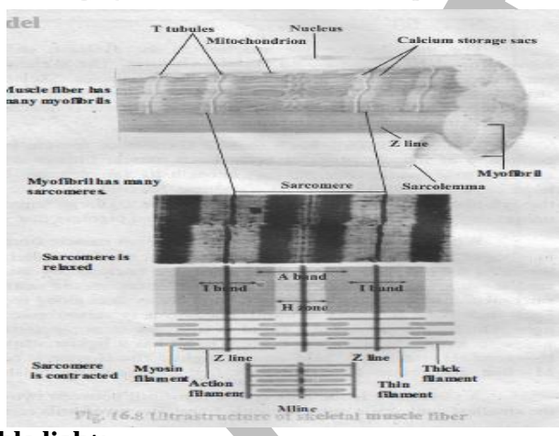
ENTRANCE TEST 2020
MDCAT
TEST # 3
BIOLOGY

Q.1 A long cylindrical cell with multiple oval nuclei is called:

A) Smooth muscle cell
B) Cardiac muscle cell
C) Skeletal muscle cell
D) Nerve cell

Explanation:

Each fibre is a long cylindrical cell with multiple oval nuclei arranged just beneath its sarcolemma.

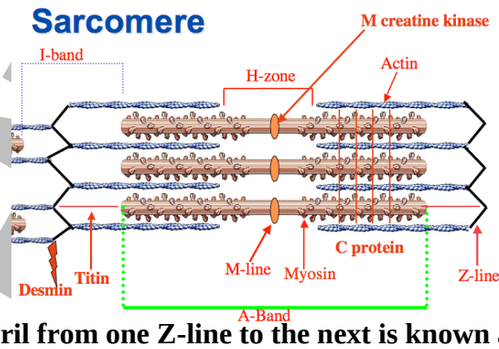


Q.2 It can polarize visible light:

A) A-band of sarcomere
C) H-band of sarcomere
B) I-band of sarcomere
D) M-line of sarcomere

Explanation:

I-band of sarcomere cannot polarize visible light.

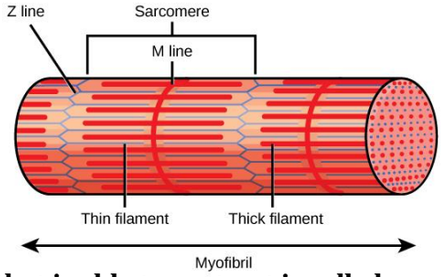


Q.3 The length of myofibril from one Z-line to the next is known as:

A) Sarcomere
C) Sarcoplasm
B) Sarcolemma
D) Plasma membrane

Explanation:

The length of myofibril from one Z-line to the next is known as sarcomere.



Q.4 The part of the muscle that is able to contract is called:

A) Origin
B) Belly
C) Insertion
D) Ligament

Explanation:
The part of the muscle that is able to contract is belly.

Q.5 Muscle fiber is considered as:
A) Muscle cell
B) Sarcomere
C) Muscle bundle
D) Myofibril

Explanation:
Each muscle consists of muscle bundles, which are further composed of muscle fibers of cells.

Q.6 Myofibril consists of many thread like structures called:
A) Actin filaments
B) Myosin filaments
C) Myofilaments
D) Intermediate filaments

Explanation:
Myofibril consists of many thread like structures called myofilaments.

Q.7 Sarcoplasmic reticulum are similar to:
A) RER
B) Microfilaments
C) Golgi bodies
D) SER

Explanation:
The nerve impulse is carried through the T-tubule to the adjacent sarcoplasmic reticulum (SR). the calcium gates of the ST open releasing calcium into the cytosol, thus binding calcium ion to troponin molecules of the thin filament

Q.8 Where can we find H-zone in the figure of the fine structure of skeletal muscles myofibril?
A) In the mid of A-band
B) In I-band
C) Beside the Z-lines
D) Along the I-band

Explanation:

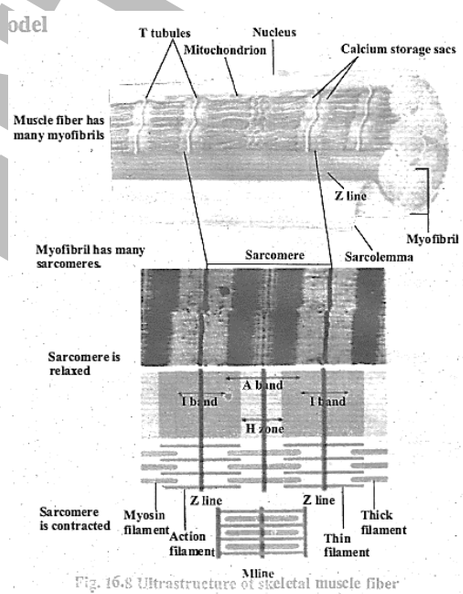


Fig. 16.8 Ultrastructure of skeletal muscle fiber

Q.9 There is a regular alteration of light and dark bands called the _____ and _____ respectively:
A) A-band, I-band
B) I-band, A-band
C) Z-line, I-band
D) M-line, A-band

Explanation:

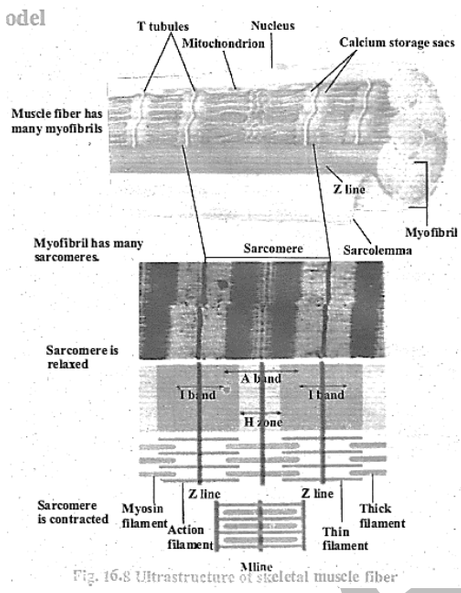


Fig. 16.8 Ultrastructure of skeletal muscle fiber

Q.10 The diameter of skeletal muscle fibre ranges from:

A) 5 – 10 µm
C) 10 – 100 µm
B) 1 – 2 µm
D) 50 – 100 nm

Explanation:

The diameter of skeletal muscle fibres is in ranges of 10 – 100 µm.

Q.11 The _____ filaments extends across the I-band and partly in A band:

A) Thick
C) Thin
B) Myo
D) Troponin

Explanation:

The thin filaments extends across the I-band and partly in A-band.

Q.12 The A bands have mid-section called:

A) H zone
C) Z zone
B) M zone
D) A zone

Explanation:

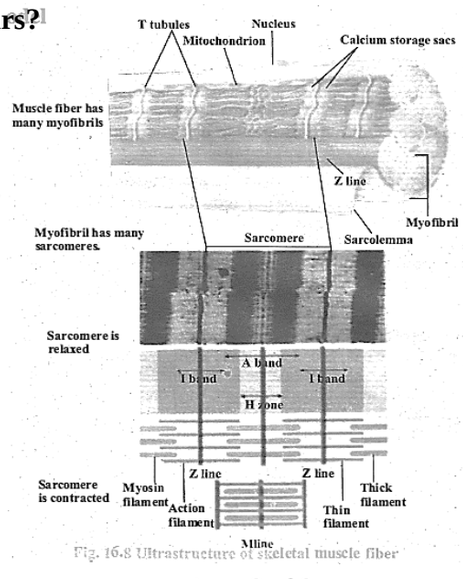
Each A band has a lighter stripe in its mid-section called H-zone (H stands for "hele" mean bright). The H-zone is bisected by dark line called M - line. The I bands have mid line called Z-line (Z for zwishen means between).

Q.13 During contraction phase, which part of sarcomere disappears?

A) I band
C) M-line
B) A band
D) H-band

Explanation:

During contraction H-band part of sarcomere disappears.



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Q.14 These are huge cells:

A) Skeletal muscle fibres C) Involuntary muscle fibres
B) Smooth muscle fibres D) Cardiac muscle fibres

Explanation:
Skeletal muscle fibres are huge cells.

Q.15 Term "Hele" means:

A) Dark C) Compact
B) Hollow **D) Bright**

Explanation:
H stands for "Hele" means bright.

Q.16 _____ muscles are also called striped or striated muscles because they show alternate light and dark bands:

A) Smooth C) Cardiac
B) Skeletal D) Circular

Explanation:
Skeletal muscles are also called striped or striated muscles because they show alternate light and dark bands.

Q.17 At rest, _____ of the lactic acid is broken aerobically:

A) 4/5 C) 2/5
B) 3/5 **D) 1/5**

Explanation:
At rest, 1/5 of the lactic acid is broken aerobically and its energy is used to change the remaining 4/5 lactic acid into glucose.

Q.18 The protein that is complex of three polypeptide chains is called:

A) Tropomyosin C) Myosin
B) Actin **D) Troponin**

Explanation:
The protein that is complex of three polypeptide chains is called troponin.

Q.19 Troponin binds to all of the following, EXCEPT:

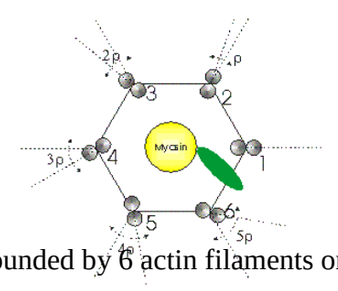
A) Ca^{+2} ions C) Tropomyosin
B) Actin **D) Myosin**

Explanation:
Troponin cannot bind with myosin.

Q.20 Each myosin filament is surrounded by _____ actin filaments on each end:

A) 5 C) 10
B) 6 D) 12

Explanation



Each myosin filament is surrounded by 6 actin filaments on each end.

Q.21 These have multi-nucleated cells with regular striations:

A) Cardiac muscle
C) Skeletal muscle
B) Smooth muscle
D) Elastic cartilage

Explanation:

Skeletal muscle cells have multi-nucleated cells with regular striations.

Q.22 Muscle cells contain numerous filaments of special protein

A) Troponin and myoglobin
C) Hemoglobin and actin
B) Actin and myosin
D) Myoglobin and myosin

Explanation:

Muscle cells contain numerous filaments of special protein actin and myosin.

Q.23 The thin filaments are about _____ nm in diameter:

A) 7 – 8
C) 15 – 20
B) 10 – 12
D) 20 – 30

Explanation:

The thin filaments are about 7 – 8 nm in diameter.

Q.24 According to sliding filament theory, when muscle fibers are stimulated by nervous system, which of the following changes occur?

A) I-bands shorten
C) Z-lines move farther apart
B) H-zone becomes more visible
D) A-bands shorten

Explanation:

According to this theory, the thin filaments slide past the thick one's so that actin and myosin filaments overlap to greater degree. Thus, the Z-line is brought close together, I-band shortens, the H zone disappears.

Q.25 Rigor mortis occurs due to the:

A) Deficiency of ATP
C) Deficiency of oxygen
B) Deficiency of calcium
D) Deficiency of water

Explanation:

After death, the amount of ATP in the body falls. Under these circumstances the bridges cannot be broken and so they remain firmly bound. This results in the body becoming stiff, a condition known as rigor mortis.

Q.26 An action potential in a muscle fibre causes the release of _____ ions from sarcoplasmic reticulum:

A) Potassium
C) Calcium
B) Sodium
D) Magnesium

Explanation:

An action potential in a muscle fibre causes the release of calcium ions from sarcoplasmic reticulum.

Q.27 The thousands of T-tubules of each muscle cell are collectively called:

A) Triad system
C) Muscle system
B) T-system
D) Sarcoplasmic reticulum system

Explanation:

The thousands of T-tubules of each muscle cell are collectively called T-system.

Q.28 Supply of ATP is maintained by the aerobic breakdown of glucose in muscle cell, which come from stored _____ in the cell:

A) Myoglobin
C) Glycogen
B) Creatine phosphate
D) Lactic acid

Explanation:

Supply of ATP is maintained by the aerobic breakdown of glucose in muscle cell, which come from stored glycogen in the cell.

Q.29 At rest, 4/5 lactic acid change into:

A) Glucose
C) CO_2 and H_2O
B) Glycogen
D) Myoglobin

Explanation:

At rest 4/5 lactic acid change into glucose.

Q.30 Pick the secondary source of energy in skeletal muscles:

A) Stored glycogen
C) Creatine phosphate
B) Stored glucose
D) Stored ATPs

Explanation:

Creatine is the secondary source of energy in skeletal muscles.

Q.31 Muscle fatigue results from relative deficit of:

A) Glucose
C) ATP
B) Glycogen
D) Calcium

Explanation:

Muscle fatigue results from relative deficit of ATP.

Q.32 Majority of muscles of our body are:

A) Smooth type
C) Cardiac type
B) Skeletal type
D) Circular type

Explanation:

Majority of muscles tissue in your body are skeletal type.

Q.33 Thin myofilament consists of:

A) Actin, tropomyosin and troponin
C) Actin, myoglobin and troponin
B) Actin, myosin and troponin
D) Actin, tropomyosin and hemoglobin

Explanation:

Thin filaments are 7 - 8 nm thick and are composed chiefly of actin molecule. The actin molecules are arranged in two chain which twist around each other like a twisted double strand of pearls.

Q.34 During muscle contraction in humans, the:

A) Sarcomere does not shorten
C) A, H and I bands shorten
B) A band remains same
D) Actin filaments shorten

Explanation:

According to sliding-filament theory of muscle contraction, the actin and myosin filaments slide past each other with the help of cross-bridge to reduce the length of the sarcomeres. The smallest unit of muscle contraction is a sarcomere (which is delineated by Z-lines). As a muscle contracts, the Z lines come closer together (shortening sarcomere), the width of the I bands decreases, the width of the H zones decreases, but there is no change in the width of the A band. During relaxation, cross-bridges disappear and actin filaments slide back from A-

bands, the width of the I bands and H zones increases, but there is still no change in the width of the A band.

Q.35 The functional unit of contractile system in striated muscle is:

A) Sarcomere C) Cross bridge
B) Z-band D) Myofibril

Explanation:

A striated muscle fibre is bounded by sarcolemma. It shows alternating dark and light cross bands, the striations. Dark band is called A band which has at its middle a light zone termed H zone. Light band is known as I band which is crossed through its centre by a dark membrane called Z line. ffe part of the muscle fibre between two successive Z lines functions as a contractile unit called sarcomere.

Q.36 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

Explanation:

Cardiac muscles are found in the wall of the heart. It is involuntary and slightly striated. Smooth muscles are found in gastrointestinal tract. These are non-striated and involuntary. Striated (or skeletal) muscles are found in the limbs and body walls. These muscles are voluntary (under the control of animal's will) and show dark and light bands thus are striated.

Q.37 It contains only thin filaments:

A) I-band C) A-band
B) H-zone D) Z-line

Explanation:

I bands contains only thin filaments.

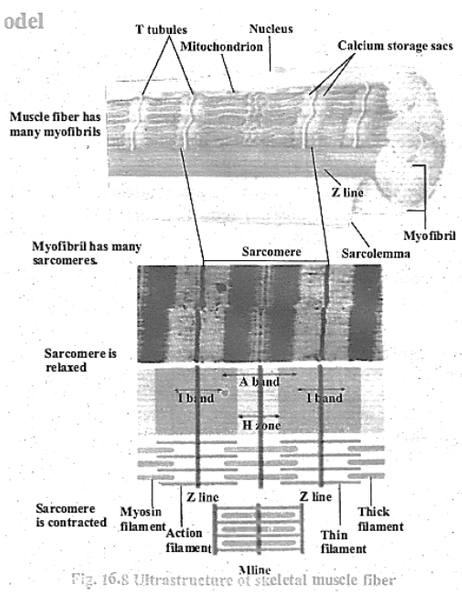


Fig. 16.8 Ultrastructure of skeletal muscle fiber

Q.38 Muscle hemoglobin is present in:

A) Sarcoplasmic reticulum C) Sarcomere
B) Sarcoplasm D) Cytoplasm

Explanation:

Muscle hemoglobin is present in sarcoplasm. Sarcoplasm of the muscle fibre is similar to the cytoplasm of other cells but it contains usually large amount of stored glycogen and unique oxygen bonding protein myoglobin, a red pigment that stores oxygen

Q.39 Thick filament of myofibril contains:

A) Actin **C) Myosin**

B) Troponin
D) Tropomyosin

Explanation:
Thick filament of myofibril contains myosin.

Q.40 The degree of contraction depends upon the _____ that participate in contraction:
A) Number of fibers
C) Number of muscle bundles
B) Size of fibers
D) Length of fibers

Explanation:
The degree of contraction depends upon the number of fibers that participate in contraction.

Q.41 Each muscle consists of:
A) Muscle fibers
C) Myofibrils
B) Muscle bundles
D) Myofilaments

Explanation:
Each muscle consists of muscle bundles.

Q.42 All the muscle fibres innervated by a single:
A) Inter neuron
C) Sensory neuron
B) Relay neuron
D) Motor neuron

Explanation:
All the muscle fibres innervated by a single muscle neuron are a "motor unit" and contract simultaneously in response to the action potential fired by the motor neurons

Q.43 Each dark band is called:
A) I-band
C) H-zone
B) A-band
D) M-line

Explanation:
Each dark band is called A band.

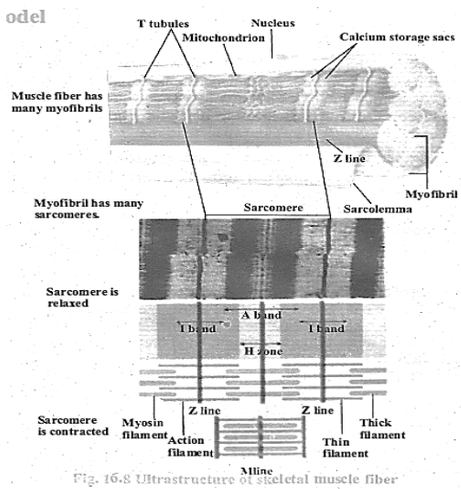


Fig. 16.8 Ultrastructure of skeletal muscle fiber

Q.44 The I-bands have mid line is called:
A) H-zone
C) Z-line
B) M-line
D) I-band

Explanation:
The I-bands have mid line is called Z line.

Q.45 Thin filaments of muscle contain _____ chains of actin molecules:
A) Four
C) Two
B) One
D) Three

Explanation:
Thin filaments of muscle contain two chains of actin molecules.

Q.46 There are _____ muscles in human body, most of which occur in pairs:

A) 100
C) 650
B) 550
D) 700

Explanation:

There are 650 muscles in human body, most of which occur in pairs.

Q.47 When muscle is at rest _____ covers the sites on the actin chain?

A) Myosin
C) Troponin
B) Tropomyosin
D) Myoglobin

Explanation:

When muscle is at rest tropomyosin covers the sites on the actin chain.

Q.48 Which statement is correct for muscle contraction?

A) Myosin filament contracts
C) Tropomyosin filament contracts
B) Actin filament contracts
D) No filament contracts

Explanation:

In contraction, the laterally projecting heads (cross bridges) of the thick myosin myofilaments come in contact with the thin actin myofilaments and rotate on them. This pulls the thin myofilaments toward the middle of the sarcomere past the thick myofilaments. The Z lines come closer together and the sarcomere becomes shorter. Length of the A band remains constant. Myofilaments stay the same length. Free ends of actin myofilaments move closer to the centre of the sarcomere, bringing Z lines closer together. I bands shorten and H zone narrows. A similar action in all the sarcomeres results in shortening of the entire myofibril, and thereby of the whole fibre and the whole muscle.

Q.49 Pick up the basic unit of muscle:

A) Muscle fibers
C) Myofibrils
B) Muscle bundles
D) Myofilaments

Explanation:

Muscle fibers are the basic unit of muscle.

Q.50 A mechanoenzyme protein that, in the form of thick filaments, interacts with actin to bring about the contraction of muscle cells called:

A) Troponin
C) Myosin
B) Actin
D) Myoglobin

Explanation:

A mechanoenzyme protein that, in the form of thick filaments, interacts with actin to bring about the contraction of muscle cells called myosin.