



FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

Overview of Genetics

Gregor Mendel
(1822-1884)

**Responsible for
the Laws
governing
Inheritance of
Traits**



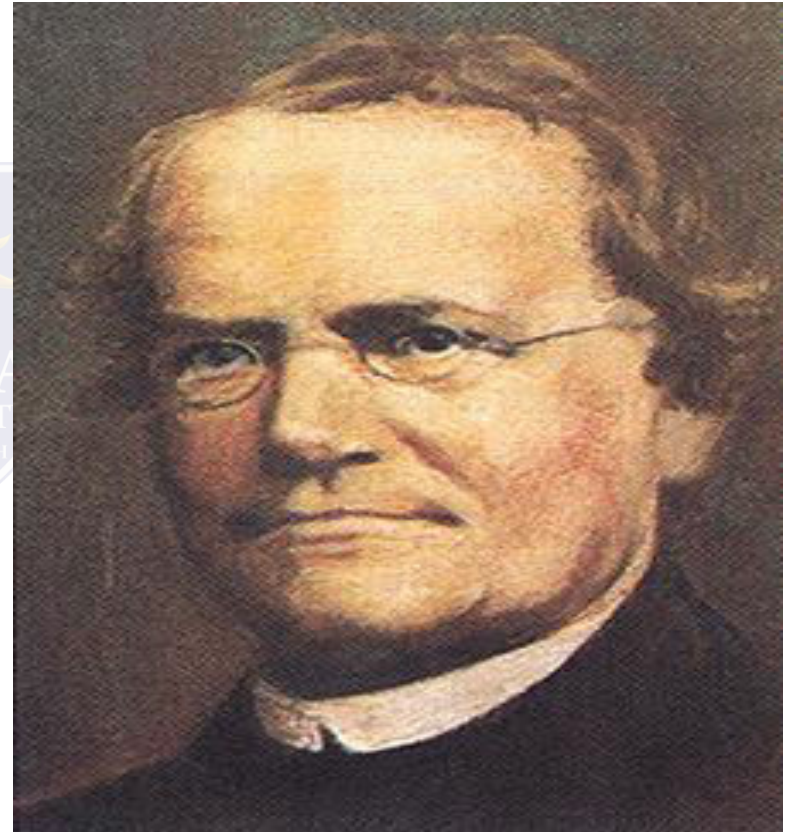
Gregor Johann Mendel

- Austrian monk
- Studied the inheritance of traits in pea plants
- Developed the laws of inheritance
- Mendel's work was not recognized until the turn of the 20th century



Gregor Johann Mendel

- Between 1856 and 1863, Mendel cultivated and tested some 28,000 pea plants
- He found that the plants' offspring retained traits of the parents
- Called the “Father of Genetics”



Genetic Terminology

- **Trait** - any characteristic that can be passed from parent to offspring
- **Heredity** - passing of traits from parent to offspring
- **Genetics** - study of heredity
- **Alleles** - two forms of a **gene** (dominant & recessive)
- **Dominant** - stronger of two genes expressed in the hybrid; represented by a **capital letter (R)**
- **Recessive** - gene that shows up less often in a cross; represented by a **lowercase letter (r)**

▪ **Homozygous** genotype - gene combination involving 2 dominant or 2 recessive genes (e.g. **RR** or **rr**); also called **pure**

▪ **Heterozygous** genotype - gene combination of one dominant & one recessive allele (e.g. **Rr**); also called **hybrid**



▪ **Genotype** - gene combination for a trait (e.g. **RR, Rr, rr**)

▪ **Phenotype** - the physical feature resulting from a genotype (e.g. **red, white**)

Why peas, *Pisum sativum*?

- Can be grown in a **small area**
- Produce **lots of offspring**
- Produce **pure** plants when allowed to **self-pollinate** several generations
- Can be **artificially cross-pollinated**



Eight Pea Plant Traits

- ***Seed shape*** --- Round (**R**) or Wrinkled (**r**)
- ***Seed Color*** ---- Yellow (**Y**) or Green (**y**)
- ***Pod Shape*** --- Smooth (**S**) or wrinkled (**s**)
- ***Pod Color*** --- Green (**G**) or Yellow (**g**)
- ***Seed Coat Color*** --- Gray (**G**) or White (**g**)
- ***Flower position***--- Axial (**A**) or Terminal (**a**)
- ***Plant Height*** --- Tall (**T**) or Short (**t**)
- ***Flower color*** --- Purple (**P**) or white (**p**)