



1) Which cytoskeleton is associated with the adherent junction?

Actin filament

2) Which of the following cytoskeletal elements is important for the nucleus?

Intermediate filaments

3) Which of the following answers is TRUE? Amino-oxidase and catalase are characteristic enzymes for:

Peroxisomes

4) The protein clathrin is involved in all of the following EXCEPT:

Protein synthesis

5) What type of cell junction is the desmosome (*binding-body*):

Cell-cell

6) Which cytoskeleton is associated with the desmosome:

Intermediate filament

7) Which of the following originate(s) from the paraxial mesoderm?

Dermis

8) The mesoderm is generated by:

Epiblast

9) How does the female reproductive tract assist sperm migration?

B. + C. (C. by a chemical secreted by the egg; B. by uterine contractions during orgasm and strands of cervical mucus)

10) From which germ layer originates the adenohypophysis (anterior pituitary)?

Surface Ectoderm

11) Which cells are generated by the secondary spermatocytes?

early spermatids

12) From the 3rd month, the hemopoiesis is:

Extravasal

13) According to the shape of the secretory portion of the exocrine glands, they are classified as:

Acinar

14) In granulocytopoiesis, which cell type is the next developmental stage after "myeloblast" stage?

Promyelocyte

15) The cartilage tissue subtypes are:

Hyaline, elastic, fibrous



16) Which of the following does NOT belong to the formed elements of the blood?

Fibrinogen

17) Which component of the axon may contain Nissl's granulations?

The axonal hillock

18) Which of the following connective tissue cells modulates the allergic reactions?

Eosinophilic leucocyte

19) When does implantation after fertilization end?

13-14 days

20) On which developmental day is the closure of the posterior neuropore of the neural tube?

Day 27

21) Which of the following phases of the menstrual cycle is under progesterone control?

Secretory phase

22) A sperm sample is considered to have normal morphology when:

If 14% or more of the observed sperm is normal

23) Which of the answers regarding the stratified epithelium is TRUE?

None of the answers are true

24) What is the shape of the nucleus of a typical cardiomyocyte?

Oval

25) The average lifetime of erythrocytes in the circulatory system is:

120 days

26) The bony lamellae of compact bone are organized into lamellar systems.

Which of the following is NOT one of them?

Lamellae in the interterritorial matrix

27) Which of the following is typical for inhibitory synapses?

Both pre- and postsynaptic membranes are with similar thickness

28) From which embryonic layer originates the smooth muscle tissue?

Mesenchyme (type of loosely organized embryonic connective tissue of undifferentiated cells)

29) Which of the following statements IS NOT true about the platelets:

They contain hemoglobin

30) Match the germ layers and their respective tissue derivatives:

Paraxial mesoderm => **Dermis of skin**



Endoderm => **Tracheal epithelium**

Intermediate mesoderm => **Urogenital epithelium**

Surface ectoderm => **Epidermis**

Lateral mesoderm => **Pleura, pericardium and peritoneum**

(31) What type of cell junction is the adherent junction:

Cell-cell

(32) All of the following answers are true EXCEPT: Microtubules can be localized:

In microvilli

(33) All listed organelles are bound by biomembranes, EXCEPT:

Ribosomes

(34) Which of the following proteins is associated with plasmalemmal (plasma membrane) stability:

Spectrin

(35) Which of the following answers is TRUE? A major function of the rough ER is: **Protein synthesis for transmembrane proteins, plasmalemma and golgi complex membranes, lysosomes and secretory granules. Glycolysation to form glycoproteins**

(36) All of the following answers are true EXCEPT: Microtubules can be localized:

Microvilli

(37) What type of cell junction is the focal adhesion:

Cell-matrix

(38) Match each of the listed tissues to the structure from the drop-down menu, which is characteristic for the corresponding tissue type:

Covering epithelium => **Mesothelium**

Cardiac muscle tissue => **Myocardium**

Nerve tissue => **Synapse**

Glandular Epithelium => **Islet of Langerhans**

Bone tissue => **Osteon**

(39) The mesenchyme is an embryonic:

Connective tissue

(40) Chondrocytes receive nutrients via:

Diffusion through the matrix of the cartilage

(41) Which of the answers regarding the stratified epithelium is TRUE?

None of the answers are true



(42) Which statement about the perichondrium is NOT true?

Fibrocartilage is surrounded by well-defined perichondrium

(43) What are the main types of lymphocytes?

NK-Cells, T-Lymphocytes, B-Lymphocytes

(44) Ovarian stimulation as part of an IVF procedure is realized via:

Injection of gonadotropins

(45) Which of the statements regarding the types of spermatogonia is NOT true?

Type C – stem cell generating Sertoli cells

(46) Which of the zona pellucida proteins acts as a receptor for spermatozoa binding?

ZP3

(47) The notochord is under which structure?

The neural tube

(48) In the beginning of the 3rd week the paraxial mesoderm differentiates into segments known as:

(49) Which of the listed proteins does NOT interact with actin filament:

Kinesis

(50) What type of cell junction is the hemidesmosome?

Cell-matrix

(51) Which of the following answers is TRUE? The brush border of the enterocytes is the light microscopical equivalent of:

Microvilli

(52) Which one of the following statements is NOT true regarding the elastic connective tissue?

It is in especially large quantities in cicatrices and celloids

(53) The Meissner's corpuscles respond to:

Light touch

(54) Which of the following connective tissue cells has antigen-presenting properties?

Macrophage

(55) What is the shape of the nucleus of a neutrophilic myelocyte?

Oval

(56) What is the shape of the nucleus of a typical cardiomyocyte?

Oval



(57) The process of metaplasia is:

[REDACTED]

(58) Match each of the listed tissues and the characteristic location of this tissue:

1) Dense irregular connective tissue => [REDACTED]

2) Elastic connective tissue => [REDACTED]

3) Bone tissue => [REDACTED]

4) Reticular connective tissue => [REDACTED]

5) Mucous connective tissue => [REDACTED]

(59) The second meiotic division during oogenesis begins:

[REDACTED]

(60) The number of somites at the end of the 5th week of development is:

[REDACTED]

(61) The second meiotic division of the female gametes is complete at:

[REDACTED]

(62) At the eighth day of development the hypoblast consists of:

[REDACTED]

(63) The amniotic cavity is formed by cells of the:

[REDACTED]

(64) Which one of the following is a correct statement concerning Haversian systems (osteons)?

[REDACTED]

(65) According to the shape of the secretory portion of the exocrine glands, they are classified as:

[REDACTED]

(66) Neurons with typical pyramid shape soma are the:

[REDACTED]

(67) Skeletal and cardiac muscle tissue originate from:
Mesoblast

(68) As a source of energy erythrocytes use:

[REDACTED]



(69) Which type of cartilage tissue forms the template for the endochondral bone formation?

Hyaline

(70) Which cells can return to the blood from the tissues through diapedesis?

Lymphocytes

(71) Where else in the cell are localized the intermediate filaments, except in the cytosol?

Nucleus

(72) The basic units of chromatin are called:

Nucleosomes

(73) Approximately how long after fertilization occurs the first cleavage of the zygote?

30 hours

(74) From which component of the blastocyst can be isolated stem cells capable of organ regeneration in humans?

Embryoblast

(75) What is the name of the outer layer of the blastocyst?

Trophoblast

(76) Primary villi result from the proliferation of:

Cytotrophoblast

(77) Gastrulation begins with formation of:

Primitive streak

(78) Which pharyngeal arch contributes to most of middle ear ossicles?

Second

(79) Which layer is in contact with the cytотrophoblast after the formation of the extraembryonic cavity?

Extraembryonic somatopleuric mesoderm

(80) The amniotic and yolk sac cavities are temporarily connected by:

The neureenteric canal

(81) The primitive endothelial cells are formed by:

Cells lining the yolk sac

(82) Which cell junction allows the easiest passage of molecules from cell to cell:

Gap junction



(83) All of the following statements regarding hematoxylin& eosin (H&E) stain are true EXCEPT:

The basophilic structures are red in color

(84) Which of the following organelles is NOT membrane-bound:

Cytoskeleton

(85) The transport from/to the nucleus takes place via:

Nuclear pore complexes

(86) Down syndrome is an example of:

autosomal trisomy

(87) How long after ejaculation is the maximum fertile time for most sperm?

48 hours

(88) Which of the following statements IS TRUE?

Chorionic villi form the fetal part of the placenta

(89) Match the listed morphological characteristics to the corresponding differentiated cells from the drop-down menu:

High number of nuclei => **Osteoclasts**

Prominent RER => **Plasma cells**

Simple squamous => **Endothelial cells**

Derive from monocytes => **Macrophages**

Contain myofilaments => **Muscle cells**

(90) Giannuzzi demilunes are typical for:

Mixed acini

(91) Which of the following structures is present in electrical synapses?

Connexons

(92) The main type of collagen in the fibrous cartilage is:

Type 1

(93) Match the terms from the left column to the corresponding definition from the drop list:

Axon terminal => **secretes neurotransmitters**

Neuroglia => **specialized supporting cells in the CNS**

Nissl bodies => **rough endoplasmic reticulum in neurons**

(94) The straited (skeletal) muscle tissue has:

None of the answers in correct

(95) The sarcomere is the part of the myofibril between:

The two Z-discs



(96) Which term does not belong to the others?

Brain

(97) Which type of neuroglial cells provide myelin in the central nervous system?

Oligodendrocytes

(98) Which statement is FALSE?

The smooth muscle tissue is involved in building the capillary wall

(99) Troponin is a complex of:

3 polypeptides

(100) A neuron with many nerve fibers arising from its cell body and carrying impulses away from the brain would be classified as:

Multipolar and motor

(101) Branched nerve fibers that convey local potential changes toward a cell body of a neuron are called:

(102) The gaps between the myelin sheath fragments along an axon are called:
Nodes of Ranvier

(103) Structures that form synapses with muscles are:

(104) Match the terms from the left column to the corresponding definitions from the dropdown list:

Receptive region of a neuron =>

Oligodendrocytes =>

Satellite cells =>

(105) The prophase of the first meiotic division is characterized by the following phases:

(106) Match the corresponding statements:

Folliculogenesis => **Oogenesis**

Spermatogenesis => **Spermatogonia**

Testosterone => **Leydig cells**

(107) The spermatozoa consist of:

Head and tail (flagellum)

(108) Match the effector nerve endings to their target from the drop list:

Motor nerve endings =>

Secretory nerve endings =>

Neuromuscular spindle =>



- (109) Which statement regarding the Schmidt-Lanterman incisures in myelin sheath is NOT correct:
- (110) What does the neuromuscular spindle, build by intrafusal muscular fibers, represent?
- (111) The speed of impulse conduction along unmyelinated nerve fibers is:
- (112) According to their sensory modality, the receptor nerve endings could be divided into:
- (113) Unmyelinated nerve fibers are:
- (114) Nodes of the Ranvier are interrupted by:
- (115) Which condition is caused by genetic abnormalities during the process of gastrulation:
caudal dysgenesis
- (116) The axoneme is presented by:
9+2 arranged parallel microtubules
- (117) The spermiation is a process of releasing the spermatozoa from:
Sertoli cells
- (118) Which layer of the trophoblast secretes hydrolytic enzymes to invade the endometrium:
cytotrophoblast
- (119) Match the organ on the left to the corresponding process that occurs in it:
- Testis => **spermatogenesis**
- Epididymis => **maturing**
- Ductus deferens => **transport of mature sperm cells**
- (120) The Leydig cells are found in:
seminiferous tubules
- (121) The process of transformation of spermatogonia in mature spermatozoa is called: **Spermatogenesis**
- (122) Match the terms on the left with the appropriate definitions from the drop list: Corona radiata => **contains granulosa cells which remain attached to the oocyte after (...)**
- Zona pellucida => **a shell (layer) of glycoproteins on the surface of the oocyte**
- Corpus albicans => **A mass of fibrotic scar tissue, forms after the (...)**



(123) Spermatogenesis includes:

Golgi phase, acrosome phase and maturation phase.

(124) The axoneme is formed by: The distal centriole

(125) An average quantity of sperm (ejaculate) is:

none of the answers is correct (correct is up to 5 ml)

(126) The blood vessels of which structure form the blood vessels of the umbilical cord?

Tertiary villi

(127) How many veins does the umbilical cord contain?

One

(128) Which of the structures is of endodermal origin?

(129) Which layer does NOT participate in the formation of chorion?

(130) Approx. on which day does the heart begin to beat?

Day 22

(131) How many layers does the trophoblast contain at the time of implantation?

2 layers

(132) The hemidesmosomes are situated in:

The basal area of epithelial cells

(133) Which are the different types of glandular epithelium:

Endocrine and exocrine

(134) Heparin is synthesized by:

basophils and mast cells (in the liver)

(135) Where is the secretory compound situated in the ENDOCRINE cells?

(136) The demilunes of Giannuzzi consists of:

(137) Which statement regarding the ENDOCRINE glands is correct?

(138) What types are the glands according to the number of cells which build them:



(139) The intraepithelial glands are:

Exocrine glands

(140) Which of the following statements about the stratified squamous keratinizing epithelium is NOT true?

It has small openings in the basal lamina so that blood vessel can pass through it.

(141) Match the different types of secretion from the glands on the left with their corresponding answer:

- 1) Merocrine type of secretion =>
- 2) Apocrine type of secretion =>
- 3) Holocrine type of secretion =>

(142) Which one of the following is NOT present in the squamous stratified nonkeratinized epithelium:

(143) Finish the sentences with the corresponding statement from the drop-down list:

The transitional epithelium is found only in => **urinary system**

The cells have adaptations which give them the ability to => **stretch if needed**

The outermost cell layer => **has cells with a dome shape**

(144) The stratified cuboidal epithelium is found in:

the bigger ducts of the exocrine glands

(145) Which of the following cells are with haploid chromosome set?

Spermatozoids

(146) The attaching and adhesive junctions are known as:

(147) Heat production is a function of:

brown adipose tissue

(148) Match the correct answer:

Down syndrome => **Trisomy 21**

Klinefelter syndrome => **XXY syndrome in males**

Turner syndrome => **Missing X chromosome in females**

(149) Which of the following structures are NOT cell inclusions?

Centrioles (non-membranous)

(150) Which is an example of tight junctions?

Zonula occludens



(151) Which of the following pigments belongs to the group of iron pigments?

Hemoglobin (also: hemosiderin and myoglobin)

(152) Melanin is a polymer of oxidation products of:

Tyrosine

(153) A centrosome is made of:

A pair of centrioles

(154) All listed are examples of intermediate filaments EXCEPT:

Glial fibrillary acidic protein

(155) Match the cells listed on the left with their appropriate characteristics:

Plasma cell => **antibody production**

Histiocyte => **phagocytosis**

Mast cell => **participates in allergic reactions**

(156) To which organ is peculiar simple squamous (*schuppenförmig*) epithelium:

(157) Tissue macrophages are called: **Fibroblasts**

(158) The compound glands have:

Branched system of main “exit” ducts

(159) PAS (periodic acid-Schiff) – reaction after Mac Manus is used for staining of:

(160) The cartilage has:

(161) Which of the enumerated cells are NOT bone cells:

(162) Which type of dentin is located closest to the dental pulp?

(163) The inner surface of the bone is covered by:

Endosteum

(164) Match the tissues on the left to the cells that form them:

Dentin => **Osteoblasts**

Enamel => **Ameloblasts**

Cementum => **Cementoblasts**



(165) The basic structural unit of the myofibril is:

Sacromere

(166) Which is an example of a communicating junction?

Gap junctions

(167) Secretory vesicles are formed by detachment from:

Trans Golgi network

(168) The transitional epithelium is found at:

Kidney, ureters, bladder, urethra

(169) The extramural glands are:

(170) Monozygous twins may have:

Common amnion, chorion and placenta

(171) How long does the capacitation of semen take?

5-7 hours

(172) Caveolae are involved in all of the following EXCEPT:

ATP synthesis

(173) Mitochondria are:

Organelles with cristae on their outer membrane

(174) Which cytoskeleton is associated with the focal adhesion:

Actin filament

(175) Which of the following answers is TRUE? Dystrophin in skeletal muscle cells binds:

The microfilaments to the plasmalemma

(176) Which of the following answers is TRUE? The viscous external surface cover of the plasmalemma is called:

Glycocalyx (Polysaccharide envelope, plasmalemmal surface)

(177) Which cytoskeleton is associated with the **hemidesmosome**:

Intermediate filament

(178) Plasmalemmal proteins originate from which of the listed organelles:

Rough ER

(179) Caveolae are involved in all of the following EXCEPT:

ATP synthesis

(180) Which of the following statements is TRUE? The diameter of actin filaments is approximately:

6-8 nm



(181) The glycocalyx is composed of all of the following EXCEPT:
Lipoproteins (Protein + fatty acids)

(182) What is the main function of the microtubules:
Intracellular transport

(183) Which of the following answers is TRUE? A genetic defect in the motor protein DYNEIN is linked to which of the following disorders?
Kartagener syndrome

(184) The active chromatin is:
Euchromatin

(185) Which of the following answers is TRUE? A major function of the rough ER is:
Protein synthesis

(186) Which of the following statements is TRUE? The microtubules are built of:
13 protofilaments

(187) Retrograde axonal transport is executed by the protein:
Dynein

(188) Which of the following statements regarding the Z-discs is correct?
They are built of alpha-actinin

(189) From which cells do reticulocytes originate during erythrocytopoiesis?
Orthochromatophilic erythroblast

(190) Macrophages in the tissues are derived from which of the following blood cells?
Monocyte

(191) Which glial cell participates in myelin formation in the PNS?
Schwann cell

(192) Which of the following statements regarding cardiomyocytes is NOT correct?
They have a better developed endoplasmic reticulum than rhabdomyocytes

(193) Which of the answers regarding the stratified epithelium is true?
None of the answers are true

(194) Which organelle stores calcium in cardiomyocytes?
Smooth endoplasmic reticulum

(195) The bone matrix is produced by:
Osteoblasts

(196) In which of the following combinations are the stages of monocytopoiesis ordered correctly?



Monocyte-granulocyte colony forming units => Monocyte colony-forming unit => Monoblast => Promonocyte => Monocyte

(197) A characteristic feature of the process of erythropoiesis is:
Disappearance of almost all organelles

(198) Hyaline cartilage is present in the listed structures EXCEPT for:
Epiglottis

(199) Which of the listed proteins is involved in the contraction of cardiomyocytes but NOT of smooth muscle cells?

Troponin

(200) Which of the following statements regarding conductive cardiomyocytes is NOT correct?

They are smaller than contractile cardiomyocytes

(201) Somatostatin is produced in the:

Hypothalamus

(202) What is the normal number of leukocytes in 1 µl blood?

6.000-10.000

(203) How many lobules can we typically find in a neutrophilic granulocyte?

Three-five

(204) The cardiac muscle tissue originates from which embryonic layer?

Mesoderm

(205) Which one of the following statements is NOT true regarding the loose connective tissue?

The cells are arranged in isogenous groups

(206) Which of the listed cells does NOT belong to the glial lineage?

Martinotti cell

(207) What is the average lifespan of lymphocytes?

From a few hours to a few decades

(208) The Ruffini's corpuscles respond to:

Vibration and pressure

(209) Which of the following statements is NOT true regarding the adipose tissue?

It is important for the immunological defense of the organism

(210) Which of the following properties is characteristic of rhabdomyocytes?

All listed (excitability, regeneration, contractility, conduction)

(211) Which of the following substances is involved in the blood coagulation:

Factor of von Willebrand



(212) Which functional types of neurons innervate the neuromuscular spindles?

Sensory and motor

(213) The length of the molecule of the hyaluronic acid is approximately:

2.5 micrometers

(214) Thromboprotein is a hormone, which is important for:

Thrombocytopoiesis

(215) Which of the following statements regarding the red muscle fibers is NOT correct?

They contract quickly

(216) Which of the following glands is purely serous?

Lacrimal gland

(217) Which one of the following cells is NOT part of the reticular connective tissue, located in the red bone marrow:

Mesangial cells

(218) Which of the statements regarding secretory cardiomyocytes is correct?

They are located in the atria of the heart

(219) What is the normal percentage of the monocytes out of the circulating leukocytes in healthy adults?

5-8%

(220) Which one of the following cells are NOT typically located in the loose connective tissue?

Reticulocytes

(221) What is the shape of the nucleus of the monocyte?

Kidney-Shape

(222) Which one of the following proteins builds the reticular fibers in the loose connective tissue?

Collagen Type 3

(223) Which of the following cells are (*is NOT) localized in connective tissue?

All are correct (*none is correct)

(224) Which of the listed neurotransmitters are inhibitory?

GABA and Glycine

(225) The approximate size of the platelets is:

2-4 µm

(226) What is the type of ossification, in which the bone is formed directly without a cartilage template?

Intramembranous



(227) Which of the following glial cells participate in the movement of cerebrospinal fluid?

Ependymal cells (form thin neuroepithelial (simple columnar ciliated epithelium) lining of the ventricular system of the brain and the central canal of the spinal cord)

(228) Which is the protective connective tissue sheath covering the nerve fascicles in a **peripheral nerve**?

Perineurium

(229) Match the listed descriptions to the corresponding tissues from the dropdown menu:

It is characterized by a close cell apposition and presence at a free surface => **Epithelial tissue**

It allows rapid response to external stimuli => **Nerve tissue**

It is composed of cells called chondrocytes and a highly specialized ECM => **Cartilaginous tissue**

It contains large amounts of contractile proteins => **Muscle tissue**

It is characterized by a mineralized ECM => **Bone tissue**

(230) Match the listed morphological characteristics to the corresponding tissues from the drop-down menu:

1) Tall prismatic cells, oval nucleus, tight contact to the basal lamina, up to 300 microvilli on the apical surface => **Simple columnar resorptive epithelium**

2) Elongated eosinophilic structural syncytia with clearly pronounced regular transverse striations and round peripherally located nuclei => **Transversely striated skeletal muscle tissue**

3) Globular complexes with central small lumen, made of cells with pyramid shape and pronounced apical acidophila and basal basophilia => **Serous secretory divisions of an exocrine glandular epithelium**

4) Weakly contacting fixed and migrating cells with diverse morphological characteristics and abundance of extracellular matrix rich in diverse fine fibers => **Loose connective tissue**

5) Complexes of polyhedral cells in close contact with each other within scarce extracellular matrix without visible ducts or cavities => **Endocrine glandular epithelium**

(231) Matching question:

It is characterized by a close cell apposition and presence at free surface => **epithelial tissue**



It allows rapid response to external stimuli => **nerve tissue**

It is composed of cells called chondrocytes and highly specialized ECM => **cartilaginous tissue**

It contains large amounts of contractile proteins => **muscle tissue**

It is characterized by a mineralized ECM => **bone tissue**

(232) Matching question:

Tall prismatic cells, oval nucleus, tight contact to the basal lamina, up to 300 microvilli on the apical surface => **Simple columnar resorptive epithelium**

Elongated eosinophilic structural syncytia with clearly pronounced regular transverse striations & peripherally located nucleus => **Transversely striated skeletal muscle tissue**

Globular complexes with central small lumen, made of cells with pyramidal shape and pronounced apical acidophilia and basal basophilia => **Serous secretory divisions of an exocrine glandular epithelium**

Weakly contacting fixed and migrating cells with diverse morphological characteristics and abundance of an extracellular matrix rich in diverse fine fibers => **loose connective tissue**

Complexes of polyhedral cells in close contact with each other within scarce extracellular matrix without visible ducts or cavities => **endocrine glandular epithelium**

(233) Which of the listed cell contacts are found in the epithelial tissue?

All answers are true (Hemidesmosomes, Tight junctions, Gap junctions, Desmosomes)

(234) Matching question:

Brush border => **Intestinal epithelium**

Simple pseudostratified ciliated epithelium => **Trachea**

Stereocilia => **Epididymis**

Basal infoldings => **Kidney tubule**

Desmosomes => **Epidermis**

(235) Which of the following is a glia cell?

Ependymal cell

(236) How many types of myelocytes are recognized?

Neutrophilic, eosinophilic and basophilic myelocytes



(237) The atrophy is a process in which:

decrease in cell size occurs

(238) alpha-, gamma-, delta-granules are specific for:

Thrombocytes

(239) Which type of glia takes a major part in the synaptic biology?

Microglia

(240) Which cell is a lymphocyte capable of directly killing target cells?

T-cytotoxic

(241) Where are the neuromuscular spindles located?

Skeletal muscles

(242) The plasma cells produce mainly:

Immunoglobins

(243) Which cells perform bone resorption?

Osteoclasts

(244) Which ion is most directly involved in the initiation of muscle contraction?

Calcium

(245) Membrane proteins that are not localized in the plasma membrane:

Histone molecules

(246) With the formation of the first division plane in the zygote it enters the stage of development known as:

Cleavage (segmentation)

(247) All are true EXCEPT - organelles involved in the secretory pathway are:

Microtubules

(248) Main type collagen in the hyaline cartilage is:

Type 2

(249) Turner syndrome:

Gonosomal monosomy

(250) Which statement is TRUE? Which family of proteins are executioners of apotheosis:

Caspases

(251) The average diameter of an erythrocyte is:

7.5 µm

(252) How many are the centrioles during the G2 phase of the cell cycle?

4



(253) Which of the following cells participates in the process of monocytopoiesis:

Promonocyte

(254) Which disassembly of nuclear envelope in mitosis occurs during:

Prometaphase

(255) The second week of development the embryoblast differentiates into:

Two layers

(256) Which component of the pre-embryo continues to develop thus forming molar pregnancy:

Trophoblast

(257) Which type of trophoblastic villi are formed in the 2nd week of development?

Primary

(258) Histiocytes is an alternative name for:

Macrophages

(260) How many pairs of chromosomes contain the primordial germ cells?

23 pairs

(261) The free nerve endings respond to:

Temperature

(262) All are true EXCEPT: The chromatin contains the following elements:

RNA

(263) Match the germ layers and their respective tissue derivatives:

Intermediate mesoderm => **Gonads**

Neuroectoderm => **Neural tube**

Surface ectoderm => **Hair, nails and cutaneous glands**

Paraxial mesoderm => **Muscles of the trunk**

Endoderm => **Epithelium of gastrointestinal tract**

(264) Which cells produce pigments?

Melanocytes

(265) Which of the following methods uses a beam of electrons?

TEM

(266) All the following cell junctions are associated with the cytoskeleton

EXCEPT:

Nexuses (gap junctions)



(267) The nodes of Ranvier represent:

Zones without myelin in a myelinated axon

(268) Which is the most common anatomical location of fertilization:

Uterine tube

(269) Which statement true - Which are the main components of the nucleus:

All answers are correct

(270) Which cell produce testosterone in the testis?

Leydig cells

(271) Which factor is of importance for the transport of the secondary oocyte in the female reproduction tract after ovulation?

An increased activity of the fimbrial smooth musculature in the uterine tube infundibulum

(272) Which components of the seminal fluid continues for raising the pH from about 3.5-4 to 7.5:

Prostatic fluid

(273) Which of the following statements is true? Glycogen granules:

Are responsible for storage of glucose (Example of Homopolysaccharides (simple carbohydrates))

(274) The first blood cells originate from:

Cells, which are around the yolk sac

(275) The drug colchicine blocks the formation of which cytoskeleton element?

Microtubules

(276) What is the shape of a typical leiomyocyte:

Fusiform

(277) Which of the following functions is typical for the lysosomes:

They digest foreign material

(278) Each somite differentiates into all of the following EXCEPT:

Nephrotome

(279) The normal value the blood volume in health adult individuals is:

5-6 liter

(280) Which of the following statement is TRUE? The cytoskeleton is composed of:

Microtubules, actin filaments and intermediate filaments

(281) The intervillous space of the placenta contains:

Maternal blood



(282) Which statement is TRUE? The movement of which type of particles is involved in the generation of ATP?

Molecule

(283) Elastic cartilage is present in all listed structures except for:

The C-shaped rings of the trachea

(284) One of the following statements about the cell matrix function is TRUE?

It regulates the intracellular traffic

(285) The cephalic end of the primitive streak is:

Primitive node

(286) Ribosomes can attach to:

Outer nuclear membrane

(287) Intermediate filaments are associated with which of the following cell junctions?

Desmosomes

(288) Which statement is TRUE? Extracellular proteins such as hormones achieves their effects on the cells by using of:

Transmembrane receptors

(289) The megakaryoblast is a precursor cell in the process of:

Thrombocytopoiesis

(290) From which germ layer originates the epithelium of the thyroid gland?

Endoderm

(291) Sharpey's fibers represent:

Collagen fibers inserting periosteum into the bone

(292) From which germ layer originates the serous membrane of the body (peritoneum, pleura, pericardium)?

Somatopleuric lateral plate mesoderm

(293) When does begin the first meiotic division of oocytes?

Before birth

(294) The change of cell shape requires which of the following organelles?

Actin filaments

(295) What kind of change in the size of the yolk sac (relative to the size of the embryo) occurs during development?

Gradually decreases

(296) Which structures originate from the lateral plate mesoderm?

Smooth muscle tissue



(297) Which one of the following molecules is responsible for attracting water in the loose connective tissues?

Proteoglycans

(298) Which of the following organelles are non-membranous?

Microtubules

(299) According to secretory product of exocrine glands, they are classified as:

Mucus

(300) What is the name of the inner layer of the blastocyst?

Epiblast

(301) The process that forms new cartilage within an existing cartilage mass is called:

Endochondral growth

(302) The neureneric canal temporarily connects:

Amniotic and yolk sac cavities

(303) To which sub-cellular structure correspond the Nissl's granulations?

Rough ER cisterns

(304) The type of hemoglobin in healthy adults is:

HbA

(305) Which cell is the precursor cell of neutrophilic granulocytes?

Myeloblast

(306) The multiple pregnancy is:

Comparatively rare in humans

(307) The epithelium of the stomach and the intestines originates mostly from the:

Endoderm

(308) From which germ layer originates the neurohypophysis (posterior):

Surface ectoderm

(309) Based on the type of secretion the glandular epithelium is classified:

Exocrine, endocrine and mixed

(310) Collagen fibers are produced by which connective tissue cell?

Fibroblast

(311) According to the secretory product of the exocrine glands, they are classified as:

serous

(312) The normal value of the haematocrit is within the range:

40-50%



(313) Which statement about the hyaline cartilage is NOT true: **chondrocytes are found in spaces known as osteons**

(314) Which of the following glands has both exocrine and endocrine secretion?
Pancreas

(315) Macrophages are associated with which tissue?
loose connective tissue

(316) Which of the statements regarding the epithelial tissue is NOT true? **The epithelial tissue contracts**

(317) Which granulocyte cell has the largest lobulation (number of segments) of its nucleus?

Neutrophil

(318) Which of the listed correspond closely to the pseudo unipolar sensory neurons?

Spinal cord ganglion neurons

(319) Which of the precursors of erythrocytes is characterized by a lack of a nucleus:

Reticulocyte

(320) What is the name of the precursor cell of the striated muscle cell?

Myoblast

(321) Match the listed structures and the tissue they are typically made of:

Tendon and ligament => **dense regular connective tissue**

Costal cartilage => **Hyaline cartilage**

Intervertebral disc => **fibrous cartilage**

Basement membrane => **epithelial tissue**

Epiglottis => **elastic cartilage**

(322) Match each of the listed cellular structures to the corresponding cell from the drop-down menu:

Dense bodies => **Smooth muscle cells**

Hemoglobin => **erythrocytes**

Lysosomes => **macrophages**

Sacromeres => **Skeletal muscle cells**

Cilia => **respiratory epithelial cells**



(323) Which of the glial cells participate in the formation of the synapses?

Astrocytes

(324) Oxytocin is released from:

Neurohypophysis

(325) What is the shape of a typical cardiomyocyte?

There is no correct answer

(326) Which type of granulocytes is increased significantly in blood during parasitosis?

Peripheral blood eosinophils

(327) Which type of connective tissue has trabeculae?

Dense collagenous tissue

(328) Which statement about the cancellous (spongy) bone is NOT true?

(329) Which statement about the bone tissue is NOT true?

(330) Which sensory modality is perceived by neuroreceptors?

(331) Which protein is involved in maintaining the stability of the erythrocyte membrane?

(332) Which one of the following statements is NOT true regarding the brown adipose tissue?

(333) Which one of the following proteins builds the collagen fibers in the loose connective tissue?

(343) Which one of the following cells is the main cellular component for the fat connective tissue?

(344) Which of the statements regarding secretory cardiomyocytes is NOT correct?



(345) Which of the listed tissues is a connective tissue subtype with fibrous extracellular matrix?

(346) Which of the listed structures contains fibrocartilage?

(347) Which of the listed structures contains elastic cartilage?

(348) Which of the listed neurotransmitters are excitatory?

ATP also Acetylcholine, ACh, Glutamate, Catecholamines (epinephrine, norepinephrine, dopamine), Serotonin und Histamine

(349) Which of the listed neurons typically have a pear-shaped (pyriform) body?

Purkinje neuron

(350) Which of the listed cells produces histamine?

Basophils and mast cells

(351) Which of the listed cell types is at the earliest stage of granulocytogenesis?

Hemocytoblast

(352) Which of the listed are functions of the epithelial tissue?

(353) Which of the following types of connective tissues has a liquid intercellular matrix?

(354) Which of the following tissues is a subtype of the epithelial tissue?

(355) Which of the following structures is highly specific for the platelets?
irregularly shaped, have no nucleus, and typically measure only 2-3 micrometers

(356) Which of the following structures do NOT contain muscle cells?

(357) Which of the following statements is NOT true regarding the loose connective tissue?



(358) Which of the following statements about conductive cardiomyocytes is NOT correct?

(359) Which of the following is typical for excitatory synapses?

(360) Which of the following is CORRECT concerning myoglobin?

(361) Which of the following function is NOT implemented by glial cells?

(362) Which of the following connective tissue cells produces antibodies?

(363) Which of the following connective tissue cells modulates the defense against parasites?

(364) Which of the following components are part of the extracellular matrix of the connective tissue?

(365) Which of the following cells participate in the process of monocytopoiesis?

(366) Which of the following cells have mainly phagocytic activity in the brain?

(367) Which of the following are NOT carbohydrates?

Polypeptides (Proteins)

(368) Which of the following about T-memory lymphocytes is TRUE:

(369) Which of the features is NOT characteristics for the peroxisomes?

(370) Which of the blood cells do NOT have a nucleus?

Mature red blood cells

(371) Which is true regarding the nucleus of a typical cardiomyocyte?



(372) Which is the neurotransmitter of the neuromuscular junction?

Acetylcholine

(373) Which is the innermost connective tissue sheath covering the axons that takes part in a peripheral nerve?

Endoneurium

(374) Which hormone stimulated the formation of hemoglobin?

Erythropoietin

(375) Which connective tissue cell produces elastin?

Fibroblast

(376) Which cellular compartment contains the Nissl's granules?

(377) Which cells are involved in humoral immunity?

(378) Which cells are involved in cell-mediated immunity?

Mature T-cells

(379) Which cell produces most of the connective tissue's extracellular matrix?

Fibroblasts

(380) Which are the three major types of cartilage tissue?

hyaline, fibrous, and elastic cartilage

(381) Which are the major types of cardiomyocytes?

Myocardial contractile cells and myocardial conducting cells

(382) Where is the Pacinian corpuscle located?

Epidermis

(383) Where does the T-cell differentiation occur?

Thymus

(384) What type of cells develop into plasma cells?

B-cells

(385) What is the typical shape of the nucleus of a Neutrophilic granulocyte?

(386) What is the percentage of lymphocytes out of all leukocytes in the peripheral blood?



(387) What is the normal percentage of the lymphocytes out of the circulating leukocytes in healthy adults?

20-40%

(388) What are the names of the cells of the skeletal muscle tissue?

(389) What is the main function of T-tubules in the structure of the rhabdomyocyte?

(390) What is the function of the macrophages?

immune sentinels (specialized cells involved in the detection, phagocytosis and destruction of bacteria and other harmful organisms)

(391) What is the function of lymphocytes?

Type of white blood cell (leukocyte) that is of fundamental importance in the immune system because lymphocytes are the cells that **determine the specificity of the immune response to infectious microorganisms and other foreign substances**. In human adults lymphocytes make up roughly 20 to 40 percent of the total number of white blood cells.

(392) What is the function of astroglia in the synapse biology?

(393) What is skeletal muscle hypertrophy?

Increase in muscle mass

(394) What is covered by the epimysium?

entire muscle tissue

(395) To which sub-cellular structure correspond the Nissl's granulations?

(396) To which major tissue type belongs the bone?

Connective tissue

(397) A typical multipolar neuron has:

(398) Anterograde axonal transport is executed by the protein:

Kinesin

(399) Based on the number of layers, the epithelial tissue is classified into:

(400) Connective tissue with non-differentiated extracellular matrix CANNOT be found in the:



(401) Elastic cartilage is present in all listed structures EXCEPT for:

(402) Electrical synapses are formed via:

Gap junction channels

(403) Endocrine glands produce:

(404) For which of the listed epithelial types are characteristic the cilia?

(405) How are the contractile filaments oriented in cardiomyocytes?

(406) How many types of muscle tissues do we distinguish under light microscopy?

(407) In simple epithelia, the basal lamina is in contact with:

Connective tissue

(408) In which type of granulocytes can we find azurophilic granules?

(409) Osteoblasts arise from:

They arise from the differentiation of osteogenic cells in the periosteum, the tissue that covers the outer surface of the bone, and in the endosteum of the marrow cavity.

(410) Osteocytes arise directly from:

Osteoblasts

(411) Signal-recognition SRP-receptors are required for the translocation of:

(412) Synapses can exist between an axon and which of the following?
two axons, two dendrites, or between an axon and a dendrite.

(413) The basement membrane (basal lamina) is situated under the basal surface of the cells of:

(414) The blood is made up of two main components. They are:
Plasma (55%) and red blood cells (RBC) (44%)

(415) The epiphyseal growth during ossification is formed by:



(416) The formation of bone from a pre-existing cartilage framework is called:
Endochondral ossification

(417) The main type of collagen in the hyaline cartilage is:
Type 2 collagen

(418) The major tissue types are:
connective tissue, epithelial tissue, muscle tissue, and nervous tissue

(419) The muscle spindles respond to:
contraction and stretching

(420) The neurohypophyseal hormones are produced in:

(421) The normal value of the blood volume in health adult individual is:
5-6 liters

(422) The open canalicular system and dense tubules are specific for:

(423) The Pacinian corpuscles respond to:
pressure and vibration

(424) The physiological regeneration is a process in which:

(425) The process that forms new cartilage at the surface of an existing cartilage is called:

Endochondral Ossification

(426) The merging of which structures contributes to the development of the face?

Maxillary and mandibular processes, frontonasal prominence

(427) Which compartment of the blastocyst contributes to the formation of the fetus?

Embryoblast

(428) Which layer of the pre-embryo is in direct contact with the endometrium?

Amnion

(429) Which of the following issue is derived from the ectoderm?

Adenohypophysis (endocrine cells => consists of epithelial cells)

(430) Impregnation is a progress of passage of the spermatozoa through the female genital tract?

Vagina => cervix uteri => cavum uteri => uterine tubes

(431) The heart and the blood vessels are derivates of:

Lateral plate mesoderm



(432) Which germ layer forms lacunae?

Syncytiotrophoblast

(433) The olfactory placode is located on the surface of which structure?

Frontonasal prominence

(434) How is the inner mucous layer of the uterus called?

Endometrium

(435) What is insemination?

Deposit of sperm into the vagina, its migration to the...

(436) From which germ layer originate the nephrogenic cords?

Intermediate

(437) Which of the listed structures penetrate deepest into the endometrium?

Tertiary villi

(438) The formation of the notochord occurs during?

Third week

(439) Teratogens are agents that:

Cause congenital malfunction

(440) Which of the following does not originate from the endoderm?

Heart and blood vessels

(441) The definitive umbilical cord contains?

Two umbilical arteries and one umbilical vein

(442) Gastrulation established?

Ectoderm, mesoderm and endoderm

(443) Which structures originate from the lateral plate and mesoderm?

Epithelium of the peritoneal, pleural and pericardial cavities

(444) Which components of the seminal fluid contributes for raising the pH from about 3.5-7.5 and activating the sperm?

Seminal vesicle fluid

(445) During the process of cleavage the cells:

Do not change their size

(446) Which are the risks for a pregnant woman in case of a tubal pregnancy?

Tuba rupture

(447) How many pairs of chromosomes contain the primordial germ cells?

23 pair

(448) The conjoined monozygotic twins connected in a head are called?

Craniopagus



(449) The sclerotomes differentiate into?

Bone and cartilage, which surround the notochord

(450) Which 2 germ layers to the pre-embryo are separated by the extra embryonic cavity?

none of the answers is true

(451) Which cells of the spermatogenic population have bivalent chromosomes?

Spermatids

(452) The bilaminar discs consist of?

Epiblast and hypoblast

(453) In which cell are localized the cortical granules?

Oocyte (peripheral cytoplasm)

(454) The preimplantation genetic diagnosis represents analysis of?

Blastomeres

(455) Name the most medially located compartment of the intraembryonic mesoderm?

Paraxial mesoderm

(456) Which structures originate from the lateral plate mesoderm?

Epithelium of the renal tubes, renal calices

(457) What is the rate of assurance of abnormal blastocysts?

20-30%

(458) How much is the volume of the seminal fluid of a healthy individual?

0.5-1 ml

(459) Which of the listed is associated with the acrosomal reaction of the spermatozoa?

All answers are true

(460) The initial hemopoiesis is?

Intravasal

(461) Which techniques of artificial insemination are available to the public?

A and C

(462) Each somite differentiates into all of the following EXCEPT?

Nephrotome

(463) At which embryonic stage form the endocardial heart tubes?

Day 19

(464) Chromosome number aberrations (trisomy/monosomy) are most frequently due to?

Non disjunction of homologous chromosome during first meiotic division



(465) The notochord serves as the basis for?

The axial skeleton

(466) The definitive umbilical cord contains:

Mucous connective tissue (Warton's jelly)

(467) Which of the structures originate the exocoelomic cavities (cysts) in 2nd week of development?

Secondary yolk sac

(468) Which of the following are functions of the yolk sac?

Takes part in early blood circulation (Producing early blood cells/vessels and forming digestive tube)

(469) The somatopleure and splanchnopleure originate from:

Lateral mesoderm

(470) The process of cleavage (segmentation) is:

Mitosis

(471) The first blood cells originate from:

Cells which are around the yolk sac

(472) Gastrulation occurs in the beginning of the:

Third week

(473) What is the average age of the menopause in humans?

45-55 years

(474) What is present in the 2nd week of the development of extraembryonic cavity?

Exocoelomic cysts

(475) In in-vitro fertilization what is used to stimulate the ovaries?

Gonadotropins

(476) On which day does the posterior neuropore close?

Day 23

(477) Which of the following are derived from the endoderm?

None of the following

(478) Which embryonic layer is in contact with parietal hypoblast?

Cytotrophoblast

(479) Which layer is generated by the epiblast?

Epiblast

(480) Which layers are the primary villi originated from?

Cytotrophoblast



(481) What structure is under the neural tube?

Notochord

(482) How long does semen capacitation take?

5-7 hours

(483) What is the placenta?

Haemochorionic

(484) What is the percentage of sperm in sample?

14.0%

(485) On which day does the process of Allantosis begin?

Days 15-16

(486) When does second meiosis of the oogenesis occur?

Fertilization

(487) At the eighth Day of development the hypoblast consists of?

Small cuboidal cells

(488) The amniotic cavity is formed by cells of the:

Epiblast

(489) Approximately how long after fertilization occurs the first cleavage of the zygote?

30 days

(490) The primitive endothelial cells are formed by?

Cells lining the yolk sac

(491) In the beginning of the 3rd week the paraxial mesoderm differentiates into segments known as?

Somites (somitomeres)

(492) The amniotic cavity is formed by cells of the:

Epiblast

(493) Gastrulation begins with formation of?

Primitive streak

(494) The following structures are NOT derived from the endoderm?

All answers are true (Nervous system, muscles of anus, bones of pelvis, heart and vessels)

(495) How long does normal capacitation of the semen take?

5-7 hours

(496) The primitive endothelial cells are formed by?

Cell linings of the yolk sac



(497) Trophoblastic overgrowth with lack of embryoblast development may lead to?

Molar pregnancy (Hydatiform mole)

(498) Select the correct sequence of formation of the chorionic villi during the III. week of development:

Primary: The chorionic villi are at first small and non-vascular/ Secondary: The villi increase in size and ramify, while the mesoderm grows into them/ Tertiary: Branches of the umbilical artery and umbilical vein grow into the mesoderm, and in this way the chorionic villi are vascularized.

(499) Which pharyngeal arch contributes to the formation of the mandible?

First pharyngeal arch

(500) What is the rate of assurance of abnormal blastocysts?

20-30%

(501) At the cranial end of the embryonic disc is formed by:

Primitive knot

(502) At the presence of how many cells, generated by the zygote, the process of cleavage (segmentation) is assumed to begin?

2

(503) The following originate from the endoderm:

Urinary bladder, urethra, alimentary canal liver, pancreas, trachea, bronchi alveoli, thyroid thymus, tympanic cavity

(504) The conjoined monozygotic twins connected in thoracic region are called?

Thoracopagus

(505) Each somite differentiates into all of the following:

Dermatomes, Myotomes, Syndetomes, Sclerotomes

(506) Bilaminar disc consists of?

Epiblast and Hypoblast

(507) Turner syndrome is?

Monosomy X (absence of an entire sex chromosome)

(508) From which germ layers originate the nephrogenic chords?

Intermediate mesoderm

(509) How is designated the outermost layer of the embryonic mesoderm?

Ectoderm

(510) The umbilical arteries:

Surround the urinary bladder



(511) Which of the following tissues is derived from the ectoderm?
[REDACTED]

(512) How is the outermost layer of the pre-embryo called?
[REDACTED]

(513) What are the two layers of the endometrium?
[REDACTED]

(514) What kind of change in the size of the yolk sac occurs during development?
[REDACTED]

(515) How long lasts the capability of the secondary oocyte to be fertilized?
[REDACTED]

(516) How many cavities characterize the pre-embryo at the end of the 2nd week of development?
[REDACTED]

(517) The first blood cells originate from?
[REDACTED]

(518) What is the normal sperm count of the sperm in 1/ml?
[REDACTED]

(519) Which of the cells produce testosterone in the testis?
[REDACTED]

(520) Which of the blastocyst's poles is directed to the endometrium at implantation?
[REDACTED]

(521) Ectoderm is created by:
[REDACTED]

(522) During which stage of Prophase of the first meiotic division in gametes does the crossing over take place?
[REDACTED]

(523) Which is the optimal window of opportunity for people wishing to conceive a child?
[REDACTED]

(524) Which structure is formed at the dorsal border tip of the neural tube?
[REDACTED]

(525) The cells generated by the spermatogonia are:
[REDACTED]

spermatogonia
primary spermatocytes
secondary " "
early spermatids



(526) The maternal and fetal components of the placenta are?

[REDACTED]

(527) The cephalic end of the primitive streak is:

[REDACTED]

(528) From which layer originates the chorion?

[REDACTED]

(529) Amniocentesis is used to investigate and detect?

[REDACTED]

[REDACTED]

(530) What is the name of the cells forming the morula?

[REDACTED]

(531) When does implantation after fertilization start?

[REDACTED]

(532) How many chromosomes has the fertilized egg?

[REDACTED]

(533) Which are the risks of pregnant women in case of a tubal pregnancy?

[REDACTED]

(534) During the second week of development, the embryoblast differentiates into?

[REDACTED]

(535) What compartment of the blastocyst contributes to the formation of the placenta?

[REDACTED]

(536) How long does it normally take the sperm to migrate in the female reproductive tract and to achieve the egg?

[REDACTED]

(537) During which week of development the primordial germ cell migrate to dorsal body wall:

[REDACTED]

(538) Which process is ejaculation?

[REDACTED]

(539) Which of the following lists are steps in in-vitro fertilization procedure?

[REDACTED]

[REDACTED]

[REDACTED]



(540) Which of the following structures refers to embryonic membranes?

(541) What is the average composition of the seminal fluid?

(542) Which presents a primary villi?

(543) The somatopleure and splanchnopleure originate from?

(544) Which of the following is not known to be human teratogen?

(545) From which germ layer originates the heart and the spleen?

(546) What is the name of the inner layer of the blastocyst?

(547) What is the mechanism of the clonal expansion of the progenitors of the gametes?

(548) Which of the listed form the corona radiata?

(549) What is the main factor of sperm migration in the female reproductive tract?

(550) In which phase of the menstrual cycle does the endometrium achieve its maximum thickness?

(551) The myotomes consist of:

(552) After its penetration in the oocyte, the spermatozoa head is transformed into?

(553) The initial hemopoiesis is?

(554) The umbilical vein:



(555) Which of the enumerated characteristics of a given semen analysis are normal?

[REDACTED]

(556) Which of the following tissues originates from the endoderm?

[REDACTED]

(557) Cumulus oophorus is characteristic for which follicle?

[REDACTED]

(558) The embryonic disc gradually becomes elongated with?

[REDACTED]

(559) The process of cleavage represents a series of?

[REDACTED]

(560) Gastrulation establishes:

[REDACTED]

(561) Which component of the pre-embryo aborts its development in a molar pregnancy?

[REDACTED]

(562) True statements of sperm capacitation:

[REDACTED]

[REDACTED]

[REDACTED]

(563) The hypoblast belongs to:

[REDACTED]

(564) The formation of the fingers in the limb buds takes place via:

[REDACTED]

(565) What is the correct sequence of the extended first meiotic division?

[REDACTED]

[REDACTED]

(566) At which developmental stage begins the segmentation of the paraxial mesoderm?

[REDACTED]

(567) From which germ layer structure originate the neurons of the peripheral nervous system?

[REDACTED]

(568) Which pharyngeal arches mostly contribute to the formation of the thymus?

[REDACTED]



(569) The formation of the primitive streak occurs on the surface of:

(570) The connecting stalk originates from:

(571) Which of the following phases of the menstrual cycle is under estrogen control?

(572) Ejaculation is identical to which process?

(573) Which compartment of the blastocyst contributed to the formation of the fetus?

(574) The exocoelomic (Heuser) membrane lines the inner surface of:

(575) The secretion of the FSH by pituitary gland is suppressed by a factor secreted by the Sertoli cells. Which is this factory?

(576) Where must sperm normally encounter the egg in order to fertilize it?

(577) Placental villi are next developed in the region of:

(578) The rate for dizygotic twins is:

(579) Down syndrome is:

(580) From which germ layer originate the serous membranes of the body (peritoneum, pleura, pericardium)?

(581) Name the most medially located components of the intraembryonic mesoderm:

(582) The layer of the embryoblast adjacent to the amniotic cavity is:

(583) Insemination is a process of passage of the spermatozoa through the female genital tract as follows: _____



(584) Which component of the pre-embryo continues to develop thus forming molar pregnancy?

~~Yolk sac~~

(585) Which is the normal sperm motility?

~~15-20 μm/s~~

(586) The cardiongenic primordium is formed by:

~~Neural folds~~

(587) Which is the sequence of appearance of the limb buds?

~~Upper limb → Lower limb → Forelimb → Hindlimb~~

(588) Which requirements of the mean must be met for sperm motility?

~~Temperature, pH, energy source, flagellar beat frequency~~

(589) Which embryonic layer is in a direct contact with the parietal hypoblast until the formation of the extraembryonic mesoderm?

~~Epiblast~~

(590) Monozygous twins may have:

~~Identical or fraternal~~

(591) The intraembryonic lateral plate mesoderm generates which of the following:

~~Amniotic cavity, yolk sac, intermediate mesoderm~~

(592) Which of the statements regarding the types of spermatogonia is not true?

~~Primary spermatogonia, secondary spermatogonia, stem cells~~

(593) The number of oogonia at birth is approximately?

~~10 million~~

(594) The amniotic and yolk sac cavities are temporarily connected by?

~~Yolk stalk~~

(595) The intraembryonic intermediate mesoderm forms?

~~Thyroid gland, suprarenal glands, gonads~~

(596) From which germ layer originates the adenohypophysis?

~~Endothelial cells~~

(597) Which pharyngeal arch contributes to most of middle ear ossicles?

~~First pharyngeal arch~~

(598) Which cells are generated by the secondary spermatocytes?

~~Sertoli cells~~

(599) Which effect have prostaglandin of the semen?

~~Stimulates uterine contractions, stimulates cervical mucus production, stimulates fallopian tube peristalsis~~



(600) How does the female reproductive tract assist sperm migration?

(601) Which of the following statements is TRUE?

(602) From which component of the blastocyst can be isolated stem cells capable of organ regeneration in humans?

(603) Which of the zona pellucida proteins acts as a receptor for spermatozoa binding?

(604) What is the name of the outer layer of the blastocyst?

(605) The processes of the compaction of the pre-embryo leads to a formation of outer and inner cell mass, which differ in their intracellular junctions as follows:

(606) The number of the somites at the end of the 5th week of development is?

(607) Which of the following structures originates from the endoderm?

(608) Which of the following phases of the menstrual cycle is under progesterone control?

(609) Primary villi result from the proliferation of:

(610) In which cavity are localized the exocoelomic cysts during the second week of development?

(611) Which of the following originates from the paraxial mesoderm?

(612) What is present in the 2nd week of development of extraembryonic cavity?



(613) Which of the following are derived from the endoderm?

[REDACTED]

(614) Which layer are the primary villi originated from?

[REDACTED]

(615) What is the percentage of sperm in a sample?

[REDACTED]

(616) When does second meiosis of oogenesis occur?

[REDACTED]

(617) Which of the following statements regarding the types of spermatogonia is NOT true?

[REDACTED]

(618) Which effect have prostaglandins of the semen?

[REDACTED]

(619) Which of the following statements is TRUE?

[REDACTED]

(620) The process of compaction of the pre-embryo leads to a formation of outer and inner cell mass, which differ in their intercellular junctions as follows:

[REDACTED]

(621) Which of the following stages is NOT a process of fertilization?

[REDACTED]

(622) The following structures are NOT derived from the endoderm?

[REDACTED]

(623) What is the rate of occurrence of abnormal blastocysts?

[REDACTED]

(624) The bilaminar disc consists of?

[REDACTED]

(625) The umbilical arteries:

[REDACTED]

[REDACTED]

(626) Which of the following tissues is derived from the ectoderm?

[REDACTED]

(627) Which of the blastocyst poles is directed to the endometrium at implantation?

[REDACTED]



(628) The ectoderm is created by?

[REDACTED]

(629) During which stage of prophase of first meiotic division in gametes does crossing-over take place?

[REDACTED]

(630) Which is the optimal window of opportunity for people wishing to conceive a child?

[REDACTED]

(631) Which structure is formed at the dorsal border (tip) of the neural tube?

[REDACTED]

(632) Which are the risks for pregnant women in case of a tubal pregnancy?

[REDACTED]

(633) Which of the following structures refers to as embryonic membranes?

[REDACTED]

(634) What is the average age of menopause in humans?

[REDACTED]

(635) Which of the following is NOT known to be a human teratogen?

(636) Cumulus oophorus is characteristic for which follicle?

[REDACTED]

(637) The secretion of FSH by pituitary gland is suppressed by a factor secreted by the Sertoli cells. Which is this factor?

[REDACTED]

(638) Placental villi are best developed in the region of?

[REDACTED]

(639) Which of the following are functions of the yolk sac?

[REDACTED]

(640) Which requirements of the semen must be met for sperm motility?

[REDACTED]

(641) Which is the range of size of human cells?

[REDACTED]

(642) DNA synthesis occurs during which phase of the cell cycle?

[REDACTED]

(643) Where are localized the fibres of the nuclear lamina?

[REDACTED]



(644) What is the normal pathway of migration of proteins through the Golgi Apparatus?

[REDACTED]

(645) Ribosomes attach to which organelle?

[REDACTED]

(646) The process of apoptosis normally occurs:

[REDACTED]

(647) Which cellular organelles are most closely associated with the rough ER?

[REDACTED]

(648) Which of the following is TRUE?

[REDACTED]

(649) All of the following statements in true EXCEPT:

[REDACTED]

(650) All of the following cell junction are associated with the cytoskeleton except:

[REDACTED]

(651) All of the statements are true EXCEPT:

[REDACTED]

(652) Which of the following statements regarding the structure of bio-membranes is true?

[REDACTED]

[REDACTED]

(653) Which of the following is NOT true? The cytosol (cellular matrix):

[REDACTED]

(654) Which of the following regarding Golgi complex is true?

[REDACTED]

(655) Which of the following is not true: the part of the DNA which are expressed are concentrated in:

[REDACTED]

(656) All are true except: Components of the nuclear envelope are:

[REDACTED]

(657) Major mitochondrial functions are:

[REDACTED]

(658) Which of the statements are TRUE: cell movement requires:

[REDACTED]



(659) All of the following statements are true EXCEPT: the following cell types may have more than one nucleus:

[REDACTED]

(670) All of the following are true except: aging is associated with which type of process:

[REDACTED]

(671) Which statement is true: intermediate filaments:

[REDACTED]

(672) Which of the statements is true: F-actin is found in:

[REDACTED]

(673) Which of the statements is true: Ca²⁺ release from the ER takes place via:

[REDACTED]

(674) Golgi complex rough ER communication requires?

[REDACTED]

(675) Which of the following statements regarding histological techniques is NOT true?

[REDACTED]

(676) Which of the following statements about the plasma membrane is NOT true?

[REDACTED]

(677) Which of the following is a marker enzyme for lysosomes?

[REDACTED]

(678) Which of the following is NOT true:

[REDACTED]

(679) All of the following are true EXCEPT: secretory proteins:

[REDACTED]

(680) Which of the following is true: the middle segment of chromosome is known as:

[REDACTED]

(681) All of the following statements regarding the pigment deposits are true except:

[REDACTED]

(682) All of the following are true except: tissues grow in size because of the following process:

[REDACTED]



(683) Which cells have a prominent rough ER?

(684) Which of the following is not true regarding cell shape:

(685) Which if the following statements is true: the parts of DNA which are not expressed are concentrated in:

(686) Which is NOT normally present in cytosol (cellular matrix)?

(687) Which if the following structures increases the cell surface area necessary or absorption? _____

(688) Which of the listed proteins is involved in the contraction of cardiomyocytes but NOT smooth muscle cells? _____

(689) From which germ layer develop the smooth muscle cells of internal organs:

(690) Which of the processes listed is NOT a stage of the fertilization?

(691) The primordial germ cells during their migration divide by:

(692) Human placenta is of which type:

(693) A characteristic feature of the process of erythropoiesis is:

(694) The amniotic cavity appears within the:

(695) Thrombopoietin is a hormone, which is important for: _____

(696) At which developmental stage appears the allantois?

(697) Match the listed cell types to their corresponding tissues from the drop-down menu:

Chondrocytes => _____

Erythrocytes => _____



Fibroblasts => [REDACTED]

Osteoclasts => [REDACTED]

Microglia => [REDACTED]

(698) Match each of the listed structures to the corresponding tissue from the drop-down menu, in which they are observed:

1) Collagen type I => [REDACTED]

2) Myelin => [REDACTED]

3) Collagen type II => [REDACTED]

4) Giannuzzi's demilunes => [REDACTED]

5) Collagen type IV => [REDACTED]

(699) Match the average cell diameter to the respective cells from the drop-down menu:

1) 15-18 μm => [REDACTED]

2) 2-4 μm => [REDACTED]

3) 120-150 μm => [REDACTED]

4) 50-70 μm => [REDACTED]

5) 10-12 μm => [REDACTED]

(700) Match the listed structures and their typical localization:

Neurosecretory nerve endings from hypothalamus =>

Meissner's corpuscles => Light touch

Motor end plates => [REDACTED]

Pacinian corpuscles => [REDACTED]

Free nerve endings => [REDACTED]
[REDACTED]

(701) Match each of the listed cellular structures to the corresponding cell from the drop-down menu:

1) Nissl bodies => [REDACTED]

2) Intercalated discs => [REDACTED]

3) Mucin granules => [REDACTED]

4) Cytokeratin filaments =>

5) Myosin filaments =>



(702) Match each of the listed cell types to their function from the drop-down menu:

Myocytes => [REDACTED]

Macrophages => [REDACTED]

Oligodendrocytes => [REDACTED]

Mast cells => [REDACTED]

Schwann cells => [REDACTED]

(703) Which of the following is not included in the glycocalyx?

[REDACTED]

(704) Organelles involved in rectory pathway? All are true EXCEPT:

[REDACTED]

(705) Which substances are detected by periodic acid shift PAS staining method?

[REDACTED]

(706) Which of the following are inorganic compounds of the cell?

[REDACTED]

(707) Which of the following statements regarding lysosomes is TRUE?

[REDACTED]

(708) The middle segment of chromosomes is known as:

[REDACTED]

(709) The division of the nucleus is referred to as?

[REDACTED]

(710) Which of the following regarding cell shape is NOT true?

[REDACTED]

(711) Which is the range of thickness of the biological membranes?

[REDACTED]

(712) Which of the following statements related to the Golgi Complex is not true?

[REDACTED]

(713) Autophagosomes are typical for?

[REDACTED]

(714) Intermediate filaments are composed of?

[REDACTED]



(715) Smooth ER is not involved in?

[REDACTED]

(716) Ribosomes can attach to which of the following?

[REDACTED]

(717) Which of the following is not a component of the plasma membrane?

[REDACTED]

(718) Which of the following statements regarding the Golgi Complex is TRUE?

[REDACTED]

(719) The Barr-body corresponds to?

[REDACTED]

(720) The chromatin contains the following elements. All are true except?

[REDACTED]

(721) Which of the following is not a characteristic of living matter?

[REDACTED]

(722) Ageing is associated with which type of processes: All are true EXCEPT?

[REDACTED]

(723) Biological membranes: Which of the following is NOT true?

[REDACTED]

(724) Which of the following statements about cell matrix functions are true?

[REDACTED]

(725) Which of the following about eukaryotic/prokaryotic cells is NOT true?

[REDACTED]

(726) Which cell type has a squamous shape?

[REDACTED]

(727) Which of the following substance is not a component of the biomembrane?

[REDACTED]

(728) Which of the following membrane proteins are not localised in the plasma membrane?

[REDACTED]

(729) Which of the following statements about lysosomes is NOT true?

[REDACTED]

(730) Which of the following molecules are material carrier of life?

[REDACTED]



(731) Clathrin coated vesicles are formed in:

[REDACTED]

(732) The change of cell shape requires which following organelles?

[REDACTED]

(733) Which phase of the mitotic cycle is mediated by actin cytoskeleton?

[REDACTED]

(734) Which of the following does not belong to cytoplasmic inclusions?

[REDACTED]

(735) The Zelwegger syndrome is related to biogenesis of which organelle?

[REDACTED]

(736) Which of the following statements regarding the structure of biomembranes is TRUE?

[REDACTED]

[REDACTED]

(737) Secretory granules are characteristic for:

[REDACTED]

(738) Mitochondrial ATP synthase is involved in:

[REDACTED]

[REDACTED]

(739) What is the main function of the intermediate filaments?

[REDACTED]

(740) Which of the following is a market enzyme for lysosomes?

[REDACTED]

[REDACTED]

(741) Which of the following increases surface area necessary for absorption?

[REDACTED]

[REDACTED]

(742) Which of the following molecules are present in the cytosol?

[REDACTED]

[REDACTED]

(743) Where are intermediate filaments present?

[REDACTED]

[REDACTED]

(744) What is the typical shape of the monocytes?

[REDACTED]

1. All of the following answers are true EXCEPT:

The glycocalyx is composed of:

- A. Proteoglycans
- B. Lipoproteins
- C. Proteins
- D. Glycolipids
- E. Glycoproteins

2. Which of the following answers is TRUE?

A genetic defect in the motor protein DYNEIN is linked to which of the following disorders?

- A. Kartagener syndrome
- B. Niemann-Pick disease
- C. Gaucher syndrome
- D. None of the answers is correct
- E. Down syndrome

3. What type of cell junction is the desmosome:

- A. Cell-cell
- B. Cell-matrix
- C. Neither cell-cell nor cell-matrix
- D. Both cell-cell and cell-matrix

4. Which cytoskeleton is associated with the focal adhesion:

- A. None of them
- B. Actin filament
- C. Microtubule
- D. Intermediate filament
- E. All of them

5. All of the following answers are true EXCEPT:

Mitochondria are:

- A. Semiautonomous (have their own DNA, RNA, ribosomes)

Biostudy

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5. All of the following answers are true EXCEPT:

Mitochondria are:

- A. Semiautonomous (have their own DNA, RNA, ribosomes)

- B. An obligatory organelle
- C. The organelles responsible for supplying ATP to the cell
- D. Organelles with cristae on their outer membrane
- E. A double-membrane organelle

6. Plasmalemmal proteins originate from which of the listed organelles:

- A. Rough ER
- B. Golgi
- C. Peroxisome
- D. Smooth ER
- E. Lysosome

7. Which of the following answers is TRUE?

The brush border of the enterocytes is the light microscopical equivalent of:

- A. Flagella
- B. Stereocilia
- C. Microvilli
- D. Glycocalyx
- E. Cilia

8. Caveolae are involved in all of the following EXCEPT:

- A. ATP synthesis
- B. Vesicle formation
- C. Intracellular traffic
- D. Lipid rafts
- E. Endocytosis

9. Identify the presented organelle:

Übung

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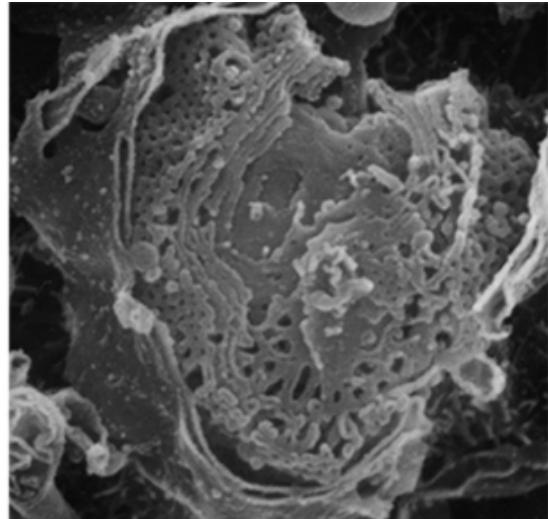
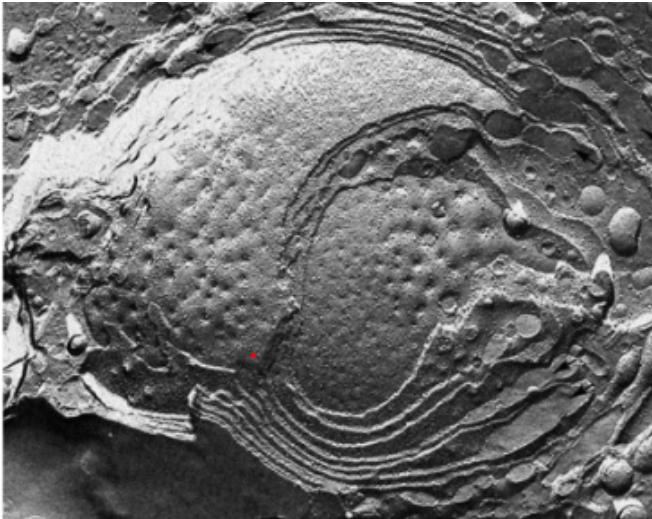
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Caveolae
= kleine Kavitäten

9. Identify the presented organelle:

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- A. Smooth endoplasmic reticulum
- B. Mitochondrion
- C. Anular lamellae
- D. Golgi complex

10. Which of the following proteins is associated with plasmalemmal stability:

- A. Cytosolic receptor
- B. Spectrin
- C. Tyrosine kinase receptor
- D. Ion channel
- E. G-protein coupled receptor (GPCR)

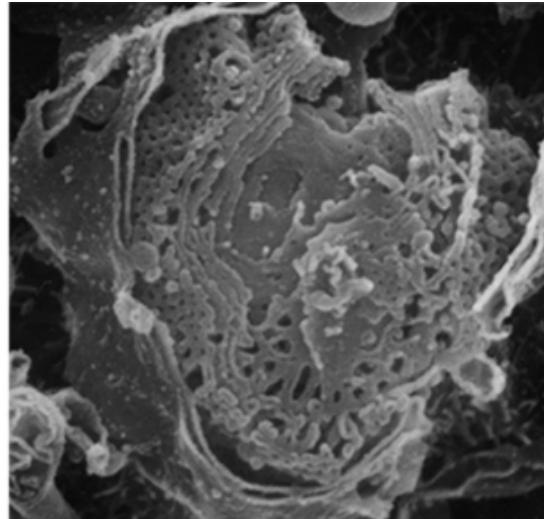
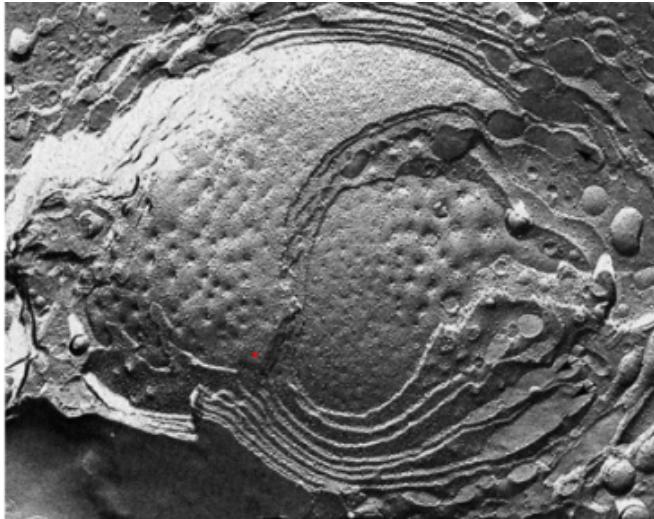
11. Which answer is **TRUE**?

Which of the main functions of the plasma membrane is attributed to the layer pointed with an arrow?



Lösung

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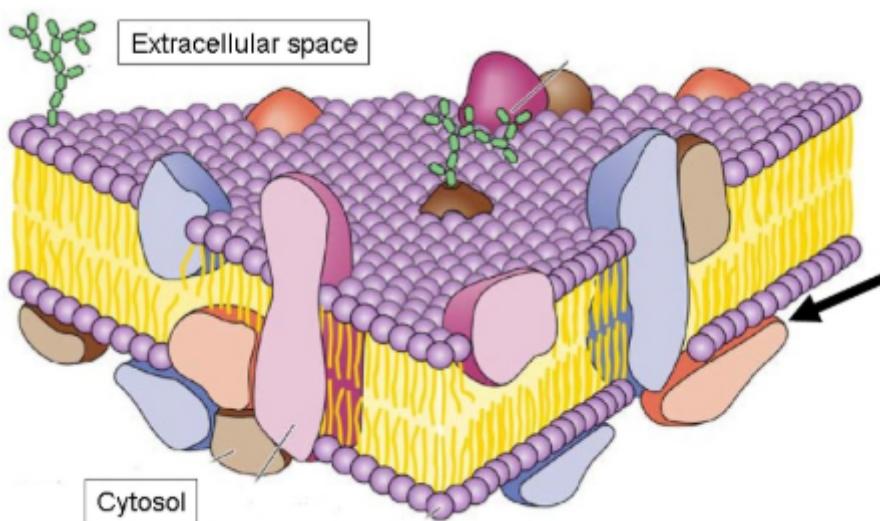
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- A. Link to the cytoskeleton
 B. Maintenance of a barrier for water soluble molecules
 C. Specific binding of ligand molecules
 D. Ion transport

12. All of the following statements regarding hematoxylin& eosin (H&E) stain are true EXCEPT:

- A. The basophilic structures are red in color
 B. The structures, stained in red by eosin are referred to as acidophilic
 C. Hematoxylin stains in blue the acidic structures in the cell
 D. Hematoxylin is a basic stain, eosin is an acidic stain
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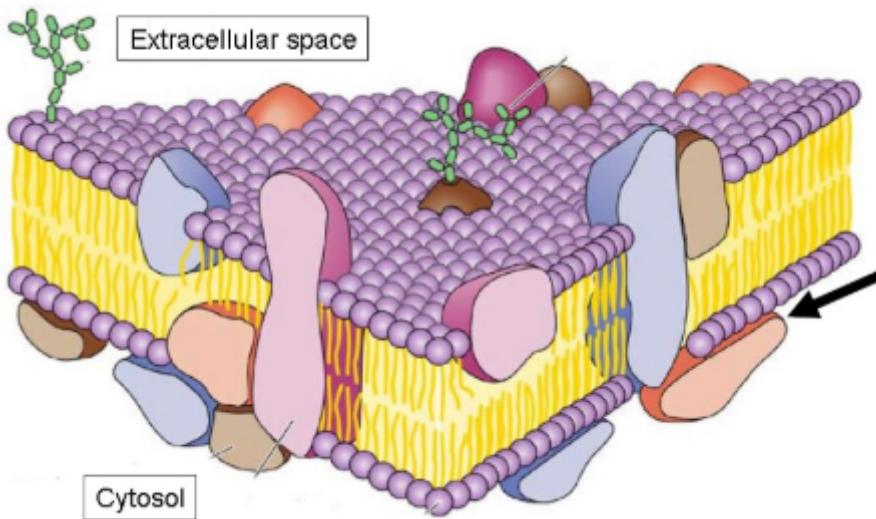
13. The protein clathrin is involved in all of the following EXCEPT:

- A. Intracellular traffic
 B. Endocytosis
 C. Vesicle formation
 D. Protein synthesis
 E. Plasmalemmal receptors

14. Which of the following cytoskeletal elements is important for the nucleus:

- A. Intermediate filaments

Lösung



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- A. Intermediate filaments

Intermediate filaments

All are important

Microtubules

None are important

Actin filaments

15. The basic units of chromatin are called:

- A. Cajal bodies
- B. Nucleosomes
- C. Nuclear bodies
- D. Nuclear speckles
- E. Nucleoli

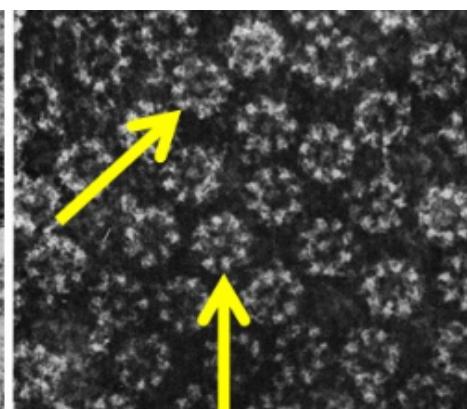
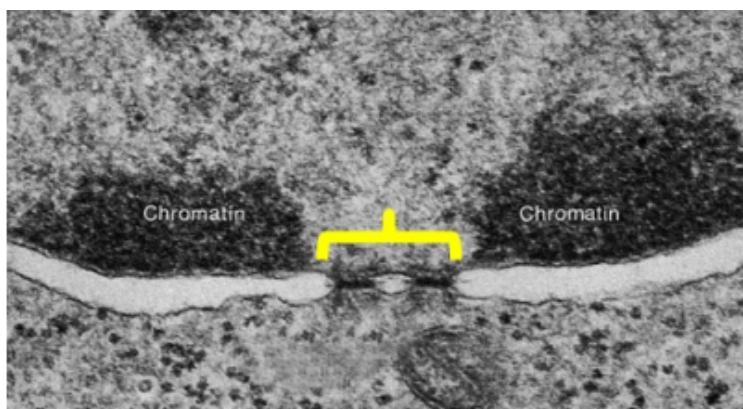
16. What type of cell junction is the adherent junction:

- A. Both cell-cell and cell-matrix
- B. Neither cell-cell nor cell-matrix
- C. Cell-matrix
- D. Cell-cell

17. Which cell junction allows the easiest passage of molecules from cell to cell:

- A. Gap junction
- B. Hemidesmosome
- C. Synapse
- D. Desmosome
- E. Tight junction

18. Identify the presented structure:



Wrong

A Intermediate filaments

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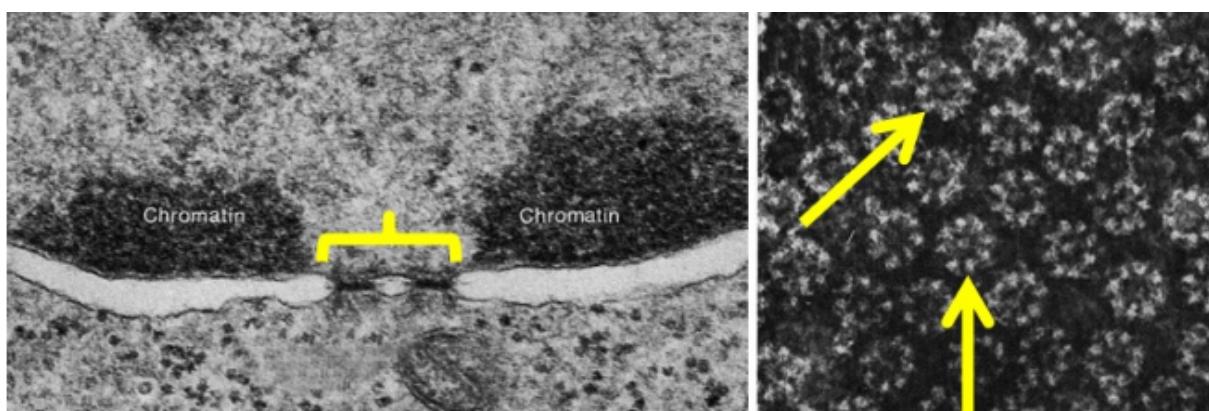
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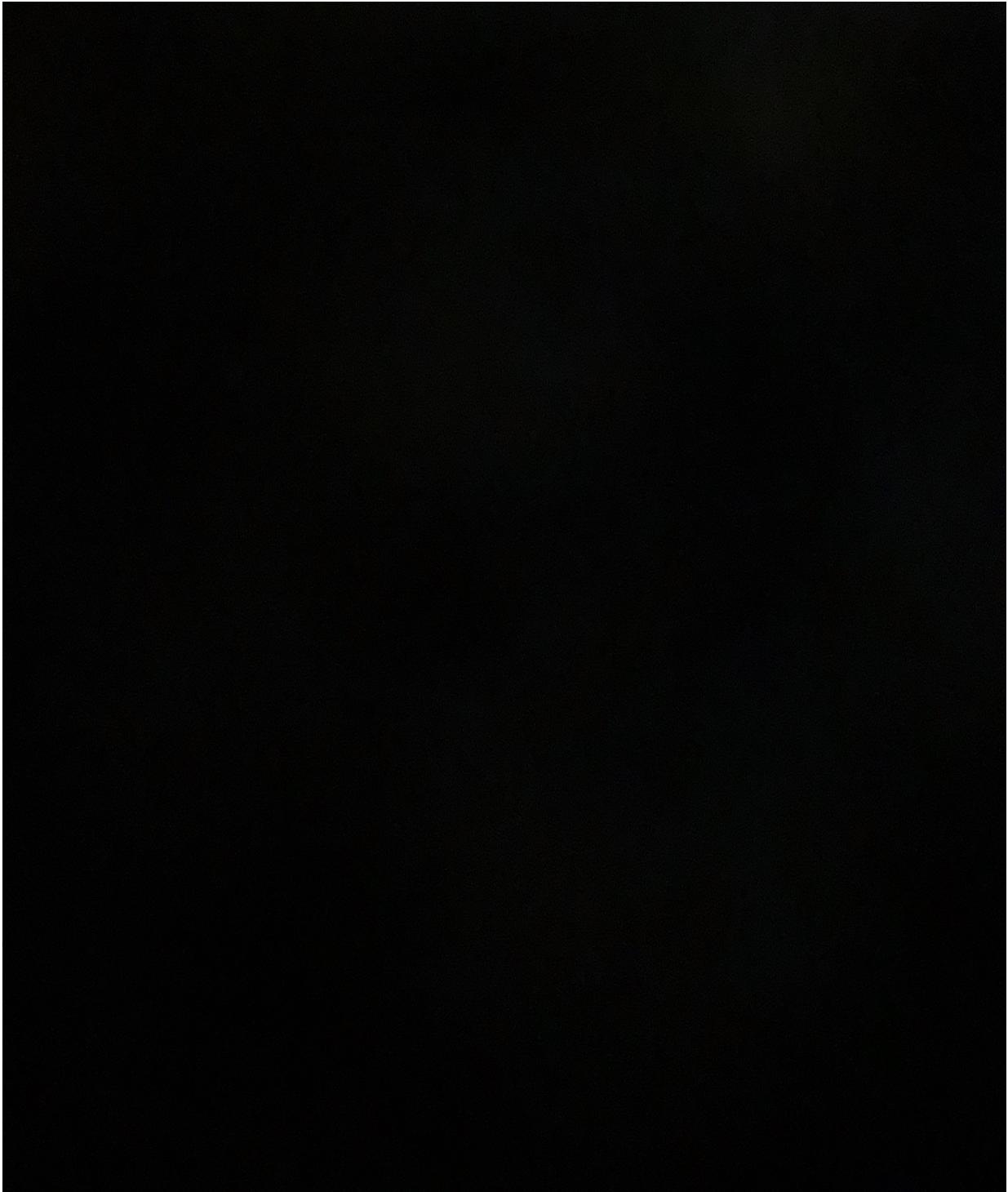
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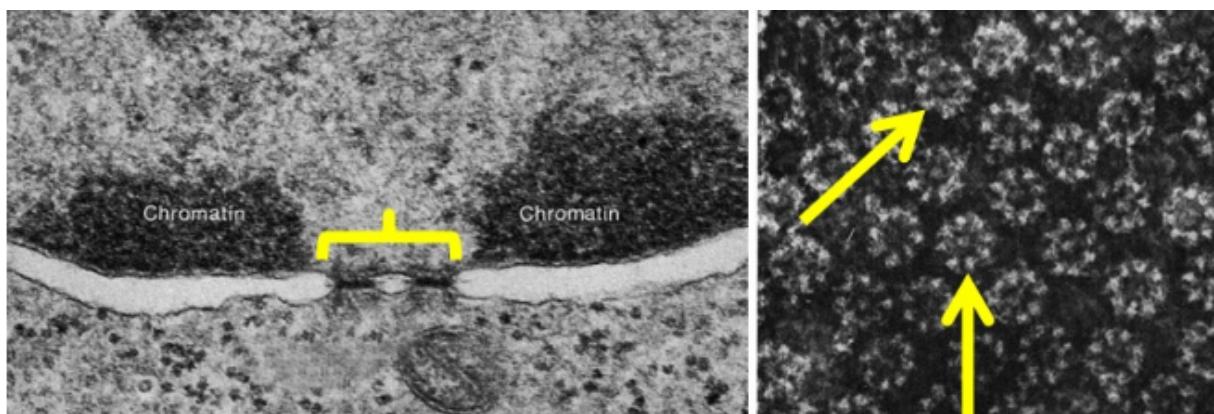
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- A. Nuclear pore complex
- B. Polysome
- C. Terminal cistern
- D. Nucleolus

19. The active chromatin is:

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- B. Both eu- and heterochromatin
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- E. Hematoxylin is a basic stain, eosin is an acidic stain

21. Plasmalemmal proteins originate from which of the listed organelles:

- A. Golgi
- B. Rough ER
- C. Smooth ER
- D. Lysosome
- E. Peroxisome

22. Which of the following answers is TRUE?

The viscous external surface cover of the plasmalemma is called:

- A. Transport protein
- B. Glycocalyx
- C. Phospholipid bilayer
- D. None of the answers is correct
- E. Plasma membrane

(Solving)

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23.Which of the following answers is TRUE?

Dystrophin in skeletal muscle cells binds:

- A. The basal body to the cilium
- B. The microfilaments to the plasmalemma
- C. The lamins to the nuclear envelope
- D. The cytoplasmic organelles to the microtubules
- E. The nexuses to the plasmalemma

24.Which of the following statements is TRUE?

The microtubules are build of:

- A. 13 protofilaments
- B. Keratin proteins
- C. Microfilaments
- D. Neurofilaments
- E. Vimentin proteins

25. What type of cell junction is the desmosome:

- A. Cell-matrix
- B. Cell-cell
- C. Neither cell-cell nor cell-matrix
- D. Both cell-cell and cell-matrix

26.Which of the following statements is TRUE?

The diameter of actin filaments is approximately :

- A. 100-150 nm
- B. 1-2 nm
- C. 6-8 nm
- D. 24-25 nm
- E. 10-11 nm

Wosung

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27. Which cytoskeleton is associated with the desmosome:

- A. None of them

None of them

- B. Intermediate filament
- C. Actin filament
- D. All of them
- E. Microtubule

28. Which of the following organelles is NOT membrane-bound:

- A. Cytoskeleton
- B. Smooth ER
- C. Peroxisomes
- D. Mitochondria
- E. Rough ER

29. Identify the depicted organelle:



- A. Microtubule
- B. Smooth endoplasmic reticulum
- C. Golgi complex
- D. Mitochondrion

30. Where else in the cell are localized the intermediate filaments, except in the cytosol?

- A. Golgi complex

Lösung

- B. Intermediate filament
- C. Actin filament
- D. All of them
- E. Microtubule

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X

Golgi comp

- B. Nucleus
- C. Peroxisomes
- D. Lysosomes
- E. Rough endoplasmic reticulum

31. Which of the listed proteins does not interact with actin filament:

- A. Dystrophin
- B. Kinesin
- C. Actinin
- D. Spectrin
- E. Myosin

32. Which of the following answers is TRUE?

A major function of the rough ER is:

- A. Carbohydrate synthesis
- B. All answers are correct
- C. Glycolipid synthesis
- D. Lipid synthesis
- E. Protein synthesis

33. Ribosomes attach to which organelle:

- A. Mitochondria
- B. Smooth ER
- C. Golgi complex
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- E. Plasma membrane

Worley

- B. Nucleus
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- B. Smooth ER
- C. Golgi complex
- D. Rough ER
- E. Plasma membrane

34. The transport from/to the nucleus takes place via:

- A. Outer nuclear membrane
- B. Inner nuclear membrane

- C. Nuclear lamina
- D. Nuclear pore complexes

35. All listed organelles are bound by biomemebranes, EXCEPT:

- A. Endoplasmic reticulum
- B. Golgi complex
- C. Lysosomes
- D. Ribosomes
- E. Mitochondria

36. Which cytoskeleton is associated with the adherent junction:

- All of them
- Actin filament
- Microtubule
- Intermediate filament
- None of them

desmosome → intermediate filaments

37. Which of the following answers is TRUE?

Amino-oxidase and catalase are characteristic enzymes for:

- A. Smooth endoplasmic reticulum
- B. Golgi complex
- C. Peroxisomes
- D. Lysosomes
- E. Mitochondria

38. What is the main function of the microtubules:

- Intracellular transport
- Protein synthesis
- Structural stability
- Nuclear function
- Membrane receptor interaction

Today

- C. Nuclear lamina
- D. Nuclear pore complexes

35. All listed organelles are bound by biomemebranes, EXCEPT:

- A. Endoplasmic reticulum
- B. Golgi complex
- C. Lysosomes
- D. Ribosomes
- E. Mitochondria

36. Which cytoskeleton is associated with the adherent junction:

- A. All of them
- B. Actin filament
- C. Microtubule
- D. Intermediate filament
- E. None of them

37. Which of the following answers is TRUE?

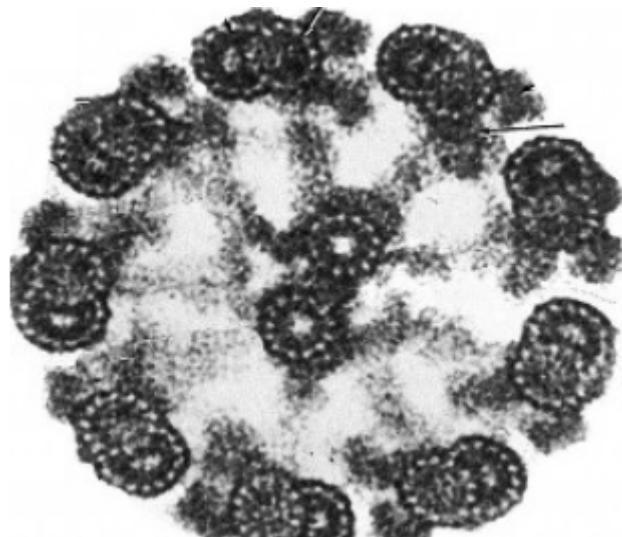
Amino-oxidase and catalase are characteristic enzymes for:

- A. Smooth endoplasmic reticulum
- B. Golgi complex
- C. Peroxisomes
- D. Lysosomes
- E. Mitochondria

38. What is the main function of the microtubules:

- A. Intracellular transport
- B. Protein synthesis
- C. Structural stability
- D. Nuclear function
- E. Membrane receptor interaction

39. The presented cross section depicts which structure?



- Desmosome
- Cilium
- Centriole
- Actin filament

40. Which cytoskeleton is associated with the hemidesmosome:

- A. Microtubule
- B. None of them
- C. All of them
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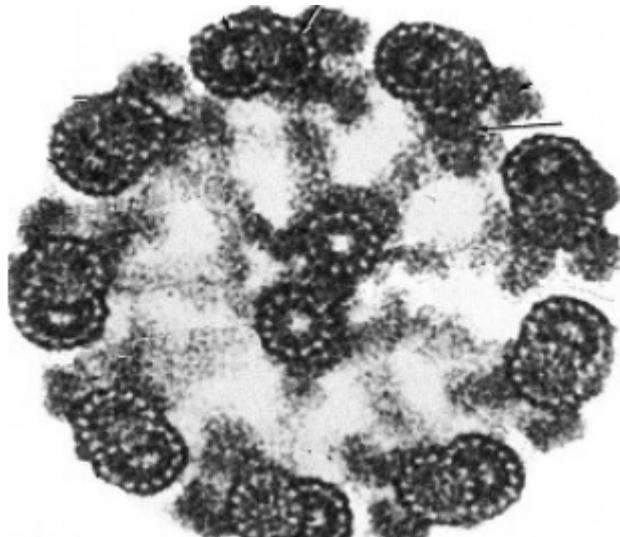
*desmosome — interm.
adherent junction — actin fil.*

41. What type of cell junction is the focal adhesion:

- A. Neither cell-cell nor cell-matrix
- B. Both cell-cell and cell-matrix
- C. Cell-cell
- D. Cell-matrix

tsung

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- B. Both cell-cell and cell-matrix
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42. All of the following answers are true EXCEPT:

Microtubules can be localized:

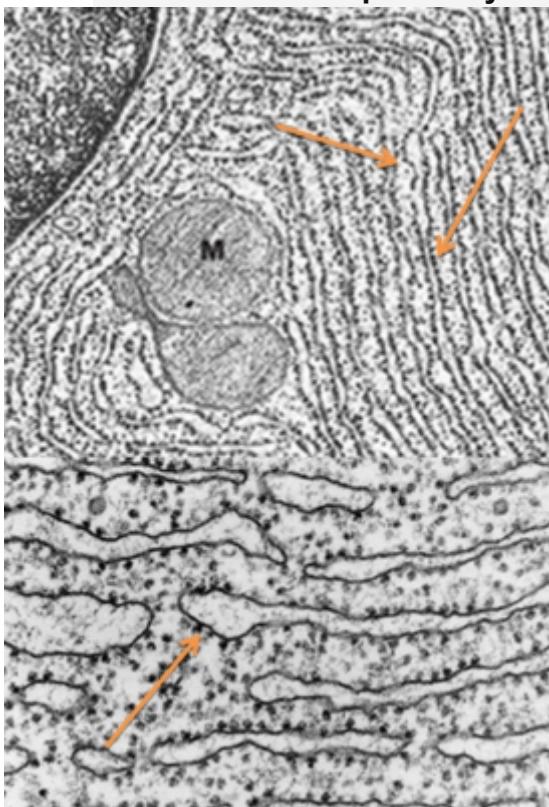
- A. In cilia
- B. In flagella

X

← Q. 42

- C. In microvilli
- D. In centrosomes
- E. To the cytosol - free

43. The structures depicted by arrows are cisterns of:



- A. Mitochondrion
- B. Nucleus
- C. Smooth endoplasmic reticulum
- D. Rough endoplasmic reticulum

44. What type of cell junction is the hemidesmosome:

- A. Cell-cell
- B. Neither cell-cell nor cell-matrix
- C. Cell-matrix
- D. Both cell-cell and cell-matrix

45. What is the normal pathway of migration of proteins through the Golgi Aparatus?

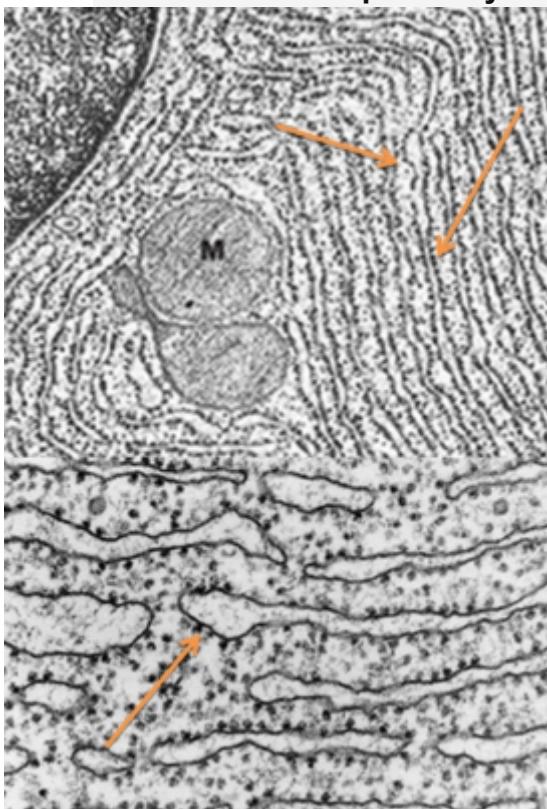
- a. Trans-golgi -> dictyosomes -> cis-golgi -> trans-golgi network

↳ my

Q. 42

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- Trans-golgi → dictyosomes → cis-golgi → trans-golgi network
- Cis-golgi → Dictyosomes → trans-golgi → trans-golgi network
- Dictyosomes → cis-golgi → trans-golgi → trans-golgi network
- Dictyosomes → trans-golgi → cis-golgi → trans-golgi network
- Trans-golgi network → trans-golgi → Dictyosomes → cis-golgi

46. Which of the following statements is true?

Where are localized the fibres of the nuclear lamina?

- All the answers are correct
- At the centre of the nucleus
- Inside if the nuclear pore, with filaments extending into the cytoplasm
- Just inside the inner nuclear membrane
- Just inside the outer nuclear membrane

47. Which of the following statements is true?

DNA synthesis occurs during which phase of the cell cycle?

- G1 phase
- S Phase
- G0 phase
- M Phase
- G2 phase

48. The process of apoptosis normally occurs:

- During ... cell death ?
- All answers are correct
- During the embryonic development
- None answers are correct ?
- During a ... process in the tissues ?

49. Glycogen granules

- Generate muscle contraction
- Are secreted by endocrine cells
- Help the structural support of the cells
- Couple excitable cells
- Are responsible for storage of glucose

50. Which is the range of size of human cells?

- 2 - 10 nm
- 5 - 100 nm
- 10 - 500 nm
- 5 - 200 μm
- 1 - 10 mm

Lesung

- Cis-golgi -> Dictyosomes -> trans-golgi -> trans-golgi network
- c. Dictyosomes -> cis-golgi -> trans-golgi -> trans-golgi network
- d. Dictyosomes -> trans-golgi -> cis-golgi -> trans-golgi network
- e. Trans-golgi network -> trans-golgi -> Dictyosomes -> cis-golgi

✓ *Z*

was ausführlich richtig

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Z *apoptosis is the process of programmed cell death.*

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- d. 5 - 200 μ m
- e. 1 - 10 mm

51. Which cellular organelles are most closely associated with the rough ER?

- Peroxisomes
- Mitochondria
- Lysosomes
- Endosomes
- Ribosomes

52. Which of the following is true

- Each centriole is formed of 9 microtubules doublets + 2 in the centre
- Each centriole is formed of 9 microtubule triplets + 2 in the centre
- Each centriole is formed of 9 microtubule triplets + 0 in the centre

53. All of the following statements in true except:

- Ribosomes have
- Ribosomal subunits are produced in the nucleolus
- Ribosomes are composed of 2 identical subunits
- Ribosomes contain rRNA and proteins
- Ribosomes are composed of 68 S and 48 S subunits

54. All of the following cell junction are associated with the cytoskeleton except:

- Gap junctions
- Desmosomes
- Adherent junctions
- Focal adhesion contacts
- Hemidesmosomes

55. All of the statements are true except: secretory proteins

probably: true about secretory proteins

- Are destined for plasma membrane
- Start their synthesis on free polyribosomes
- Are destined for secretory granules
- Are destined for lysosomes

Young



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- d. Endosomes
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- c. Are destined for secretory granules
- d. Are destined for lysosomes

56. Which of the following statements regarding the structure of bio-membranes is true?

Biomembranes contain mainly proteins, nucleic acids and carbohydrates

Integral proteins are always present on the outer surface of the plasma membrane

X? 0



-  Biomembranes are supramolecular lipoprotein complexes composed of polar lipids and proteins
- d. Biomembranes are static structures and have the same composition in all cells
 - e. Biomembranes do not contain cholesterol and glycolipids

57. Which of the following is not true? The cytosol...

- Contains only ions and small proteins
- Contains high amount of water
- Contains large amounts of macromolecules
- Is a complex mixture of substances dissolved in water
- Include multiple levels of organization.

58. The role of calcium in muscle contraction is:

59. All of the following are true except: molecules involved in the transmembrane transport (<100e D) molecules are:

- ATP binding cassette transporters
- Glucose transporters
- Ion channels
- Hormone receptors
- Ions pumps

60. Which of the following regarding Golgi complex is true?

- It is the site of proteins glycolisation
- It does not interact with the lysosomes
- It is responsible for the storage of Ca^{2+} ions
- Its Cis-compartment is continuous with the membrane of the nuclear envelope

61. Which of the following is not true: the part of the DNA which are expressed are concentrated in:

- Nucleus
- Nuclear lamina
- Euchromatin
- Nuclear pore complex
- Heterochromatin

62. All are true except: Components of the nuclear envelope are:

- Chromatin
- Nuclear lamina
- Outer nuclear membrane
- Inner nuclear membrane
- Nuclear pore complex

Loony

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- e. Include multiple levels of organization.

58. The role of calcium in muscle contraction is: *to bind to troponin*

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- Chromatin
- b. Nuclear lamina
- c. Outer nuclear membrane
- d. Inner nuclear membrane
- Nuclear pore complex

- e. Nuclear pore complex

63. Major mitochondrial functions are:

- Generation of ATP
- b. Calcium storage
- c. Citric acid (Krebs) cycle
- d. Phagocytosis
- e. Induction of apoptosis

64. Which of the following is not characteristic of living matter?

- a. Reproduction
- ...
- c. Growth
- Response to stimuli
- e. Adaption

65. Which of the statements are true: cell movement requires

- Actin filaments
- b. Elastic fibres
- c. Intermediate filaments
- d. Caveolae
- e. Microtubules

66. Which of the following are not carbohydrates:

- Polypeptides
- b. Ribose
- c. Cellulose
- d. Glucose
- e. Glycogen

67. Which statement is true: extracellular proteins such as hormones achieve their effects on the cells by means of:

- a. Ion pumps
- Transmembrane receptors
- c. Cytoplasmic receptors
- d. Nuclear receptors
- e. Ion channels

68. All of the following statements are true except: the following cell types may have more than one nucleus:

- a. Hepatocytes

- b. Skeletal muscle cell
- c. Osteoclasts
- d. Neutrophil leukocytes
- e. Cardiac muscle cells

69. All of the following are true except: aging is associated with which type of process:

- a. Hyperplasia
- b. Functional impairment
- c. Degeneration
- d. Apoptosis
- e. Hypertrophy

70. Which statement is true: intermediate filaments:

- a. Contain keratin
- b. Have a wall composed of 13 protofilament strands
- c. Are responsible for the muscle contraction
- d. Consist of globular actin monomers forming a double helix
- e. Associate with myosin

71. Which of the statements is true: F-actin is found in:

- a. Microfilaments
- b. Intermediate filaments
- c. All answers are correct
- d. Microtubules
- e. None of the answers is correct

72. Which of the statements is true: Ca²⁺ release from the ER takes place via:

- a. Ryanodine receptor
- b. Sacroendoplasmic reticulum Ca²⁺ ATPase (SERCA)
- c. Na/Ca pump
- d. Voltage-sensitive Ca²⁺ channels
- e. Dihydropyridine receptor

73. Golgi complex rough ER communication requires?

- a. Clathrin-coated vesicles
- b. Lysosomes
- c. Peroxisomes
- d. Endosomes

 c. COP-coated vesicles

74. Which of the following statements is true: the change of cell shape requires which of the following organelles?

- a. Golgi complex
- b. Coated pits
-  c. Actin filaments ?
- d. Collagen fibres
- e. Peroxisomes

75. Which of the following statements regarding histological techniques is not true?

-  a. Paraffin embedding includes freezing of the material
- b. The most widely employed methods is called paraffin embedding method
- c. Cell structure is most commonly studied in tissue slices called sections
- d. The process through which cell structure is preserved is called fixation
- e. Sectioning is accomplished by using a cutting apparatus called a microtome

76. Which of the following organelles are non-membranous?

- a. ER
- b. Lysosomes
- c. Peroxisomes
-  d. Microtubules
- e. Plasmalemma

77. Which of the following statements about the plasma membrane is not true?

- a. It maintains the negative charge of the cell surface
- b. It is important for the cell-to-cell recognition
- c. It has selective permeability
-  d. It contains filaments and microtubules
- e. It contains surface cell antigens and enzymes

78. The mitochondrial functions are:

- a. Phagocytosis
- b. Calcium storage
- c. Citric acid (Krebs) cycle
-  d. Generation of ATP
- e. Induction of apoptosis

79. Ribosomes can attach which of the following?

 a. Peroxisomes → No DNA → Proteins imported via Ribosomes
=Free Polyribosomes

- b. Outer nuclear membrane
- c. All the answers are true
- d. Lysosomes
- e. Golgi complex → But only as protein vesicles ⚡ Rhosomes

80. Which of the following is a marker enzyme for lysosomes?

- a. Acid phosphatase
- b. Citrate synthase
- c. Succinate dehydrogenase
- d. Pyruvate decarboxylase
- e. Pyruvate carboxylase

81. Which of the following is not true:

- a. Proteins contain glycerol, fatty acids and ATP
- b. The 2 nucleic acids in the cell are DNA and RNA
- c. Lipids are relatively insoluble in water
- d. ATP is a form of energy storage
- e. Some hormones have lipid structure

82. Which of the following statements is true: autophagosomes are typical for:

- a. Macrophages
- b. Lymphocytes
- c. Exocrine cells
- d. Muscle cells
- e. Neurons

83. All of the following are true except: secretory proteins

- a. Bind to signal recognition particles (SRP)
- b. Are translocated into the rough ER
- c. Are translocated into the nucleus
- d. Are translocate into the smooth ER
- e. Have a signal sequence

84. Which of the following is true: the middle segment of chromosome is known as:

- a. Acromere
- b. Chromatid
- c. Centromere
- d. Telomere
- e. Kinetochore

85. All of the following statements regarding the pigment deposits are true except:

- a. Haemoglobin is a pigment
- b. Pigment deposits are found in only some cells
- c. Melanin is a pigment
-  Hemosiderin is a pigment
- e. Lipofuscin is a pigment

86. All of the following are true except: tissues grow in size because of the following process:

- a. All are correct
-  Apoptosis
- c. Hypertrophy
- d. Hyperplasia
- e. Mitosis

87. Which cells have a prominent rough ER?

- a. Adrenal gland cells
- b. Leydig cells
- c. Adipocytes
- d. Follicular cells
-  Neurons

88. Which of the following is not true regarding cell shape:

- a. Oocytes have spherical shape
- b. Astrocytes have a stellate (star-like) shape
- c. The epithelial lining of the small intestine is composed of columnar cells
- d. Hepatocytes are polyhedral cells
-  Smooth cells are cuboidal cells

89. Which if the following statements is true: the parts of DNA which are not expressed are concentrated in:

-  Nuclear lamina
- b. Nucleolus
-  Heterochromatin
- d. Nuclear pore complex
- e. Euchromatin

90. Which is not normally present in cytosol?

-  HCO_3^-
-  Hg^{2+}

- c. Ca^{2+}
- d. HPO_4^{2-}
- e. Mg^{2+}

91. Which of the following statements is true?

Which if the following structures increases the cell surface area necessary for absorption?

- a. Flagella
- b. Cilia
- c. Stereocilia
- d. Microvilli
- e. All answers are correct

92. Which cells have plenty of lysosomes

- a. Adipocytes
- b. Cardiac muscle cells
- c. Erythrocytes
- d. Phagocytes
- e. Glial cells

93. All of the statements are true except:

Integrins are:

all should be right

- a. Extracellular matrix receptors
- b. Transmembrane proteins
- c. Laminin receptors
- d. Intermediate filament receptors
- e. Fibronectin receptors

94. Which statement is true: which family of proteins are executioners of apoptosis

- a. Glucuronidases
- b. Sulfatases
- c. Lipases
- d. Capsases
- e. Acid phosphatases

95. Which is the main function of the intermediate filaments?

- a. Cell movement
- b. Structural stability of the cell
- c. All answers are correct

- d. Constriction
- e. Cell division

96. The role of calcium in muscle contraction is:

- a. None of the answers is correct
- b. To maintain the structure of the myosin filament
- c. To bind to troponin and thereby expose actin filaments to myosin heads
- d. To spread the actin potential from the plasma membrane to the contractile machinery
- e. To detach myosin heads from the actin

97. How many are the centrioles during the G2 phase of the cell cycle

- a. 0
- b. 8
- 4
- d. 2
- e. 6

98. Which of the following statements is true: microtubules:

- a. Have a wall composed of 13 protofilaments strands
- b. Associate with myosin
- c. Consist of globular actin monomers forming a double helix
- d. Provide structural support to astrocytes
- e. Contain keratin

99. Division of tissue stem cells results from the direct activity of

- a. Carbohydrate molecules
- b. Lipid molecules
- c. DNA molecules
- d. Proteins molecules acting as ligand-receptor interactions
- e. RNA molecules

100. Which cells have plenty of lysosomes?

- a. Adipocytes
- b. Cardiac muscle cells
- c. Erythrocytes
- d. Phagocytes
- e. Glial cells

101. Free polyribosomes synthesize proteins for

- a. Lysosomes
- b. Cytosol
- c. Complex of Golgi
- d. Exocytosis
- e. Smooth ER

102. Main molecular railroads for intracellular transport are the:

- a. Microtubules
- b. Centrosomes
- c. Microfilaments
- d. Myosin filaments
- e. Intermediate filaments

103. All are true except: electrically excitable cells are:

- a. Adipocytes
- b. Neurons
- c. Cardiomyocytes
- d. Leiomycytes
- e. Phabomyocytes

104. The rough ER:

- a. It does not contain ribosome on its surface
- b. It is responsible for the biosynthesis of lipids
- It takes part in the metabolism of glycogen → ~~smooth~~
- c. It is present in all cells but is abundant in cells specialized for protein secretion
- e. It is associated with the production and metabolism of steroid hormones

105. Which of the following statements regarding cell shape is not true:

- a. The epithelial lining of the small intestine is composed of columnar cells
- b. Smooth muscle cells are cuboidal cells
- c. Hepatocytes are polyhedral cells
- d. Oocytes have spherical shape
- e. Astrocytes have a stellate shape

106. Which is not true.

- a. Prokaryotic cells are cells with a nuclear envelope
- b. The human cells are eukaryotic
- c. Eukaryotic cells are large and demonstrate a complex organization
- d. Eukaryotic cells constitute predominantly multicellular organisms

- e. Prokaryotic cells are small with simple organization

107. All are true except: components of the mitotic spindle are

- a. Actin filaments
 - b. Kinetochore microtubules
 - c. Astral microtubules
 - d. Kinesin motors (motor protein)
 - e. Overlap microtubules
- Laut Töchter Vorlesung = richtig
function depends on - dynein*

108. The mitochondrial ATP synthase is involved in

- a. Gas exchange
- b. Absorption and secretion
- c. Synthesis of steroid hormones
- d. Synthesis of proteins
- e. Oxidative phosphorylation

109. Which of the following particles is involved in the generation of ATP:

- a. Proteins
- b. Neutrions
- c. Electrons
- d. Molecules
- e. Atoms

110. Which substances are detected by periodic acid-Schiff (PAS) staining method?

- a. Proteins
- b. Glycoproteins and glycolipids
- c. Fatty acids
- d. Steroids
- e. Oligosaccharides

111. Signal-recognition particle (SRP) receptors are required for the translocation of:

- a. Secretory proteins
- b. Cytosolic proteins
- c. Peroxisomal proteins
- d. Nuclear proteins
- e. Mitochondrial proteins

112. The cell participating in closing the wounds during wound healing are:

- a. Adipocytes
- b. Myofibroblasts

- c. Neurons
- d. Skeletal muscle cells
- e. Hair follicles

113. Plasmalemal proteins.

- a. Ion channels are transmembrane proteins
- b. H-proteins are tranmembrane proteins
- c. Glycocalix molecules are on the internal side of the plasmalemma
- d. Membrane proteins do not interact with other molecules
- e. Growth factor receptors are endomembrane proteins.

114. What cell type has squamous shape:

- a. Intestinal goblet cell
- b. Oocytes
- c. Endothelial cells
- d. Hepatocytes
- e. Neurons

115. Which of the following membrane proteins are not localized in the plasma membrane?

- a. Cluster of differentiation (CD) markers
- b. Histone molecules
- c. Ion channels
- d. Receptors
- e. Cell adhesion molecules

116. All of the following statements regarding the pigment deposits are true except:

- a. Hemosiderin is a pigment
- b. Pigment deposits are found only in some cells
- c. Melanin is a pigment
- d. Lipofuscin is a pigment
- e. Haemoglobin is a pigment

117. All are true except: apoptosis is:

- a. A regulated process
- b. A genetically determined process
- c. A spontaneous process
- d. Initiated by a mitochondrial enzyme
- e. Affected by external signals

118.Golgi complex rough ER communication requires?

- a. Endosomes
- b. Clathrin-coated vesicles
- c. Lysosomes
- d. Peroxisomes
- e. COP-coated vesicles

119.Which of the following are molecules are the material carriers of life:

- a. Lipids
- b. Glycolipids and carbohydrates
- c. Cholesterol
- d. Nucleic acids and proteins
- e. Fatty acids

120.Which of the following statements about the lysosomes is not true?

- a. Lysosomes contain a large variety of hydrolytic enzymes
- b. Lysosomal enzymes digest macromolecules and foreign material
- c. The optima pH of lysosomal digestion is pH 8
- d. Lysosomal proteins are targeted via mannose-6-phosphate receptor
- e. Lysosomes are found in all cells

121.Clathrin coated vesicles are formed from

- a. Peroxisomes
- b. Mitochondria
- c. Nuclear envelope
- d. Endosomes
- e. Trans-Golgi network

122.Microfilaments

- a. Have a wall composed of 13 proto-filaments strands
- b. Associate with kinesin
- c. Provide structural support to astrocytes
- d. Consist of globular actin monomers forming double helix
- e. Contain keratin

123.All are true except: major mitochondrial functions are:

- a. Phagocytosis
- b. Citric acid cycle
- c. Generation of ATP

- d. Calcium storage
- e. Induction of apoptosis

124. Which are the main components of the nucleus

- a. Nuclear envelope
- b. Nuclear pore complexes
- c. All answers are correct
- d. Chromatin
- e. Nuclear bodies

125. Which statement is not true? The cytosol:

- a. Includes multiple levels of organisation
- b. Constrains a high amount of water
- c. Contains large amounts of macromolecules
- d. Is a complex mixture of substances dissolved in water
- e. Contains only ions and small proteins

126. The kinetochore binds to which segment of the chromosomes?

- a. Kinetochore
- b. Centromere
- c. Acromere
- d. Telomere
- e. Chromatid

127. Autophagosomes are typical for:

- a. Neurons
- b. Exocrine cells
- c. Lymphocytes
- d. Muscle cells
- e. Macrophages

128. Which statement regarding Golgi-complex is not true:

- a. It is present in cells synthesizing and secreting substances mainly for export and less for intracellular needs
- b. It is a semi-autonomous organelle that contains DNA, RNA and ribosomes.
- c. It is composed of flattened cisternae, small vesicles and large vacuoles
- d. It is well-expressed in neurones and glandular cells
- e. It is an obligatory, membrane-limited, polarized, asymmetric and dynamic organelle

129. Which is not true:

- a. The 2 nucleic acids in the cell are DNA and RNA
- b. Some hormones have lipid structure
- c. ATP is a form of energy storage
- d. Proteins contain glycerol, fatty acids and ATP
- e. Lipids are relatively insoluble in water

130. Intermediate filaments are composed of:

- a. Tubulin
- b. Actin
- c. Myosin
- d. Keratin
- e. Kinesin

131. All are true except: components of the nuclear envelope are:

- a. Nuclear lamina
- b. Inner nuclear membrane
- c. Nuclear pore complex
- d. Chromatin *binds with lamina*
- e. Outer nuclear membrane

132. All are true except: synaptic vesicles:

- Use the microtubules for their movement
- b. Need calcium ions for their release
- c. Are found in nerve cells
- d. Do not have membrane
- e. Contain neurotransmitter molecules

1	B
2	A
3	A
4	B
5	D
6	A
7	C
8	A
9	D
10	B

11	A
12	A
13	D
14	A
15	B
16	D
17	A
18	A
19	D
20	B
21	B
22	B
23	B
24	A
25	B
26	C
27	B
28	A
29	D
30	B
31	B
32	E
33	D
34	D
35	D
36	B
37	C
38	A
39	B
40	D
41	D
42	C
43	D
44	C

45	B
46	D
47	B
48	?
49	D
51	E
52	C
53	C/E
54	A
55	?
56	C
57	A
58	?
59	?
60	C
61	?
62	A
63	A
64	?
65	A
66	A
67	B
68	?
69	?
70	B
71	A
72	?
73	E
74	C?
75	A?
76	D
77	D
78	?
79	B?

80	A
81	A
82	?
83	D
84	C
85	D
86	?
87	E
88	E?
89	C
90	?
91	E
92	D
93	A
94	?
95	C?
96	?
97	D?
98	A
99	?
100	D
101	?
102	?
103	B
104	D
105	B
106	A
107	?
108	E
109	C
110	?
111	A
112	?
113	A

114	?
115	B
116	A
117	C
118	E
119	D
120	C
121	E
122	D?
123	C
124	C
125	E
126	?
127	?
128	B
129	D
130	?
131	D
132	D

Cytology Questions & Answers

1. Which of the following is not included in the glycocalyx? **Steroids**
2. Which of the following are not characteristic friction for
3. Organelles involved in rectory pathway? **All are true except peroxisomes.**
4. Electrically excited cells are? **All are true except adipocytes.**
5. Which substances are detected by periodic acid shift PAS staining method? **Glycolipids & Glycoproteins.**
6. Which of the following are inorganic compounds of the cell? **Water**
7. Microtubules..which of the following statement is true? **Have a wall composed of 13 protofilament.**
8. Which of the following statements regarding lysosomes is true? **Optimal pH is 5.0**
9. The middle segment of chromosomes is known as.. **Centromere.**
10. All of the following cell junctions are associated with the cytoskeleton except? **Nexuses (Gap junctions).**
11. Synaptical vesicles..are all true except? **Do not have a membrane.**
12. Cytoskeleton motor proteins are..all are true except? **Vimentin.**
13. The division of the nucleus is reffered to as? **Mitosis.**
14. Where are localised the fibres of the nuclear lamina? **Just inside the inner nuclear membrane.**
15. Which of the following regarding cell shape is not true? **Smooth muscle cells are cuboidal cells.**
16. Integrins are..all are true except? **Intermediate filament receptors.**
17. All of the following structures contain microtubules except? **Microvilli.**
18. All of the following are cell to cell junctions except? **Hendesnosomet**
19. Which statement regarding peroxisomes is true? **Peroxisomes are generated from pre-existing peroxisomes.**
20. Secretory granules..all are true except? **Are returned to the Rough ER for recycling.**
21. Which is the range of thickness of the biological membranes? **5-10µm.**
22. F-actin is found in? **Microfilaments.**
23. Components of the nuclear envelope..all are true except? **Chromatin.**

24. Which of the following statements related to the Golgi Complex is not true? **It is a semi autonomous organelle that contains DNA, RNA & Ribosomes.**
25. Autophagosomes are typical for? **Lymphocytes.**
26. The cytosol..which of the following statements is not true? **Contains ions and small proteins.**
27. Intermediate filaments are composed of? **Keratin.**
28. Synaptic vesicles..all are true except? **Use microtubules for their movement.**
29. Smooth ER is not involved in? **Protein synthesis.**
30. Ribosomes can attach to which of the following? **Outer nuclear membrane.**
31. Ca²⁺ release from the endoplasmic reticulum takes place via? **Voltage sensitive Ca²⁺ channels.**
32. Extracellular proteins such as hormones achieve their effect on the cells by the means of? **Transmembrane receptors.**
33. Secretory proteins..all are true except? **Are translocated into the nucleus.**
34. Which of the cells have a prominent rough ER? **Adrenal gland cells.**
35. The parts of DNA which are not exposed are concentrated in..? **Heterochromatin.**
36. Amino-oxidase and catalase are characteristic enzymes of..? **Peroxisomes.**
37. Microtubules..all are true except? **Are the thick filaments of the sarcomere.**
38. Intermediate filaments are associated with which of the following cell functions? **Desnomet.**
39. Organelle included in the secretory pathway..All are true except? **Peroxisomes.**
40. Which of the following is not a component of the plasma membrane? **Nucleic acids.**
41. Which of the following substance is not a component of the biomembrane? **Melanin.**
42. Microfilaments..**Consist of globular actin monomers forming a double helix.**
43. Which of the following of the cell matrix function is true? **Regulates intracellular traffic of the molecule.**
44. Which of the following statements regarding the Golgi Complex is true? **It is the site of protein glycosylation.**
45. Intracellular targeting of vesicles depends on? **Snare-Snare Interactions.**
46. The Barr-body corresponds to? **Heterochromatin.**
47. Integrins..**Link the Extracellular Matrix with the Cytoskeleton.**

48. The chromatin contains the following elements..All are true except? **RNA**.
49. Microtubules..all are true except? **Associate with Myosin**.
50. Major mitochondrial compartments are..All are true except? **Mitochondrial pores**.
51. Which of the following is not a characteristic of living matter? **Refraction**.
52. Tissues grow in site because of the following processes..All are true except? **Apoptosis**.
53. Ageing is associated with which type of processes..All are true except? **Hyperplasia**.
54. The main molecular railroads for intracellular transport are? **Microtubules**.
55. Biological membranes..Which of the following is not true? **Organise the mitotic spindle during cell division**.
56. Which of the following statements about cell matrix functions are true? **It regulates intracellular traffic of molecules and organelles**.
57. The cytoplasmic inclusions...? **ALL** answers are correct.
58. Ribosomes are..All are true except? **Related in function to lipid synthesis**.
59. Apoptosis is..All are true except? **A spontaneous process**.
60. Cell crystals..**Crystalline forms of protein**.
61. Which family of proteins are excretions of apoptosis? **Caspases**.
62. Which of the following statements related to histological techniques is not true? **Paraffin embedding includes processing of the material**.
63. Which of the following about eukaryotic/prokaryotic cells is not true? **Prokaryotic cells are cells with a nuclear envelope**.
64. All of the following statements regarding pigment deposits are true except? **Globin is a pigment**.
65. Movement of which type of particle is involved in the generation of ATP? **Proton**.
66. Signal recognition particle/SR receptors are required for the translocation of..? **Secretory Proteins**.
67. Cells participating in closing the wound during..? **Myofibroblasts**.
68. Which cell type has a squamous shape? **Endothelial cells**.
69. Which of the following statements about plasmalemma is true? **Ion channels are transmembrane proteins**.
70. Which of the following membrane proteins are not localised in the plasma membrane? **Histone molecules**.

71. Which of the cell types have more than one nucleus? All are true except..**Neutrophil Leukocytes.**
72. Which of the following statements about lysosomes is not true? **Optimal pH of lysosomal digestion is pH 8.0**
73. Which of the following molecules are material carrier of life? **Protein & Nucleic acids.**
74. Golgi Complex-RER communication requires .. **COP coated vesicles.**
75. Clathrin coated vesicles are formed in..**Trans Golgi network.**
76. The change of cell shape requires which following organelles? **Actin filaments.**
77. Which is the size range for peroxisomes? **0.5-1.5mm.**
78. Which of the cytoskeletal proteins is components of nuclear lamina? **Intermediate filaments.**
79. Secretory proteins..**Are not translocated into the RER.**
80. Which type of molecules can pass through the nuclear pore? **Molecules with a nuclear localisation signal.**
81. Which phase of the mitotic cycle is mediated by actin cytoskeleton? **Cytokinesis.**
82. Which of the following does not belong to cytoplasmic inclusions? **Secretory vesicles.**
83. The Zelwegger syndrome is related to biogenesis of which organelle? **Peroxisomes.**
84. Which of the following statements regarding the structure of biomembranes is true?
Biomembranes are supermolecular lipoprotein complexes composed of polar lipids and proteins.
85. The process of apoptosis normally occurs.. **During mitotic cell death.**
86. Secretory granules are characteristic for.. **Exocrine cells.**
87. Mitochondrial ATP synthase is involved in..**Oxidative Phosphorilation.**
88. What is the main function of the intermediate filaments? **Structural stability of the cell.**
89. Which of the following are non membranous? **Microtubules.**
90. Which of the following statement about the cell theory is not true? **There is no close relationship between cell structure and function.**
91. Which of the following is a market enzyme for lysosomes? **Acid phosphatase.**
92. Components of the mitotic spindle are, all true except? **Actin filaments.**
93. Ribosomes can attach to which of the following? **Outer nuclear membrane.**

94. Which of the following statements is not true? **Proteins contain glycerol, fatty acids and ATP.**
95. Which of the following structures (centriole) is true? **Each centriole is composed of 9 microtubule triplets and 0 in the centre.**
96. Which of the following increases surface area necessary for absorption? **Microvilli.**
97. Which of the following about the plasma membrane is not true? **It maintains the negative charge of the cell surface.**
98. Free poly-ribosomes synthesize proteins for..**Cytosol.**
99. Which of the following ions is not present in the cytosol? **Hg²⁺.**
100. Divisions of tissue stem cells result from direct activity of..**DNA molecules.**
101. The role of Calcium in muscle contraction is..**To bind to troponin and expose actin filaments to myosin heads.**
102. How many centrioles are there in non dividing cells? **2.**
103. The kinetic core binds to which segment of the chromosome? **Centromere.**
104. Glycogen granules.. **Are responsible for Glucose storage.**
105. Which of the following methods uses a beam of electrons? **Transmission Electron Microscope.**
106. Which cells have plenty of lysosomes? **Phagocytes.**
107. Molecules involved in the transmembrane transport of small molecules (small than 1000) are all true except? **Hormone receptors.**
108. Which is the range of size of human cells? **5-200mm.**
109. What is the normal pathway of migration of proteins through the Golgi Apparatus? **Cis golgi --> Oyciosomes --> Trans golgi --> Trans golgi: Network.**
110. Which of the following is not a function of EPR? **Microtubule organiser.**
111. Major mitochondrial functions are all true except? **Phagocytosis.**
112. Which of the following molecules are present in the cytosol? **H₂O.**
113. Which of the following molecules are not carbohydrates? **Polypeptides.**
114. What are the main components of the nucleus? **All answers are correct.**
115. Cell movement requires.. **Microtubules.**
116. Cell differentiation includes the following features. All are true except? **Apoptosis.**

117. Which of the following statements related to the RER is true? **It takes part in the metabolism of glycogen.**
118. The diameter of actin filament is of..**6-8nm.**
119. Which of the following statements relating to H&E staining is true? **Basophilic structures under H&E stain are not red.**
120. Where are intermediate filaments present? **In the nucleus and cytosol.**
121. The brushborder of erythrocytes represents which structure? **Microvilli.**
122. The glycocalyx is composed of all, except? **Glycolipids.**
123. Microtubules are found in the..**Microvilli.**
124. What is the function of dystropin? **It links microfilaments to the plasmalemma.**
125. What syndrome is the genetic defect in Dynein linked to? **Kartagener syndrome.**
126. What is the function of the layer at the bottom (usually pointed with an arrow) of the plasmalemma? **Ion transport.**

Embryology Questions & Answers

1. What is present in the 2nd week of development of extraembryonic cavity? **Exocoelomic cysts.**
2. In IVF, what is used to stimulate ovaries? **Gonadotropins are used to stimulate ovaries.**
3. On which day does the posterior neuropore close? **Day 23.**
4. Which are following are derived from the endoderm? **None of the following.**
5. Which embryonic layer is in contact with parietal hypoblast? **Cytotrophoblast.**
6. Which layer is generated by the epiblast? **Epiblast.**
7. Why layer are the primary villi originated from? **Cytotrophoblast.**
8. What structure is under the neural tube? **Notochord.**
9. How long does semen capacitation take? **10 hours.**
10. What is the placenta? **Haemochorral.**

11. What is the percentage of sperm in a sample? **14/94%.**
12. On which day does the process of Allantosis begin? **Days 15-16.**
13. When does second meiosis of oogenesis occur? **Fertilisation.**
14. At the eighth day of development the hypoblast consists of? **Small cuboidal cells.**
15. The amniotic cavity is formed by cells of the? **Epiblast.**
16. Approximately how long after fertilization occurs the first cleavage of the zygote? **30 hours.**
17. The primitive endothelial cells are formed by? **Cells lining the yolk sac.**
18. In the beginning of the 3rd week the paraxial mesoderm differentiates into segments known as? **Somites.**
19. Which embryonic layer is in a direct contact with the parietal hypoblast until the formation of the extraembryonic mesoderm? **Cytotrophoblast.**
20. Monozygous twins may have: **Common amnion, placae and chorion.**
21. The intraembryonic lateral plate mesoderm generates which of the following? **Limb buds.**
22. Which of the statements regarding the types of spermatogonia is NOT true? **Stem cells generating Sertoli cells.**
23. The number of oogonia at birth is approximately? **700 000- 2 000 000.**
24. The primitive endothelial cells are formed by? **Cell linings of the yolk sac.**
25. The amniotic and yolk sac cavities are temporarily connected by? **The neureenteric canal.**
26. The intraembryonic intermediate mesoderm forms? **Gonads.**
27. From which germ layer originates the adenohypophysis (anterior pituitary)? **Surface ectoderm.**
28. Which pharyngeal arch contributes to most of middle ear ossicles? **Second.**
29. Which cells are generated by the secondary spermatocytes? **Early spermatids.**
30. Which effect have prostaglandins of the semen? **A+C.**

31. How does the female reproductive tract assist sperm migration? **B. + C.**
32. Which of the following statements is true? **Chorionic villi are part of the foetal placenta part.**
33. The merging of which structures contributes to the development of the face? **Maxillary & Mandibular processes and Frontonasal prominence.**
34. From which component of the blastocyst can be isolated stem cells capable of organ regeneration in humans? **Embryoblast.**
35. Which of the zona pellucida proteins acts as a receptor for spermatozoa binding? **ZP3.**
36. What is the name of the outer layer of the blastocyst? **Trophoblast.**
37. The process of compaction of the pre-embryo leads to a formation of outer and inner cell mass, which differ in their intercellular junctions as follows: **Outer cell mass --> Tight junctions --> Inner cell mass --> Gap junctions.**
38. From the 3rd month, the hemopoiesis is? **Extravasal.**
39. The number of somites at the end of the 5th week of development is? **42-44.**
40. Which of the following structures originates from the endoderm? **Epithelium of vagina and prostate.**
41. Which of the following stages is not a process of fertilisation? **Gastrulation.**
42. Which of the following phases of the menstrual cycle is under progesterone control? **Secretory phase.**
43. Primary villi result from the proliferation of? **Cytotrophoblast.**
44. In which cavity are localized the exocoelomic cysts during the second week of development? **Extraembryonic cavity.**
45. How long after ejaculation is the maximum fertile time for most sperm? **48 hours.**
46. Which of the following originate(s) from the paraxial mesoderm? **Dermis.**
47. The amniotic cavity is formed by cells of the? **Epiblast.**
48. Gastrulation begins with formation of? **Primitive streak.**

49. The following structures are NOT derived from the endoderm? All answers are true.
50. How long does normally capacitation of the semen take? About 10 hours.
51. The primitive endothelial cells are formed by? Cell linings of the yolk sac.
52. Trophoblastic overgrowth with lack of embryoblast development may lead to? Molar pregnancy (Hydatiform mole).

1. Match the correct answers
- a. Down syndrome
 - b. Klinefelter syndrome
 - c. Turner syndrome
- 4
- 1. XXY Syndrome in males
 - 2. Missing X chromosome in females
 - 3. Trisomy 21
2. Which of the following structures are not cell inclusion?
- a. Glycogen granules
 - b. Lipid droplets
 - c. Centrioles
 - d. Melanin granules
3. Which is an example of tight junction?
- a. Desmosomes
 - b. Zonula occludens
 - c. Nexus
 - d. hemidesmosomes
4. Which of the following cells are with haploid chromosome set?
- a. Spermatozoids
 - b. Hepatocytes
 - c. Somatic cells
 - d. Promegakaryocytes
5. Which of the following pigments belong to the group of iron pigments?
- a. Myoglobin
 - b. Hemoglobin
 - c. Ferritin
 - d. Bilirubin
6. Melanin is a polymer of oxidation products of:
- a. None of the above
 - b. Arginine
 - c. Tryptophan
 - d. Tyrosine
7. Centrosome is made of:
- a. Actin filaments
 - b. Intermediate filaments
 - c. A centriole
 - d. A pair of centrioles
8. All listed are examples of intermediate filaments except?
- a. Myosin
 - b. Desmin
 - c. Keratins

- Glial fibrillary acidic protein
9. Which of the following are with haploid chromosome set?
- Spermatozoids
 - Hepatocytes
 - Somatic cells
 - Promegakaryocytes
10. The attaching and adhesive junctions are known as
- Gap junctions
 - Maculae occludentes
 - Zonula adherentes and maculae adherents
 - Zonula occludentes
11. The hemidesmosomes are situated in
- The basal area of the epithelial cells
 - b/n the cells of connective tissue
 - The apical surface of the epithelial cells
 - The nervous tissue

1.a-3, b-1, c-2

2. C

3. B

4.

5. B

6.d

7.d

8.d

9.

14.

15.

16.

17.

18.

19.

20.