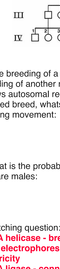
# CORONARY BATCH
# GENETICS AND MOLECULAR BIOLOGY
# FINAL EXAM QUESTIONS

I have collected **24 out of 42 questions**;
هذا الي قدرت أجمعه مني و من المنشورات والشاتس بين الطلاب

:: All of the following chromosomes are metacentric, EXCEPT:
**Chromosome 2**

:: A pedigree was shown like the one here below, a mitochondrial inheritance mode, asking whats the probability if both parents (individual IV,9 and IV,12) to have an affected child, the father was affected with the mitochondria mutation, the mother wasn't affected with the mitochondria mutation:
**0% probability of them having an affected child**



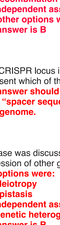

:: True breeding of a rat with normal movement, with a true breeding of another rat with dancing movement, this movement follows autosomal recessive. If the children of both parents are crossed breed, whats the probability that they will have a rat with dancing movement:
**1/4**

:: What is the probability that both parents will have 5 children that are males:
**1/32**

:: Matching question: (midterm material)
**- DNA helicase - breaks H binds of the DNA**
**- Gel electrophoresis - requires a constant current of electricity**
**- DNA ligase - connects the phosphate back bone**
**- PCR - making copies of DNA**

:: Luxturna (voretigene neparvovec-rzyl) is a gene therapy used to treat vision loss due to confirmed biallelic RPE65 mutation-associated retinal dystrophy. The affected part of the eye in this condition is:
**Retina or the nerves (make sure to ask the doctor)**

:: A pedigree was shown like the following one below, says the individual III,6 is:
**Male deceased (a male who has died)**




:: A karyotype was showed, an X chromosome was missed, other autosomal chromosomes were normal:
**2 options were there including (Monosomy X and Turner syndrome)**

:: Which type of cell that different to a SPECIFIC TYPE of cells:
**Unipotent stem cell**

:: Which of the following statements is false regarding CRISPR-Cas9 complex:
**The statement discussed using CRISPR-Cas9 to create induced pluripotent stem cells (iPSCs), and another statement discussed that this gene editing tool CRISPR-Cas9 complex does the same reaction in bacterial cells and also human cells**

**Now we had to choose between both statements, i think its the one that talks about "iPS", since this gene editing tool does the same reaction (which is RNA-guided cutting tool) in both bacterial and human cells**

:: If a hypothetical organism has haploid cells containing 10 chromosomes and it experiences trisomy on chromosome 6, whats the total set of chromosomes:
**21**

:: A mother with a type (A) blood, and a father with type (B) blood, they had a child with type (O) blood. If both parents had fraternal twins (non identical twins), what is the chance that both twins will have blood (A):
**1/16 (since fraternal twins are genetically independent, the probability of each twin having type A blood is 25% (1/4))**

:: On one of the chromosomes, if a father has genes ABC abc, and a mother has genes ABC ABC, their child's genotype is ABc ABC, which of the following explains this case:
**Options were:**
**(A) Recombination in the father's gametes in mitosis**
**(B) Recombination in the father's gametes in meiosis**
**(C) Independent assortment**
**and other options were mentioned**
**The answer is B**

::  In CRISPR locus in a bacterial cell, the repeated sequences represent which of the following:
**The answer should be bacterial genome, but if the question state "spacer sequences" then the answer should be the viral genome.**

:: A case was discussing that a specific gene affect the expression of other genes, this phenomenon is called:
**The options were:**
**(A) Pleiotropy**
**(B) Epistasis**
**(C) Independent assortment**
**(D) Genetic heterogeneity**
**The answer is B**

:: A case was discussing a black rat, and a white rat, and both of these rats were crossed, and all of the offspring were gray, this phenomenon is best explained by which of the following:
**Incomplete dominance**

:: There was a question about a recessive genetic disease in a family. It asked: "Mrs. Simpson's brother had the disease, but Mrs. Simpson did not. Additionally, Mr. Simpson's father had the disease. What is the probability that both Mrs. Simpson and Mr. Simpson are carriers":
**The answer is 2/3 x 1 = 2/3**

:: Which of the following stains is used to detect chromosomal mutations using karyotype:
**The options were**
**(A) G stain**
**(B) C stain**
**(C) R stain**
**(D) T stain**
**(E) Can't be detected using karyotype**
**The answer should be (A) since its one of the most common one used, other students said mutations can't be detected using karyotype but the question stated "chromosomal" not "genetic" mutations.**

:: The single strand of cDNA is synthesized by which of the following:
**RT (reverse transcriptase), other options were mentioned like (inverted transcriptase, or RNA transcriptase, they weren't right)**

:: A long case, but the case ended with "which of the following steps is not a step typically seen in recombinant DNA technology":
**I think it was an option says "Using retrovirus to circularize the DNA"**

:: In a case concerning Fragile X syndrome, the rapid detection of the trinucleotide repeat sequence was accomplished by which of the following methods:
**The options were**
**(A) PCR but not SNP analysis and qPCR**
**(B) qPCR but not SNP analysis and PCR**
**(C) PCR and qPCR but not SNP analysis**
**(D) PCR and SNP analysis but not qPCR**
**(E) SNP analysis but not qPCR or PCR**
**I think its A, since the CGG or CTG repeats are considered mutations not SNP (less than 1% of the population), and qPCR uses cDNA, the case was about the genomic repeats of CGG, IM NOT SURE, AND I DONT KNOW WHAT IS THE ANSWER BUT THESE WERE THE OPTIONS.**

:: Other questions and cases about 10-6 were about **PCR, qPCR, SNPS, and choose ALL correct (more than one answer) or ALL incorrect**

:: CYP enzymes were related to which of the following:
**The options were:**
**(A) Drug kinetics**
**(B) Drug transportation**
**(C) Drug excretions**
**(D) Drug toxicity**
**The answer is drug toxicity**

:: In a case involving a patient requiring warfarin due to a clot or injury, genetic testing revealed mutations in CYP2C9, slowing the drug's metabolism which resulted in a lower dose, and in VKORC1, affecting the vitamin K-dependent enzyme crucial for producing clotting factors (such as factor X and IX). Given this scenario, what would be the result in the metabolism of this drug and whats the most appropriate action regarding the dose to this individual:
**The options were: (all options were related to warfarin)**
**(A) Faster metabolism, lower dose**
**(B) Slower metabolism, lower dose**
**(C) Higher sensitivity, higher dose**
**(D) Higher sensitivity, lower dose**
**(E) Slow metabolism, higher sensitivity, lower dose**
**I think the best answer here is (E)**

:: A case about 2 parents, and both were (AB) had a child with type (O) blood, the question was "which of the following best describes this case":
**The answer mentioned something about gene I and gene H and epistasis, other options were far from right**

Good luck

Written by Momen Allala :)