الجامعة اللبنانية

كلية الصحة العامة

مباراة الدخول 2020– 2021

مسابقة في العلوم العلوم الطبيعية (A Series)

المدة : ٤٥ دقيقة عدد الصفحات: 5

1- For each question circle <u>the correct answer</u> (Only one correct answer per question)

- Fertilization:
  - a- allows the appearance of new phenotypes.
  - b- allows the appearance of new alleles
  - c- results in a zygote, that is, a haploid cell.
  - d- corresponds to the union of two diploid cells.

- During meiosis, genetic recombination:
  - a- results from an exchange of chromatid fragments between homologous chromosomes.
  - b- takes place only during the second division of meiosis.
  - c- induces genetic diversity in the gametes produced.
  - d- affects genes located on the same pair of chromosomes.

- The following document represents the results of DNA electrophoresis of selected members of a family with some members suffering from an inherited disease.

DNA Fragments	Mother	Daughter 1	Daughter 2
F1	—	—	—
F2		—	
	Healthy	**Affected**	**Healthy**

The allele of the disease is:
- a- recessive carried by an autosome.
- b- recessive carried by the X chromosome.
- c- dominant carried by the X chromosome.
- d- dominant carried by an autosome.

- A mutation affecting a somatic cell
  - a- is transmitted to only one of the two daughter cells during mitosis of the mutated cell
  - b- is never transmitted to daughter cells during mitosis of the mutated cell
  - c- is transmitted to germ cells during mitosis of the mutated cell
  - d- is transmitted to the two daughter cells during mitosis of the mutated cell

- Pituitary hormones (FSH and LH) stimulate:
  - a- pituitary gland.
  - b- ovaries
  - c- uterus.
  - d- hypothalamus.

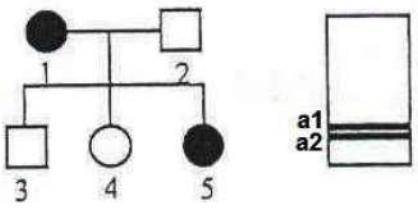
- Progesterone exerts:
  - a- whatever its concentration, a negative feedback on the hypothalamic-pituitary complex.
  - b- whatever its concentration, a positive feedback on the hypothalamic-pituitary complex.
  - c- at high concentration, a negative feedback on the hypothalamic-pituitary complex.

d- at low concentration, a negative feedback on the hypothalamic-pituitary complex.

- The hormone LH stimulates:
  a- by a peak of secretion, the onset of menstruation
  b- follicular growth.
  c- regression of the yellow body.
  d- by a peak of secretion, the triggering of ovulation.

- The functioning of the pituitary gland is:
  a- inhibited by continuous secretion of GnRH produced by the hypothalamus.
  b- stimulated by continuous secretion of GnRH produced by the hypothalamus.
  c- inhibited by pulsatile secretion of GnRH produced by the hypothalamus.
  d- stimulated by pulsatile secretion of GnRH produced by the hypothalamus.

- The following document represents the genealogical tree of a family in which some members have a hereditary anomaly controlled by a pair of alleles (a1, a2) and the results of the electrophoresis of the DNA in question in the individual 5.



The allele responsible for the disease is:
  a- dominant.
  b- viral.
  c- recessive.
  d- linked to the X chromosome.

- Before performing a transplant, we ensure the compatibility of the donor and the recipient by comparing
  a- B lymphocytes
  b- major histocompatibility complexes (MHC)
  c- T lymphocytes
  d- cytokines

- The production of antibodies by the body:
  a- is more important during the secondary response.
  b- is less important during the secondary response.
  c- occurs only during the secondary response.
  d- occurs only during the primary response.

- During meiosis, a genetic recombination occurs by
  a- an intrachromosomal recombination during the second division of meiosis
  b- an interchromosomal then intrachromosomal recombination during the first division of meiosis
  c- an intrachromosomal then interchromosomal recombination during the second division of meiosis
  d- an intrachromosomal then interchromosomal recombination during the first division of meiosis

- The zygote formed by fertilization:
  a- contains a unique and novel combination of alleles
  b- contains the same combination of alleles as its parents
  c- contains the same combination of alleles as one of its parents
  d- contains a combination of alleles that is identical to the other descendants of the couple

- the prophase of the second division of meiosis
  a- is preceded by a DNA replication during the stages of the first division
  b- involves two cells having chromosomes with two chromatids each
  c- involves one cell having chromosomes with two chromatids
  d- involves two cells having chromosomes with one chromatid

- Crossing over
  a- Occurs exclusively during mitosis
  b- Doesn't participate to genomes diversification
  c- Occurs in males only
  d- Corresponds to exchanges of fragments of non-sister chromatids of homologous chromosomes

- Genetic recombination:
  a- corresponds to the succession of fertilization and meiosis.
  b- Allows the karyotype stability during meiosis.
  c- causes new combination of alleles in the descendants.
  d- Always involves a crossing over.

- Considering two linked genes undergoing a crossing over, the test-cross of two individuals gives among the descendants:
  a- four phenotypes at equal proportions.
  b- two phenotypes at equal proportions.
  c- Parental phenotypes higher in number than recombined phenotypes.
  d- Parental phenotypes lower in number than recombined phenotypes.

- The principal hormone having a positive feedback on hypothalamus and pituitary gland is :
  a- progesterone
  b- estrogen
  c- FSH
  d- GnRH

- Indicate the correct statement.
  Statement 1: ovulation is triggered at the end of the menstrual cycle
  Statement 2: there is a sudden drop of the level of ovarian hormones during the last days of the cycle.
  a- The two statements are correct but without a cause-effect relationship
  b- The two statements are correct with a cause-effect relationship.
  c- The two statements are false.
  d- One of the two statements is correct and the other is false.

- A gene:
  a- Frequently exists in a single allelic form
  b- exists in one copy in somatic cells
  c- is a sequence of nucleotides
  d- is never subject to mutations

- A mutation:
  a- Always alters the phenotype
  b- Doesn't alter the genotype
  c- Always modifies the sequence of the protein encoded by the mutated gene
  d- Must occur in a germinal cell to be transmitted to the descendance

- When a trait is autosomal and dominant, we expect to have
  a- More males than females showing this trait
  b- Each affected person has 2 affected parents
  c- Each affected person has at least one affected parent
  d- If both parents are affected, we expect to have 100% of affected children

- A soluble antibody is:
  a- formed of four polypeptide chains
  b- at the origin of the formation of an immune complex
  c- synthetized in response to the presence of a specific antigen
  d- All of the above

- Cytotoxic T lymphocytes:
  a- exist prior to any antigen penetration
  b- act by phagocyting infected cells
  c- decrease the viral load along with limiting viral reproduction
  d- are incapable of protein secretion

- Cells involved in humoral response are:
  a- granulocytes
  b- plasma cells
  c- monocytes
  d- all of the above

- Antibody secreting cells are:
  a- granulocytes
  b- T4 lymphocytes
  c- T8 lymphocytes
  d- none of the above

- Phagocytosis:
  a- starts with exocytosis
  b- is involved only in non-specific immune reactions
  c- is performed by T8 lymphocytes
  d- none of the above

- Les immunoglobulins are:
  a- Granulocyte receptors
  b- B lymphocyte receptors
  c- The effectors of cell-mediated responses
  d- All of the above

- An X-linked recessive anomaly is transmitted:
  a- From phenotypically normal parents to all their sons
  b- From a phenotypically normal mother to all her sons
  c- From a phenotypically affected father to his sons
  d- From a phenotypically affected mother to all her sons

- The karyotype of a boy affected with trisomy 21 includes:
  a- 44 autosomes + XY
  b- 45 autosomes + XX
  c- 45 autosomes + XY
  d- 43 autosomes + XY

2- Answer by true (T) or false (F) the following questions

T/F	
	Vaccination is efficient at the medium and the long-term but it doesn't procure any advantage at a very short-term because the protective response needs time to develop.
	Ovaries are gonads that produce female gametes from puberty to menopause.
	Yellow-body cells secrete both estrogen and progesterone.
	Macrophages and polynuclear neutrophiles are necessarily involved in a cell-mediated specific immune response.
	The secretory phase of the menstrual cycle is associated with a decrease in the concentration of estrogen and progesterone.
	During a physiological sexual cycle, the peak of the plasmatic concentration of luteinizing hormone occurs at day 21.
	Follicular cells secrete progesterone.
	Effector T8 cytotoxic lymphocytes kill their target by phagocytosis.
	Test-cross is the breeding of two pure strains.
	Estrogen appears only after ovulation.

Good Work