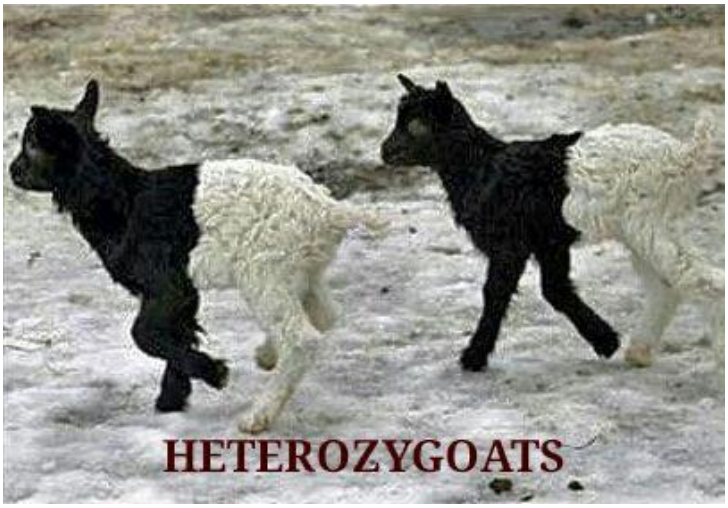
GENETICS



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Lecture 1

1-Two parents are phenotypically normal, but one of their four biological

Children has a typical autosomal recessive trait. The other three children are

Phenotypically normal. It is very likely that:

A. the affected child is a girl.

B. the affected child is a boy.

C. the trait was expressed by one of the grandparents of the children.

D. the parents are both heterozygous for the trait.

E. if the affected child eventually marries a phenotypically normal

spouse, all of their children will have the trait

Ans: D

2-Which description of a Y-linked trait in humans is CORRECT?

A. All the sons of an affected father will be affected with the trait.

B. Half the sons of a mother whose father was affected with the trait will be affected.

C. Half the sons of an affected father will not be affected with the trait and the other half will be infertile.

D. All the daughters of an affected father will be phenotypically normal but half of their own sons will be affected with the trait.

E. The parents of an affected man likely were both phenotypically normal.

Ans: A

3-Which statement is INCORRECT concerning an X-linked recessive trait in humans

A. An affected man often has phenotypically normal parents.

B. All the sons of an affected woman will be expected to be affected.

C. An affected woman almost always has an affected mother.

D. An affected man usually has a mother who carries the recessive allele.

E. A phenotypically normal woman whose father was affected is likely to Be heterozygous for the condition.

Ans: C

4-How is colchicine, the chemical used in preparing karyotypes, useful for Studying chromosomal mutations?

A. Colchicine prevents cells from entering anaphase, stalling them in Metaphase with condensed chromosomes.

B. Colchicine induces chromosome condensation during interphase, which allows the visualization of interphase chromosomes.

C. Colchicine causes chromosomal breakage, leading to inversions and translocations that can be observed with a microscope.

Ans: A

5-According to the central dogma , which of the following represents the flow of genetic information in cells

a . RNA to DNA to protein

b . protein to DNA to RNA

c . DNA to protein to RNA

d . DNA to RNA to protein

Ans: D

6-Process of cutting introns out of immature RNAS and stitching together the exons to form final product is called

a. DNA splicing

b. Alternative splicing

C. RNA transcription

d. RNA translation

e. RNA splicing

Ans: e

7-Which of the following statements about RNA splicing is FALSE?

a. It removes the introns

b. It is performed by the spliceosome

c. It shortens the RNA molecule

d. It always occurs in the nucleus

e. All of the above statements are true

Ans: e

8- liver cells are called…….

A- Ribosome
B- Gametes
C- Germ cells
D- Somatic cells
E- Mitochondria
Ans: D

9- The DNA contains of Nucleotides linked to each other by …….

A- Phosphodiester bonds between 3′ carbon of one nucleotide and the 5′ carbon of the following nucleoide in 5′ to 3′ direction
B- Phosphodiester bonds between the 5′ carbon of one nucleotide and the 3′ carbon of the following nucleotides in 5′ to 3′ direction
C- Phosphodiester bonds between the 2′ carbon of one nucleotide and the 5′ carbon of the following nucleotide in 5′ to 3′ directions
D- Glycosidic bonds
Ans: A

10-which of the following statements about mitochondria DNA is incorrect?

A- The mitochondria genome encodes all of the mitochondrial proteins
B- Mitochondria DNA is usually a circular , double stranded DNA molecule that is not packaged with histones
C- Mitochondria genome has no introns but few noncoding nucleotides between the genes
D- Mitochondria genome has very little repetitive DNA
E- A and D
F- B and D
G- G All of the above except A
And:E

11- what is correct regarding the messenger RNA?

A- It is made in the cytoplasm
B- It is a component of the ribosomes
C- It carries amino acids
D- It is a coding RNA used to generate a corresponding polypeptide sequence
E- It is not found in bacteria
Ans: D

12- name the single individual whose work in the mid 1800s contributed to our understanding of the particular nature of inheritance as well as the basic genetic transmission partterns and what organism did this person work?

A- Gregor Mendel, possum sativum
B- Goethe Bradley , neurospora
C- Thomas Hunt Morgan , drosophila
D- Calvin bridges , drosophila
E- Boris ephrussi, Ephesians
Ans:A

13-how many pairs of chromosomes are found in a typical human somatic cells karyotype ?

A- 0
B- 22
C- 23

D- 44

E- 46

Ans: C

Lecture 2

1-A Barr body is a(n):

A. gene on the X chromosome that is responsible for female development.

B. patch of cells that has a phenotype different from surrounding cells because Of variable X inactivation.

C. inactivated X chromosome, visible in the nucleus of a cell that is normally from a female mammal.

D. extra X chromosome in a cell that is the result of nondisjunction.

E. extra Y chromosome in a cell that is the result of nondisjunction.

Ans: C

2-Which of the following statements about X inactivation in mammalian females Is FALSE?

A. Females that are heterozygous for an X-linked gene have patches of cells That express one allele and patches of cells that express the other.

B. Some genes on the inactive X continue to be expressed after the chromosome is inactivated.

C. X inactivation is random as to which X is inactivated and takes place early in embryonic development

D. Inactivation is thought to be initiated by expression of the Xist gene on the X That will remain active.

E. Once an X chromosome first becomes inactivated in a cell, that same X will remain inactivated in somatic cells that are descendants of this cell

Ans: D

3- In order to perform karyotype analysis, chromosomes are obtained from

Actively dividing cells and treated with chemicals to keep them at the __ stage of mitosis.

A. Prophase

B. Interphase

C. Anaphase

D. Telophase

E. metaphase

Ans: E

4-Which his tone is replaced in nucleosides found in the vicinity of centromere?

A.histone H1

B.histone H2A

C.histone H2b

D.histone H3

E.histone H4

Ans:D

5- which of the following in NOT a component of DNA?

A- Pyrimidines such as uracil

B- Purines such as adenine
C- Pyrimidines such as guanine
D- Doxyribose sugar
E- A phosphate group
F- A and C
Ans: F

6- the difference between leading and lagging stands is that

A- There is no clear difference between leading and lagging stands
B- The leading stand is synthesized by adding nucleotides to the 3' end or the growing stand , and the lagging stand is synthesized by adding nucleotides to the 5'end
C- The lagging stand is synthesized continuously , whereas the leading stand is synthesized in short fragments that are ultimately stitched together
D- The leading stand is synthesized in the same direction as the movement of replication fork and the lagging stand is synthesized in the opposite direction
Ans- D

7- which of the following statement about DNA packaging into chromosomes is correct

A- The DNA double helix wrapped 4time around the core histones to produce a nucleosome
B- The h1 histone is a part of the core histone
C- The 300 nm chromatin is created by interaction of 10 nm fibers and the nuclear matrix
D- The radial loops of 300 nm chromatin are generated by the attachment of lopped domains to the nuclear matrix via DNA sequences called MAR

E- C and D

F- All of the above are correct

Ans :D

8- where would you most likely find chromatin in the 30 nm diners conformation

A- Heterochromatin

B- Actively transcribed chromatin

C- Silenced chromatin

D- Euchromatin

E- A and B

F- B and D

Ans : D

9- which of the following is not a true statement prokaryotic and eukaryotic DNA replication

A- Both eukaryotic and prokaryotic DNA polymerases require RNA primers made by primase

B- DNA replication always occurs in the nucleus

C- Eukaryotic DNA replication involved more polymerase than prokaryotic replication

D- Eukaayaotic DNA replication requires multiple origins of replication while prokaryotic replication sues a single origin of replication

Ans : B

10- which of the following statements about euchromatin is correct

A- Euchromatin is lightly packed and a available for transcription

B- Euchromatin is tightly packed and available for transcription

C- Euchromatin represents 10% of chromosome

D- Euchromatin replicate late s phase

Ans – A

11- nucleosides contain a nitrogenous base , a Penrose , and at least one phosphate while nucleotides contain a nitrogenous base , a Pentose but missing the phosphate

A- True
B- False
Ans: b

12- X chromosome inactivated is an example of facultative heterochromatin

A- True
B- False
Ans: A

13- during DNA replication , the complementary stand is always built from

A- The end of the middle
B- The 3’ to 5’, nucleotides are added at the 5’ end of the growing sequence
C- The 5’ to 3’ end, nucleotides are added at the 5’ end of the growing sequence
D- The replication fork to the end , nucleotides are added at then 5’ end of the growing sequence
E- Non of the above
And: E

14- where is the general location of a Barr body

A- Adjacent to the Y chromosome
B- In the nucleolus
C- Attachment to the other X chromosome
D- Attachment to the nuclear envelope

E- Stuck in a nuclear pore

Ans: D

15- what is meant by the " beads on a sting" module of chromatin

A- The beads are the histones , and the sting transcriptionally active DNA loops

B- The beads are the nucleosome and the string is the linker DNA

And: b

16- which Huston protein in not part of the nucleoside structure

A- H1
B- H2A
C- H2B
D- H3
E- H4

Ans: A

17-a chromosome with two arms of equal length is

A- Acrocentric
B- Homologous
C- Telocentric
D- Metazoan
E- Metacentric

Ans E

Lecture 3

1-Homologous recombination takes place in the G1 phase the cell cycle

a-true

b- false

Ans:b

2-which of the following helps explain why increased maternal risk pf dawn syndrome?

A-mutations accoumulate in the germ line in a time dependent manner

b- meiosis in procures is incomplete before fertilisation

C- Frequency of crossovers increase with gamers age

D- Barrie's to double fertilisation decrease in older ova

E- Kinetochore fusion is more common in older women

Ans : B

3- Which regions of the X chromosome recombine with Y during meiosis?

A. the pseudoautosomal regions

B. the heterochromain

C. SRY

D. the male- specific region of the Y

E. the centromere

Ans: A

Lecture 4

1. When chromosomes are heated and stained with Giemsa stain, the resulting bands are called:
A. G bands
B. Q bands
C. R bands
D. C bands
Ans: C

2. The purpose of a staining technique of chromosomes such as Giemsa is to:
A. allow the mitotic process to be followed and monitored for variations.
B. allow the numbering of chromosomes and identification of variations.
C. identify new somatic cells formed through mitosis and cytokinesis.
D. distinguish the point mutations in chromosomes
Ans: B

3-This form of prenatal testing is most commonly performed between the 15th week and 18th week of pregnancy.

A. chorionic villus sampling

B. preimplantation genetic analysis

C. amniocentesis

D. heterozygote screening

E. presymptomatic screening

Ans: C

4-. Which type of chromosome has no p arms?

A. Metacentric

B. Submetacentric

C. Acrocentric

D. Subacrocentric

E. Telocentric

Ans: E

5- You have identified a chromosome that has both p and q arms, but notice that

the p arms are composed of highly repetitive DNA. What type of

chromosome is this?

A. Metacentric

B. Submetacentric

C. Acrocentric

D. Subacrocentric

E- Telocentric

And: C

6- You are trying to prepare a DNA karyotype, but this time you forgot to

Add trypsin to your chromosome preparation. What effect would you expect to see?

A. Dyes would stain the chromosomes better because more proteins are present to take up the dye.

B. Dyes would not stain the chromosomes at all.

C. Chromosomes will be uniformly stained, so it would be very difficult to isolate individual chromosomes.

D. Chromosomes would be degraded quickly because the trypsin is necessary to promote DNA stability by adding more scaffold proteins to the chromatin.

E. The chromosomes would be more difficult to pair up because the

trypsin acts as a dye, creating a banding pattern that distinguishes between

chromosomes.

Ans: C

Lecture 5

1-In humans, XXY individuals are males with Klinefelter syndrome. Which of the following events may not give rise to a Klinefelter male?

A. nondisjunction at meiosis I in the mother

B. nondisjunction at meiosis II in the mother

C. nondisjunction at meiosis I in the father

D. nondisjunction at meiosis II in the father

E. All of the choices could give rise to a Klinefelter male.

Ans: D

2-The most common human aneuploidy is trisomy 21, Down syndrome. All of the effects listed below may be seen in this syndrome except:

A. death always by age 25.

B. mental retardation.

C. skeletal abnormalities.

D. heart defects.

E. increased susceptibility to infection.

Ans: A

3-Which of the following sex chromosome aneuploidies is not usually seen in live births?

A. XO

B. XXY

C. YO

D. XXX

E. None of the choices are correct.

Ans: C

4-What is the expected outcome for a human embryo with the XXXY Chromosome constitution?

A. It would likely develop into a female who will not respond to the hormone testosterone.

B. It would likely develop into a sterile male with reduced testes.

C. It will always abort early in development before birth.

D. It would likely develop into a tall female who may be slightly cognitively

impaired.

E. It would likely develop into a fertile man with a completely normal male phenotype.

Ans: B

5- The condition that exists when an organism gains or loses one or more chromosomes but not a complete haploid set is known as _____ .

A. polyploidy

B. euploidy

C. aneuploidy

D. triploidy

E. Trisomy

Ans: C

6- Which of the following human genetic conditions is missing a chromosome?

A. Jacob syndrome

B. Klinefelter syndrome

C. XXXX syndrome

D. Down's syndrome

E. Turner syndrome

Ans: E

7-Which of the following karyotypes would lead to male

characteristics in humans?

A. XO
B. XYY
C. C. XXY
D. D. Both A and B
E. E. Both B and C
Ans: E

8- Klinefelter and Turner syndromes have how many chromosomes, respectively?

A. 47,46
B. 46,46
C. 45,47
D. 47,45
E. 46,45
Ans: D

9-For an individual with the XXY chromosomal composition, the expected numberof Barr bodies in interphase cells is:

A. Two

B. One

C. Three

D. Variable

E. Zero

Ans: B

10- How many Barr bodies would one expect to see in cells of Turner Syndrome females and Klinefelter syndrome males, respectively?

A. zero and two

B. one and one

C. zero and one

D. one and zero

E. zero and zero

Ans: C

11-Nondisjunction can occur at either the first or second division of meiosis. XYY individuals would most likely arise from nondisjunction at the _____ meiotic division in the _____ .

A. first; mother

B. second; mother

C. first; father

D. second; father

E. more than one of the choices could give rise to XYY individuals

Ans: D

12- What is the most common cause of Down syndrome?
A. Paternal nondisjunction
B. Maternal translocations
C. Maternal nondisjunction
D. Paternal translocation
Ans: C

13- Hyperphagia is associated with which condition?
A. Down syndrome
B. Angelman syndrome
C. Williams syndrome
D. Prader-Willi syndrome
Ans: D

14- What is the relationship between the cause of Prader-Willi syndrome and the cause of Angelman syndrome?
A. Both involve chromosome 15; Prader-Willi involves a deletion of genetic material on this chromosome, while Angelman Syndrome involves extra material on this chromosome.
B. Both involve chromosome 15; Prader-Willi involves a deletion of genetic material from the father whereas Angelman involves a deletion of genetic material from the mother.
C. Both involve the deletion of genetic material; Prader-Willi from chromosome 15 and Angelman from chromosome 16.
D. Both involve nondisjunction; Prader-Willi on chromosome 15 and Angelman on chromosome 16
Ans: B

15- If, while examining a human karyotype, it is observed that there are 22 paired chromosomes and two chromosomes that are not the same size, this would most likely be due to:
A. The karyotype belonging to a female
B. Nondisjunction
C. The karyotype belonging to a male or nondisjunction
D. The karyotype belonging to a male
E. The karyotype belonging to a female or nondisjunction
Ans: D

16- The parents of a child with a karyotype of 47,XY, +21 ask the nurse what this means. Which is an accurate response by the nurse?
A. This karyotype is for a normal male.
B. This karyotype is for a normal female.
C. This karyotype is for a male with Down syndrome.
D. This karyotype is for a female with Turner's syndrome.
Ans: C

17- Which of the following is a form of aneuploidy in which two members of The same homologous pair are absent? Extra!

A. Nullisomy

B. Monosomy

C. Disomy

D. Trisomy

E. Tetrasomy

Ans: A

Lecture 6

1. The three chromosomal abnormalities that cause Down syndrome are:
A. trisomy 21 ; translocation ; mosaicism
B. trisomy 23 ; translocation ; mosaicism
C. trisomy 21 ; translocation ; Fragile X
D. trisomy 23 ; translocation ; Fragile X
E. trisomy 23 ; mosaicism ; Fragile X
Ans: A

2-which of the following represents a karyotype of a male with a balanced Roberstonian translocation of chromosome 13 and 14:
A. 46, XY, der (13;14) (p21:q13)
B. 46, XY, + (13;14) (q23:q22)
C. 45, XY, der (13;14) (p21:q13)
D. 45, XY, der (13;14) (q10:q10)
E. 46, XY, der (13;14) (q10:q10)
Ans: D

3-Down syndrome can result from

A. three copies of chromosome 21.

B. a translocation of a part of chromosome 21.

C. a reciprocal translocation between any two autosomes.

D. both A and B

Ans:D

4-Triploid organisms usually result from

A. the union of haploid and diploid gametes.

B. unequal disjunction during embryogenesis.

C. propagation of fused cell lines.

D. fusion of three gametes simultaneously.

E. Two of the choices

Ans:E

5- Although the most frequent forms of Down syndrome are caused by nondisjunction of chromosome 21, Down syndrome occasionally runs in families. The cause of this form of familial Down syndrome is _____ .

A. an inversion involving chromosome 21

B. a chromosomal aberration involving chromosome 1

C. too many X chromosomes.

D. a translocation between chromosome 21 and a member of the D chromosome

group.

E. a maternal age effect.

Ans: D

6-Individuals have been identified who have two different karyotypes, such as (45,X and 46,XY) or (45,X and 46,XX). Such individuals are called:

A. Heteromorphic

B. Homogametic

C. Trisomic

D. Mosaics

E. Heterogametes

Ans: D

7- 6. In case of Robertsonian translocation causing Down syndrome. How

Many chromosomes would you expect to see in the karyotype of a somatic cell in an affected individual?

A. 21

B. 23

C. 45

D. 47

E. 46

Ans: E

Good luck