

# LESSON 1 VARIATION

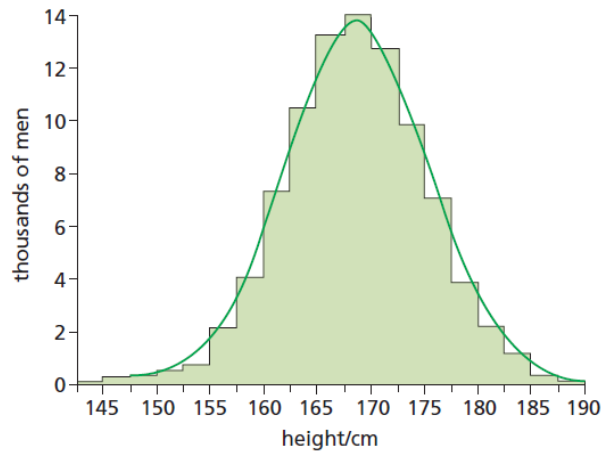
## 1. DESCRIBE VARIATION

- Variations are the differences between individuals of the same species.
- Genetic variations: the differences between the genetic makeup of different organisms of the same species due to the presence of different alleles, arising through mutations and sexual reproduction.
- Phenotypic variations: the differences in the appearance and characteristics of organisms of the same species that may be brought about by genes, but can also be caused by the environment, or a combination of both genes and the environment.

## 2. WHAT ARE THE TYPES VARIATIONS?

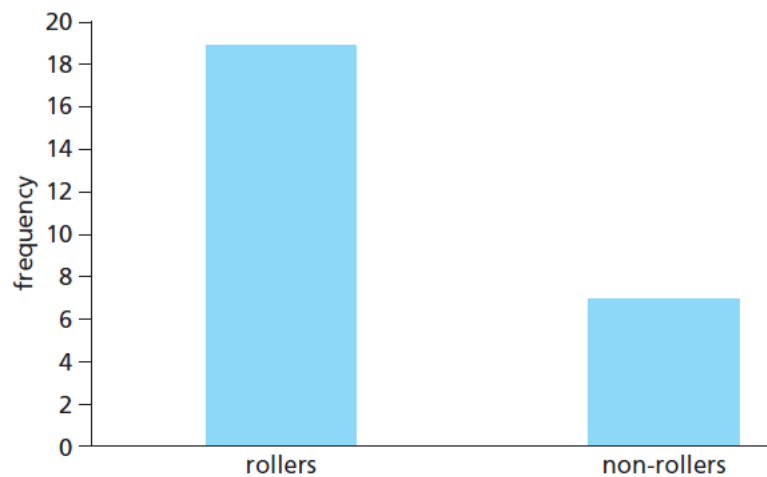
### 1. Continuous Variation:

- It results in a range of phenotypes between two extremes; examples include body length and body mass
- It is caused by genes and by the environment.
- Examples of environmental influences in plants are availability of or competition for nutrients, light and water and exposure to disease. For animals, availability of food or balanced diet, exposure to disease
- An example of continuous variation is height. There are no distinct categories of height; people are not either tall or short. There are all possible intermediates between very short and very tall. When the frequency is plotted in a graph, a smooth curve is produced, with the majority of the population sample grouped together and only small numbers at the extremes of the graph (represented on histogram showing normal distribution)
- Another example is body mass.



## 2. Discontinuous Variation:

- The variations take the form of distinct, alternative phenotypes with no intermediates
- It is caused by a single or small number of genes.
- No environmental influence
- Examples include blood group, ability to tongue- roll, earlobe shape, seed shape in peas and seed color in peas.
- When frequencies are plotted on a graph, bars are produced that cannot be linked with a smooth curve.



### 3. DESCRIBE MUTATION

- Mutation is a source of variation, caused by unpredictable changes in the base sequence of DNA, or chromosome numbers.
- As a result, new alleles are formed.

### 4. WHAT FACTORS (MUTAGENS) INCREASE THE RATE OF MUTATION?

Mutagens are chemical, biological or physical agents that increases the rate of gene mutations above normal level; examples are:

- Ionizing radiation
- Some chemicals such as tobacco smoke

Exposure to mutagens can cause uncontrolled cell division, leading to the formation of tumors (cancer).

Exposure of gonads (testes and ovaries) to radiation can lead to sterility or damage to genes in sex cells that can be passed on the children.

### 5. WHAT ARE SOURCES OF GENETIC VARIATION IN POPULATIONS?

- Mutation
- Meiosis
- Random mating
- Random fertilization