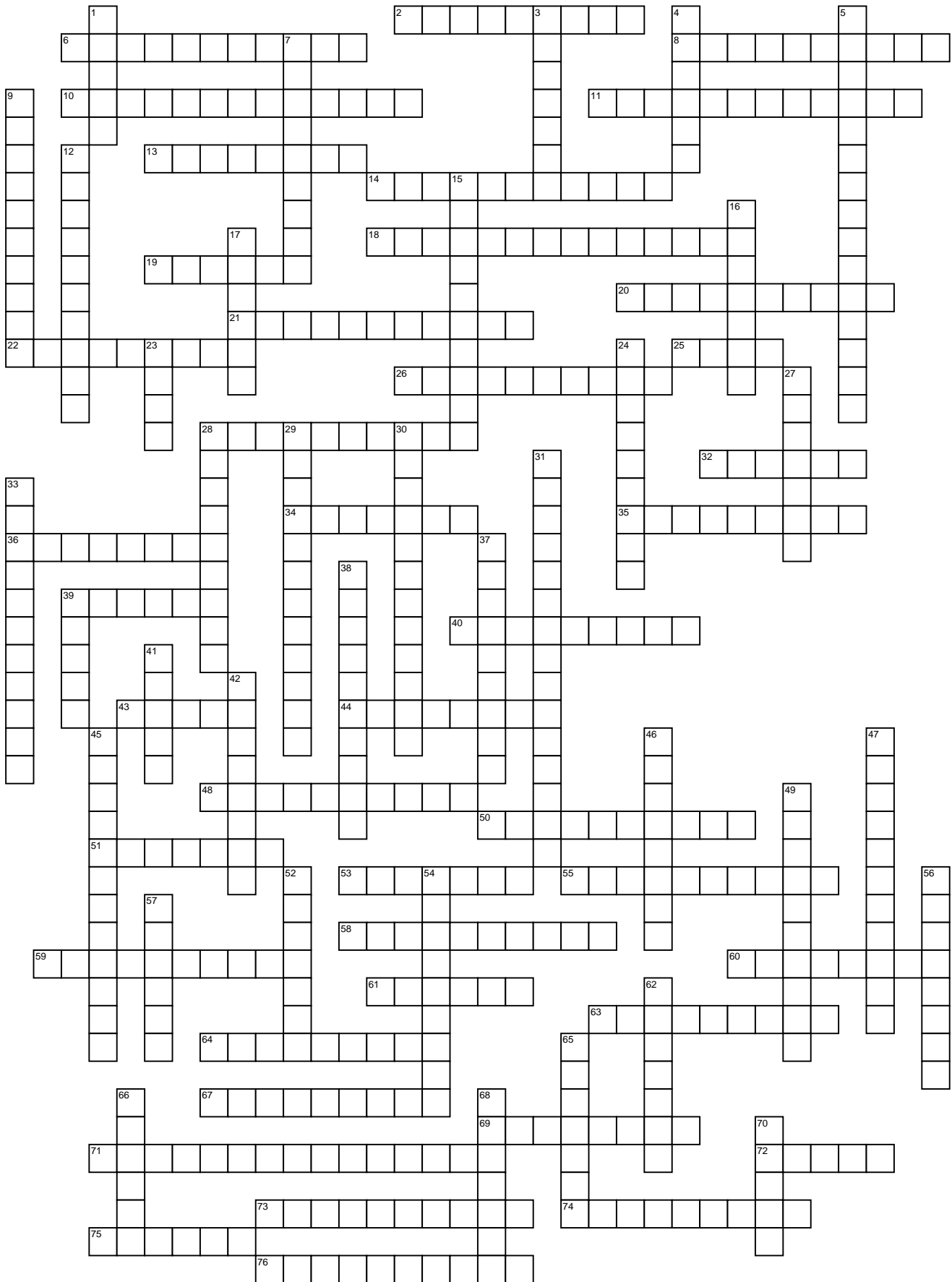


# Musculoskeletal System



**ACROSS**

- 2 \_\_\_\_\_ canals are a series of tubes around narrow channels formed by lamellae in compact bone.
- 6 The sarcoglycans are a family of five transmembrane proteins involved in the protein complex responsible for connecting the muscle fibre cytoskeleton to the extracellular matrix.
- 8 The \_\_\_\_\_ is the portion of a long bone between the epiphyses and the diaphysis.
- 10 \_\_\_\_\_ is a calcium-binding protein of the sarcoplasmic reticulum.
- 11 \_\_\_\_\_ ossification is the type of bone formation responsible for much of the bone growth in vertebrate skeletons, especially in long bones.
- 13 A \_\_\_\_\_ is a type of stem cell that exists in muscles which differentiate into satellite cells.
- 14 As part of the regulation of muscle contraction, in resting muscle fibres, the protein \_\_\_\_\_ is displaced from its normal binding groove by troponin.
- 18 White \_\_\_\_\_ consists of a mixture of white fibrous tissue and cartilaginous tissue in various proportions.
- 19 A transverse or T-\_\_\_\_\_ is a deep invagination of the plasma membrane found in skeletal and cardiac muscle cells which allows depolarization of the membrane to quickly penetrate to the interior of the cell.
- 20 In contrast to intrafusal fibers, \_\_\_\_\_ muscle fibers are the class of muscle fiber innervated by alpha motor neurons which generate tension, perform mechanical work and allow for movement by contracting.
- 21 \_\_\_\_\_s are the only cells found in cartilage.
- 22 \_\_\_\_\_s are cylindrical organelles, found within muscle cells, which are bundles of actomyosin filaments that run from one end of the cell to the other, attached to the cell surface membrane at each end.
- 25 A motor \_\_\_\_\_ is a single alpha-motor neuron and all of the corresponding muscle fibers it innervates.
- 26 The \_\_\_\_\_ plate, or growth plate, is the cartilage plate in the long bones of children and adolescents.
- 28 \_\_\_\_\_ is the muscular tissue of the heart.
- 32 A \_\_\_\_\_ is a small space containing an osteocyte in bone or chondrocyte in cartilage.
- 34 1 to 3 \_\_\_\_\_ bag fibers lie in the center of each intrafusal muscle fibre of a muscle spindle, which cause excitation of both the primary and secondary nerve fibres.
- 35 \_\_\_\_\_ cells are mononuclear progenitor cells found in mature muscle between the basal lamina and sarcolemma, which are able to differentiate and fuse to augment existing muscle fibres and to form new fibres.
- 36 Also known as compact bone, \_\_\_\_\_ bone is dense and forms the surface of bones.
- 39 \_\_\_\_\_ adherens is broad intercellular junction in the intercalated disk of cardiac muscle anchoring actin filaments.
- 40 The \_\_\_\_\_ is a thin layer of connective tissue which lines the surface of the bony tissue that forms the medullary cavity of long bones.
- 43 \_\_\_\_\_, also known as connectin, is a protein important in the contraction of striated muscle tissues, connecting the Z line to the M line in the sarcomere.
- 44 \_\_\_\_\_ is nitrogenous organic acid which naturally occurs in vertebrates and helps to supply energy to muscle and nerve cells.
- 48 The \_\_\_\_\_ is a thin layer of dense, irregular connective tissue membrane that covers the outer surface of a bone in all places except at joints.
- 50 \_\_\_\_\_ are microscopic canals between the various lacunae of ossified bone into which the radiating processes of the osteocytes project.
- 51 \_\_\_\_\_ is a protein mixture secreted by

osteoblasts which mineralizes and becomes bone.

- 53 \_\_\_\_\_ cartilage is a type of cartilage present in the outer ear, larynx, and epiglottis which contains fibers made of elastin.
- 55 The \_\_\_\_\_ is the cell membrane of a muscle cell.
- 58 \_\_\_\_\_ fibers are muscle fibers that comprise the muscle spindle.
- 59 \_\_\_\_\_ is a rod-shaped cytoplasmic protein, and a vital part of a protein complex that connects the cytoskeleton of a muscle fiber to the surrounding extracellular matrix through the cell membrane.
- 60 Excitation-contraction \_\_\_\_\_ is a term which describes the physiological process of converting an electrical stimulus to mechanical response.
- 61 \_\_\_\_\_s are a large family of motor proteins found in eukaryotic tissues which are responsible for actin-based motility.
- 63 The \_\_\_\_\_ is the main or mid section shaft of a long bone.
- 64 The a star-shaped \_\_\_\_\_ is the most abundant cell found in bone, derived from osteoblasts after they become trapped within the matrix they secrete.
- 67 \_\_\_\_\_ is a type of dense connective tissue composed of collagen fibers and/or elastin fibers which can supply smooth surfaces for the movement of articulating bones.
- 69 \_\_\_\_\_ muscle is a type of striated muscle, usually attached to the skeleton.
- 71 \_\_\_\_\_ ossification is the type of bone formation responsible for the development of flat bones, especially those found in the skull and clavicles.
- 72 A nuclear \_\_\_\_\_ fiber is a specialized sensory organ contained within a muscle, which, along with nuclear bag fibers, make up the muscle spindle responsible for the detection of changes in muscle length.
- 73 Bone \_\_\_\_\_ is the process by which osteoclasts break down bone and release the minerals, resulting in a transfer of calcium from bone fluid to the blood.
- 74 \_\_\_\_\_ is the name for a rounded end of a long bone.
- 75 A \_\_\_\_\_ or sinew is a tough band of fibrous connective tissue that connects muscle to bone and is built to withstand tension.
- 76 An \_\_\_\_\_ is a mononucleate cell that is responsible for bone formation.

**DOWN**

- 1 The Interstitial cell of \_\_\_\_\_ is a type of cell found in the gastrointestinal tract that serves as a pacemaker that triggers gut contraction.
- 3 \_\_\_\_\_'s fibers are a matrix of connective tissue consisting of bundles of strong collagenous fibres connecting periosteum to bone.
- 4 \_\_\_\_\_ muscle is a type of non-striated muscle, found within the bladder, abdominal cavity, the uterus, male and female reproductive tracts, the gastrointestinal tract and elsewhere.
- 5 The inorganic mineral \_\_\_\_\_ makes up seventy percent of bone.
- 7 The \_\_\_\_\_s are sub-sarcolemmal protein assemblies circumferentially aligned in register with the Z-disk of peripheral myofibrils.
- 9 The \_\_\_\_\_ is a layer of connective tissue that ensheathes a muscle fiber and is composed mostly from reticular fibers.
- 12 Also known as trabecular, or spongy bone, \_\_\_\_\_ bone fills the inner cavity of long bones. It has low density and strength, but very high surface area.
- 15 a \_\_\_\_\_ is a sheath of connective tissue which groups individual muscle fibers into bundles or fascicles.
- 16 A \_\_\_\_\_ contraction occurs when a motor

unit has been maximally stimulated by its motor neuron.

- 17 \_\_\_\_\_ is contractile tissue of the body and is derived from the mesodermal layer of embryonic germ cells.
- 23 \_\_\_\_\_s are rigid organs that form part of the endoskeleton of vertebrates, functioning to move, support, and protect the various organs of the body, produce red and white blood cells and store minerals.
- 24 \_\_\_\_\_ K is a protein with the ability to catabolize elastin, collagen, and gelatin which allows it to break down bone and cartilage.
- 27 Localized to the I-band of sarcomeres in skeletal muscle, \_\_\_\_\_ is a very large protein, binding as many as 200 actin monomers.
- 28 The \_\_\_\_\_ cavity is the central cavity of bone shafts where yellow marrow is stored.
- 29 A \_\_\_\_\_ is a cell originating from a mesenchymal stem cell which forms chondrocytes or cartilage cells.
- 30 An \_\_\_\_\_ disc is an undulating double membrane separating adjacent cells in cardiac muscle fibers.
- 31 \_\_\_\_\_ is a phosphorylated creatine molecule that is an important energy store in skeletal muscle.
- 33 Motor unit \_\_\_\_\_ is the progressive activation of a muscle by successive \_\_\_\_\_ of contractile units motor units to accomplish increasing gradations of contractile strength.
- 37 \_\_\_\_\_ receptors form a class of calcium channels which are the major cellular mediators of calcium induced calcium release in animal cells.
- 38 An \_\_\_\_\_ is a type of bone cell that removes bone tissue by removing the bone's mineralized matrix.
- 39 A muscle \_\_\_\_\_ is a single cell of a muscle.
- 41 A \_\_\_\_\_ is a histological structure formed by a T tubule with a sarcoplasmic reticulum cisterna on either side.
- 42 \_\_\_\_\_ is the point at which a tendon inserts into bone, where the collagen fibers are mineralized and integrated into bone tissue.
- 45 The \_\_\_\_\_ reticulum is a special type of smooth endoplasmic reticulum found in smooth and striated muscle.
- 46 A \_\_\_\_\_ is a bundle of skeletal muscle fibers surrounded by connective tissue.
- 47 A muscle \_\_\_\_\_ occurs when a muscle fiber generates tension through the action of actin and myosin cross-bridge cycling.
- 49 \_\_\_\_\_ (CaM) is a ubiquitous, calcium-binding protein that can bind to and regulate a multitude of different protein targets, thereby affecting many different cellular functions.
- 52 The muscle \_\_\_\_\_'s functions are to send proprioceptive information about the muscle to the central nervous system and to respond to muscle stretching.
- 54 A \_\_\_\_\_ is the basic unit of a muscle's cross-striated myofibril.
- 56 A \_\_\_\_\_ muscle doesn't need to receive impulses from a nerve to make it contract.
- 57 Bone \_\_\_\_\_ is the soft tissue found in the hollow interior of bones.
- 62 \_\_\_\_\_ muscle is a type of involuntary striated muscle found within the heart.
- 65 \_\_\_\_\_ cartilage consists of a slimy mass of a firm consistency, but of considerable elasticity and pearly bluish color, containing no nerves or blood vessels.
- 66 Creatine \_\_\_\_\_ catalyses the conversion of creatine to phosphocreatine.
- 68 \_\_\_\_\_ tissue forms the rigid part of the bone organs that make up the skeletal system.
- 70 \_\_\_\_\_ is the monomeric subunit of microfilaments, one of the three major components of the cytoskeleton, and of thin filaments which are part of the contractile apparatus in muscle cells.