Discussion topic

Science, Biology

Discussion topic al Affiliation) Discussion topic Achromatopsia in canis lupus familiaris A gene scan was carried out using a number of microsatellites; one microsatellite was discovered on CFA29. This microsatellite was referred to as C29. 002. The microsatellite is directly connected to the disorder locus hence it is responsible for achromatopsia. Achromatopsia is a condition that is inherited from parents and passes to the off springs. In canis lupus familiaris, this condition is associated with loss of visual acuity, daytime blindness due to high sensitivity to extreme light, and total loss or reduced ability to differentiate colors. This condition is caused by mutations in certain genes. Two common genes that undergo mutation to result in achromatopsia are CNGB3 and CNGA3. Four chromosomes might have changes responsible for achromatopsia. These chromosomes are chromosome 14, chromosome 8q21-q22, chromosome 2q11, and chromosome 10q24.

A mutation that causes this disorder was discovered through a comparative positional cloning approach. The locus of the disorder is in a region of chromosome CFA29. The homologous region on the human genome has the gene for cyclic nucleotide-gated channel beta subunit. Mutation causes same disorders in human beings. The mode of inheritance for this disorder is autosomal recessive. Some chromosomal information is lost or deleted through the process of converting DNA to amino acids (Parker, 2004).

Part II, punnet square

A scientist known as Punnet in 1993 discovered the trait for blue egg. This trait was mapped on chromosome GGA1 to a region from 67. 3-69. 1. Dongxiang chicken breed was used to discover this trait. Using analysis of linkage on the candidate region on information from 146 F2 hens that

originate from cross breeding between homozygous blue and homozygous non-blue birds of the Dongxiang breed, scientists refined the location to 120 kb region from 67296991 bp to 67416784 bp located on chromosome 1along the chicken genome.

The location that was refined by scientists is made up of four positional candidate genes. Just a single gene out of the four genes is responsible for blue shell trait. This gene is SLCO1B3. It is expressed in the shell glands in the uterus of chicken with a blue shell trait but it is not expressed in shell glands within the uterus of non blue-shelled hens. Through the process of converting DNA to proteins, a gene responsible for this trait was inserted within the amino acid sequence in the protein structure. Process of sequencing uncovered causal mutation to be a~4. 2, (that is a retroviral), EAV-HP in the fifth flanking region of SLCO1B3. A survey for genotyping that consisted 38 hens from different breeds in which blue eggshell segregates indicated total correlation of the presence or absence of the insertion mutation with blue egg-shell genotype. The same insertion mutation was also reported in other chicken breeds in different parts of the world. This trait comes because of autosomal dominant inheritance. A gene for this trait is located in somatic cells. A single mutated gene from one parent is enough for the off spring to acquire a trait that is responsible for blue egg trait.

References

Parker, J. (2004). Achromatopsia medical dictionary and research guide. San Diego.

Endogenous retrovirus EAV-HP linked to blue egg phenotype in Mapuche fowl. (n. d.). Public library of science.