

9/22 Lecture Revised notes

Genetics

Genetics after Mendel: no one understood because of the math involved, although trivial

- Mendel assumed:
 1. Traits are due largely to the action of a single factor
- BUT MENDEL WAS WRONG—most traits are polygenic (height, skin color, disease predisposition)

Concept of Polygene Inheritance:

- Most traits are determined by several genes at different places of chromosome

CODOMINANCE: When 2 alleles are together but both are shown (Blood Type)

Mendel also assumed that his factors only affected 1 trait. FALSE. → some genes affect many traits.

Concept of Pleiotropy: 1 gene controls more than 1 characteristic

Chromosomes discovered in 1875:

- They are arranged linearly
- We know where all the major genes are located on the chromosomes
- Unless in nuclear division, genetic material is unraveled and called chromatin
- Chromatin is made up of protein and DNA

Humans → 46 chromosomes (diploid) 23 pairs

- Human karyotype= chromosome pattern
- Polyploidy → 3n, 4n, 5n.. Happens in cells like liver or intestinal
- Possible to have more than 2 sets of chromosomes
- 22 pairs of autosomes → code for body and function
- 1 pair of sex chromosomes → mostly sex characteristics

Particular place of a gene = LOCUS

Sister chromosomes carry alleles in the same position (one from mom one from dad)

Linkage: Genes on the same chromosome are linked

Cell division: Most cells go through *mitosis*

- Before this happens, cells must duplicate

Step 1: The chromosomes duplicate providing 2 identical arms, each with same alleles. Moment its ripped apart, 2 chromosomes.

Step 2: Chromosomes are lined up

Step 3: Chromatids pulled apart

Step 4: 46 chromosomes on each cell.

*****1 chromosome, 2 chromatids, once they split, 2 chromosomes*****

[Look at meiosis chart]—draw division of sperm and egg cells on sheet

Distribution of chromosomes is random → **sexual recombination = variety**

Crossover: sister chromosomes swap during meiosis 1 (side by side)

Crossover can break up linked traits

SRY → Sex determining region of chromosome