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Lecture title: **DOMINANCE TYPES:**

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Summary:

DOMINANCE TYPES

COMPELETE DOMINANCE

In complete dominance, the effect of one allele in a heterozygous genotype completely masks the effect of the other.

INCOMPELETE DOMINANCE

incomplete dominance is when there is a blending of the two alleles that results in a third phenotype that doesn't look like either of the parents. The classic example is when a white flower and red flower are crossed. With incomplete dominance, all their offspring would be solid pink flowers, a completely new phenotype. You don't see either of the parent phenotypes (i.e. white or red) in the offspring.

CODOMINANCE

In codominance, both alleles are expressed together in the offspring. If we cross a red flower and white flower that have a codominance inheritance pattern, the offspring would be flowers with red and white patches on them. Unlike incomplete dominance, where the two parent phenotypes are blended together into a new phenotype, in codominance, both parent phenotypes show up together on the offspring.

The most common example of codominance is the AB blood type. If a person with A type blood and a person with B type blood have a child, that child could have type AB blood where both phenotypes are fully expressed.

Other example are the four types of combs in fowls: rose, pea, walnut and single. Bateson first performed a cross between rose and single. The F1 hens all had a rose comb, and on inbreeding gave rise to an F2 progeny of rose and single in the ratio 3 : 1. The cross indicates that rose and single comb are controlled by a single gene and that rose is dominant over single. In the second cross when chickens with pea comb were mated with

single comb, the F1 progeny had pea comb, and F2 had pea and single in the proportion 3 : 1. Obviously, the gene for pea comb is dominant over single. This raises an interesting question—are the genes for rose and pea comb same or different? Bateson then crossed rose and pea. Surprisingly, the F1 birds had completely different comb of the walnut type! An F2 progeny raised by inbreeding the walnut type consisted of four types of chickens—walnut, rose, pea and single (Fig. 2.1) in the ratio 9 : 3 : 3 : 1. As this ratio is typical for dihybrid Inheritance it became clear that rose and pea combs were controlled by two pairs of genes.

WALNUT> ROSE , PEA> SINGLE

1. rose x single = rose

2. pea x single = pea

3. (rose x single) F1 x (rose x single) F1 = 3 rose : 1 single

Example: Deduced the product of a rose comb male with pea comb female?

The Chromosomes Abnormalities

Evolution happened based on the changes at a molecular level that cause species to change over time. These changes may be mutations in DNA, or they could be mistakes that happen during mitosis or meiosis in relation to the chromosomes. If the chromosomes are not split correctly, there may be mutations that affect the entire genetic makeup of the cells, As:

1-Dublication: A duplication involves attachment of a chromosomal fragment resulting in addition of one or more genes to a chromosome.

2- Translocation: Sometimes a segment of a chromosome becomes detached and unites with another non homologous chromosome

3- Inversion: Inversions result when there are two breaks in a chromosome and the detached segment becomes reinserted in the reversed order.