Commentary
Volume 12:S7, 2021

Journal of Veterinary Science and Technology

ISSN: 2157-7579 Open Access

A Brief Note on Genetic Recombination in Animals

Alec Wade*

Department of Veterinary Science, Addis Ababa University, Bishoftu, Ethiopia

About The Study

Genetic recombination (also known as genetic reshuffling) is the transfer of genetic material between organisms that results in the development of offspring with characteristics that are different from either parent. Genetic recombination during meiosis in eukaryotes can result in a new collection of genetic information that can be passed down from parents to offspring. Most significant percentage of recombination occurs naturally. In eukaryotes, genetic recombination happens during meiosis, where homologous chromosomes are paired. This could be followed by chromosome-to-chromosome information transfer. Information can be transferred without physical exchange (a segment of genetic material is copied from one chromosome to another without changing the donating chromosome) or by breaking and rejoining DNA strands, which results in the synthesis of new DNA molecules.

In eukaryotes, recombination can also happen during mitosis, and it usually includes the two sister chromosomes that form after chromosomal replication. Because the sister chromosomes are normally identical, no novel allele combinations are formed in this situation. Recombination occurs between comparable DNA molecules during meiosis and mitosis (homologous sequences). Non-sister homologous chromosomes pair with each other during meiosis, resulting in recombination between non-sister homologues. Recombination between homologous chromosomes is a common DNA repair method in both meiotic and mitotic cells.

Many different enzymes catalyse genetic recombination. The strand transfer step of recombination is mediated by recombinases, which are important enzymes. RecA, the most common recombinase discovered in E. coli, is in charge of repairing DNA Double Strand Breaks (DSBs). Two recombinases are necessary for DSB repair in yeast and other eukaryotic species. The RAD51 protein is essential for both mitotic and meiotic recombination, while DMC1 is only required for meiotic recombination. RadA is the archaea's basis of the bacterial RecA protein.

Recombination during meiosis in eukaryotes is facilitated by chromosomal crossing. The crossover process results in kids with different gene combinations than their parents, and it can occasionally result in new chimeric alleles. Genetic recombination causes gene shuffling, which results in more genetic variation. It also enables sexually reproducing species to avoid Muller's ratchet, in which an asexual population's genomes collect genetic deletions in an irreversible manner.

Recombination of the paired chromosomes inherited from each of one's parents is called chromosomal crossover, and it usually occurs during meiosis. The four available chromatids are in close connection with one another during prophase I (pachytene stage). Homologous spots on two chromatids can develop a tight bond and exchange genetic information while in this form. Because recombination can happen with a tiny chance at any point along a chromosome, the frequency of recombination between two places is proportional to the distance between them. As a result, for genes located far apart on the same chromosome, the amount of crossover is sufficient to remove allele correlation.

Geneticists had found that tracking the movement of genes caused by crossovers is very beneficial. Because two genes close together are less likely to become separated than genes farther apart, geneticists can estimate the distance of two genes on a chromosome based on the frequency of crossovers. This method can also be used by geneticists to infer the presence of specific genes. Linked genes are those that often stay together following recombination. In some cases, one gene in a linked pair can be used as a marker to infer the existence of another gene. This is usually taken to determine out if a disease-causing gene is expressed.

The crossing-over value is the observed recombination frequency between two loci. It is the frequency with which two connected gene loci (markers) cross across, and it is determined by the genetic locus's mutual distance. Recombination in a particular region of a linkage structure (chromosome) tends to be constant for any defined set of genetic and environmental variables, and the same is true for the crossing-over value used in the production of genetic maps. Gene conversion involves copying a segment of genetic material from one chromosome to another without changing the supplying chromosome. In fungal crosses, where the four products of individual meioses can be easily observed, gene conversion has been studied extensively.

How to cite this article: Wade, Alec. "A Brief Note on Genetic Recombination in Animals." *J Vet Sci Techno* 12 (2021) : 008.

***Address for Correspondence:** Dr. Alec Wade, Department of Veterinary Science, Addis Ababa University, Bishoftu, Ethiopia; Tel: 9657493661; E-mail: wadealec77@gmail.com*

Received: September 10, 2021; **Accepted**: September 24, 2021; **Published**: October 01, 2021