

Alleles

Sexually reproducing organisms in nearly all cases have paired sets of chromosomes, one set coming from each parent. The equivalent chromosomes that form a pair are termed

homologues. They contain equivalent sets of genes on them. But there is the potential for different versions of a gene to exist in a population and these are termed **alleles**.

Homologous Chromosomes

In sexually reproducing organisms, most cells have a homologous pair of chromosomes (one coming from each parent). The diagram below shows the position of three different genes on the same chromosome that control three different traits (A, B and C).

These two different versions of *gene A* create a condition known as **heterozygous**. Only the dominant allele (A) will be expressed.

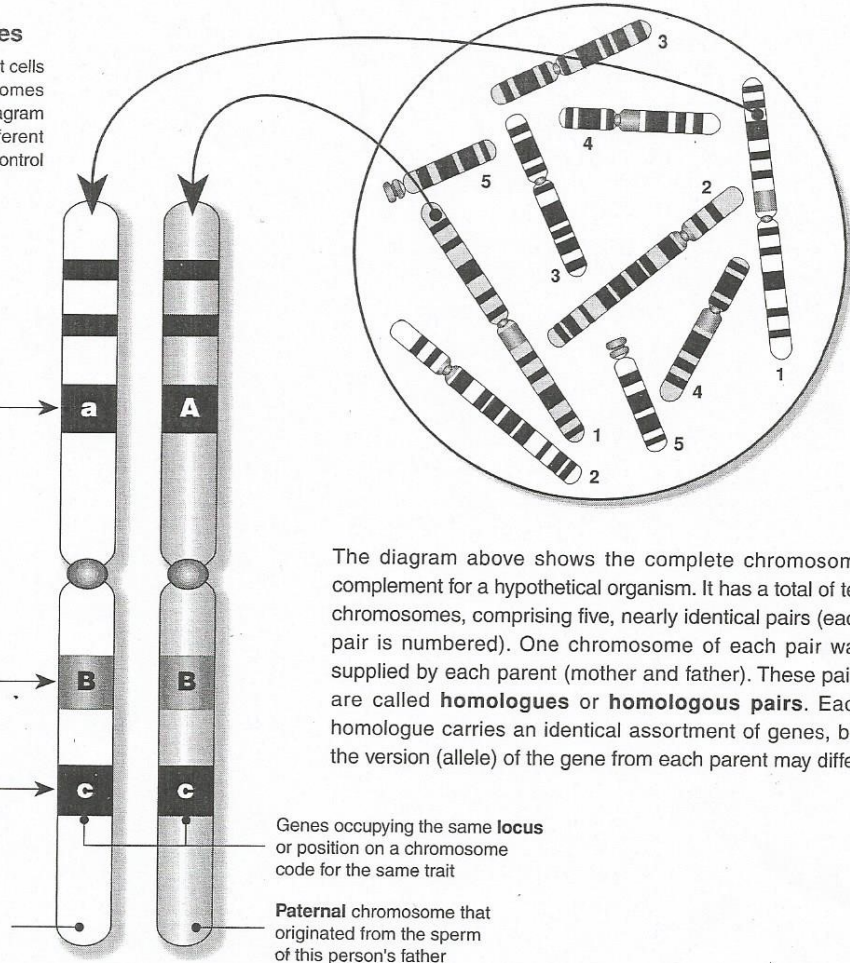
When both chromosomes have identical copies of the dominant allele for *gene B* the organism is said to be **homozygous dominant** for that gene

When both chromosomes have identical copies of the recessive allele for *gene C* the organism is said to be **homozygous recessive** for that gene

Maternal chromosome that originated from the egg of this person's mother

Genes occupying the same locus or position on a chromosome code for the same trait

Paternal chromosome that originated from the sperm of this person's father



The diagram above shows the complete chromosome complement for a hypothetical organism. It has a total of ten chromosomes, comprising five, nearly identical pairs (each pair is numbered). One chromosome of each pair is supplied by each parent (mother and father). These pairs are called **homologues** or **homologous pairs**. Each homologue carries an identical assortment of genes, but the version (allele) of the gene from each parent may differ.

- Define the following terms used to describe the allele combinations in the genotype for a given gene:
 - Heterozygous: _____
 - Homozygous dominant: _____
 - Homozygous recessive: _____
- For a gene given the symbol 'A', name the alleles present in an organism that is identified as:
 - Heterozygous: _____
 - Homozygous dominant: _____
 - Homozygous recessive: _____
- Explain what a **homologous pair** of chromosomes is: _____

- Discuss the significance of genes existing as **alleles**: _____

