LAB -4 –
Mendelian inheritance

4-1: Mendel's experiment

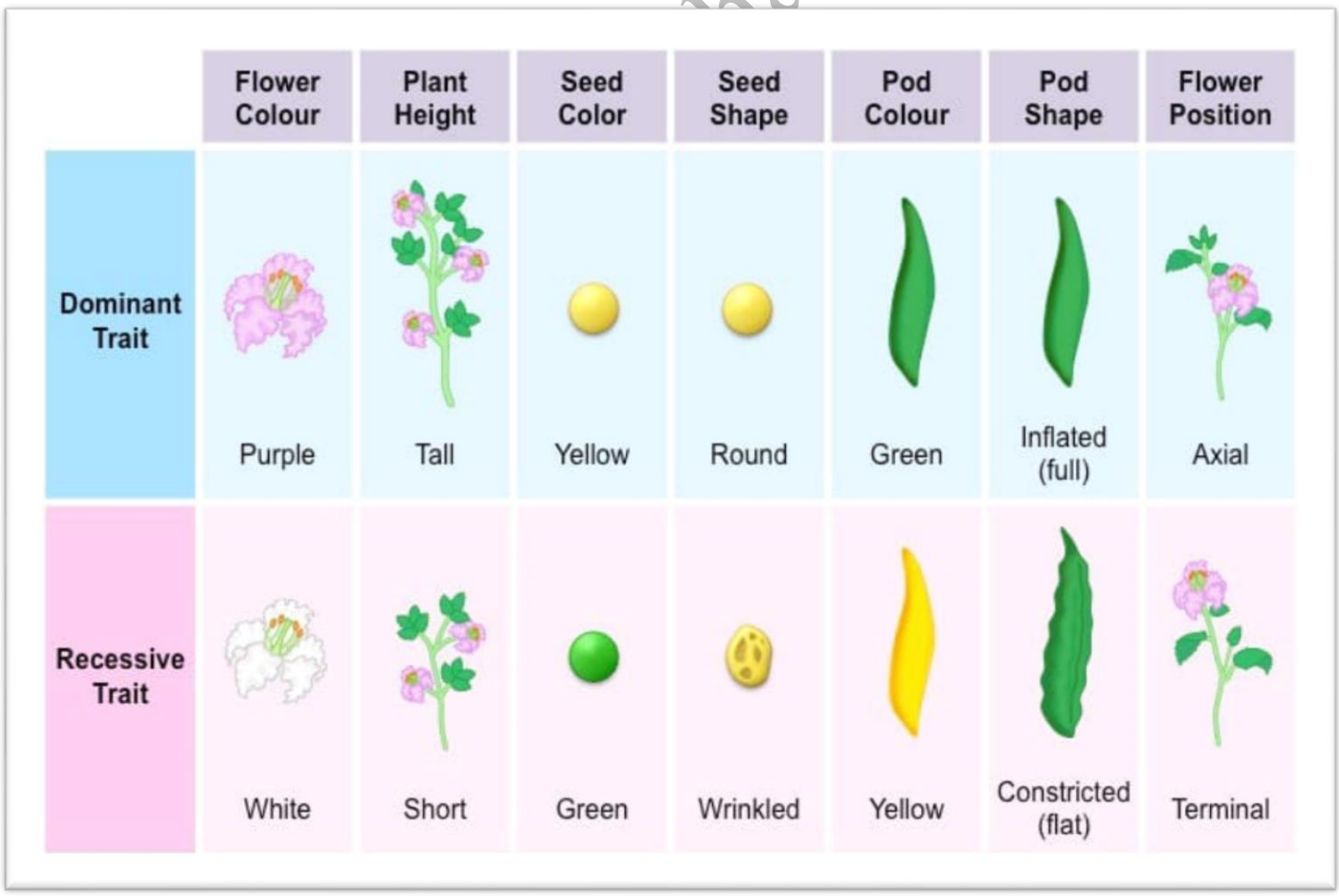
Mendel's approach centered on the use of **pea plant *Pisum sativum* L. a model organism. It is unlikely that Mendel was truly interested in the genetic of pea's plant, but he recognized that organism had the characteristics necessary to study genetics:**

1- It was easy to grow, develop quickly.

2- It was easily identifiable variants of trait.

3-: we could easily to make **self pollination** for plant to produced true-breeding lines. Figure 4-1

. Figure (4-1) *pisum sativum* L. Traits Mendel studied



4-2 Law of Segregation of genes (the "First Law")

The Law of Segregation states that (every individual organism contains **two alleles** for each **trait,** these alleles **separate** during **meiosis** such that each gamete contains **only one of the** alleles. thus individual receives a **pair of alleles** for a trait inheriting from the parents: **one allele for each trait from each parent.**

Before you start the exercise, briefly review some principles and terms:

- **Gene** is an unit of heredity on a chromosome.
- **Gene** has an alternate state called allele.
- **Allele** for particular gene occurs in pairs. Why?
- **Allele** that **hides expression** of another allele but expressed itself called **dominant**; this allele is symbolize by capital letter (for exp., T).
- **Allele** that expression is **hidden by dominant** allele are **recessive**, and they are symbolize by a small letter (for exp., t).
- **The genotype** of an organism includes all alleles present in the cell, whether they are dominant or recessive. Tt, TT, tt, ee, dp
- **The physical** appearance of the trait is **the phenotype**.
- Thus if **tallness (T)** is dominant to **shortness (t)**, a tall plant can have a genotype **TT or Tt.**
- **A short** plant can only have a genotype **tt.**
- When the paired alleles are **identical** (**TT or tt**), the genotype is **homozygous.** •

Heterozygous refer to a pair of alleles that are **different (Tt)**. Figure 3-2.

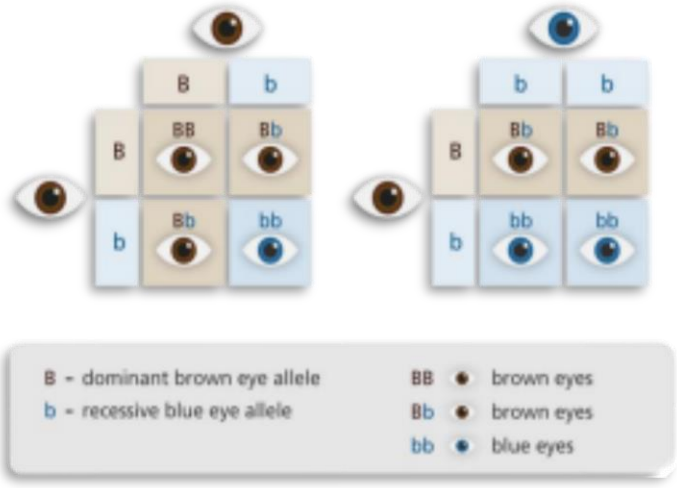


Figure 4-2 (Heterozygous and homozygous)

3-4: Monohybrid Crosses

Mendel found that reproduction between **two heterozygous monohybrid individuals (Aa)** result in both dominant and recessive phenotypes in the offspring. **The phenotype ratio** in the offspring was **3:1; three individuals have the dominant phenotype and one has the recessive phenotype.**

Solved Exercises

1) A black man married a black woman one of their babies is white ,write the ratio of phenotype of offspring resulting in first generation , if you know the trait of black is dominant .

P1 **Bb** **x** **Bb** **P---Parents**

G1 **B** **b** **B** **b** **G --- Gamets**

F1 **BB , Bb ,Bb , bb** **F --- Filial**

3 black **1 white**

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2) A round seed pea plant crossed with a wrinkled seed pea plant , the ratio of phenotype for first generation was round seed pea plant ,what is the genetype of the first generation, what are the genetypes and phenotypes of second generation if we crossed the first generation in self pollination (inbreeding) .the trait of round

is dominant.

P1 RR X rr

G1 (R) (r)

F1 Rr

100% round seed

P1 Rr x rr

G1 (R) (r) (r)

F1 Rr , rr

50%round 50%wrinkled

Homework Exercises

1. A man with **brown eyes** (his father had **blue eyes**) married a **brown-eyed** women (her mother had **blue eyes**), what is the proportion of children would be expected to have blue eyes? (The brown color is **dominant**).

2. A **right** handed man marries a **left** handed women and produce **left** handed children. Write the complete cross (**right** hand is **dominant**).

3. A mating between *Drosophila* fly **wild type** and **dumpy winged** fly, what is the possible result of this mating?