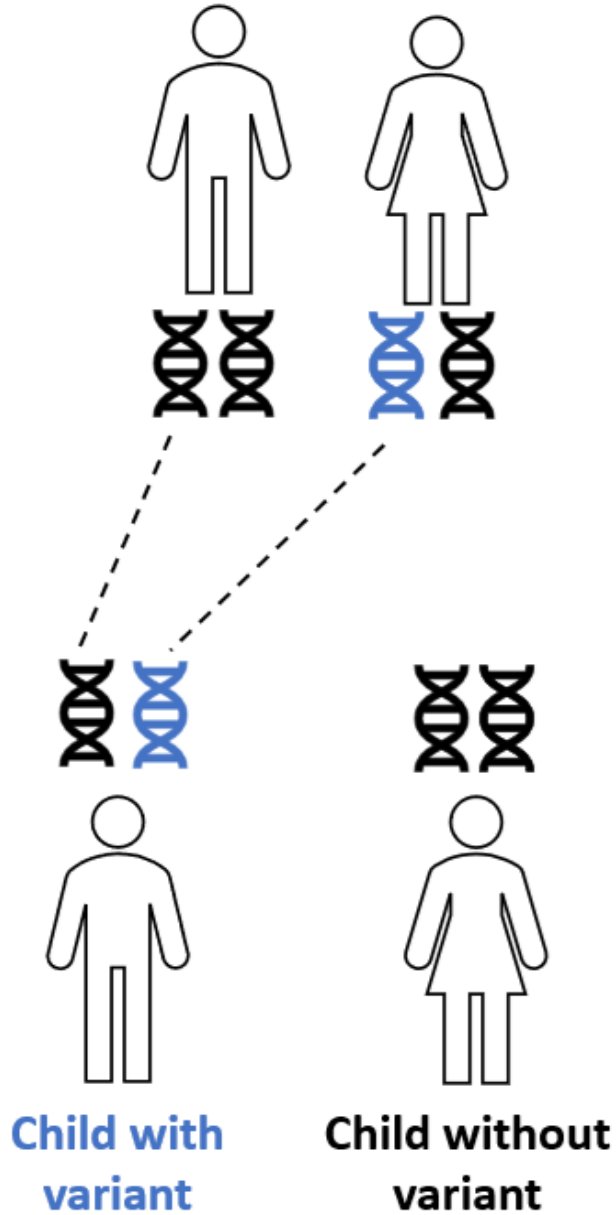


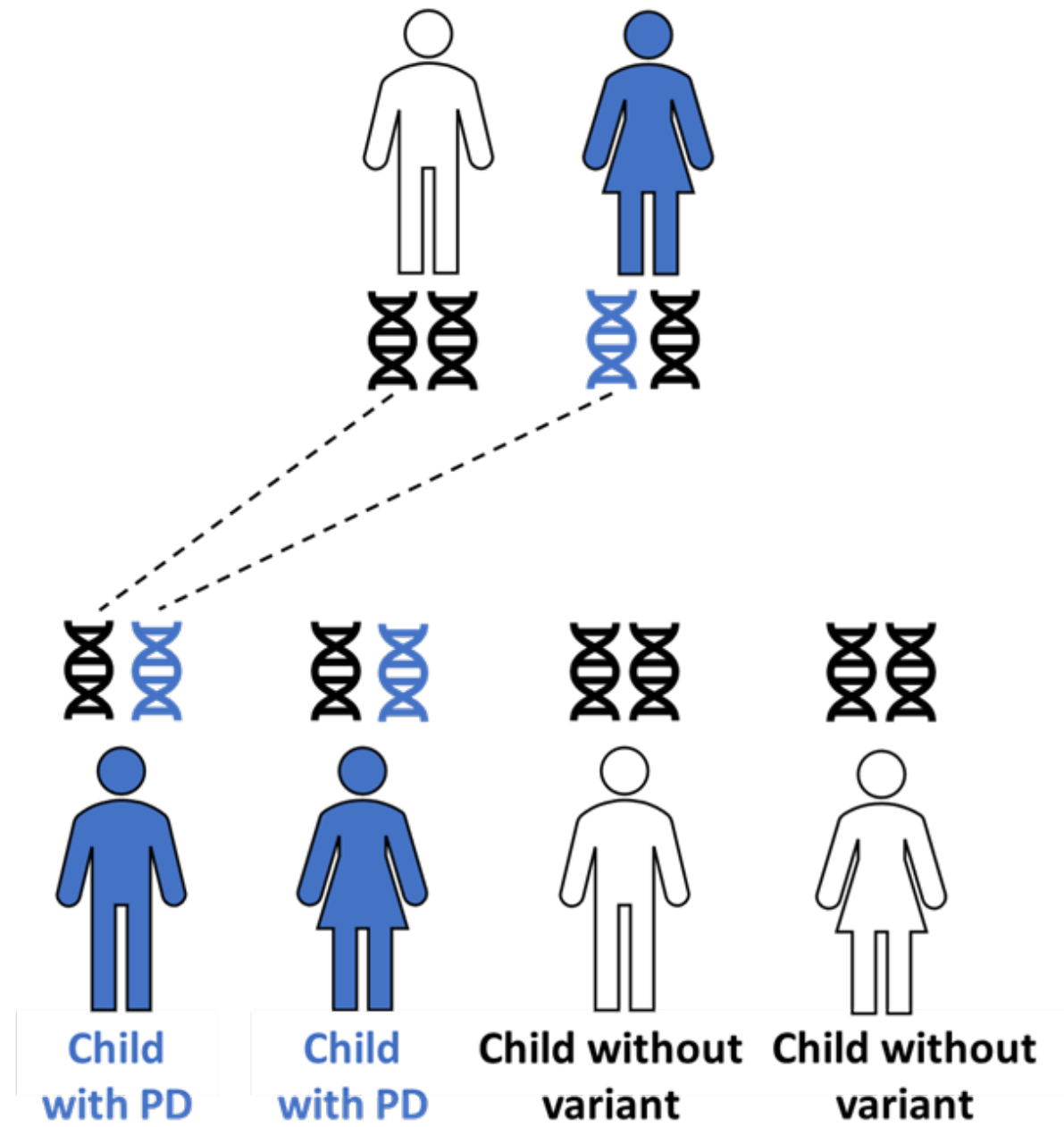
# Dominant Inheritance

Mother with variant



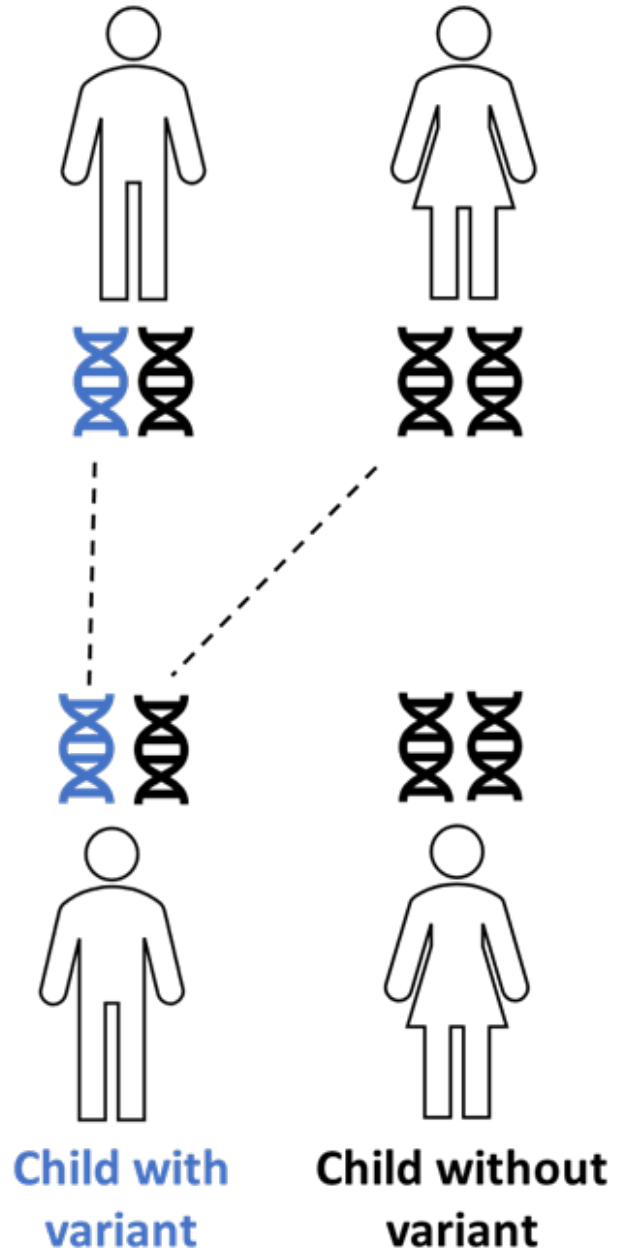
# Dominant Inheritance

Mother with PD



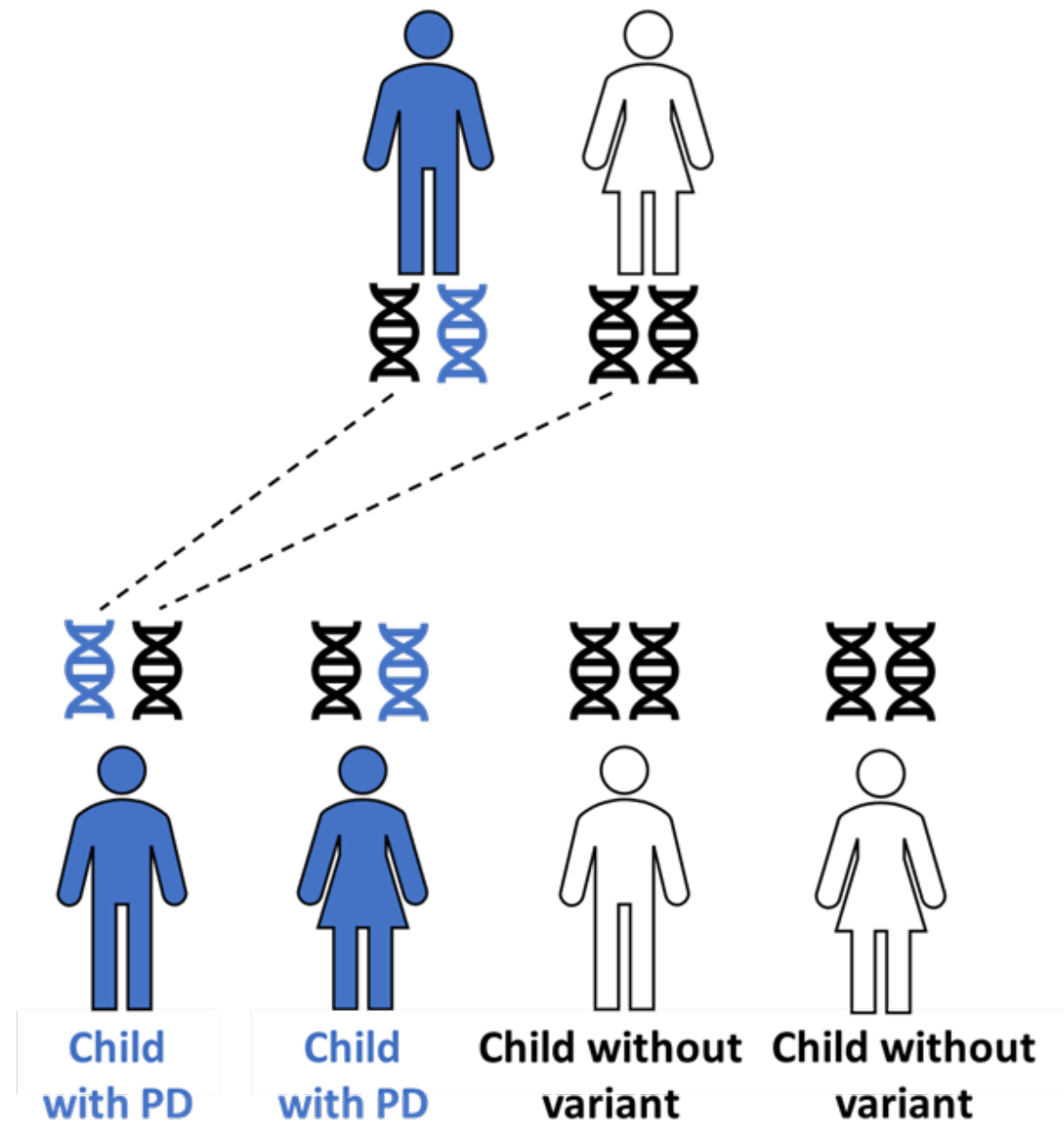
# Dominant Inheritance

Father with variant



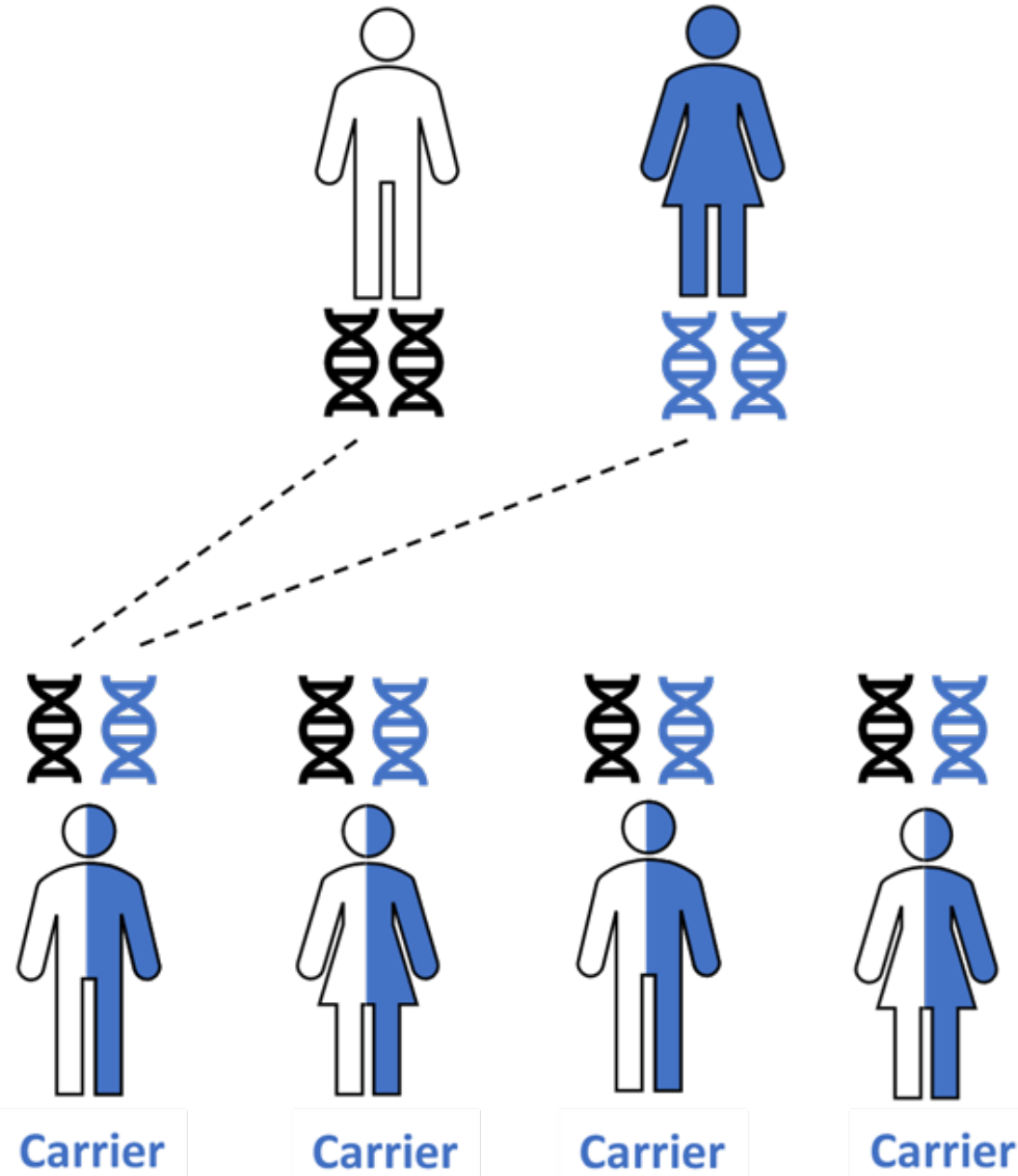
# Dominant Inheritance

Father with PD



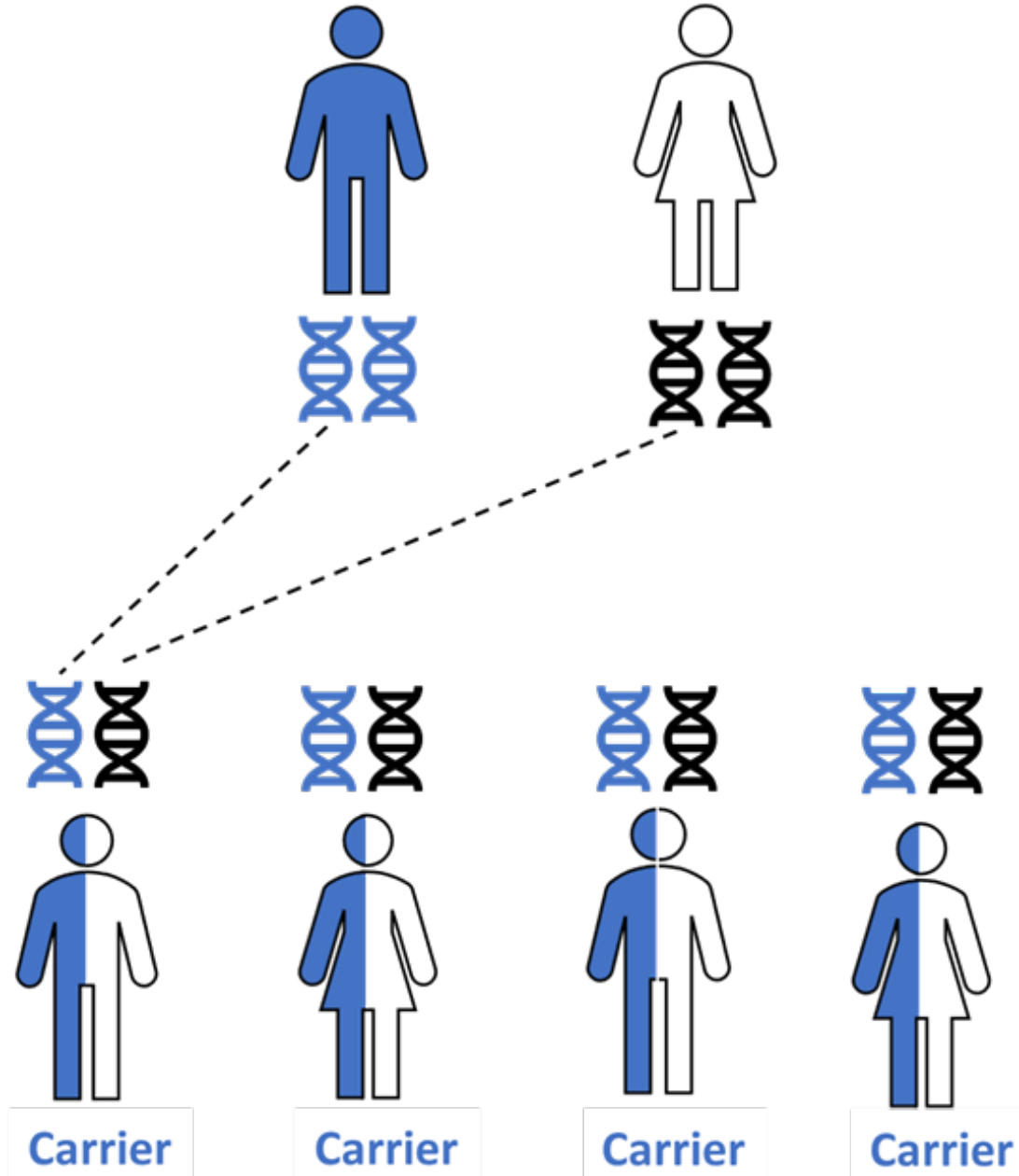
# Recessive Inheritance

Mother with PD



# Recessive Inheritance

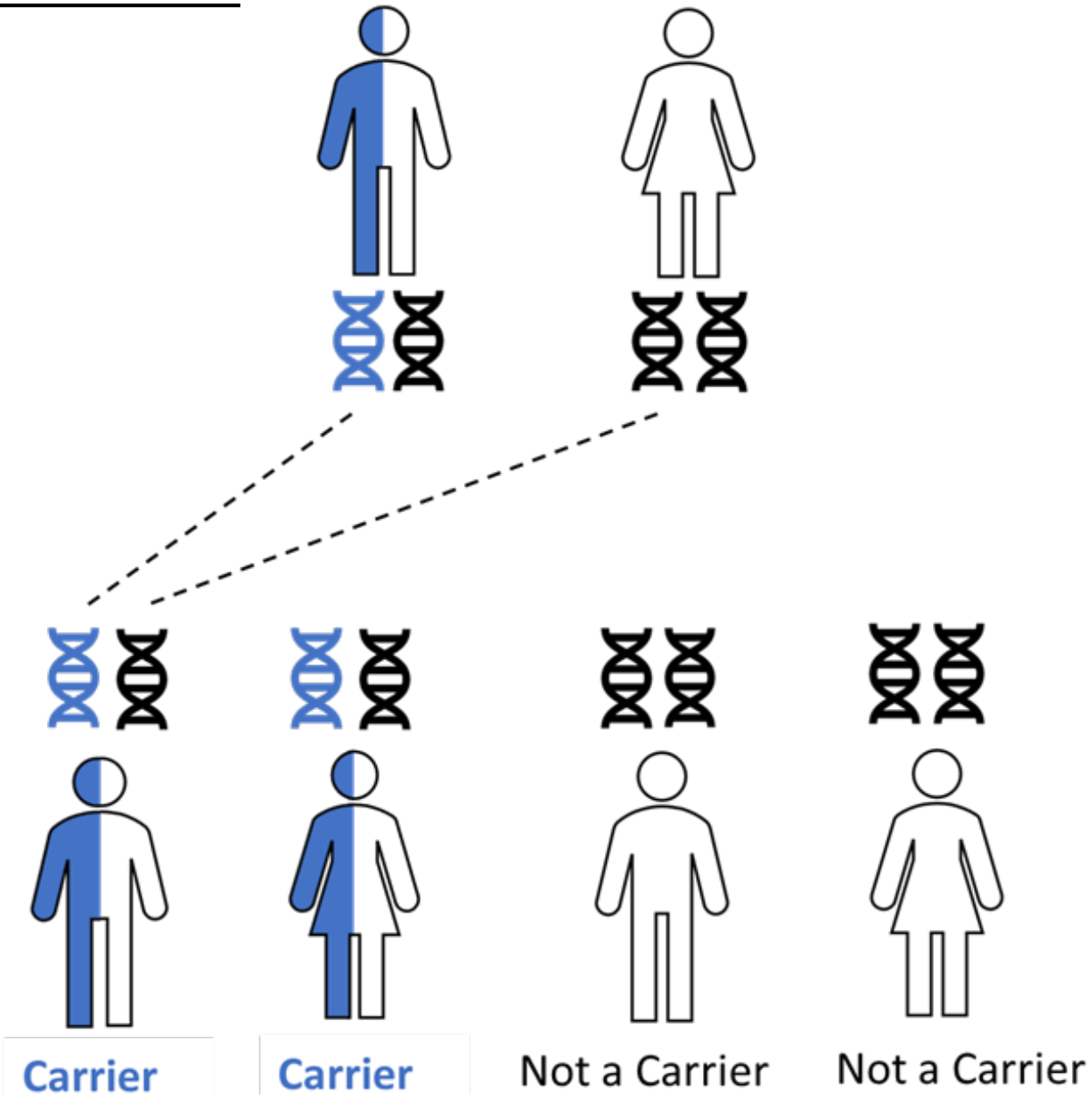
Father with PD





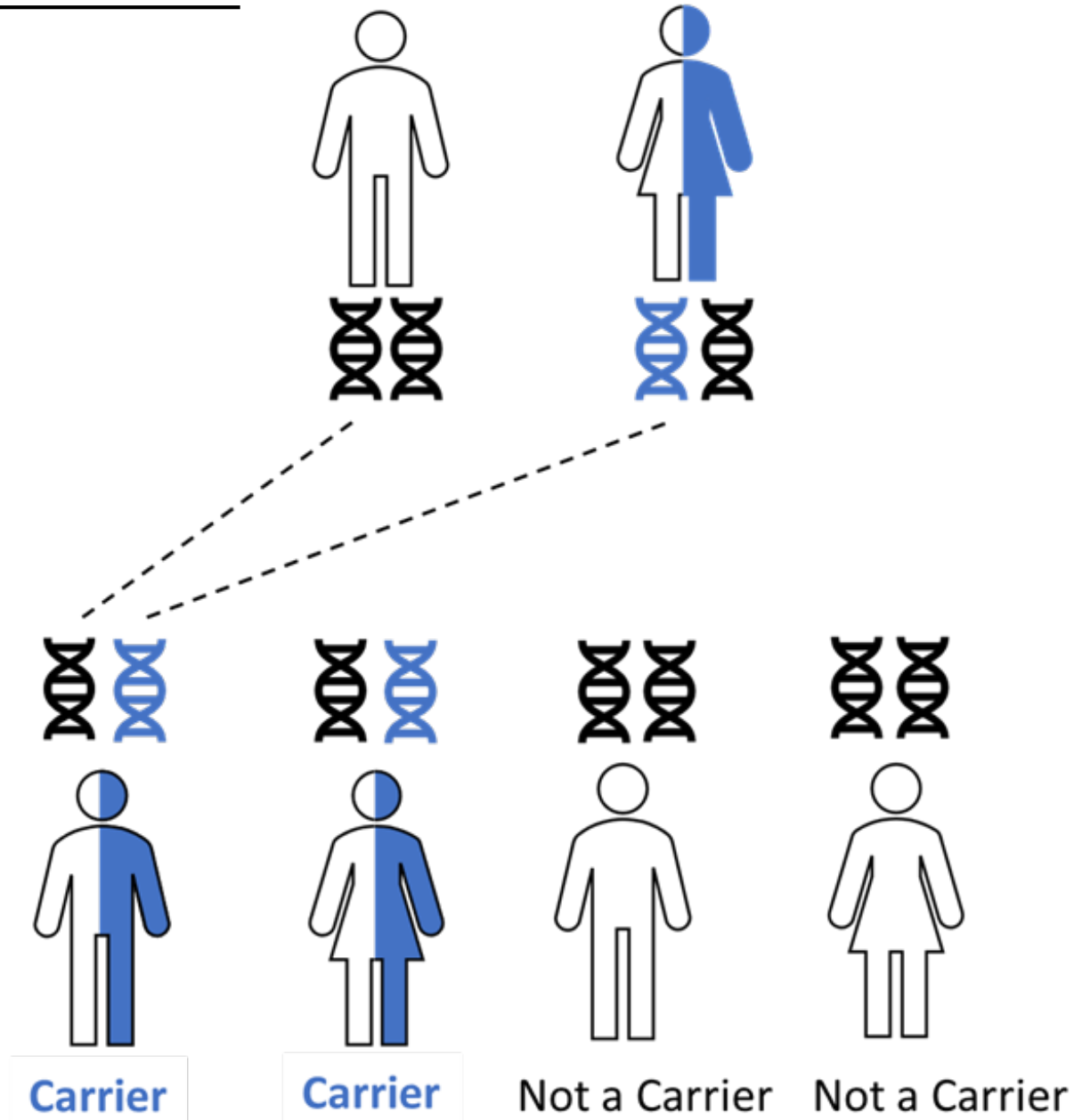
# Autosomal Recessive Inheritance

Carrier Father



# Autosomal Recessive Inheritance

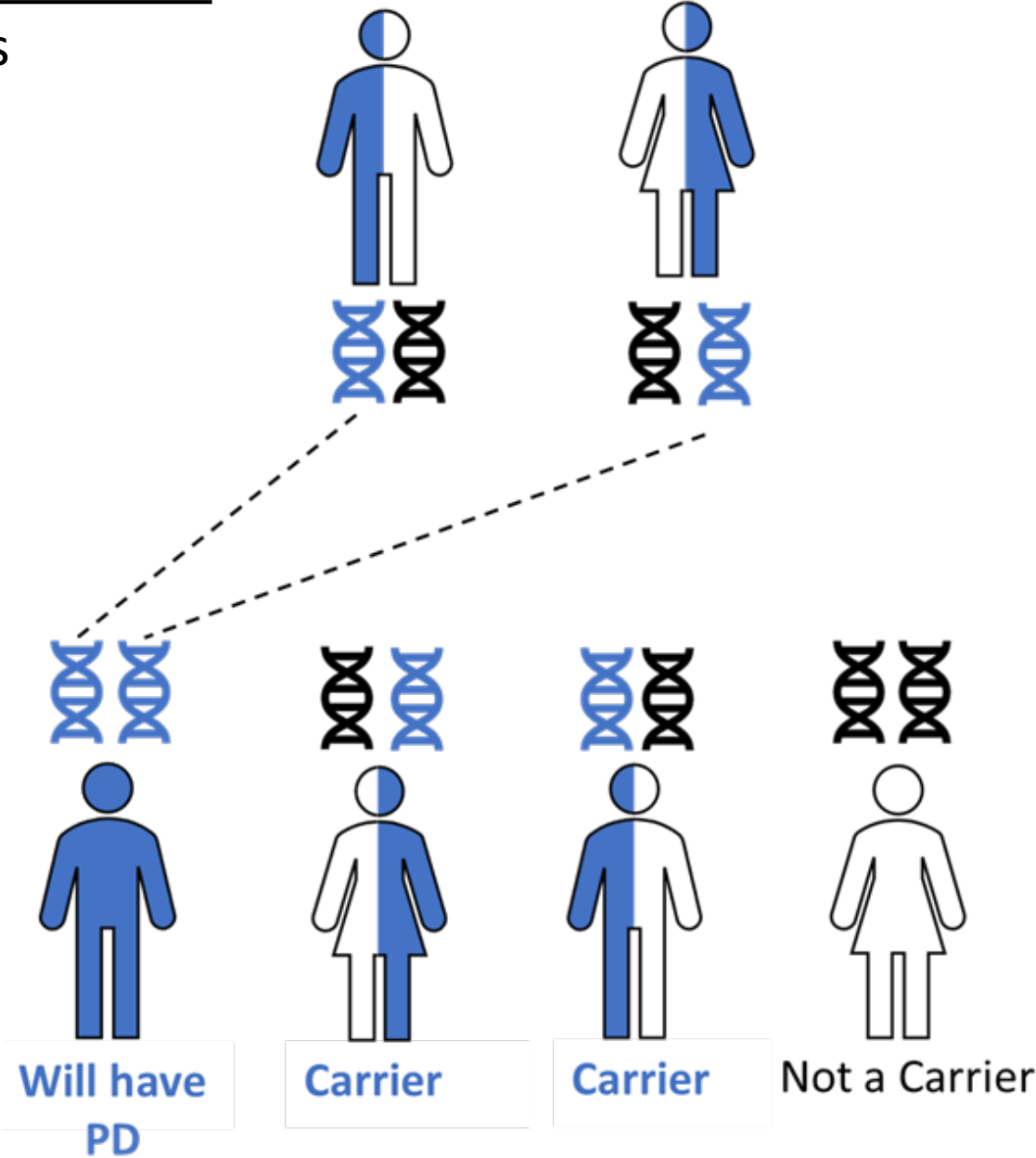
Carrier Mother



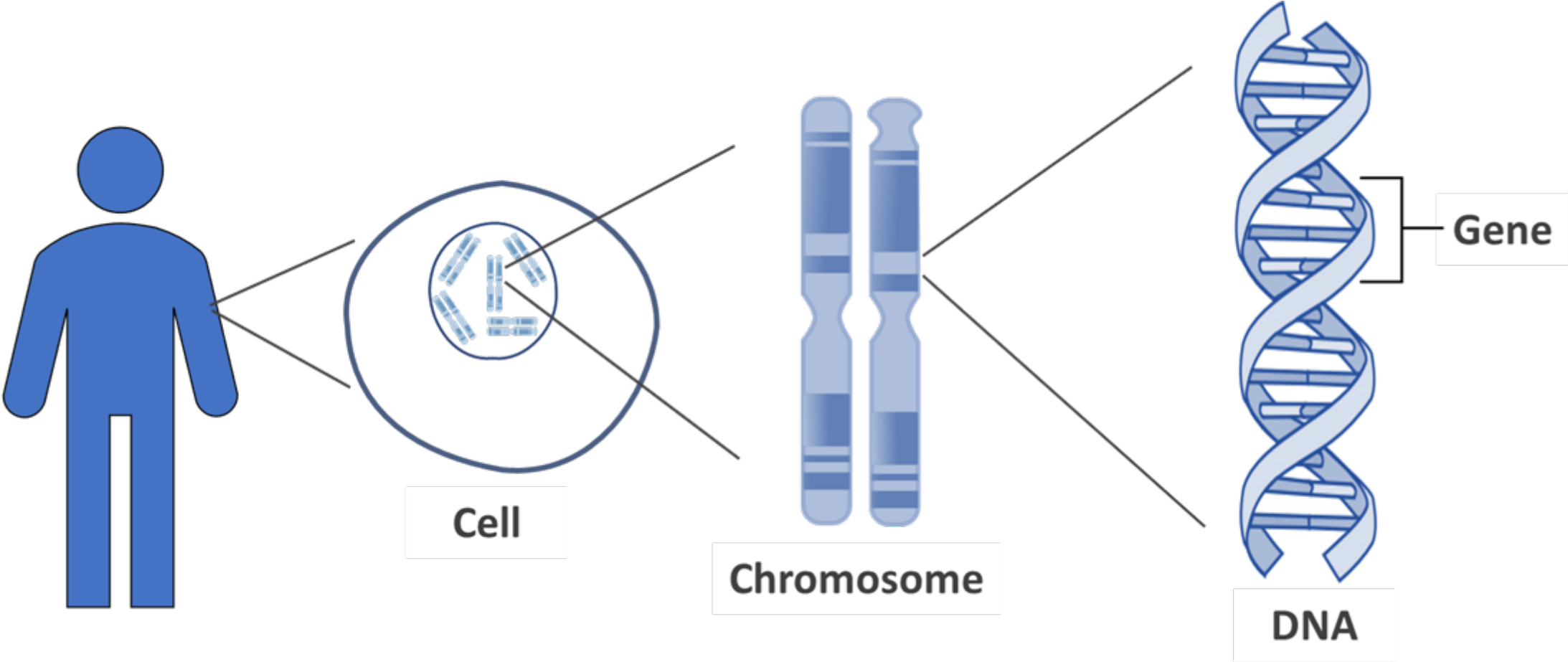


# Autosomal Recessive Inheritance

Both parents are carriers

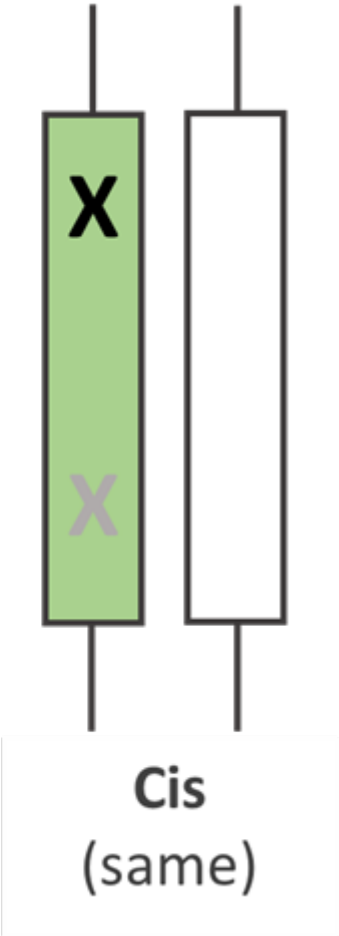
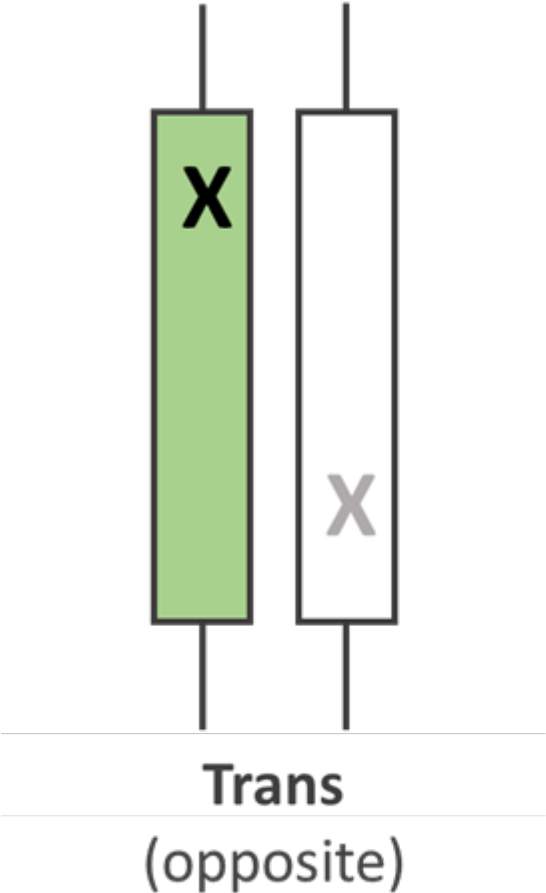


# Cell to Gene





# Compound Heterozygous



Legend:

- Gene from father
- Gene from mother
- X** Variant 1
- X** Variant 2

# PD GENERation Gene Testing



*GBA1*

*LRRK2*

*PRKN*

*VPS35*

*SNCA*

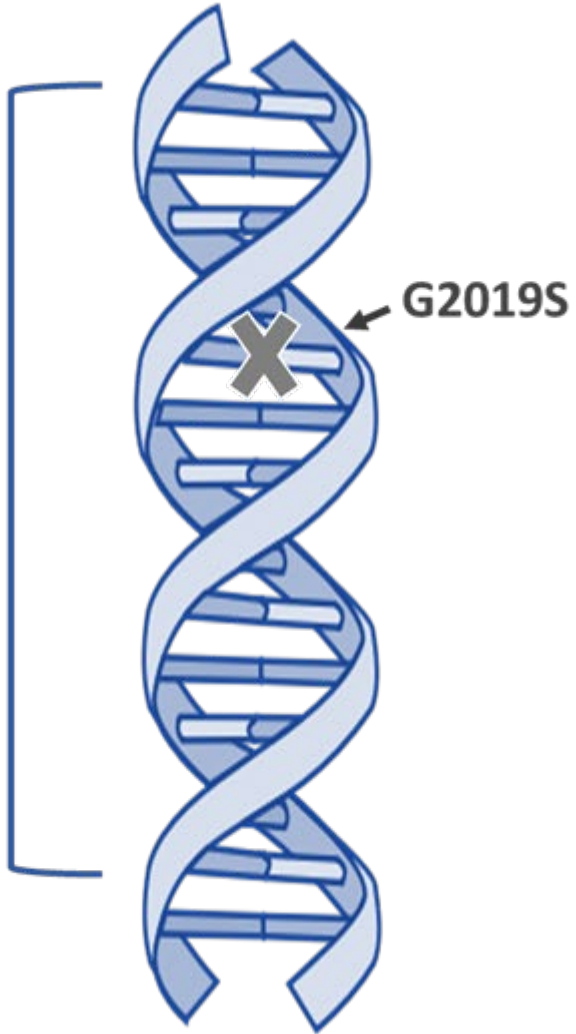
*PINK1*

*PARK7*

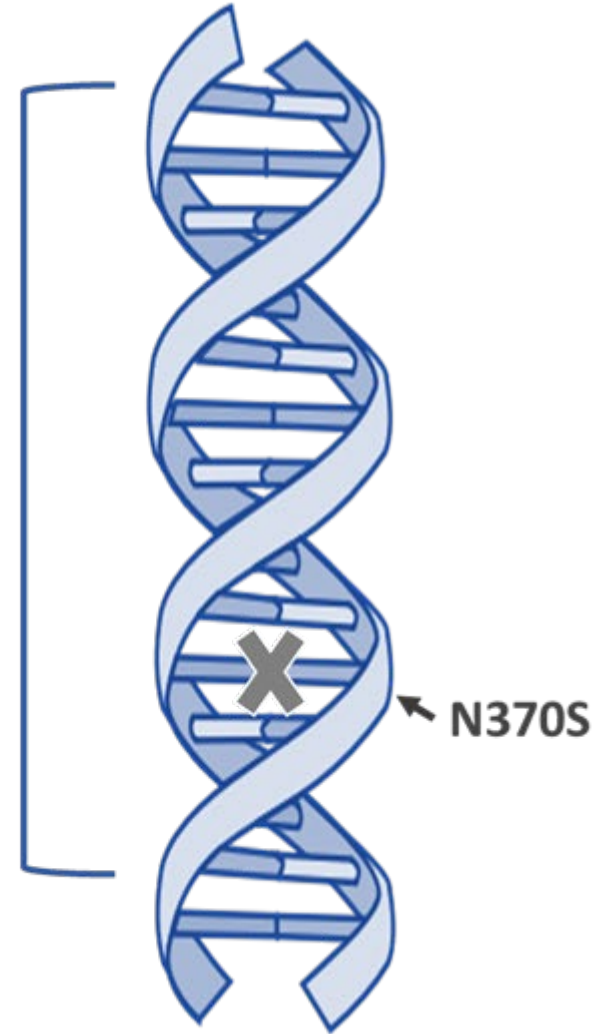
# Targeted Gene Testing

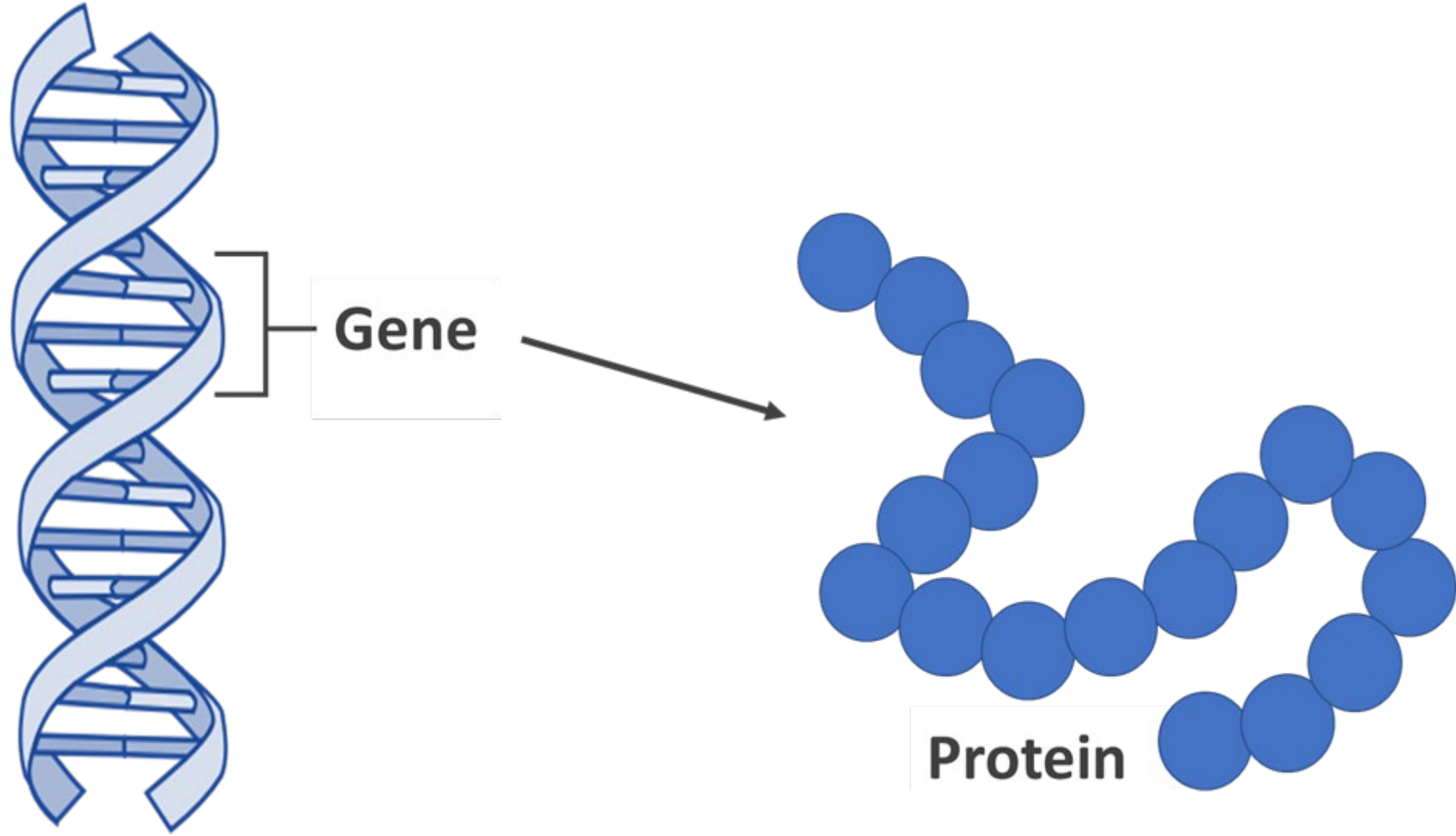


*LRRK2*



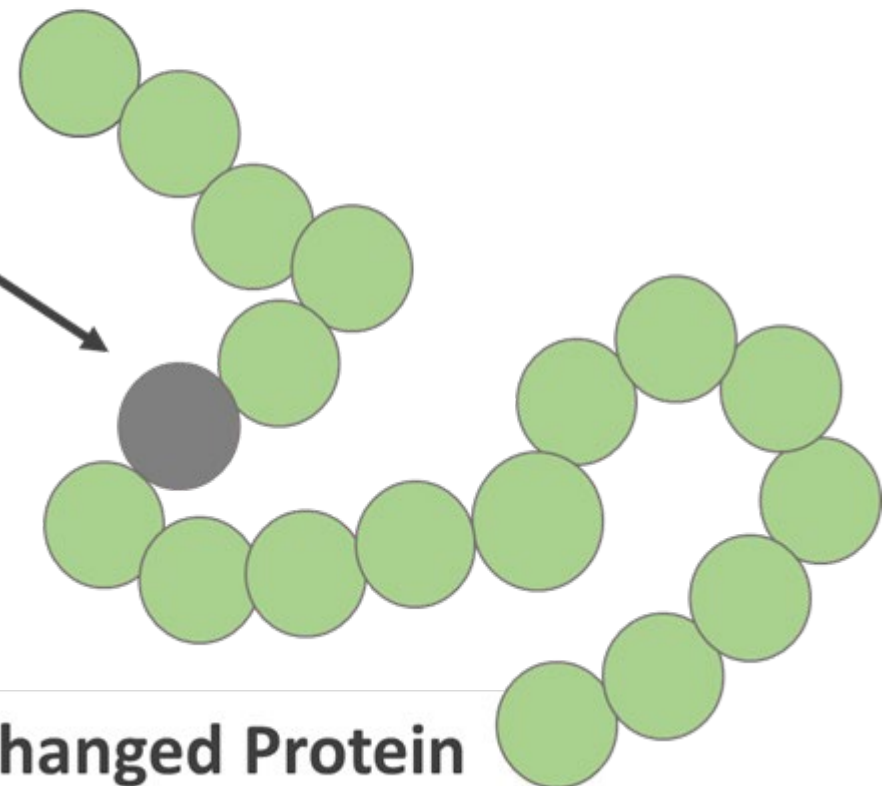
*GBA1*







**Gene Change  
(Variant)**



**Changed Protein**

# Types of Genetic Results





# Multi-gene Panel



**LRRK2**



**GBA1**



**PRKN**



**SNCA**



**PINK**



**PARK7**







**VPS35**

# Symptoms of Gaucher Disease



**Gaucher Disease**

-  Enlarged spleen
-  Anemia  
Easy bruising and bleeding
-  Severe bone pain  
Fractures
-  Fatigue

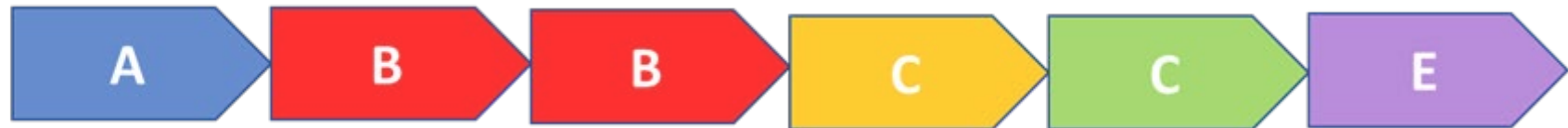
# Duplication



**Normal**



**Duplication**



# Triplification

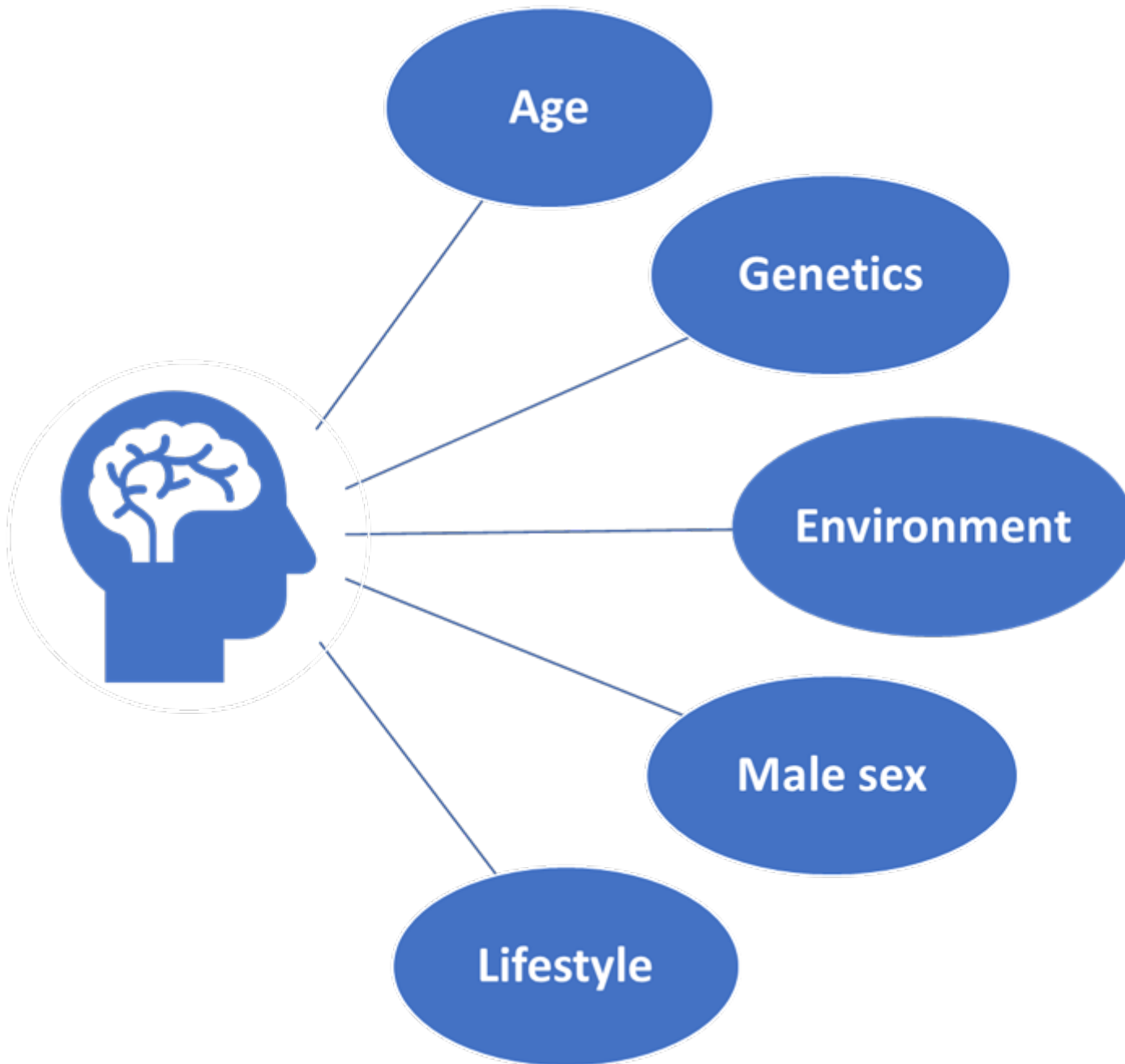


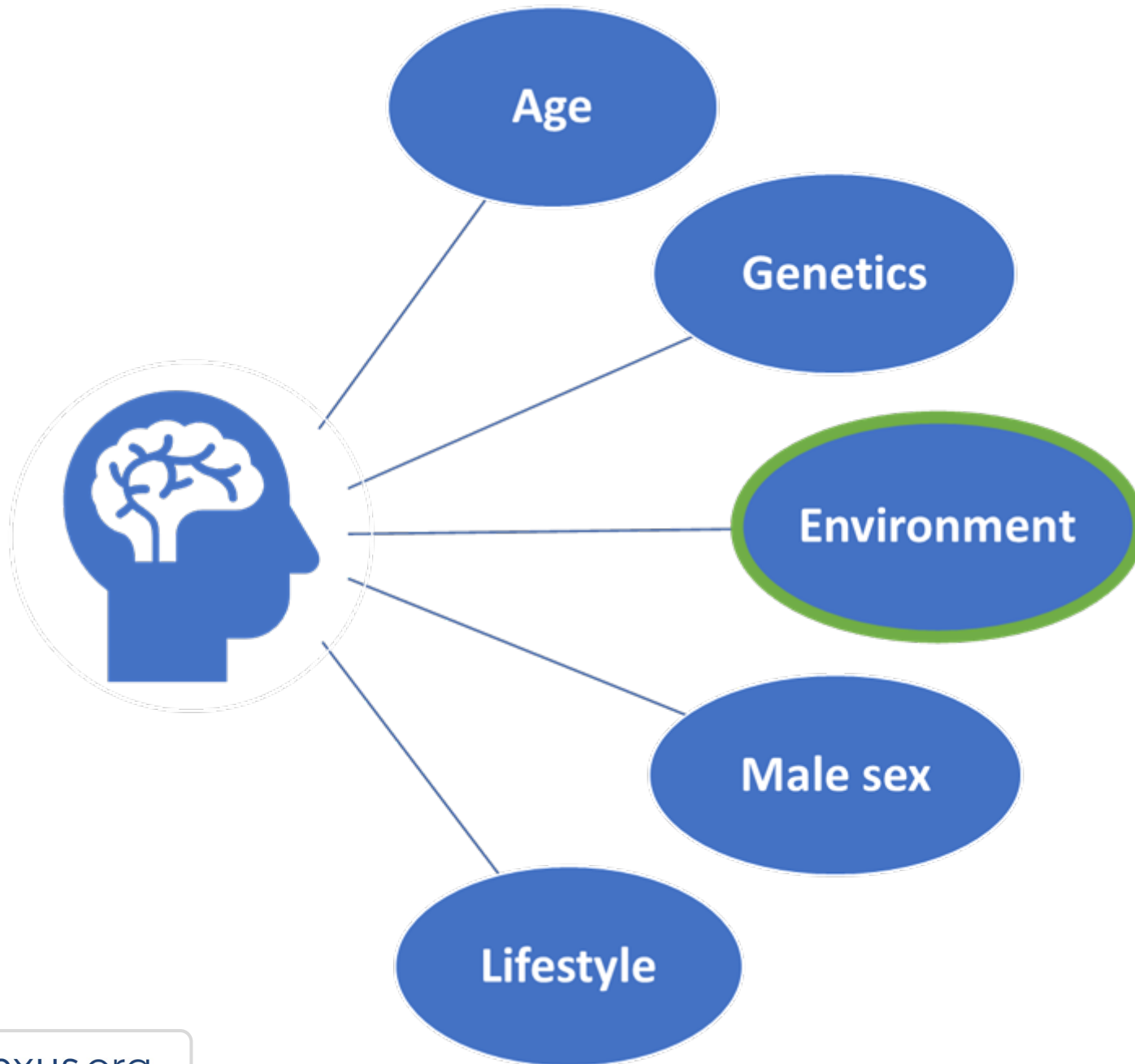
**Normal**



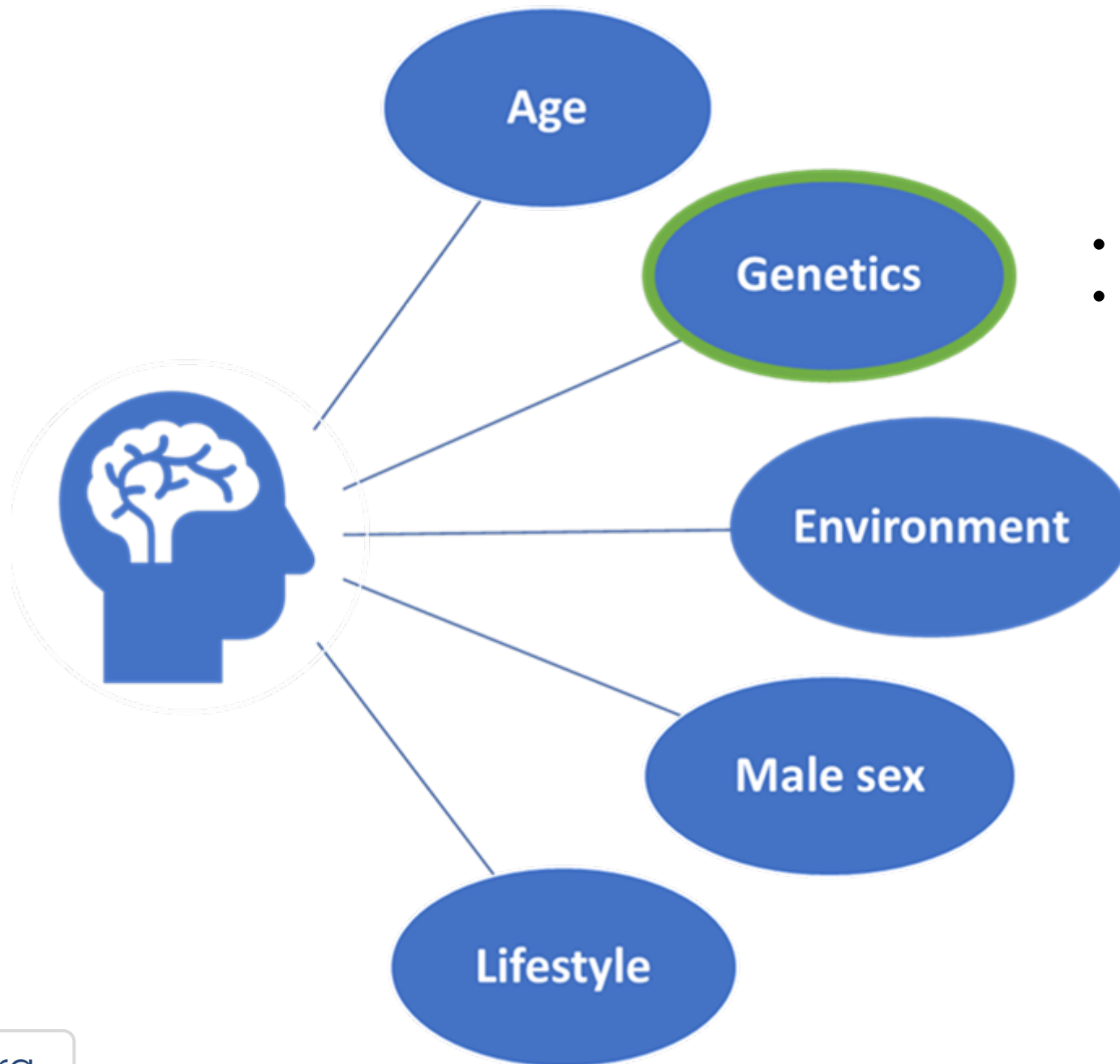
**Triplification**



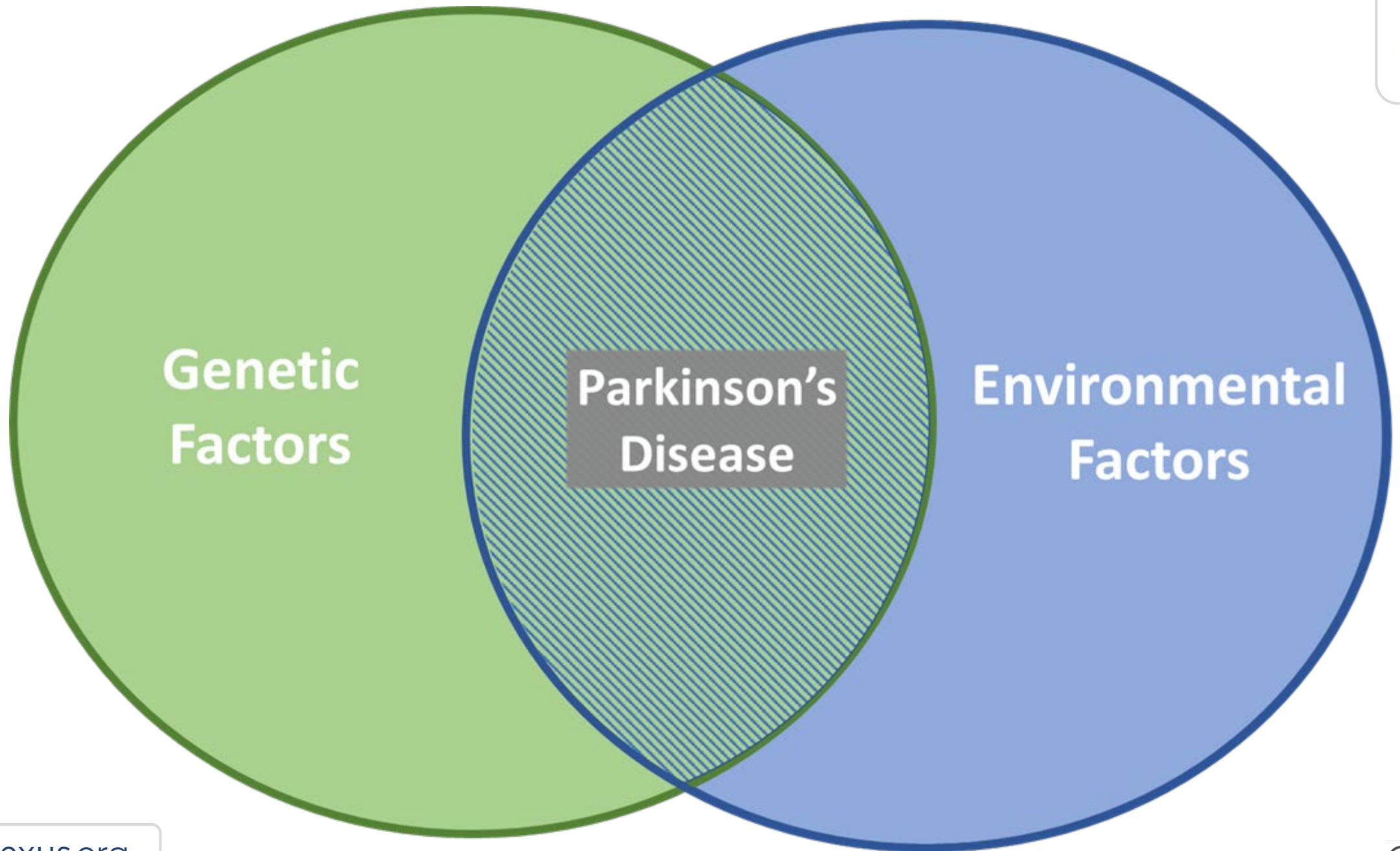


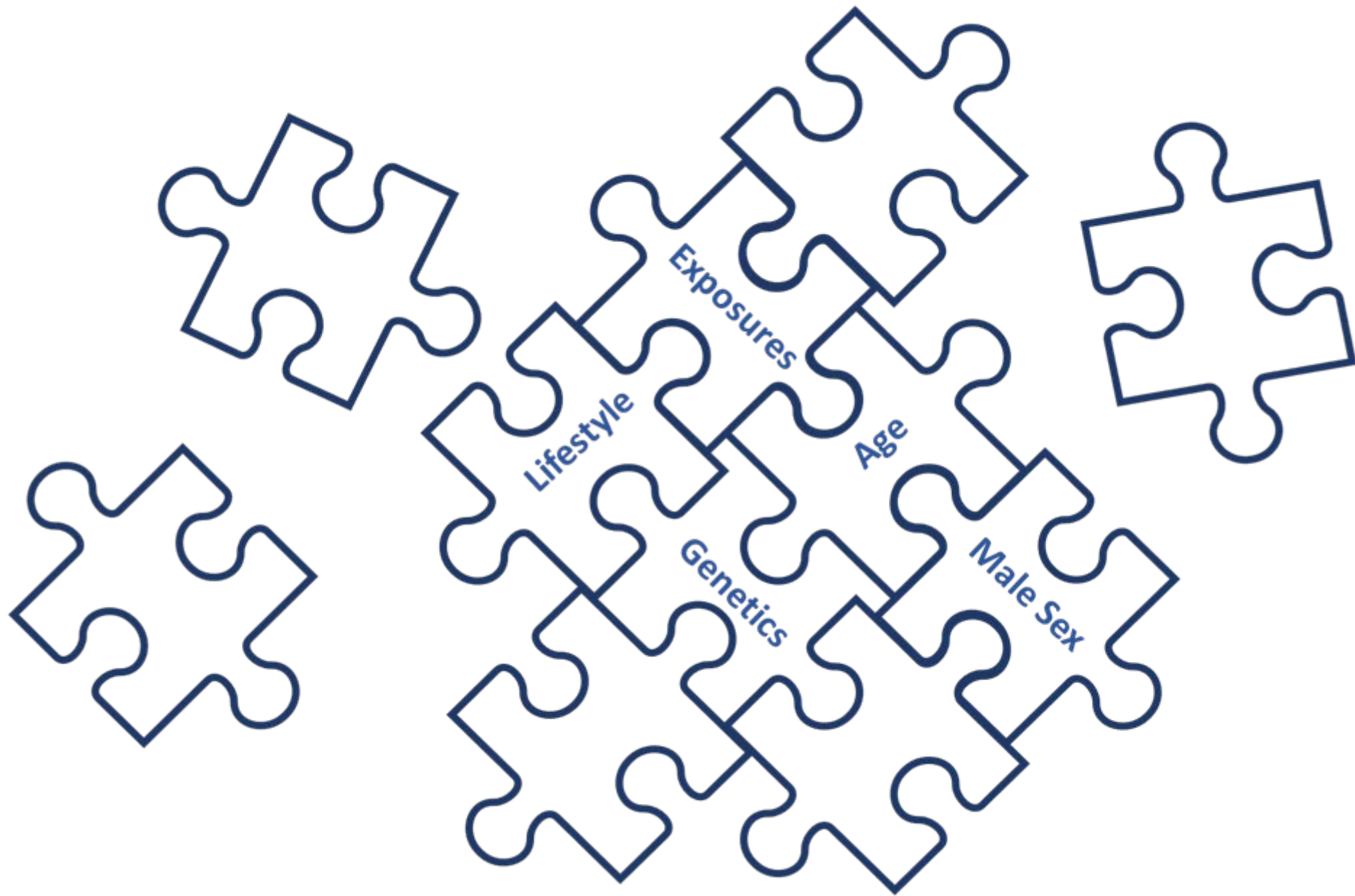


- **Pesticides, Herbicides**
- **Rural Living**
- **Prior Head Injury**
- **Infection**
- **Other**



- Major Genetic Factors
- Minor Genetic Factors







# GINA

## Genetic Information Non-Discrimination Act

A Federal Law in the United States

---



### Protects against

- Employment discrimination
- Health insurance discrimination



### Does not protect against

- Life insurance discrimination
- Long-term insurance discrimination
- Disability insurance discrimination



# GINA

## Genetic Information Non-Discrimination Act

A Federal Law in the United States

---



GINA **protects** most people from **genetic discrimination by employers and health insurance companies.**



However, **it does *not* protect** a person from **discrimination by life, long-term, or disability insurance companies.**

# Risk of Parkinson's Disease



Baseline Population

3% = 3/100



# Risk of Parkinson's Disease



First Degree Relative

6% = 6/100



# Risk of Parkinson's Disease



*GBA1* N370S



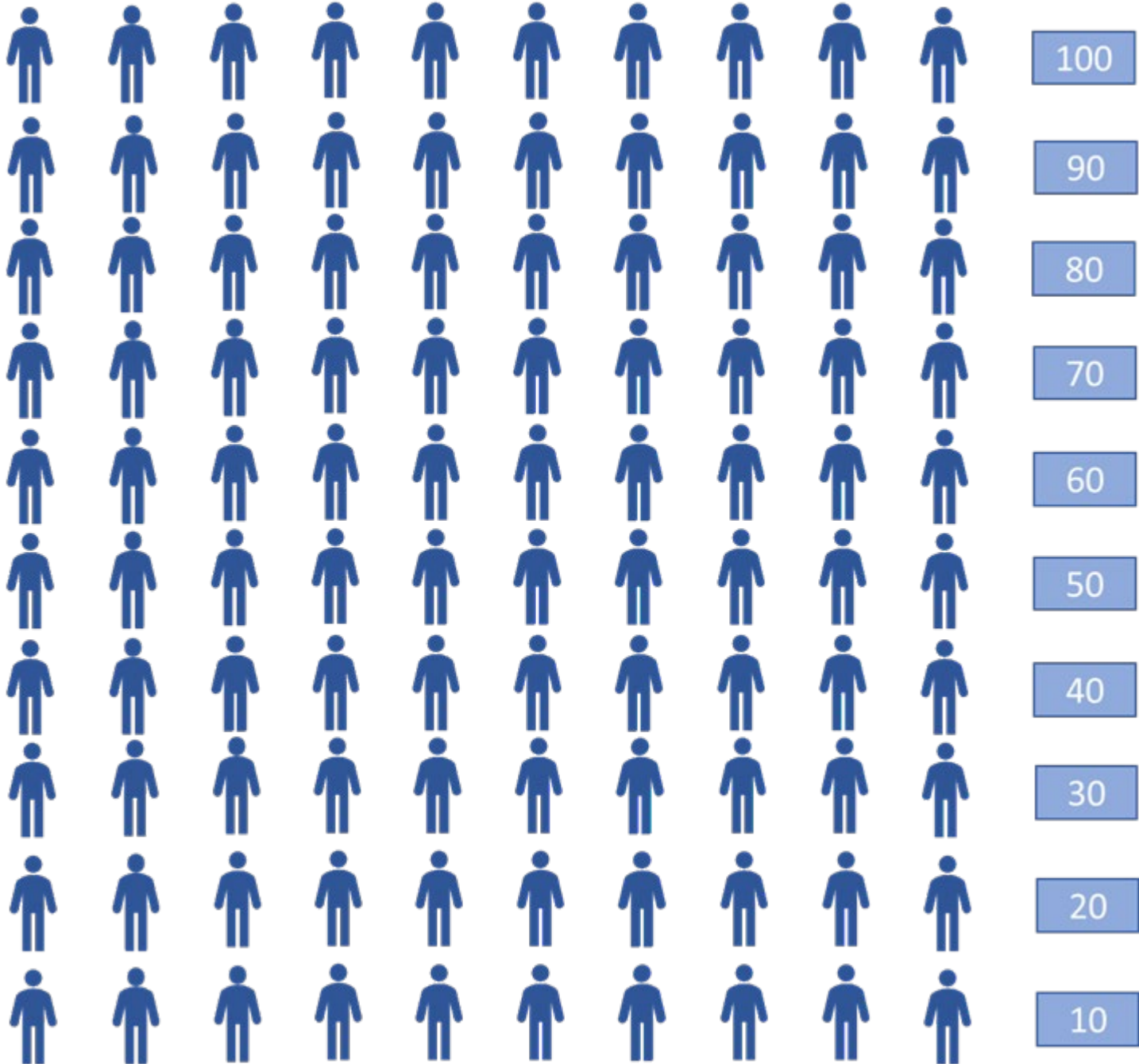


# Risk of Parkinson's Disease

*LRRK2* G2019S  
25% = 25/100



# Risk of Parkinson's Disease







# Everyone has an “Parkinson’s jar”

Environmental risk factors

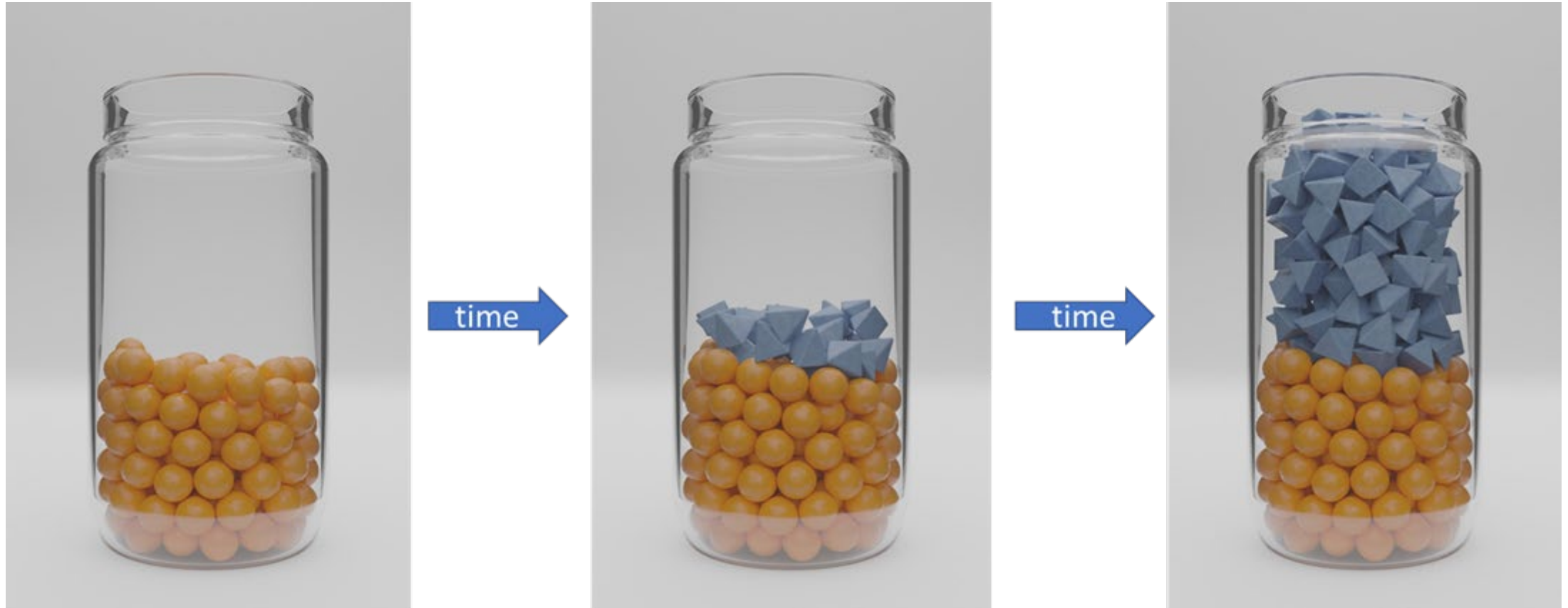


Genetic risk factors

Images by Ben Austin

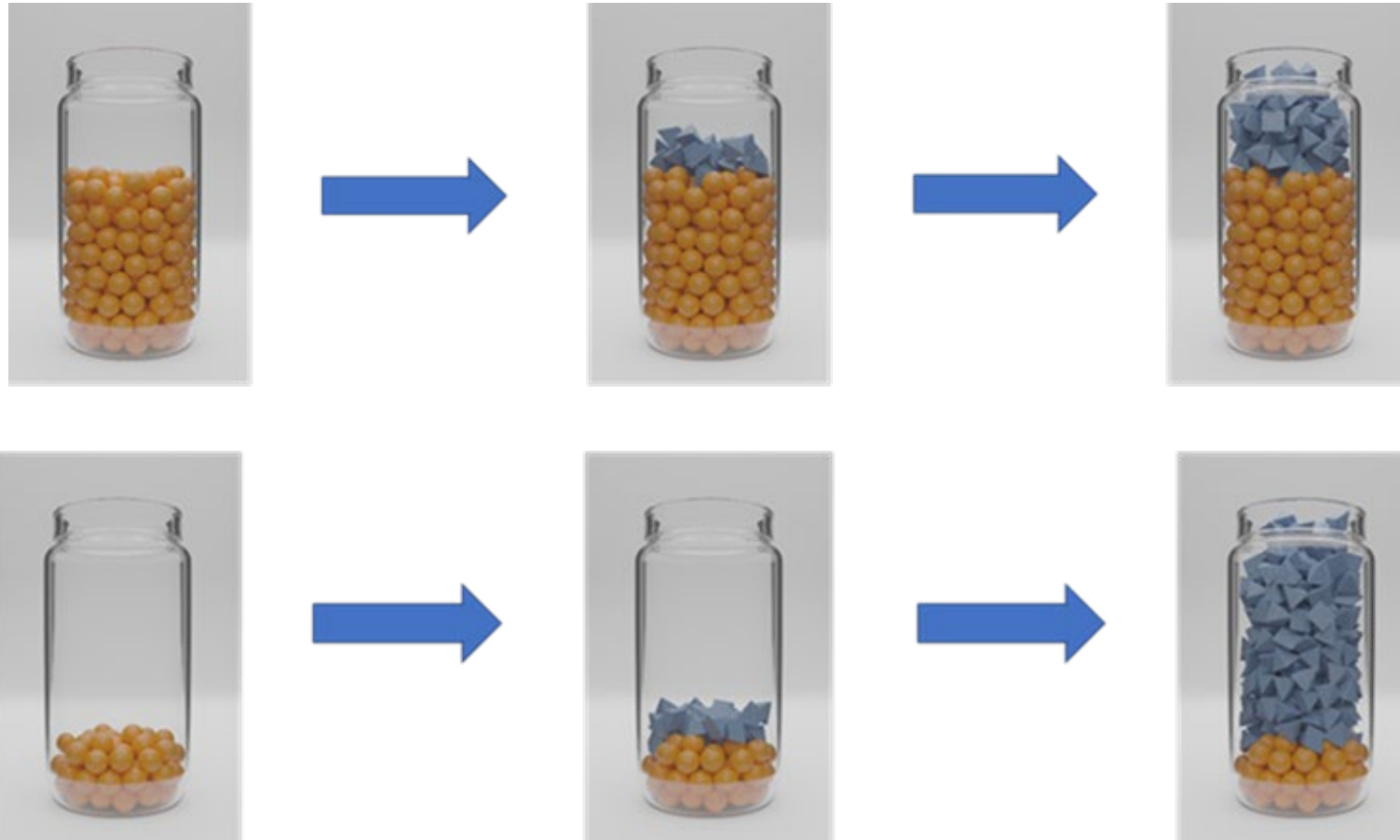
Adapted from work by Jehannine Austin

# Parkinson's develops when the jar fills to the top



Adapted from work by Jehannine Austin

# Different people have different combinations of genetic and environmental risk factors



Adapted from work by Jehannine Austin



# Protective factors can make the jar taller



Adapted from work by Jehannine Austin



# Everyone has an “Parkinson’s jar”



Adapted from work by Jehannine Austin

# Parkinson's develops when the jar fills to the top



time →



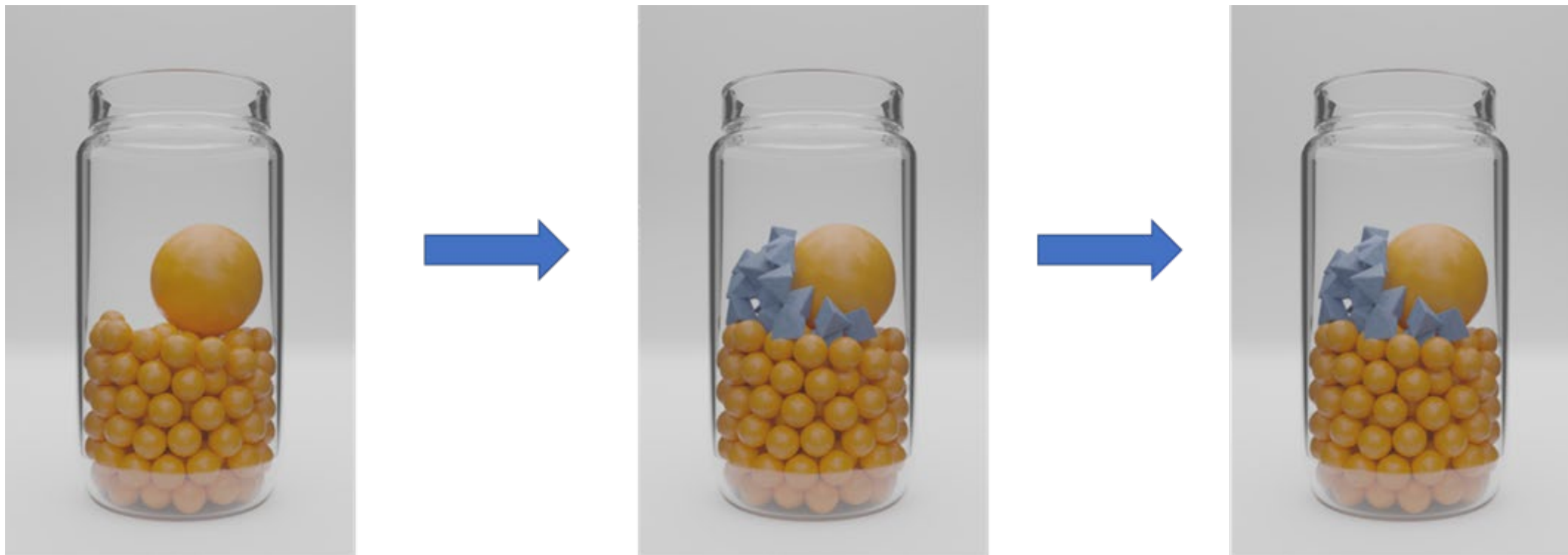
time →



Adapted from work by Jehannine Austin



## We can have genetic risk factors for Parkinson's but not develop symptoms



Adapted from work by Jehannine Austin



# Protective factors can make the jar taller



Adapted from work by Jehannine Austin