CHAPTER 20

# Locomotion and Movement

## 20.2 Muscle

**1.** Calcium is important in skeletal muscle contraction because it
(a) binds to troponin to remove the masking of active sites on actin for myosin
(b) activates the myosin ATPase by binding to it
(c) detaches the myosin head from the actin filament
(d) prevents the formation of bonds between the myosin cross bridges and the actin filament. *(NEET 2018)*

**2.** Name the ion responsible for unmasking of active sites for myosin for cross-bridge activity during muscle contraction.
(a) Calcium (b) Magnesium
(c) Sodium (d) Potassium *(NEET-II 2016)*

**3.** Lack of relaxation between successive stimuli in sustained muscle contraction is known as
(a) tetanus (b) tonus
(c) spasm (d) fatigue. *(NEET-I 2016)*

**4.** Sliding filament theory can be best explained as
(a) actin and myosin filaments do not shorten but rather slide pass each other
(b) when myofilaments slide pass each other, myosin filaments shorten while actin filaments do not shorten
(c) when myofilaments slide pass each other actin filaments shorten while myosin filaments do not shorten
(d) actin and myosin filaments shorten and slide pass each other. *(2015 Cancelled)*

**5.** Stimulation of a muscle fibre by a motor neuron occurs at
(a) the neuro-muscular junction
(b) the transverse tubules
(c) the myofibril
(d) the sacroplasmic reticulum. *(2014)*

**6.** The H-zone in the skeletal muscle fibre is due to
(a) the central gap between actin filaments extending through myosin filaments in the A-band
(b) extension of myosin filaments in the central portion of the A-band
(c) the absence of myofibrils in the central portion of A-band
(d) the central gap between myosin filaments in the A-band. (*NEET 2013*)

**7.** During muscle contraction in humans, the
(a) sarcomere does not shorten
(b) A band remains same
(c) A, H and I bands shorten
(d) actin filaments shorten.
(*Karnataka NEET 2013*)

**8.** The type of muscle present in our
(a) heart is involuntary and unstriated smooth muscle
(b) intestine is striated and involuntary
(c) thigh is striated and voluntary
(d) upper arm is smooth muscle and fusiform in shape. *(2011)*

**9.** The contractile protein of skeletal muscle involving ATPase activity is
(a) troponin (b) tropomyosin
(c) myosin (d) $\alpha$-actinin. *(2006)*

**10.** Which statement is correct for muscle contraction?
(a) Length of H-zone decreases.
(b) Length of A-band remains constant.
(c) Length of I-band increases.
(d) Length of two Z-line increases. *(2001)*

**11.** What is sarcomere?
(a) Part between two H-line
(b) Part between two A-line
(c) Part between two I-band
(d) Part between two Z-line *(2001)*

**12.** Which of the following is the contractile protein of a muscle?
(a) Tropomyosin (b) Tubulin
(c) Myosin (d) All of these *(1998)*

**13.** The functional unit of contractile system in striated muscle is
(a) sarcomere (b) Z-band
(c) cross bridges (d) myofibril. *(1998)*

**14.** When a muscle bends one part upon the other, it is called
(a) abductor (b) regulator
(c) extremor (d) flexor. *(1996)*

## 20.3 Skeletal System

**15.** Match the following columns and select the correct option.

| | Column-I | | Column-II |
|---|---|---|---|
| (A) | Floating ribs | (i) | Located between second and seventh ribs |
| (B) | Acromion | (ii) | Head of the humerus |
| (C) | Scapula | (iii) | Clavicle |
| (D) | Glenoid cavity | (iv) | Do not connect with the sternum |

| | (A) | (B) | (C) | (D) |
|---|---|---|---|---|
| (a) | (ii) | (iv) | (i) | (iii) |
| (b) | (i) | (iii) | (ii) | (iv) |
| (c) | (iii) | (ii) | (iv) | (i) |
| (d) | (iv) | (iii) | (i) | (ii) |

*(NEET 2020)*

**16.** Select the correct option.
(a) There are seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs.
(b) $8^{th}$, $9^{th}$ and $10^{th}$ pairs of ribs articulate directly with the sternum.
(c) $11^{th}$ and $12^{th}$ pairs of ribs are connected to the sternum with the help of hyaline cartilage.
(d) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum. *(NEET 2019)*

**17.** Out of '*X*' pairs of ribs in humans only '*Y*' pairs are true ribs. Select the option that correctly represents values of *X* and *Y* and provides their explanation.
(a) $X = 12$, $Y = 5$ True ribs are attached dorsally to vertebral column and sternum on the two ends
(b) $X = 24$, $Y = 2$ The true ribs are dorsally attached to vertebral column but are free on ventral side
(c) $X = 24$, $Y = 12$ True ribs are dorsally attached to vertebral column but are free on ventral side
(d) $X = 12$, $Y = 7$ True ribs are attached dorsally to vertebral column and ventrally to the sternum
*(NEET 2017)*

**18.** Which of the following is not a function of the skeletal system?
(a) Production of body heat
(b) Locomotion
(c) Production of erythrocytes
(d) Storage of minerals *(2015)*

**19.** Glenoid cavity articulates
(a) clavicle with scapula
(b) humerus with scapula
(c) clavicle with acromion
(d) scapula with acromion. *(2015 Cancelled)*

**20.** Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair.

| | Pair of skeletal parts | Category |
|---|---|---|
| (a) | Sternum and ribs | Axial skeleton |
| (b) | Clavicle and glenoid cavity | Pelvic girdle |
| (c) | Humerus and ulna | Appendicular skeleton |
| (d) | Malleus and stapes | Ear ossicles |

*(2011)*

**21.** Which one of the following is the correct matching of three items and their grouping category?

| | Items | Group |
|---|---|---|
| (a) | Ilium, ischium, pubis | Coxal bones of pelvic girdle |
| (b) | Actin, myosin, rhodopsin | Muscle proteins |
| (c) | Cytosine, uracil, thiamine | Pyrimidines |
| (d) | Malleus, incus, cochlea | Ear ossicles |

*(2009)*

**22.** Which one of the following items gives its correct total number?
(a) Types of diabetes-3
(b) Cervical vertebrae in humans-8
(c) Floating ribs in humans-4
(d) Amino acids found in proteins-16 *(2007)*

**23.** In human body, which one of the following is anatomically correct?
(a) Collar bones - 3 pairs
(b) Salivary glands - 1 pair
(c) Cranial nerves - 10 pairs
(d) Floating ribs - 2 pairs *(2007)*

**24.** An acromion process is characteristically found in the
(a) pelvic girdle of mammals
(b) pectoral girdle of mammals
(c) skull of frog
(d) sperm of mammals. *(2005)*

**25.** What will happen if ligaments are torn?
(a) Bones will move freely at joint and no pain.
(b) Bone less movable at joint and pain.
(c) Bone will become unfixed.
(d) Bone will become fixed. *(2002)*

**26.** Sternum is connected to ribs by
(a) bony matter
(b) white fibrous cartilage
(c) hyaline cartilage
(d) areolar tissue. *(2000)*

**27.** Bone related with skull is
(a) coracoid (b) arytenoid
(c) pterygoid (d) atlas. *(2000)*

**28.** Total number of bones in each limb of a man is
(a) 24 (b) 30
(c) 14 (d) 21. *(1998)*

**29.** The number of floating ribs in the human body is
(a) 3 pairs (b) 2 pairs
(c) 6 pairs (d) 5 pairs. *(1995)*

**30.** Which of the following components is a part of the pectoral girdle?
(a) Sternum (b) Acetabulum
(c) Glenoid cavity (d) Ilium *(1994)*

**31.** The cervical vertebrae in human is
(a) same as in whale
(b) more than that in rabbit
(c) double than that of horse
(d) less than that in giraffe. *(1993)*

**32.** Long bones function in
(a) support
(b) support, erythrocyte and leucocyte synthesis
(c) support and erythrocyte synthesis
(d) erythrocyte formation. *(1993)*

**33.** Number of cervical vertebrae in camel is
(a) more than that of rabbit
(b) less than that of rabbit
(c) same as that of whale
(d) more than that of horse. *(1993)*

**34.** A deltoid ridge occurs in
(a) radius (b) ulna
(c) femur (d) humerus. *(1990)*

## 20.4 Joints

**35.** Match the following joints with the bones involved:

| | | | |
|---|---|---|---|
| (1) | Gliding joint | (i) | Between carpal and metacarpal of thumb |
| (2) | Hinge joint | (ii) | Between atlas and axis |
| (3) | Pivot joint | (iii) | Between the carpals |
| (4) | Saddle joint | (iv) | Between humerus and ulna. |

Select the correct option from the following:
(a) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)
(b) (1)-(iv), (2)-(i), (3)-(ii), (4)-(iii)
(c) (1)-(iv), (2)-(ii), (3)-(iii), (4)-(i)
(d) (1)-(i), (2)-(iii), (3)-(ii), (4)-(iv)
*(Odisha NEET 2019)*

**36.** The pivot joint between atlas and axis is a type of
(a) cartilaginous joint (b) synovial joint
(c) saddle joint (d) fibrous joint.
*(NEET 2017)*

**37.** Which of the following joints would allow no movements?
(a) Synovial joint
(b) Ball and socket joint
(c) Fibrous joint
(d) Cartilaginous joint *(2015)*

**38.** Select the correct matching of the type of the joint with the example in human skeletal system.

| | Type of joint | | Example |
|---|---|---|---|
| (a) | Cartilaginous joint | – | Between frontal and parietal |
| (b) | Pivot joint | – | Between third and fourth cervical vertebrae |
| (c) | Hinge joint | – | Between humerus and pectoral girdle |
| (d) | Gliding joint | – | Between carpals *(2014)* |

**39.** The characteristic and an example of a synovial joint in humans is

| | Characteristics | Examples |
|---|---|---|
| (a) | Fluid filled synovial cavity between two bones | Joint between atlas and axis |
| (b) | Lymph filled between two bones, limited movement | Gliding joint between carpals |
| (c) | Fluid cartilage between two bones, limited movements | Knee joint |
| (d) | Fluid filled between two joints, provides cushion | Skull bones |

*(NEET 2013)*

**40.** Which one of the following is the correct description of a certain part of a normal human skeleton?
(a) Parietal bone and the temporal bone of the skull are joined fibrous joint.
(b) First vertebra is axis which articulates with the occipital condyles.
(c) The $9^{th}$ and $10^{th}$ pairs of ribs are called the floating ribs.
(d) Glenoid cavity is a depression to which the thigh bone articulates. *(2010)*

**41.** Elbow joint is an example of
(a) hinge joint (b) gliding joint
(c) ball and socket joint (d) pivot joint. *(2009)*

**42.** Which of the following pairs is correctly matched?
(a) Hinge joint – Between vertebrae
(b) Gliding joint – Between zygapophyses of the successive vertebrae
(c) Cartilaginous joint – Skull bones
(d) Fibrous joint – Between phalanges
*(2005)*

**43.** What is the name of joint between ribs and sternum?
(a) Cartilaginous joint (b) Angular joint
(c) Gliding joint (d) Fibrous joint *(2000)*

**44.** The joint between atlas and axis is called
(a) angular joint (b) hinge joint
(c) pivot joint (d) saddle joint. *(1999)*

**45.** The type of joint between the human skull bones is called
(a) cartilaginous joint (b) hinge joint
(c) fibrous joint (d) synovial joint. *(1994)*

## 20.5 Disorders of Muscular and Skeletal System

**46.** Which of the following muscular disorders is inherited?
(a) Botulism (b) Tetany
(c) Muscular dystrophy (d) Myasthenia gravis
*(NEET 2019)*

**47.** Osteoporosis, an age-related disease of skeletal system, may occur due to
(a) immune disorder affecting neuromuscular junction leading to fatigue
(b) high concentration of $Ca^{++}$ and $Na^{+}$
(c) decreased level of estrogen
(d) accumulation of uric acid leading to inflammation of joints. *(NEET-II 2016)*

**48.** Select the correct statement with respect to locomotion in humans.
(a) The vertebral column has 10 thoracic vertebrae.
(b) The joint between adjacent vertebrae is a fibrous joint.
(c) A decreased level of progesterone causes osteoporosis in old people.
(d) Accumulation of uric acid crystals in joints causes their inflammation. (*NEET 2013*)

**49.** Select the correct statement with respect to disorders of muscles in humans.
(a) Failure of neuromuscular transmission in myasthenia gravis can prevent normal swallowing.
(b) Accumulation of urea and creatine in the joints causes their inflammation.
(c) An overdose of vitamin D causes osteoporosis.
(d) Rapid contractions of skeletal muscles cause muscle dystrophy. (*Karnataka NEET 2013*)

**50.** Select the correct statement regarding the specific disorder of muscular or skeletal system.
(a) Muscular dystrophy – Age related shortening of muscles
(b) Osteoporosis – Decrease in bone mass and higher chances of fractures with advancing age
(c) Myasthenia gravis – Autoimmune disorder which inhibits sliding of myosin filaments
(d) Gout – Inflammation of joints due to extra deposition of calcium *(2012)*

### ANSWER KEY

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (a) | **2.** | (a) | **3.** | (a) | **4.** | (a) | **5.** | (a) | **6.** | (a) | **7.** | (b) | **8.** | (c) | **9.** | (c) | **10.** | (a, b) |
| **11.** | (d) | **12.** | (c) | **13.** | (a) | **14.** | (d) | **15.** | (d) | **16.** | (a) | **17.** | (d) | **18.** | (a) | **19.** | (b) | **20.** | (b) |
| **21.** | (a) | **22.** | (c) | **23.** | (d) | **24.** | (b) | **25.** | (b) | **26.** | (c) | **27.** | (c) | **28.** | (b) | **29.** | (b) | **30.** | (c) |
| **31.** | (a) | **32.** | (b) | **33.** | (c) | **34.** | (d) | **35.** | (a) | **36.** | (b) | **37.** | (c) | **38.** | (d) | **39.** | (a) | **40.** | (a) |
| **41.** | (a) | **42.** | (b) | **43.** | (a) | **44.** | (c) | **45.** | (c) | **46.** | (c) | **47.** | (c) | **48.** | (d) | **49.** | (a) | **50.** | (b) |