. **Adduction** – Movement of a bone toward the midline of the body.
3. **Acetylcholine** – A neurotransmitter, ACh. In both the peripheral and central nervous system.
4. **Action** – How a muscle moves bones.
5. **Action Potential** - +40mv Where Ca^{++} is released from the sarcoplasmic reticulum resulting in the beginning of the muscle contraction process.
6. **Actin** – A protein fiber in muscle cells that has myosin head bonding sites and includes the proteins tropomyosin and troponin.
7. **Aerobic**- metabolism with oxygen. Normal metabolism
8. **Amphiarthroses** – Slightly moveable joints. Lack a synovial cavity. (Syndesmosis, Symphysis, Diarthroses).
9. **Anaerobic** – metabolism w/o oxygen. Creates lactic acid and oxygen debt.
10. **Antagonistic pairs** – Muscles occur in pairs that have opposite actions.
11. **Appositional growth** – Growth in diameter. Osteocytes in the periosteum on the outside of bones lay down new bone, adding new material to the outside of bones.
12. **Articulating cartilage** – Covers the ends of the bones in the joint. Provides a smooth articulating surface.
13. **Atrophy** – If you don't use a muscle it will reduce in size. Can happen in as little as 60 days.
14. **Ball and socket joint** – A rounded ball that fits into the cup shaped depression in another bone. Femur/pelvis
15. **Bony callus** – Bone that fills in the break 3-4 months after a break. The bony callus initially forms a large bump on the outsides of the bone which is later removed by bone remodeling.
16. **Bursae** – Small sack like structures near the joints that alleviate friction with outer tissue layers when the joint moves. Surrounded by synovial membrane and are filled with synovial fluid.
17. **Bursitis** – Inflammation of the synovial membranes that surround the bursae.

18. **Calcitonin** – hormone which is released from the thyroid glands when blood calcium levels are high and increases the uptake of calcium by bones and bone formation by osteocytes and inhibits osteoclastic activity.
19. **Calmodulin** – In smooth muscle Ca ions which are released from the cell bind with calmodulin.
20. **Canaliculi** – Small tubes that connect the lacunae and allow plasma from the blood to circulate around the osteocytes.
21. **Cardiac Muscle** – Muscle used to contract the heart. Striated, intercalated disks, myogenic, single nucleus, very fast contraction speed.
22. **Carpel tunnel syndrome** – Narrowing of the tunnel that runs under ligaments that run across the back of the wrist which causes the nerves running through the tunnel to be compressed.
23. **Cartilage** – Has chondrocytes in a rubbery gelatinous ground substance called chondroitin sulfate. May contain elastic and/or collagen fibers.
24. **Cartilaginous** – Joints that lack a synovial cavity and are held together by hyaline cartilage. I.e. The Symphysis of the pelvis.
25. **Chondrocytes** – Cells in cartilage
26. **Circumduction** – Movement of the distal end of a body part in a circle. Involves abduction/adduction and flexion/extension.
27. **Collagen** – larger diameter protein fibers that are not very elastic and have great tensile strength. They are found in tendons and ligaments.
28. **Compact bone** – Solid bone with little space between osteocytes.
29. **Condylloid joint** – (ellipsoidal) an oval shaped condyle of one bone fits into an elliptical cavity of another bone. Where the radius/ulna meet the carpels
30. **Creatine phosphate** – Used to store excess ATP energy, can be used to convert ADP to ATP at times of high energy needs.
31. **Diaphysis** – The shaft of the bone which is the area between the metaphysis, mostly compact bone.
32. **Diarthrosis** – Freely movable joints that have a synovial cavity.
33. **Elastic fibers** – Small diameter protein fibers that are very elastic. They are found in the dermis and make the skin elastic.
34. **Endochondral ossification** – Mostly after birth. Bone that forms within hyaline cartilage (i.e. mesenchyme → hyaline cartilage → bone). Most of the bones in the body form this way.

35. **Endomysium** – The part of the fascia that surrounds the individual muscle fibers.
36. **Endosteum** – A layer of fibrous connective tissue and blood vessels that lines the medullary cavity it contains osteoclasts and osteoprogenitor cells.
37. **Epimysium** - The outer layer of the fascia that surrounds the whole muscle.
38. **Epiphyseal line** – In adult bones (after puberty), caused when the epiphyseal plate is ossified shortly after puberty.
39. **Epiphyseal plate** – Between the spongy bone (epiphysis) and the compact bone (diaphysis) in a long bone. In juvenile bones only, where the bone growth occurs.
40. **Epiphysis** – End of bone where it meets a joint. Mostly spongy bone. The articulating ends of the epiphyses are covered with a layer of cartilage called the articulating cartilage.
41. **Extension** – Increasing the angle between two articulating bones.
42. **Fascia** – A sheath of fibrous connective tissue that surrounds the muscle and connects it to the muscle tendon.
43. **Fibrous capsule** – The outer layer of the articular capsule. Made up of dense irregular connective tissue (ligaments).
44. **Flaccid paralysis** – (hypotonia) muscles are loose due to insufficient contraction to maintain muscle tone. Most often caused by nervous system disorders.
45. **Flexion** – Decreases the angle between two articulating bones.
46. **Fracture hematoma** – Blood clot that forms where a bone breaks.
47. **Gliding** – The surface of one bone moves back and forth and from side to side over another bone.
48. **Gliding joint** – (arthrodial joint) Two flat surfaces that are capable of side to side or back and forth movement. Between carpals and tarsals.
49. **Gomphosis** – A cone shaped peg (i.e. tooth) that fits into a socket and is held there by ligaments.
50. **Graded response** – The use of a number of muscle cells, more cells for stronger contractions.
51. **Granulation tissue** – The tissue that replaces a blood clot in the repair of a wound.
52. **Haversian system** – System which distributes the nutrients to the osteocytes within the compact bone.
53. **Hematopoiesis** – Formation of red & white blood cells.

54. **Hinge joint** – (ginglymus) The convex surface of one bone fits into the concave surface of another bone. This type of joint only moves in one plane and is capable of flexion or extension. Elbow, knee.
55. **Hypertrophy** – As you use a muscle it increases in size.
56. **Interstitial growth** – Longitudinal growth of bones. Occurs at the epiphyseal plate. Cartilage grows ahead of ossification of the bone. Until puberty the cartilage grows at the same rate that ossification occurs. At puberty hormonal changes cause the ossification to occur faster than the new cartilage formation. This eventually causes the epiphyseal plate to be ossified, preventing further bone growth.
57. **Intramembranous ossification** – Mostly before born. Formation of bone directly within loose fibrous connective tissue. This bone forms directly within mesenchyme (i.e. embryonic connective tissue) without first forming cartilage. This type of ossification occurs in skull, mandibles and most flat bones.
58. **Insertion** – Where a tendon attaches a muscle to a moveable bone.
59. **Isometric** – Muscle contractions where the force of the muscle is constant but the muscle fibers cannot contract. Better for building muscle mass.
60. **Isotonic** – Muscle contractions where the force of the muscle is constant and the muscle fibers can fully contract. Better for cardiovascular system.
61. **Labile** – Cells that divide throughout life and can be repaired by regeneration. Epidermis.
62. **Lactic Acid**- Builds up when anaerobic metabolism occurs. Causes Oxygen Debt
63. **Lacuna** – Cavities within the lamellae where the osteocytes are located in the compact bone.
64. **Ligaments** – Hold bone to bone, some stretch.
65. **Light chain kinase** – An enzyme that catalyzes the addition of ATP to myosin heads
66. **Medullary** – The marrow cavity in the shaft of the bone.
67. **Metaphysis** – The place where the epiphysis meets the diaphysis (shaft)
68. **Multi-unit smooth muscle** – smooth muscle which lacks a pacemaker cell, receive signal from nerves.
69. **Myoglobin** – Protein in muscle cells which carry oxygen
70. **Myosin** – A protein fiber in muscle that has a myosin head which will bond to actin bonding sites when Ca^{++} is present.
71. **Neurogenic** – Muscle cells that receive their signal to initiate contractions from a nerve.

72. **Neurotransmitter** – A chemical that carries the nerve signal between two cells.
73. **Nexus** – protein channel connectors between smooth muscle cells. Nexuses allow the action potential to move from cell to cell.
74. **Nutrient artery** – The hole in the diaphysis through which veins and arteries enter the bone supplying it with blood.
75. **Origin** – Where a tendon attaches a muscle to a stationary bone.
76. **Ossification** – Precipitation of calcium phosphate ($Ca_{10}(PO_4)_6(OH)_2$) within the cartilage matrix. Makes bones hard and stone like.
77. **Osteoarthritis** – A degenerative disease that usually occurs in people over the age of 60. Cartilage at the ends of bones softens and disintegrates so bones rub against bones.
78. **Osteoblast** – Young bone cells that secrete collagens and cartilage needed to make the bone matrix. Develop into osteocytes.
79. **Osteoclast** – Use lysosomes to reabsorb bone and are important in bone remodeling.
80. **Osteocyte** – Mature bone cells that lay down and maintain bone.
81. **Osteoporosis** – Loss of bone volume due to loss of minerals (calcium phosphate).
82. **Osteoprogenitor cell** – undifferentiated cells that develop into osteoblasts
83. **Osteology** – The study of bones.
84. **Oxygen debt** – Build up of lactic acid which requires oxygen and energy to remove.
85. **Pacemaker cells** – cells in smooth muscle which reaches its action potential when they are stretched.
86. **Parathyroid hormone (PTH)** – released from the parathyroid glands when blood calcium levels are low. It increases breakdown of bone by increasing the number and activity of osteoclasts. It also increases calcium reabsorption from the urine and the formation of calcitriol (active form of vitamin “D”), increases absorption of calcium in the gut.
87. **Perimysium** – The part of the fascia that surrounds the fascicles (i.e. bundles of muscle fibers).
88. **Periosteum** – A layer of connective tissue that surrounds the outside of the bone. Has two layers. Outer layer is fibrous connective tissue, inner layer is osteoclasts and osteocytes.
89. **Peristalsis** – Smooth muscle contractions, very slowly starts at one end and moves to the other end.

90. **Permanent** – Cells that do not divide once the tissue is fully formed and must be repaired by replacement. Nerve and muscle tissue.
91. **Pivot joint** – A rounded or pointed surface articulates with a ring formed partly by another bone and partly by ligaments. This type of joint moves by rotation. Atlas rotates around the axis and ulna/radius are only pivot joints.
92. **Primary ossification** – Starts in the center of the diaphysis of long bones prior to birth.
93. **Primary union** – When the edges of a wound meet. The tissue is repaired by regeneration and usually does not result in a scar.
94. **Procallus** – Fibrocartilage grows through the break. A type of granulation tissue/repair tissue.
95. **Proprioceptors** – Sense the position of joints and send that information back to the brain.
96. **Red marrow** – Fills the spaces between the bone elements in spongy bone. Involved in hematopoiesis – the formation of blood (red and white blood cells). In shaft of bones of children.
97. **Red muscle** – Slow twitch muscle. More myoglobin than white muscle, smaller SR, better blood supply, more mitochondria.
98. **Regeneration** – Repair of tissue with cells of the same type as were previously there. Usually does not produce a scar.
99. **Replacement** – Repair of tissue with a different type of cells or tissue. Usually forms a scar.
100. **Resting potential** - -90mv The membrane potential of a muscle cell when it is resting.
101. **Reticular fibers** – Collagen fibers that are surrounded by glycoproteins. Smaller in diameter than normal collagen fibers and have many branches forming a net-like network. Form a support system for most soft organs.
102. **Rheumatoid arthritis** – The synovial membrane grows thicker which damages the cartilage on the ends of the bones. The joint fills with fibrous connective tissue which may become ossified preventing the joint from moving. Thought to be an autoimmune disease.
103. **Rigor mortis** – The contraction of muscle tissue due to the release of Ca ions into the cell body as the cell breakdown occurs.
104. **Rotation** – One bone rotates relative to another along its longitudinal axis.

105. **Saddle joint** – (sellaris) the articulating surface of one bone is saddle-shaped and the surface of the other bone is like the legs of a rider fitting over the saddle. Mandible and skull.
106. **Sarcomere** – A single contractile unit within a muscle cell. There are many sarcomere in a single muscle cell.
107. **Sarcolemma** – The plasma membrane (i.e. cell membrane) that surrounds a muscle cell.
108. **Sarcoplasm** – The cytoplasm of the muscle cell.
109. **Sarcoplasmic reticulum** – A special type of endoplasmic reticulum only found in muscle cells that stores calcium ions. It is these calcium ions that cause the muscle to contract. The action potential causes the sarcoplasmic reticulum to release calcium causing the muscle to contract.
110. **Scurvy** – A disease in which the body does not produce enough collagen in the connective tissue, which can cause the hair and teeth to fall out as well as other symptoms. Caused by a vitamin “C” deficiency in the diet.
111. **Secondary ossification** – Occurs after primary ossification, prior to birth until puberty.
112. **Secondary union** – When the edges of a wound do not meet. The tissue is repaired by replacement and a scar will be formed.
113. **Single-unit smooth muscle** – Smooth muscle with pacemaker cells, myogenic.
114. **Skeletal muscle** – Muscle attached to bones and used for movement. Striated, no intercalated disks, Neurogenic, multinucleate cells, very fast contractile speed.
115. **Smooth muscle** – Muscle that is found in gut, blood vessels, uterus, base of hairs, etc. Not striated, no intercalated disks, myogenic, single nucleate cells, very slow contraction speed.
116. **Spastic paralysis** – (hypertonia) Above normal muscle tone causes muscle to partially contract. Can be caused by a number of nervous system disorders.
117. **Spongy bone** – (cancellous bone), bone with lots of space between the groups of osteocytes. The spaces in spongy bone are filled with red bone marrow. The bony elements in lattice work of spongy bone are called trabeculae
118. **Sprain** – Ligaments are stretched/torn when the joint is temporarily dislocated.
119. **Stable** – Cells that don’t normally divide, but can divide after an injury and can be repaired by regeneration. Liver, spleen.
120. **Synarthroses** - Immoveable joints which lack a synovial cavity. (Sutures, Gomphosis, Sychondrosis).

121. **Synchondrosis** - A cartilage joint where the connecting material is hyaline cartilage.
122. **Syndesmosis** – A fibrous joint held together by ligaments in which there is some degree of movement. The distal end of the tibia/fibula.
123. **Synovial fluid** – The fluid in a synovial joint. Acts as a lubricant.
124. **Synovial joint** – Joints that have a synovial cavity.
125. **Synovial membrane** – The inner layer of the articular capsule. Holds the synovial fluid.
126. **Symphysis** – A cartilaginous joint in which the connecting material is a broad flat disk of fibrocartilage (pubic symphysis of the pelvis).
127. **Suture** – (Synarthroses Joints) A joint where a thin line of fibrous connective tissue holds the bones together.
128. **Tendons** – Collagen fibers that connect muscle to bones. No stretch.
129. **Tendinitis** – Inflammation of the tendons.
130. **Transverse tubules** – (T-tubules) Tunnel like infoldings of the sarcolemma that carry the contraction signal nearer to the sarcoplasmic reticulum.
131. **Tropomyosin** – Covers myosin head bonding sites on actin where Ca^{++} is not bonded to troponin; When Ca^{++} is bonded to troponin, tropomyosin changes shape exposing the myosin head bonding sites on actin allowing myosin heads to bond.
132. **Troponin** – Bonds Ca^{++} and causes troponin to change shape and uncover the myosin head bonding sites on actin.
133. **White muscle** – Fast twitch muscle. Has less myoglobin, fewer mitochondria, poorer blood supply, larger SR.
134. **Yellow marrow** – Fills the shaft of the bone as you age, mostly fat storage.