

# PEDIGREE CHARTS

---

A FAMILY HISTORY OF A GENETIC CONDITION

EQ: HOW DO YOU ORGANIZE THE INHERITANCE OF A  
GENETIC DISEASE?

# What is a pedigree chart?

---






- A record of the family of an individual
- Used to study the transmission of a hereditary condition

# Studying human genetics

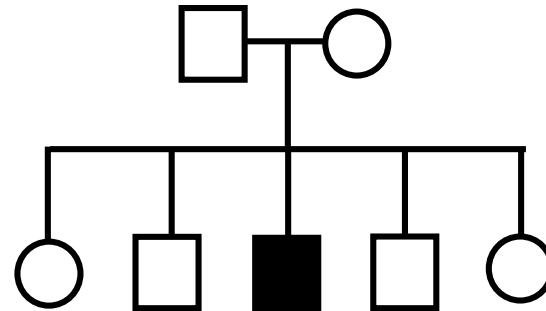
---

- You cannot make humans of different types breed together
- Pedigree charts offer an ethical way of studying human genetics
- Today genetic engineering has new tools to offer doctors studying genetic diseases
- A genetic counsellor will still use pedigree charts to help determine the distribution of a disease in an affected family.

# Symbols used in pedigree charts

-  Normal male
-  Affected male
-  Normal female
-  Affected female
-  Marriage.

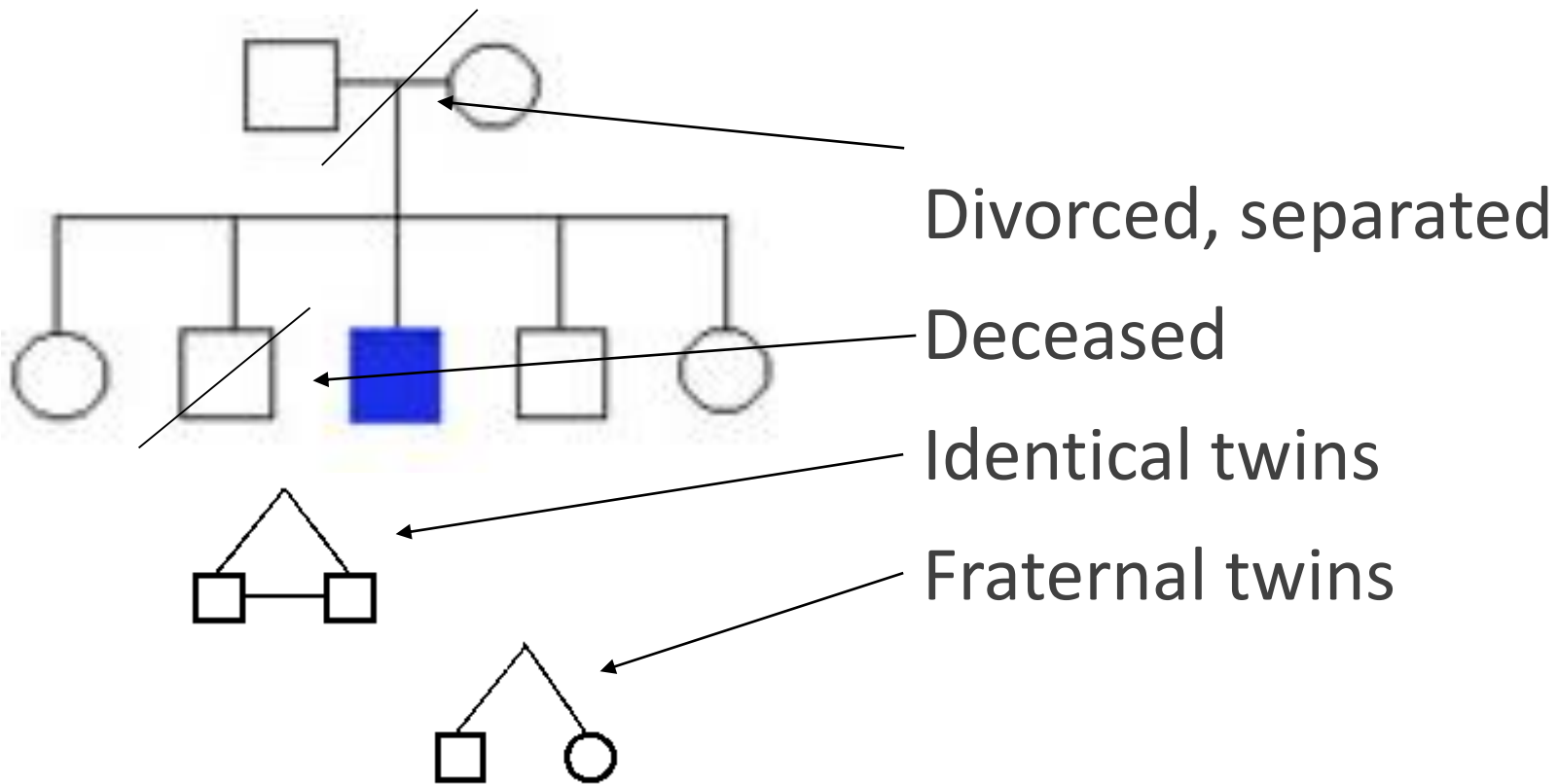
A marriage with five children, two daughters and three sons. The middle son is affected by the condition



Eldest child ↔ Youngest child

# Other Symbols

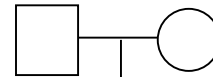
---



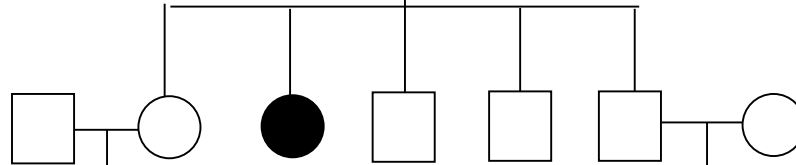
# Organising the pedigree chart

- Generations are identified by Roman numerals.

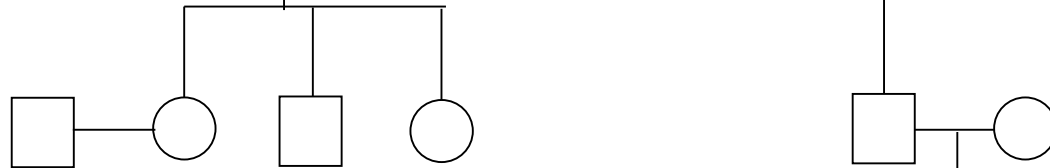
**I**



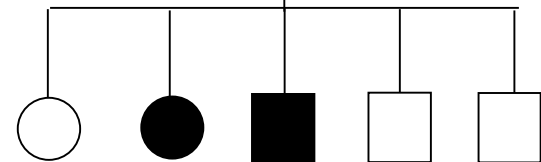
**II**



**III**



**IV**

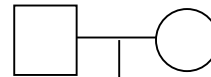


# Organising the pedigree chart

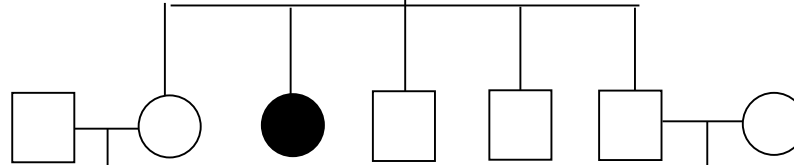
Individuals in each generation are identified by Arabic numerals numbered from the left

Therefore the affected individuals are **II3**, **IV2** and **IV3**.

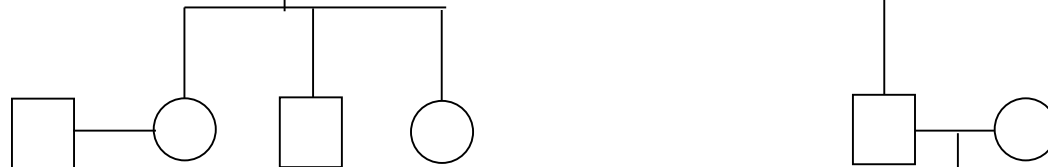
**I**



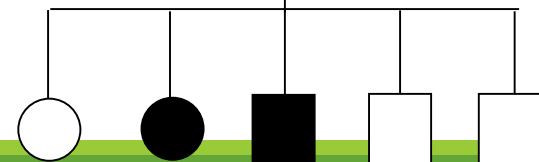
**II**



**III**



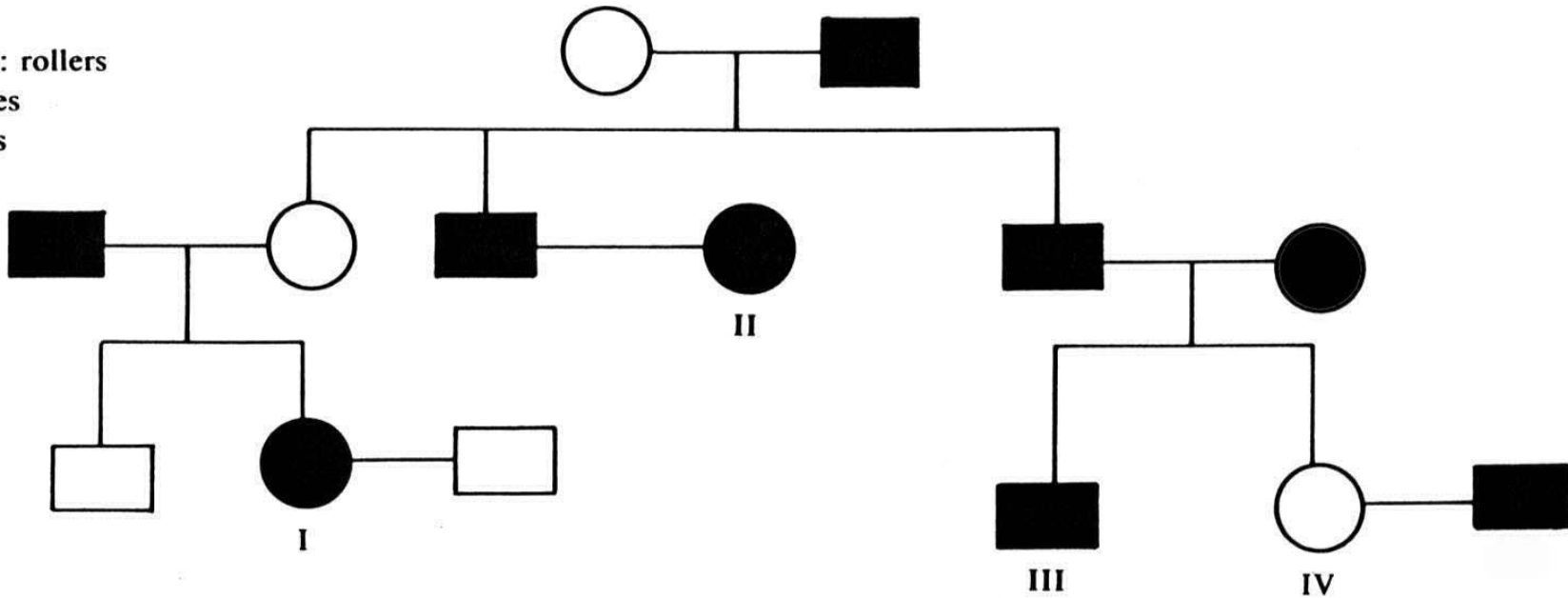
**IV**



# Reading Pedigree Charts

- If two affected individuals give rise to an unaffected child the condition is **dominant**
- Is tongue rolling dominant or recessive?

Black symbols: rollers  
Circles: females  
Squares: males

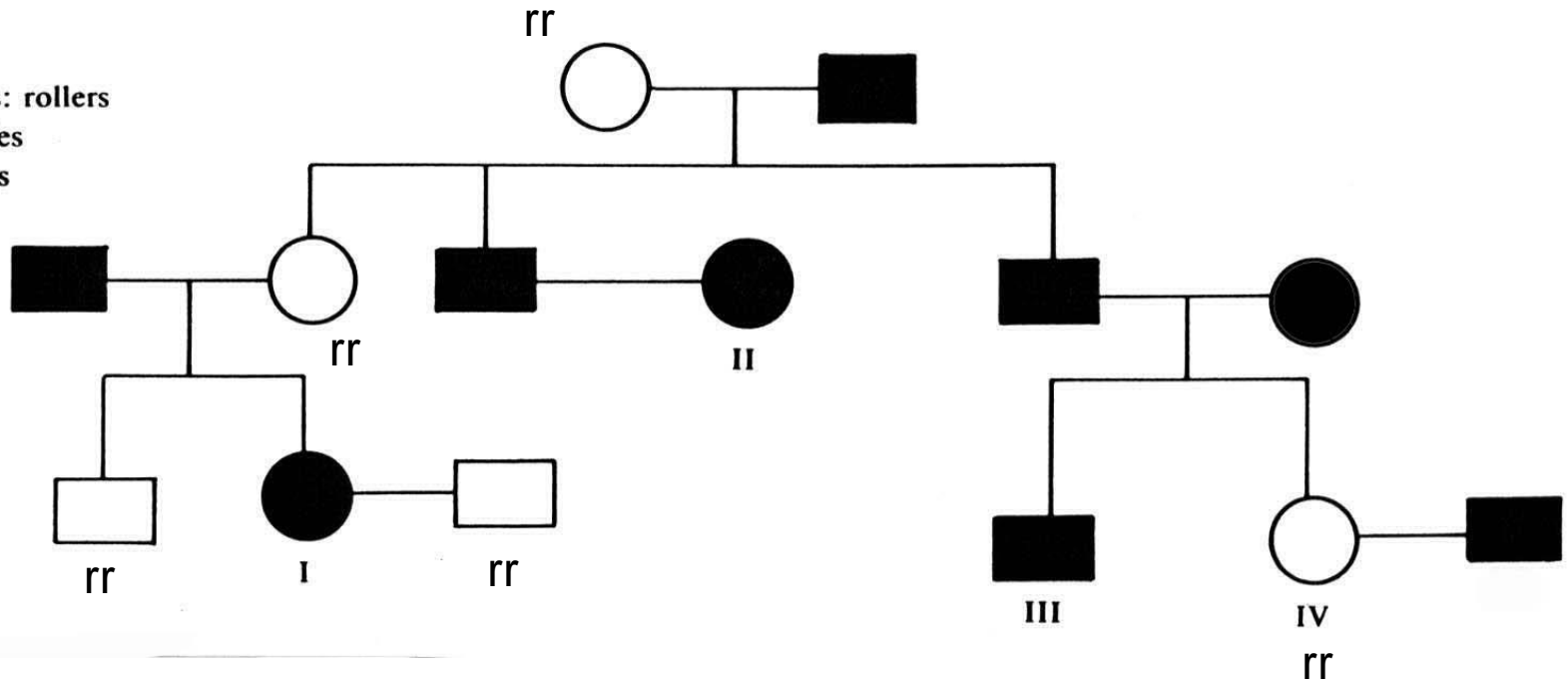




# Tongue rolling

---

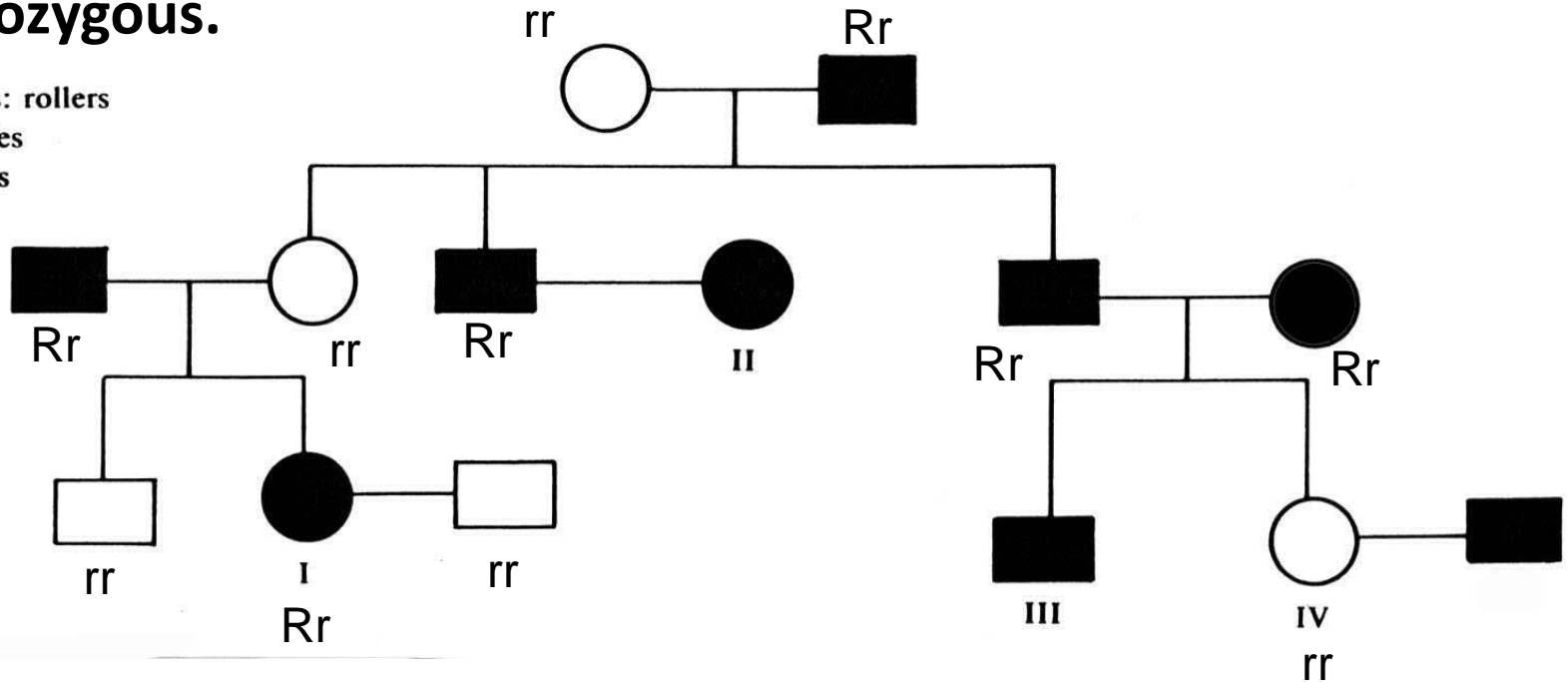
Black symbols: rollers  
Circles: females  
Squares: males



# Tongue rolling

- If a roller parent has a non-roller child the parent must be **heterozygous**.

Black symbols: rollers  
Circles: females  
Squares: males





# Albinism - a recessive condition

---

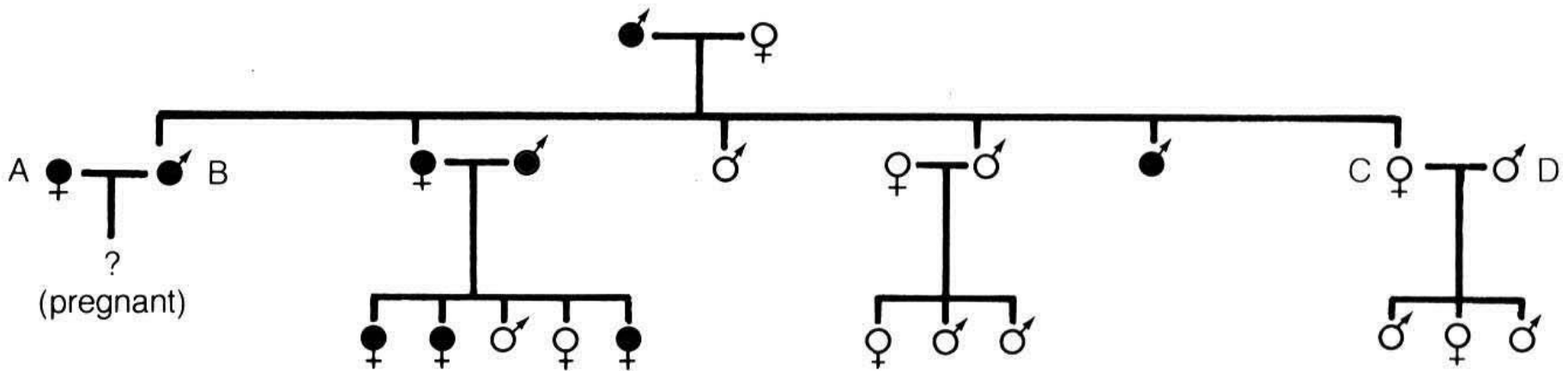
- If two unaffected individuals give rise to an affected child, the allele for the affected condition is **recessive**
- The unaffected parents are **carriers** (heterozygous)
- Thus recessive conditions can skip several generations

# Polydactyly- recessive or dominant?

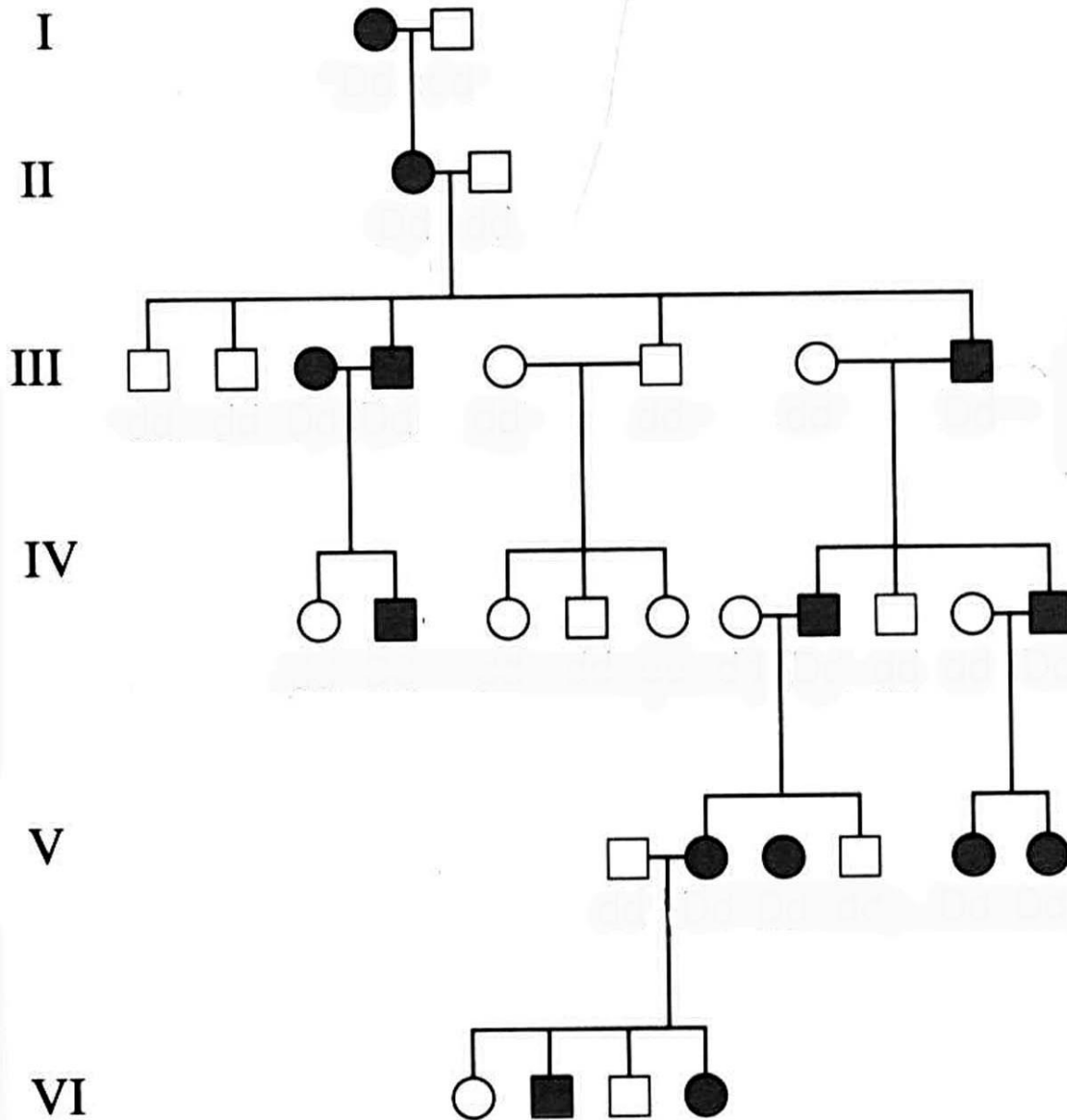
---

♂ ♀ = normal male, female

●♂ ●♀ = polydactylous male, female



generations



Brachydactyly  
recessive or  
dominant?