CONCEPT: DIPLOID AND HAPLOID GENETICS

Diploid Genetics

● Understanding allele combinations is extremely important in understanding genetics

□ There are many important _____ to remember:

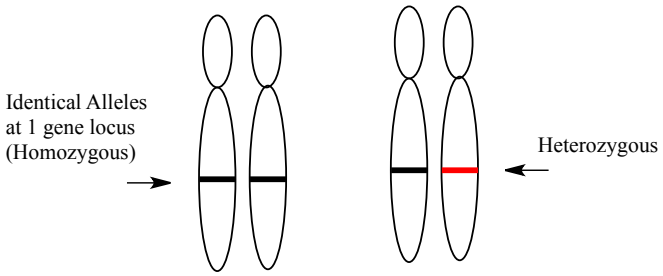
- **Alleles** are variants for a particular trait, in diploid organisms there are two alleles per gene

- Alleles can be **dominant** or **recessive**; The dominant trait is always seen when it is present

- **Homozygous** means that there are two of the same alleles; **heterozygous** means two different alleles

- Each gene sits at a specific chromosomal **locus**

EXAMPLE: Alleles



□ Genes lie on _____

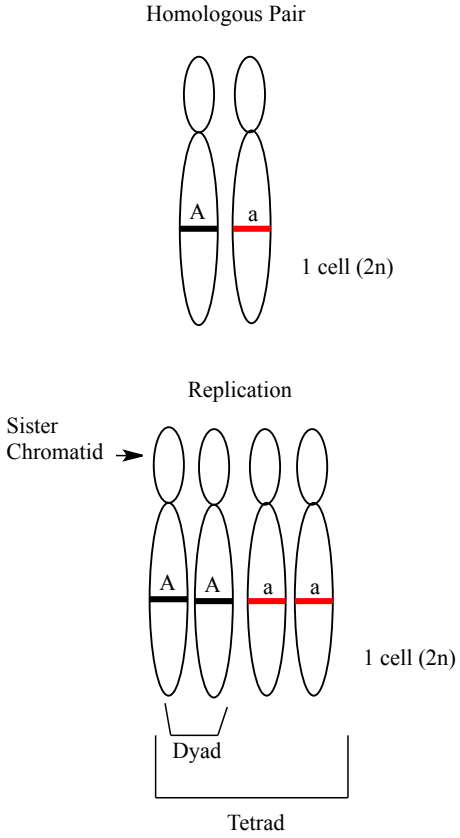
- In Diploid cells, there are two chromosome copies

  - Each chromosome contains one allele

- During **meiosis** these chromosomes are replicated once, but divided into daughter cells twice

  - Creates four haploid **gametes** (sex cells)

EXAMPLE: Chromosomes and Meiosis



□ Chromosomes have a distinct _____

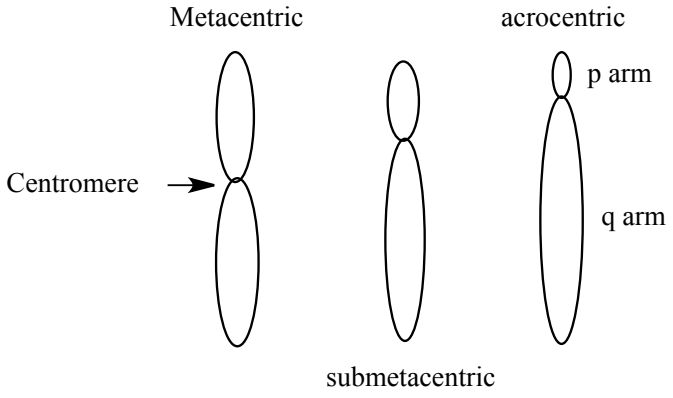
- A **centromere** is a condensed region of the chromosome

    - It can be *metacentric* (in center), *submetacentric* (off-center), *acrocentric* (at one end),

- The **p arm** is the shorter arm and the **q arm** is the longer arm

    - Determined by the length between centromere and end of chromosome

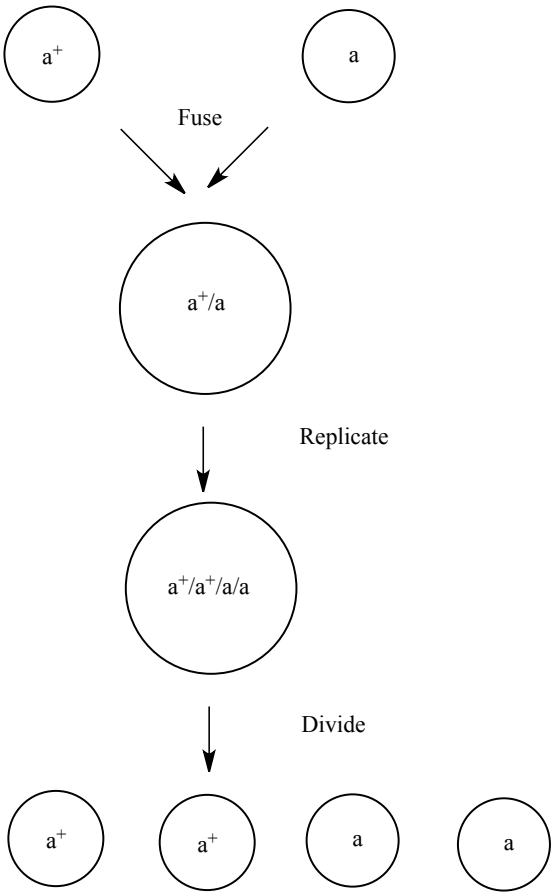
EXAMPLE:



Haploid Genetics

- In haploid cells, there is only one _____ per gene
  - □ Wild type and mutant alleles have different symbols
    - WT allele looks like a^+ ; Mutant allele looks like a
    - When opposite mating types fuse – it creates a diploid combination (a^+/a) called a *meiocyte*
      - These can be replicated and divided into haploid cells containing either a^+ or a

EXAMPLE: Haploid cell creation



PRACTICE:

1. Which of the following describes an acrocentric chromosome?
    a. The p arm is longer than the q arm
    b. The centromere is located at the center of the chromosome
    c. The centromere is located at the end of the chromosome
    d. The p arm and q arm are the same length

2. In diploid organisms there are _____ chromosomal copies. In haploid organisms there is _____ chromosomal copy.
    a. One, two
    b. Two, one
    c. Two, four
    d. Four, two

3. After a diploid cell undergoes meiosis, it divides to produce…
    a. Two diploid cells
    b. Two haploid cells
    c. Four diploid cells
    d. Four haploid cells