BIO301-GENETICS
MIDTERM CURRENT PAPER
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LION GROUP OF ZOOLOGIST

1. Quantitative Genetics. (2)

Quantitative genetics is the study of group hereditary for traits determined by many genes simultaneously such as skin color, height, eye color etc .

2. Cluster rule. (2)

Stated that pyrimidines often occur in clusters and hence on the complementary strand purines do likewise.

3. Difference between purines and pyramidines (3)

	Purines	Pyrimidine
Introduction	A purine is a heterocyclic aromatic organic compound, consisting of a pyrimidine ring fused to an imidazole ring.	Pyrimidine is a heterocyclic aromatic organic compound similar to benzene and pyridine, containing two nitrogen atoms at positions 1 and 3 of the six-member ring. It is isomeric with two other forms of diazine.
Function	Production of RNA and DNA, proteins and starches, the regulation of enzymes and cell signaling.	Production of RNA and DNA, proteins and starches, the regulation of enzymes and cell signaling.

ASIM KHAN NAZI

Nucleobases	Adenine and guar	Cytosine, thymine, uracil
Structure	A pyrimidine ring fused to a imidazole ring. Contains two carbon-nitrogen rings and four nitrogen atoms.	Contains one carbon-nitrogen ring and two nitrogen atoms.

4-Short note on the structure of chromosomes (5)

Chromosome Structure: Living organisms are made up of cells. Within cell, there is nucleus or nucleoid region. DNA or chromosomes are present in nucleus/nucleoid region.
Chromosome structure: chromosomes are made of DNA and associated proteins. Chromosome carries part or all of a cell's genetic information. Chromosomes have sister chromatids. Centromere is constricted region, where chromatids are attached. A chromosome constitutes DNA molecule, a protein Histones and supercoiled DNA .

5-Meiosis-1 phases (5)

In meiosis I, chromosomes in a diploid cell resegregate, **producing four haploid daughter cells**. It is this step in meiosis that generates genetic diversity. DNA replication precedes the start of meiosis I. During prophase I, homologous chromosomes pair and form synapses, a step unique to meiosis.

6-Polyploidy

Polyploidy is the heritable condition of possessing more than two complete sets of chromosomes
Two major types

ASMA KHAN NIAZI

Autopolyploidy
Allopolyploid

7-Non-disjunction

When two homologous chromosomes or sister chromatids fail to separate during cell division, such a phenomenon is called as Non-disjunction

Types of Non-disjunction

Meiotic non-disjunction
Mitotic non-disjunction

8. Difference Cross over and chiasmata

Chiasmata is the point where **two** homologous non-sister chromatids exchange genetic material during crossing over whereas crossing over is the process of mutual exchange of segments of non-sister chromatids of homologous chromosomes during the process of meiosis.

9.Environmental factors

Nutrition of mother

The nutrition of the mother can affect the epigenome of a fetus.

Stress hormones

Stress hormones also travel from the mother to a fetus to affect the epigenome

Social interactions and physical activities

Social interactions, physical activity, are factors that affect the epigenome

Exposure to toxins and diet

Exposure to toxins and diet are major factors that affect the epigenome

10. two types of physical mapping

ASMA KHAN NIAZI

1. Cytogenetic map
2. In situ hybridization
3. Genetic mapping
4. Restriction enzymes site mapping

11. chargaff rule

1944 - Study of DNA and its four chemical bases- adenine, cytosine, guanine and thymine.

Discover amounts of adenine and thymine were equal, as were the amounts of cytosine and guanine

12. define telophase 2

The final phase of cell division, between anaphase and interphase, in which the chromatids or chromosomes move to opposite ends of the cell and two nuclei are formed.

13. acquired and genetic variations. 5 marks

Acquired Variation

Acquired characteristics can not be inherited. Language, obesity, athletic skills etc

Example: Apples - different position on same tree

The differences between the apples are acquired during the growing season.

The differences will not be inherited.

What is Inherited Variations?

Inherited variations result from the activity of genes.

Genetically controlled and cannot be altered.

Blood groups, finger prints and sex etc