Quadrant II- Transcript and Related Material

Programme : Bachelor of Science (First Year)

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Course Code : ZOC 102

Course Title : Diversity of chordates and Genetics

Unit Number : 8

Module Name : Sex linked Inheritance-II

Name of the Presenter : Dr. Kulkarni Rajender Rao.

Notes:

Haemophilia. was first reported by John Cotto in 1803.Main Symptoms are delayed blood clotting. Continuous bleeding, It is also known as Bleeders Disease.

Normal clotting time is 2-6 minutes. In Haemophiliacs, clotting time ranges between 20 minutes – 24 hours.thus results in death due to haemarrhage.

Sex linked recessive character caused by 'h' mutant gene to normal wild dominant gene + or 'H' Queen Victoria had mutant allele of haemophilia. It is very common among the royal family hence regarded as Royal disease Its Locus is present on only X Chromosomes.

Male is hemizygotic. i.e having only one gene. In Female homozygotic having two Genes / alleles. Haemophilia. Is more common in male compared to female (rare). Inheritance of the disease follow criss cross pattern.

Three types Haemophilia A is also known as Classical haemophilia. 4 out of 5 cases of haemophilia are of this type.It is due to lack of antihaemophilic globulin (factorVIII), it is a severe disorder, occurs 1 in 5000 male births.

Haemophilia B (Stephen Christmas 1952) (Christmas disease) is due to lack of

Plasma thromboplastin Component (factor IX).It is less severe.

Haemophilia C is very rare.it is due to lack of plasma thromboplastin antecedent (Factor XI).

Haemophilia inheritance.

Normal Father (X^+Y) and Carrier (Normal) Mother(X^+ X^h) produce Normal Daughter(X^+X^+ Carrier Daughter (X^+ $X^{h)}$, Normal Son (X^+Y) , Haemphiliac Son (X^h Y)

Father with Haemophilia (X^hY) and Normal Mother(X^+ X^+) give birth to carrier daughters and normal sons in equal proportion.

Father with Haemophilia (X^hY) and Carrier (Normal) Mother(X^+ X^h) give birth to carrier daughter ,normal daughter and normal son, Haemophiliac son in equal proportion.

COLOUR BLINDNESS - John Dalton described in 1794.Its inheritance and mechanism was discovered by Horner Wilson in 1911 as Sex(X) linked recessive disorder, in which Patient cannot distinguish between red and green colours.

In males no allele of colour blindness is present on Y chromosome. Man is hemizygous – have only one gene for colour blindness on single X chromosome. It is more common in men than in women. Male 50% - female 33% It follows criss cross heritance pattern. Daughter carrying single gene is the carrier. It is never transmitted to son from father.

Dichromatism is difficulty in seeing one of the three primary colours: red, blue or green. Anomalous trichomatism is reduced sensitivity to certain colours. Monochromatism (RARE) is a condition in which there is no colour vision at all and the world is seen in white, black and grey shades.

(Protonopia- unable to perceive red light, Dueteranopia- unable to perceive green light.

Tritanopia- unable to perceive blue light)

Colour Blindness Inheritance .Normal man X^+Y and Colour blind Woman X^+X^c produce carrier daughters and colour blind sons in equal ratio. Colour blind man X^C Y and Normal Woman X^+X^+ produce carrier daughters and normal sons. Thus reciprocal cross give different phenotypes.

Colour blind man X^C Y and Carrier(Normal) Woman X^+X^C have Carrier daughter , colour blind daughter , colour blind son and normal sons in equal number.

Normal man X Carrier (Normal) Woman have normal daughter, colour blind daughter, normal son and colour blind son.

Sex linkage in Birds. Male is homogametic having ZZ and Female is heterogametic having ZW. Inheritance pattern is reverse to Man.

e,g, In Barred plumage (dominant gene on Z) condition . Feathers are with Black bars on white background.

Barred Female (ZW) BW when crossed with Non barred Male (ZZ) bb, resulting progeny will have barred male and non barred female in equal ratio.

Barred male(ZZ) Bb when crossed with Non barred female (ZW) bW resulting progeny will have barred and non barred male and female in equal ratio.

Barred male (ZZ) Bb and barred female(ZW)Bw produce all the barred progeny of sons and both barred and non barred female