MINISTÈRE DE L'ÉDUCATION NATIONALE, DU PRÉSCOLAIRE ET DES SPORTS

EXAMEN DU BACCALAUREAT

1075 : J

Série / Option : .....

COMPOSITION DE : S.V.T

65232

RESERVE ACADEMIE

.....

Note Globale	
En chiffres	En lettres
19,00 / 20	Dix neuf, sur vingt
Appréciation de la note chiffrée	

Nom du correcteur et signature : Wafae Benhardouze BWafae

Exercise 1. (6)

1. By exploiting Data of Document 1,

a: + Similarities : Both individuals (the healthy and the sick) have the same number of mitochondria and the presence of pyruvate and lactate in different concentrations also the same activities of glycolytic enzymes.

+ Differences : In the healthy individual : we have the presence of pyruvate in an average concentration (about 0,08 mmol/L) and the same for lactate (about 1 mmol/L)

- In the sick individual the presence in a high concentration of pyruvate (about 0,12 mmol/L) and lactate (about 2,25 mmol/L)

* The presence of pyruvate is approximately the same in both individuals

b: - In the sick individual we have the high activity of the glycolytic enzymes → the degradation of glucose by way the glycolysis metabolic pathway → the content of glucose into pyruvate → the product of pyruvate in high concentration.

- In the sick individual we have the very low activity of (mitochondrial → the none use of the respiratory metabolic pathway (to continue the degradation of pyruvate) → the use of fermentation (lactic fermentation) → product of lactate in high concentration (due to the presence of pyruvate in high concentration).

2. By exploiting the data of document 2,

+ In medium 1 : we have the high consumption of O_2 (0,179 AU) and the high activity of the ATP synthase (0,301 AU) then the high product of ATP

+ In medium 2 : we have the low consumption of O_2 (0,021 AU) and the low activity of the ATP Synthase (0,030 AU) then the low product of ATP

-N.B: Il est interdit au candidat de signer sa composition ou d'y mettre un signe quelconque pouvant indiquer son identité.

→ therefore the Mitochondria in the abnormal person is the responsable in the appearance of the disease observed / the problem is in the mitochondria

3. By exploiting the data of Document 2, we observe that in the sick individual we have the low activity of the following reaction: the reduction of NAD^+, H^+ and the activity of the ATP synthase and the ADP phosphorylation:
→ Since in the sick individual we have the low activity of the reduction reaction (reduct of $NADH, H^+$) → low fluxness of electrons → the low activity of the complexes transformation of electrons (due to the small amount of electrons and the anactive enzymes) → the low synthesis of ATP (due to the anactive ATP synthase "enzymes" → anactive electron transport chain → the low consumption of O_2

4. Based on the previous data: we in the person with NARP (sick individual) anactive electron transport chain → anactive mitochondria → the none way of respiration pathway to do the complete degradation of glucose and produce high amount of ATP → the way of lactic fermentation → the incomplete degradation of glucose (pyruvate) → the production of O_2 and amount of ATP.

EXERCISE 2 /5

1. Based on document 1,
+ In the healthy person we have: the LDL quantity in the cell surface is decreasing while the LDL quantity inside the cells is increasing (the increase of LDL on the inside is compared By the decrease of LDL in the surface)
+ In the sick individual: LDL quantity in the cells surface is remaining constant (about 10 AU) and the quantity of the LDL quantity inside the cells is very low and remains constant (about 2 AU)

2. Since In the sick individual we have the more entry of LDL in the cells (remains constant in high quantity on the cells surfaces due to the anactivity of LDL receptors →

anacitic protein → the hight concentrat of the cholesterol in the blood (higher than normal) → the appearance of type Hypercholesterolémie.

3. For the normal individual.
+ the untranscribed strand of the normal LDLR allel.
AGA_AAC_GAG_TTC_CAG_TGC_CAA
+ the transcribed strand of the abnormal LDLR allel
TCT_TTG_CTC_AAG_GTC_ACG_GTT
+ the mRNA strand.
AGA_AAC_GAG_UUC_CAG_UGC_CAA V0,2V
+ the sequence of amino acids:
Arg_Asn_Glu_Phe_Gln_Cys_Gln V0,2V

- For the abnormal individual.
+ the untranscribed strand of the abnormal LDLR allel. 1
AGA_AAC_GAG_TTC_TAG_TGC_CAA
+ the transcribed strand of the abnormal LDLR allel
TCT_TTG_CTC_AAG_ATC_ACG_GTT
+ The mRNA strand. V0,7V
AGA_AAC_GAG_UUC_UAG_UGC_CAA
+ the sequence of amin acids.
Arg_Asn_Glu_Phe V0,2V

* the genetic origin of FH disease.
We have mutation by substitute in the triplet number 33 of the nonetranscribed strand of the abnormal allele (substitut of C by T if substitution of G by A in the transcribed strand) → the appearance of codon stop in the amino acid sequences correspondin to the fragment of the normal allel (shorter of the amino acid sequence) → non functional protein → the apearance of the abnormal LDL receptors (anacitic receptors) → the none transfer of LDL into the cells → the high concentrat of LDL in the blood → the appearse of hypercholesterémie (the FH disease) 0,5

Exercise 3. 2,5

1. Dyhybridism case: We study the transmission of two hereditary traits "Coat color" et "Hair size"
cross 1: Between parent of pure lines
We obtained F_1 generat composed from two phenotypes
50% ♂ with an orang coat and short hair
and 50% ♀ with bicolor coat and short hair

النقطة الإجمالية	
بالحروف	بالأرقام
التقدير المفسر للنقطة	

الشعبة/المسلك : ....

مادة : ....

خاص بالأكاديمية

اسم المصحح وتوقيعه (ها) : ....

* For the the Hair trait: we obtained a Homogenous generation i.e. all individuals are with short hair so the first law of Mendel is verified. the hair the allele responsible for the short hair is dominant "R" and the allele responsible for the long hair is recessive "r".

* For the trait "coat color" we have the males of F1 generation have the same caracter of their mother (the genes responsible for this trait is carried on X chromosome) and the femelles of the F1 generation have an intermediate color. Their for we have a codominance case because the allele responsible for the black color "N" and the allele responsible for the orange color "O" then we get an intermediate caracter = bicolor "ON"

2: Since we have the gene responsible for the coat color is carried on the X chromosome and the gene responsible for the Hair size is carried on the autosome thus the two genes are independent

Thus Hypothesis number 2 is correct

3. Chromosomal interpretation of cross 2.

cross 2: (reciprocal cross)

phenotype ♂ [N ; R] x ♀ [O ; r]

genotype $\frac{X^N}{Y}$; $\frac{R}{R}$ x $\frac{X^O}{X^O}$; $\frac{r}{r}$

gametes 50% X^N , R x 100% X^O , r

50% Y , R 50% X^O , r

ROYAUME DU MAROC

MINISTÈRE DE L'ÉDUCATION NATIONALE, DU PRESCOLAIRE ET DES SPORTS

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Nom du correcteur et signature : ....

Fertilization. Punnet square

♀ \ ♂	50% X $\frac{N}{}$, $\frac{R}{}$	50% Y —— , $\frac{R}{}$
X $\frac{O}{}$, $\frac{r}{}$ 50%	X $\frac{N}{}$ X $\frac{}{O}$, $\frac{R}{r}$ 25% [NO, R] ♀	Y $\frac{O}{}$ X $\frac{}{O}$, $\frac{R}{r}$ 25% [O, R] ♂
X $\frac{O}{}$, $\frac{r}{}$ 50%	X $\frac{N}{}$ X $\frac{}{O}$, $\frac{R}{r}$ 25% [ON, R] ♀	Y $\frac{O}{}$ X $\frac{}{O}$, $\frac{R}{r}$ 25% [O, R] ♂

0,12

We obtain 50% ♂ [O, R] and 50% ♀ [ON, R]

0,12

the theoretical and experimental studies are similar

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Exercise 4. 4,5

1. From document 1:
the two tectonic clues of this collision are:
Fold
Fault and overlap } this tectonic clues signifies that a strong compressive forces has been aplied on the region 0,5

2. From the data of Document 2.
+ during the passage from Rock R_1 to R_2 we have the absence of Chlorite and the apearance of Biotite and Muscovite and the remaining of Andalusite 0,5

+ during the passage from R_3 to R_4:
the absence of Andalusite and Muscovite and the apearance of Sillimanite and Potassium Feldspar and the remaining of Biotite. 0,5 1

3. • the passage from R_1 to R_2.
during the passage from R_1 to R_2 we have the change in domain of presence of the minerals of R_1 (Chlor and And.) : low pressure (0,2 GPa) and low temperature (350°C) into the domain of the presence of the minerals of R_2 (Bio - Mus - And) : average temperature (450°C) and average pressure (0,35 GPa)
→ the transformation from P_1 to P_2

• the passage from R_3 to R_4
during the passage from R_3 to R_4 we have the change in domain of presence of the minerals of R_3 (Bio - And Mus) : average temperature 500°C and average pressure (0,3 GPa) into the domain of presence of the minerals of R_4 (Bio - Sill - FK) : high temperature (670 GPa) and average pressure (0,4 GPa). 0,75 1,5

4. Based on document 4 we have that the gneiss rock R_4 are existed near to the fusion state of minerals and R_5 migmatite are existed in the fusion state of minerals and we know that the migmatite comes from gneiss therefore the migmatite is a result of the fusion of gneiss and its cooling → after the fusion of gneiss the analyzed magma is cooling in the bottom to give the migmatite Rock R_5 with two structure (granular and foliated). 1

5. Based on document 4 and 5 we observe that the pressure and temperature conditions under which each of the rocks (R2, R3 and R5) are formed are (average pressure + high temperature) thus this region has been subjected to a collision because the conditions of temperature + pressure are as the case of collision generation 0,5

Exercise 1: 4,5

I:

1: Euthophical ✓0,25

2: Global warming ✓0,25

3: Oishate ✓0,25

4: renewal of energy ✓0,25 1

II:

1. true ✗0

2. true ✓0,25

3. False ✗0

4. true ✓0,25 0,5

III: 1. a ✓0,5

2. d ✓0,5

3. a ✗0,5

4. c ✓0,5 2

IV (1. e) ✓0,25 (2. c) ✓0,25 (3. a) ✓0,25 (4. b) ✓0,25 1