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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**

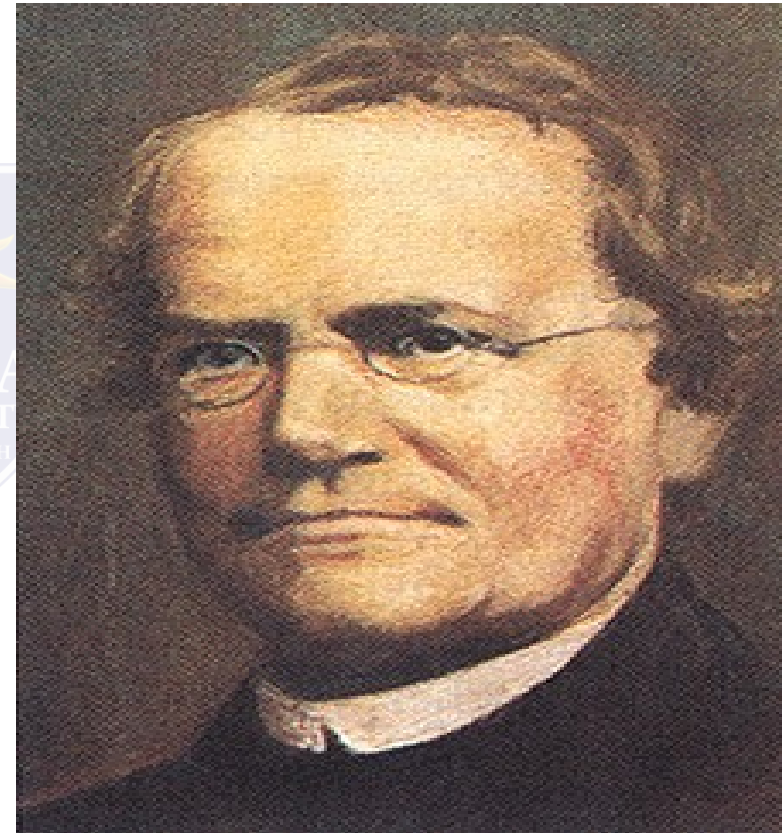


## Gregor Johann Mendel

- 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**)
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