Cellular Basis of Medicine TESTS 2020-21

Započetí testu	Monday, 25. January 2021, 08.30
Stav	Dokončeno
Dokončení testu	Monday, 25. January 2021, 09.30
Délka pokusu	59 min. 57 sekund
Známka	**38,5** z možných 60,0 (**64**%)

Navigace testu

1 2 3 4 5 6 ✓ 7 8 ✓ 9
10 11 12

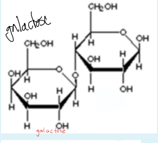
Dokončit prohlídku

Úloha **1**
Částečně správně
Bodů 3,0 / 5,0
Úloha s vlaječkou

BIOCHEMISTRY question

Match the correct characteristic to each of the pictured molecules *(you receive 1 point for each correct pair)*.

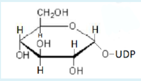
[redacted] [redacted]



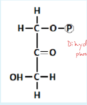
gnlactose

galactose

[redacted] ✓

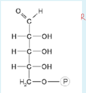


[redacted] [redacted] ✗



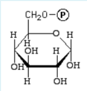
Dihydroxyacetone phosphate

is produced by a [redacted] ✓



Ribose - 5 - phosphate

[redacted] ✓



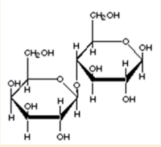
glucose - 6 - phosphate

enters the oxidation phase of pentose cycle

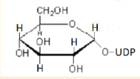
[redacted] ✗

Your answer is partially correct.

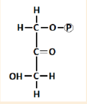
Vybrali jste správně 3.
Správná odpověď je:



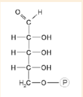
→ is not degraded in lactase deficiency,



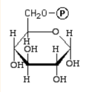
→ is a substrate of enzyme glycogen synthase,



→ is produced by aldol cleavage of fructose-1,6-bisphosphate,



→ is used in a nucleotide synthesis,



→ enters the oxidation phase of pentose cycle.

Úloha **2**
Nesprávně
Bodů 0,0 / 4,0
Úloha s vlaječkou

HISTOLOGY question

Match the type of secretion or way of transport by which the particular component of maternal milk (the secretory product of secretory cell) leaves the secretory cell.

IgA	Vyberte...
lactalbumin, kasein	Vyberte...
milk lipids	[redacted]
water, ionts	Vyberte...

[redacted]

Your answer is incorrect.

Správná odpověď je:
IgA → transcytosis,

lactalbumin, kasein → merocrine secretion, exocytosis,

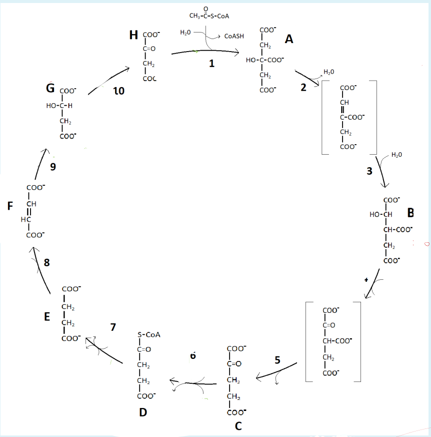
milk lipids → apocrine secretion,

water, ionts → eccrine secretion.

Úloha **3**
Částečně správně
Bodů 4,5 / 5,0
Úloha s vlaječkou

BIOCHEMISTRY question

Complete the text under the picture (you receive 0.5 point for each correct selection).


$CH_3-\overset{O}{C}-S-CoA$
H_2O
CoASH
H
A
1
2
H_2O
H_2O
3
B
4
5
6
7
8
9
10
G
F
E
D
C
S-CoA

citrate

Regulation of Krebs Cycle (inhibition)
- due to not enough oxygen
  - Citrate synthase
  - Isocitrate D.H.
  - α - KG D.H.

[redacted] [redacted]

The metabolic pathway pictured above takes place in many cells except [redacted] ✓ .

[redacted] Substance H is produced in cells predominantly in the reaction catalyzed by mal [redacted] ✓ .

If there is an insufficient amount of oxygen in cells, enzymes catalyzing the following regulatory reactions are inhibited [redacted] ✓ .

In case of a lack of the substance H in hepatocytes [redacted] ✓ is activated, in case of an accumulation of the substance A ceto [redacted] ✓ is stimulated.

Enzyme catalyzing the reaction No. [redacted] ✓ is simultaneously one of the electron transport chain enzymes: the enzyme transfers electrons directly to [redacted] ✓ . [redacted]

Enzyme catalyzing the reaction No. 10 is connected with the electron transport chain via the reaction catalyzed by complex [redacted] ✓ .

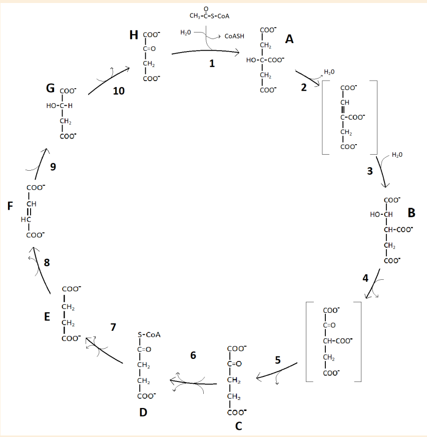
Vitamin B1 is essential for the reaction No. [redacted] ✓ . [redacted]

Reaction No. [redacted] ✗ is important for gluconeogenesis because one of its products is used by the enzyme phosphoenolpyruvate carboxykinase.

Vaše odpověď je částečně správná.

Vybrali jste správně 9.
Správná odpověď je:
BIOCHEMISTRY question

Complete the text under the picture (you receive 0.5 point for each correct selection).


$CH_3-\overset{O}{C}-S-CoA$
H_2O
CoASH
H
A
1
2
H_2O
H_2O
3
B
4
5
6
7
8
9
10
G
F
E
D
C
S-CoA

The metabolic pathway pictured above takes place in many cells except [erythrocytes].

Substance H is produced in cells predominantly in the reaction catalyzed by [pyruvate carboxylase].

If there is an insufficient amount of oxygen in cells, enzymes catalyzing the following regulatory reactions are inhibited [1, 4, 6].

In case of a lack of the substance H in hepatocytes [ketogenesis] is activated, in case of an accumulation of the substance A [lipogenesis] is stimulated.

Enzyme catalyzing the reaction No. [8] is simultaneously one of the electron transport chain enzymes: the enzyme transfers electrons directly to [coenzyme Q].

Enzyme catalyzing the reaction No. 10 is connected with the electron transport chain via the reaction catalyzed by [NADH dehydrogenase].

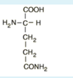
Vitamin B1 is essential for the reaction No. [6].

Reaction No. [7] is important for gluconeogenesis because one of its products is used by the enzyme phosphoenolpyruvate carboxykinase.

Úloha **4**
Částečně správně
Bodů 4,0 / 5,0
Úloha s vlaječkou

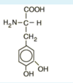
BIOCHEMISTRY question

Match the correct characteristic to each of the pictured molecules *(you receive 1 point for each correct pair).*

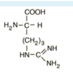


glutamine

the main transport form of amino-nitrogen in blood ⇕ ✓

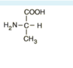


[redacted] ⇕ ✗



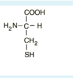
arginin

[redacted] ⇕ ✓



[redacted]

formed by transamination of a product of glycolysis ⇕ ✓



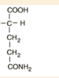
[redacted]

[redacted] ⇕ ✓

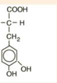
Vaše odpověď je částečně správná.

Vybrali jste správně 4.
Each correct answer is rewarded by 1 point.

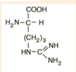
Správná odpověď je:



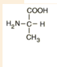
→ the main transport form of amino-nitrogen in blood,



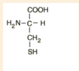
→ not used for proteosynthesis,



→ its hydrolytic cleavage produces urea,



→ formed by transamination of a product of glycolysis,



→ in its synthesis homocysteine is involved.

Úloha **5**
Částečně správně
Bodů 4,0 / 5,0
Úloha s vlaječkou

MOLECULART BIOLOGY question

Choose the best answer:

[redacted] ⇕ ✓ can participate in the function of the mitotic spindle, the intracellular transport of organelles, but not in the function of flagella and cilia. [redacted]

[redacted] ⇕ ✓ can participate in the function of the mitotic spindle, the intracellular transport of organelles, and the function of flagella and cilia.

Motor proteins that need one molecule of ATP for each „step“ include [redacted] ✗ .

[redacted] ⇕ ✓ move(s) along the actin filaments to their [redacted] ⇕ ✓ .

Vaše odpověď je částečně správná.

Vybrali jste správně 4.
Správná odpověď je:
MOLECULART BIOLOGY question

Choose the best answer:

[kinesin] can participate in the function of the mitotic spindle, the intracellular transport of organelles, but not in the function of flagella and cilia.

[dynein] can participate in the function of the mitotic spindle, the intracellular transport of organelles, and the function of flagella and cilia.

Motor proteins that need one molecule of ATP for each „step“ include [kinesin, dynein, and myosin].

[myosin] move(s) along the actin filaments to their ["plus" end].

Úloha **6**
Správně
Bodů 5,0 / 5,0
Úloha s vlaječkou

BIOCHEMISTRY question

→ Cellular respiration → glycolysis cycle

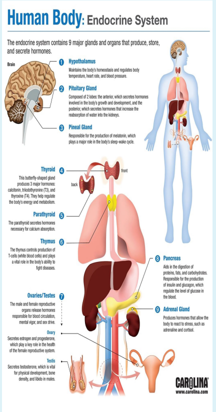
Under aerobic conditions, cells can break down glucose to carbon dioxide and water. Several metabolic pathways are involved in this process, which follow each other.
Select enzymes that are NOT involved in this process:

(for incorrect selections points are deducted)

Vyberte jednu nebo více možností:

[redacted]

- aldolase A
- pyruvate kinase
- citrate synthase
- cytochrome c oxidase
- glucose 6-phosphatase
- citrate lyase
- pyruvate dehydrogenase
- carbamoyl phosphate synthetase
- 6-phosphofructokinase-1
- triose-phosphate isomerase
- isocitrate dehydrogenase
- *cis* aconitase
- acyl-CoA dehydrogenase
- alpha-ketoglutarate dehydrogenase
- acetyl-CoA carboxylase


Human Body: Endocrine System
The endocrine system contains 9 major glands and organs that produce, store, and secrete hormones.
Brain
1 Hypothalamus
Maintains the body's homeostasis and regulates body temperature, heart rate, and blood pressure.
2 Pituitary Gland
Composed of 2 lobes: the anterior, which secretes hormones involved in the body's growth and development, and the posterior, which secretes hormones that increase the reabsorption of water into the kidneys.
3 Pineal Gland
Responsible for the production of melatonin, which plays a major role in the body's sleep-wake cycle.
Thyroid 4
This butterfly-shaped gland produces 3 major hormones: calcitonin, triiodothyronine (T3), and thyroxine (T4). They help regulate the body's energy and metabolism.
front
back
Parathyroid 5
The parathyroid secretes hormones necessary for calcium absorption.
Thymus 6
The thymus controls production of T-cells (white blood cells) and plays a vital role in the body's ability to fight diseases.
8 Pancreas
Aids in the digestion of proteins, fats, and carbohydrates. Responsible for the production of insulin and glucagon, which regulate the level of glucose in the blood.
9 Adrenal Gland
Produces hormones that allow the body to react to stress, such as adrenaline and cortisol.
Ovaries/Testes 7
The male and female reproductive organs release hormones responsible for blood circulation, mental vigor, and sex drive.
Ovary
Secretes estrogen and progesterone, which play a key role in the health of the female reproductive system.
Testis
Secretes testosterone, which is vital for physical development, bone density, and libido in males.
CAROLINA
www.carolina.com

Vaše odpověď je správná.

Glucose is first converted to 2 pyruvates in the aerobic glycolysis, which are consequently transformed to 2 acetyl-CoA by the pyruvate dehydrogenase complex (PDH). Acetyl-CoA enters the Krebs cycle in which it is oxidized to 2 CO2, simultaneously produced enzyme cofactors (3 NADH and 1 FADH2) are then reoxidized in the electron transport chain in which oxygen is reduced to water. (reduced enzyme cofactors are also produced in glycolysis and PDH)

Správné odpovědi jsou: glucose 6-phosphatase, acyl-CoA dehydrogenase, acetyl-CoA carboxylase, citrate lyase, carbamoyl phosphate synthetase

Úloha **7**
Částečně správně
Bodů 4,0 / 5,0
Úloha s vlaječkou

GENETICS question

[redacted] ⇕ ✓ can be defined as a metabolic disorder caused by a deficiency in the production of the hepatic enzyme phenylalanine hydroxylase. It is the most serious form of a class of diseases referred to as "hyperphenylalaninemia," all of which involve elevated levels of [redacted] ✓ in the blood. The primary symptom of untreated disease is mental retardation. The disease is an inherited, [redacted] ⇕ ✓ disorder. It is the most common genetic disease involving "amino acid metabolism." The disease is incurable, but early, effective treatment can prevent the development of serious mental incapacity. The primary screening test is the measurement of [redacted] ✓ in a drop of blood taken from the heel of a newborn baby's foot. This screening procedure is referred to as the Guthrie test (Guthrie bacterial inhibition assay). In the Czech Republic, the population frequency of this disease corresponds to 1/6,500, thus the frequency of heterozygotes in the Czech Republic for this disease is [redacted] ⇕ ✗ .

[redacted]

Your answer is partially correct.

Vybrali jste správně 4.
Správná odpověď je:
GENETICS question

[Phenylketonuria] can be defined as a metabolic disorder caused by a deficiency in the production of the hepatic enzyme phenylalanine hydroxylase. It is the most serious form of a class of diseases referred to as "hyperphenylalaninemia," all of which involve elevated levels of [phenylalanine] in the blood. The primary symptom of untreated disease is mental retardation. The disease is an inherited, [autosomal recessive] disorder. It is the most common genetic disease involving "amino acid metabolism." The disease is incurable, but early, effective treatment can prevent the development of serious mental incapacity. The primary screening test is the measurement of [phenylalanine levels] in a drop of blood taken from the heel of a newborn baby's foot. This screening procedure is referred to as the Guthrie test (Guthrie bacterial inhibition assay). In the Czech Republic, the population frequency of this disease corresponds to 1/6,500, thus the frequency of heterozygotes in the Czech Republic for this disease is [1/41 = 0.0244].

Úloha **8**
Hotovo
Bodů 8,0 / 8,0
Úloha s vlaječkou

HISTOLOGY question

Describe erythropoeisis. Explain the tinction (staining) properties of the cytoplasm of the developing stages of the cells - related to the cell process, running within the cell type.

Erytrhropesis involves five stages, and its the ~~creation of red blood cells.~~

~~Proerythroblast = large oval cell, basophilic cytoplasm, contains nucleus~~

~~Baseophillic erythroblast= nucleus gets condensed, still basophillic cytoplasm~~

~~polychromtophillic erythroblast= has decreased numbers of ribosomes, haemahlobins start occuring~~

~~orthochromatophillic erythroblast= most condensed form of nucleus, cytoplasm becomes eosphillic becuase of the increased heamoglobin.~~

~~Reticulocyte= looses nucleus, but has some ribosomes and mitochodrias left.~~

~~Erythrocytes= after some days as reticulocyte it realses the mitochondria and ribosomes.~~

~~Tinction stanning is also called gram staning~~

Komentář:

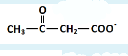
Úloha **9**
Částečně správně
Bodů 3,0 / 5,0
Úloha s vlaječkou

BIOCHEMISTRY question

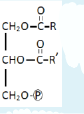
Match the correct characteristic to each of the pictured molecules *(you receive 1 point for each correct pair).*

$CH_3\text{-}(CH_2)_{14}\text{-}COOH$

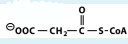
undergoes the beta-oxidation to form 8 acetyl-CoA ⇕ ✓


$CH_3-\overset{O}{\overset{\|}{C}}-CH_2-COO^-$

is formed in ketogenesis ⇕ ✓

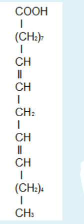


is an intermediate in triacylglycerol synthesis ⇕ ✓


$^{\ominus}OOC-CH_2-\overset{O}{\overset{\|}{C}}-S\text{-}CoA$

a product of a reaction catalyzed by acetyl-CoA carboxylase

[redacted] ⇕ ✗



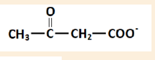
belongs among essential substances

[redacted] ⇕ ✗

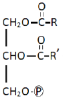
Your answer is partially correct.

Vybrali jste správně 3.
Správná odpověď je:

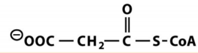
$CH_3\text{-}(CH_2)_{14}\text{-}COOH$ → undergoes the beta-oxidation to form 8 acetyl-CoA,


$CH_3-\overset{O}{\overset{\|}{C}}-CH_2-COO^-$

→ is formed in ketogenesis,

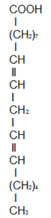


→ is an intermediate in triacylglycerol synthesis,



$$^{\ominus}OOC-CH_2-\overset{\overset{O}{\|}}{C}-S\text{-}CoA$$

→ is a product of reaction catalyzed by acetyl-CoA carboxylase,



→ belongs among essential substances.

Úloha **10**
Nesprávně
Bodů 0,0 / 6,0
Úloha s vlaječkou

HISTOLOGY question

From the following statements about the bone, choose the true ones.

For every incorrect answer, an appropriate number of points will be deduced.

[redacted]

- a. Osteoblasts are polarized cells. [redacted]
- b. In general: long bones are formed on preexisting cartilage matrix, while flat bones are formed by mineralisation of bone matrix secreted by osteoblasts (it means - mesenchyme is the source for the new bone) [redacted]
- c. Dense bone, the layer localised underneath the periosteum is the compact bone, while the spongy bone is on its inner surface (deeper localised). [redacted]
- d. Bone matrix is **identical** in its composition with extracellular matrix of another types of the connective tissues. [redacted]
- e. Bone cells, osteoblasts, osteoclasts, osteocytes ,differentiating from the mesenchyme, belong to residental bone cells. (it means they do originate "in situ" from mesenchyme, and none of them migrate to bone from blood. [redacted]
- f. Bone does not regenerate. [redacted]
- g. Bone is an avascular tissue. The only exception is the connective tissue coat - periosteum. [redacted]
- h. Bone, which is formed in the process of ossification (primary bone) is a definitive structure. It is not replaced by another type of bone. [redacted]

Your answer is incorrect.

Správné odpovědi jsou:
Dense bone, the layer localised underneath the periosteum is the compact bone, while the spongy bone is on its inner surface (deeper localised).,

In general: long bones are formed on preexisting cartilage matrix, while flat bones are formed by mineralisation of bone matrix secreted by osteoblasts (it means - mesenchyme is the source for the new bone),

Osteoblasts are polarized cells.

Úloha **11**
Částečně správně
Bodů 3,0 / 6,0
Úloha s vlaječkou

HISTOLOGY question

Choose the true statements from the following ones - abot the cell types of connective tissues

For every incorrect answer, an appropriate number of points will be deduced.

The "fixed" or "residental" cells of connective tissues (it means those cells, that are produced locally and remain there) belong following ones:

[redacted]

[redacted]

- a. goblet cells
- b. erythrocytes
- c. keratinocytes
- d. adipocytes
- e. myofibroblasts
- f. macrophages
- g. neutrophilic granulocytes
- h. fibroblasts

[redacted]

Your answer is partially correct.

Vybrali jste správně 2.
Správné odpovědi jsou:
fibroblasts,

myofibroblasts,

adipocytes

Úloha **12**
Nezodpovězeno
Počet bodů z 1,0
Úloha s vlaječkou

HISTOLOGY question

Explain the term "transcytosis" . Which macromolecules are transported by this type of transport? Give an example.

Transcytosis is a type of transcellular transport in which various macromolecules are transported across the interior of the cell, like insulin and transferrin.

Dokončit prohlídku