

# Interpreting for Cancer Genetics

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Professor, University of California, San Francisco

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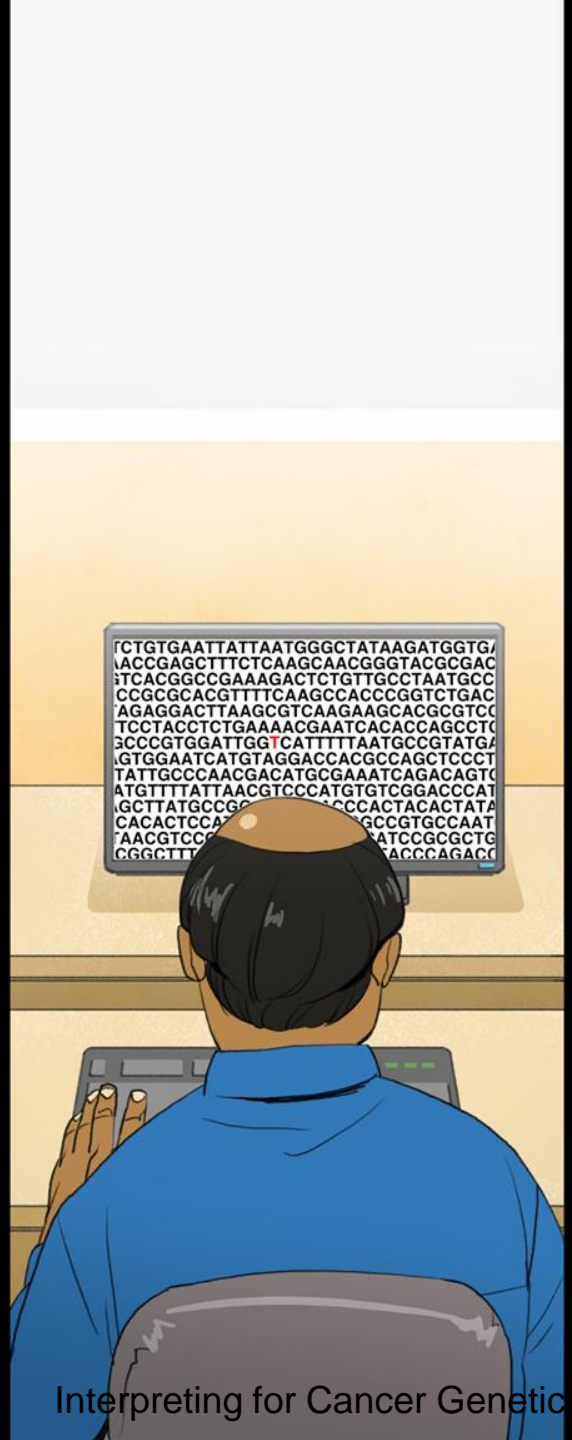
Licensed Certified Genetic Counselor



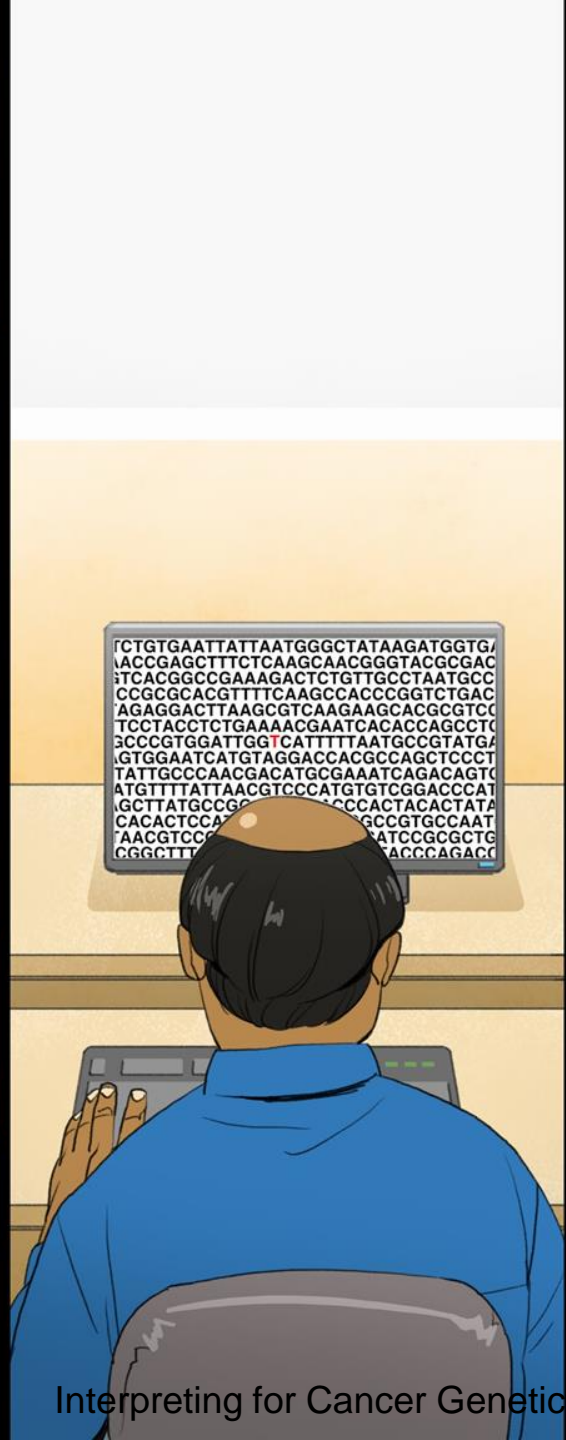




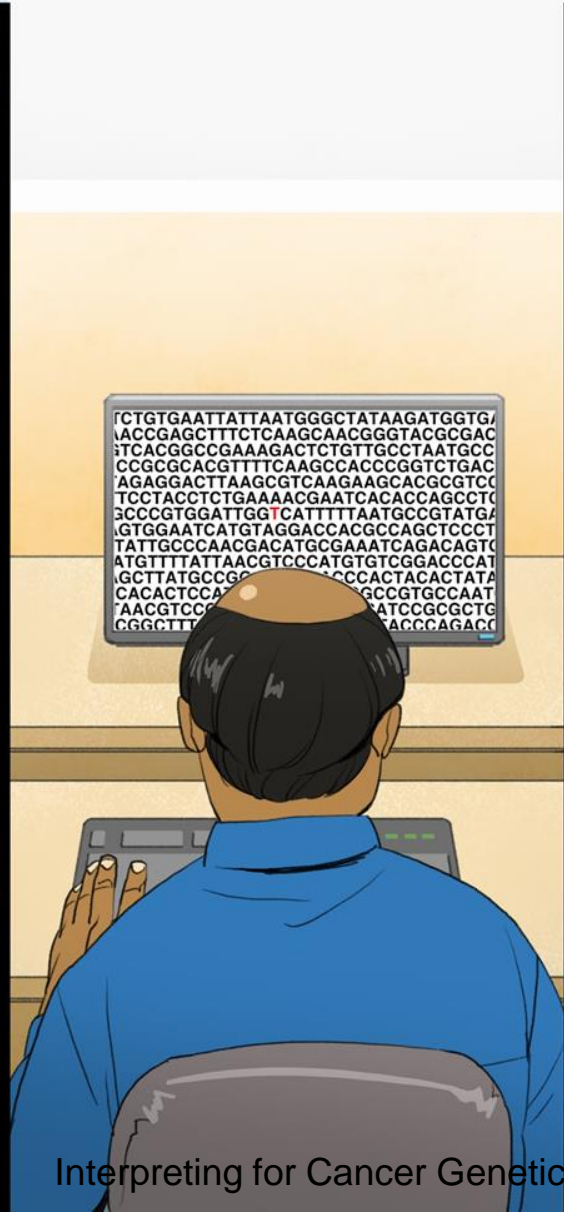
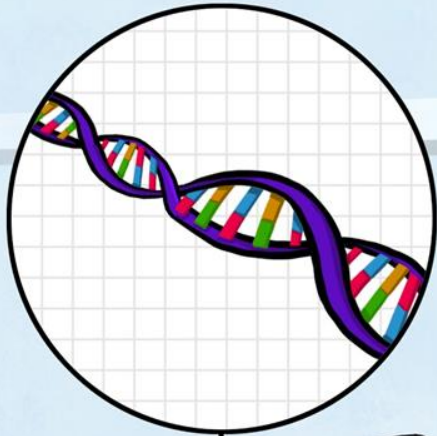
August 2024



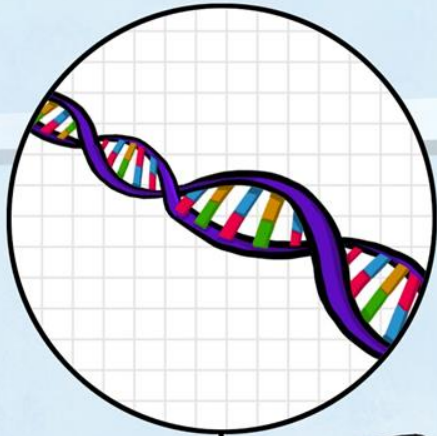
Interpreting for Cancer Genetics



# Genetics



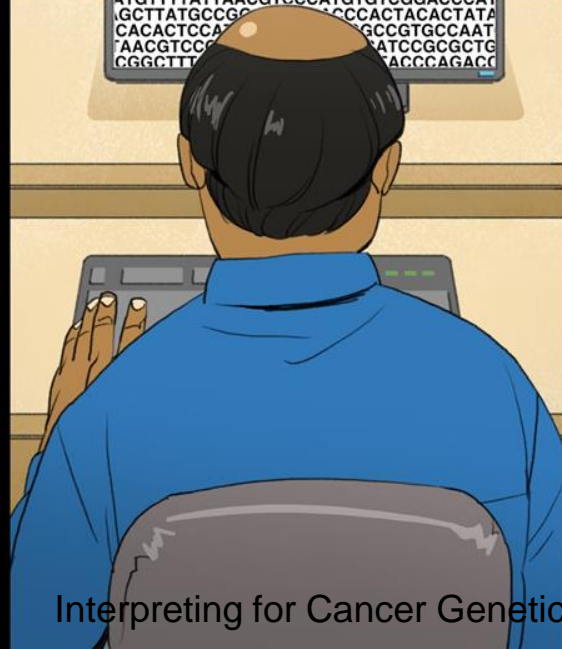
# Basic concepts



August 2024

# Genetic testing

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Interpreting for Cancer Genetics

# Genetic specialists



# What to expect today

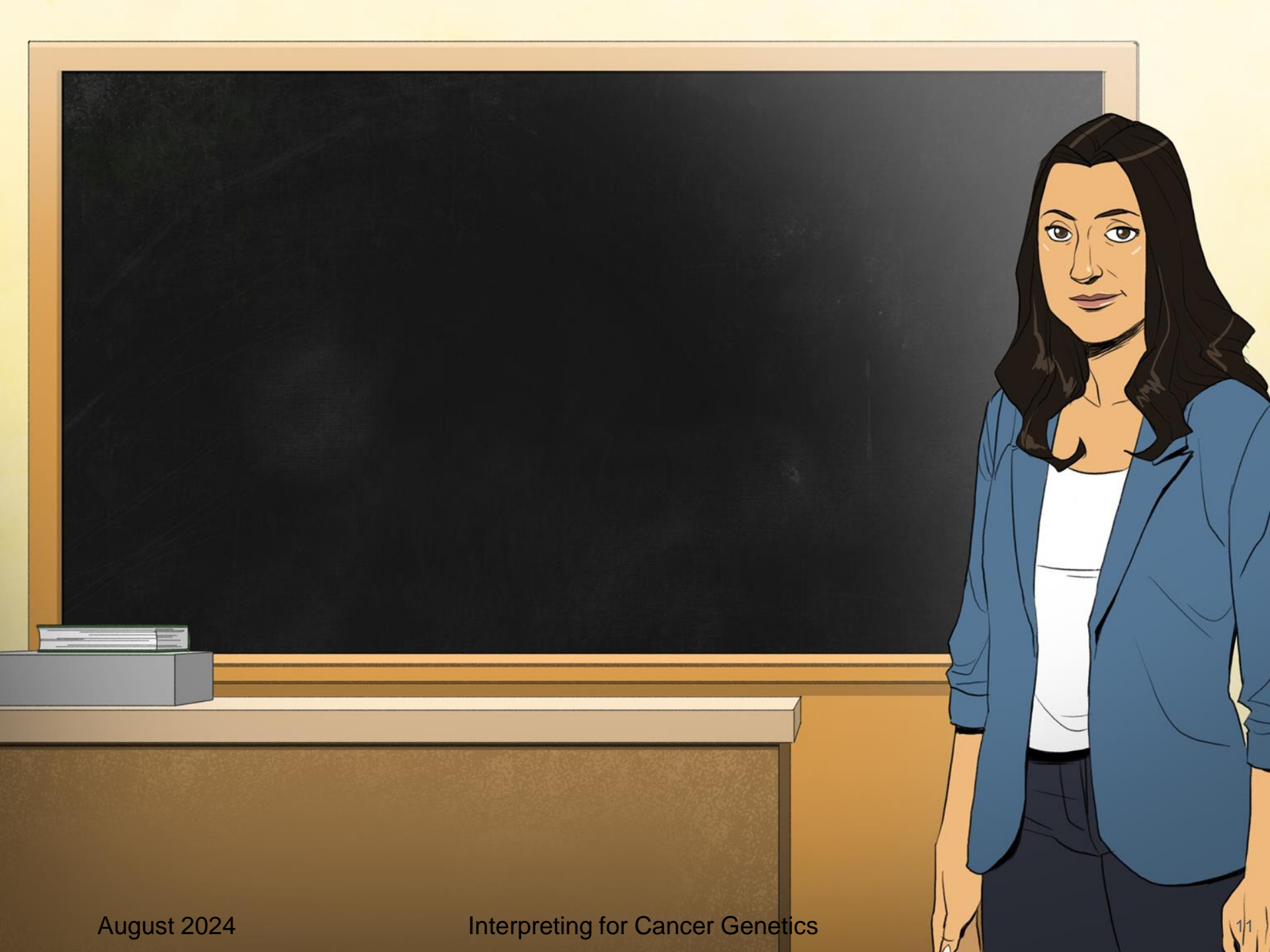
1. Short pre-test.
2. Introduction to Cancer Genetics



# What to expect next week

1. Challenges for interpreters
2. Vocabulary exercises in English
3. Conversion exercises
4. Posttest

So, what do you know already?



What is genetics?



# What is genetics?

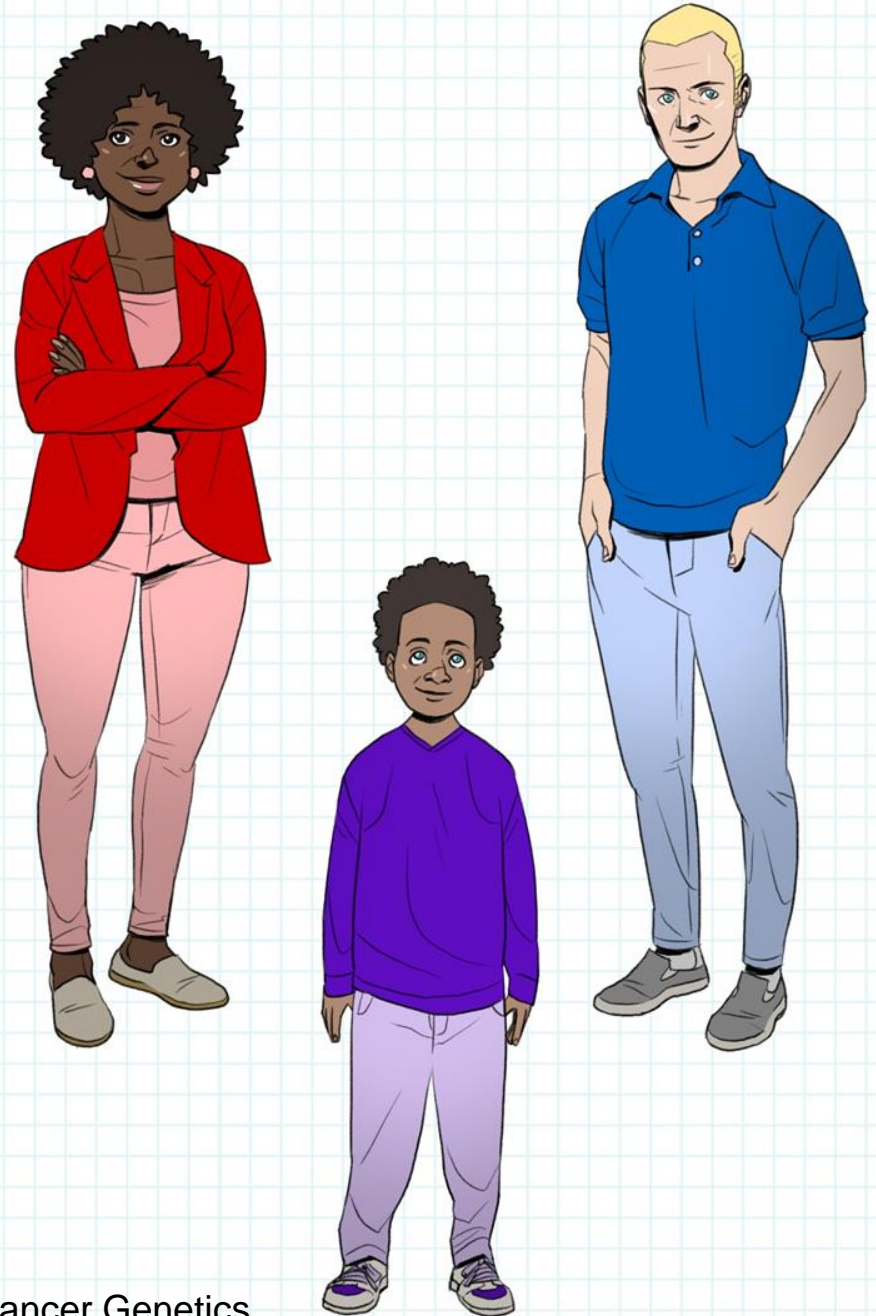
The field of science and medicine that studies the biologic basis of heredity...



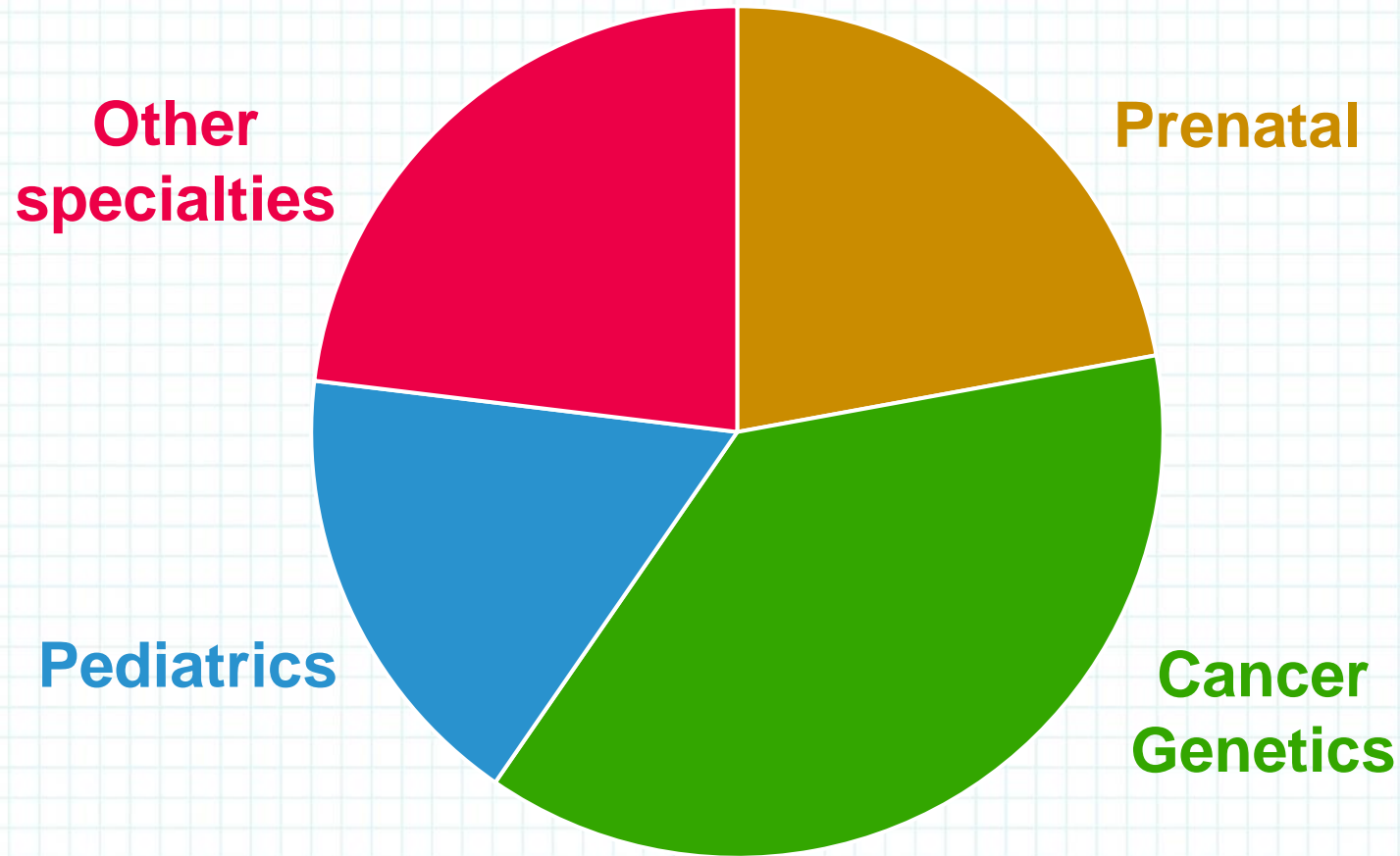
# What is genetics?

The field of science and medicine that studies the biologic basis of heredity...

...and how the instructions for life are used by all living organisms.

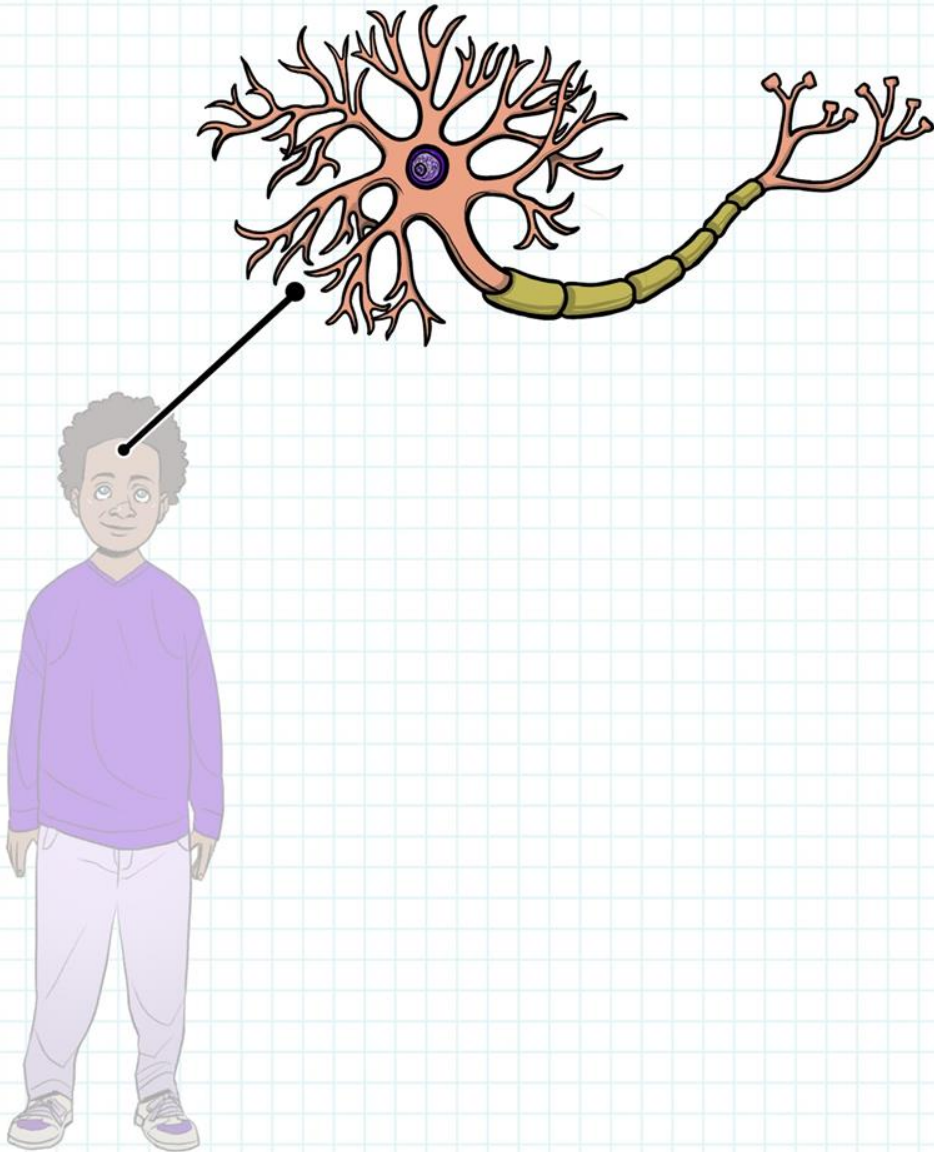


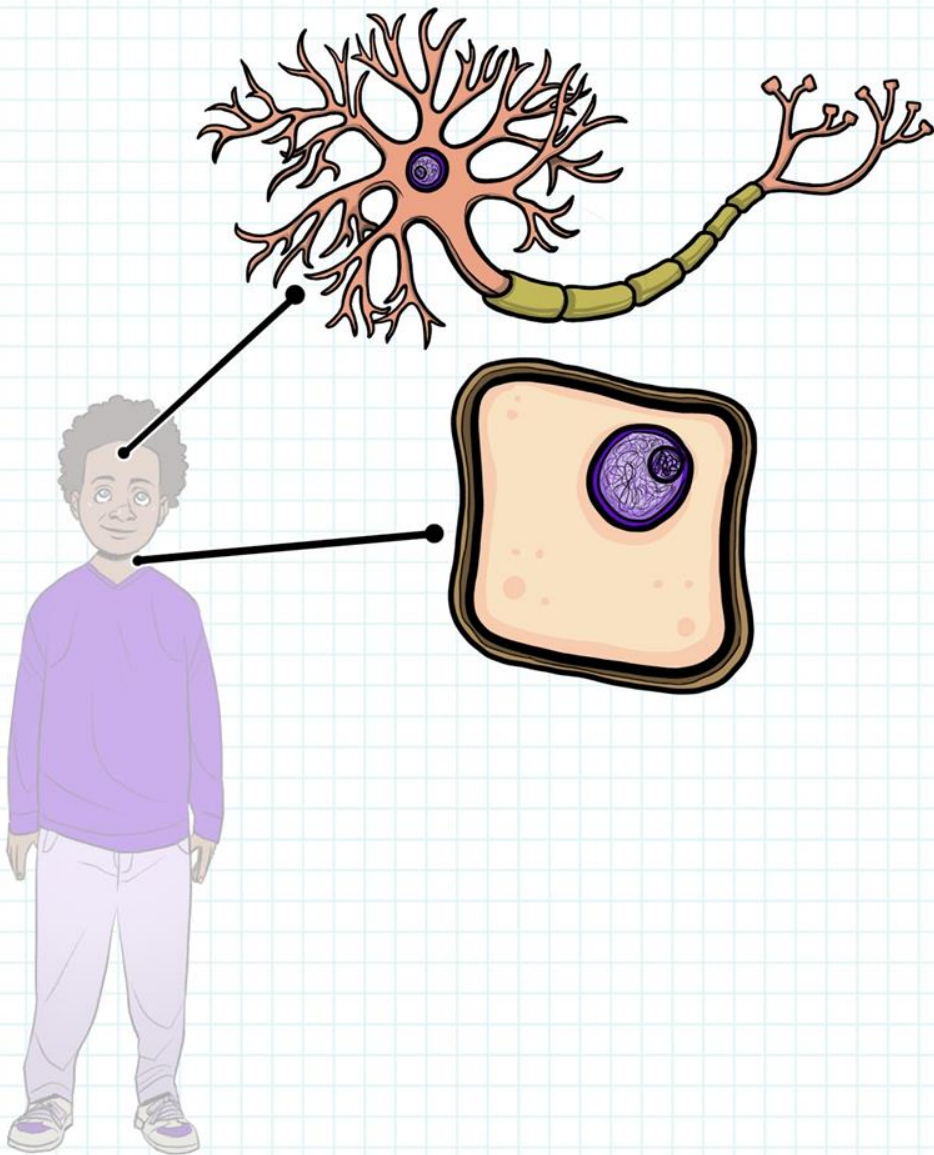
# Where is genetics discussed?

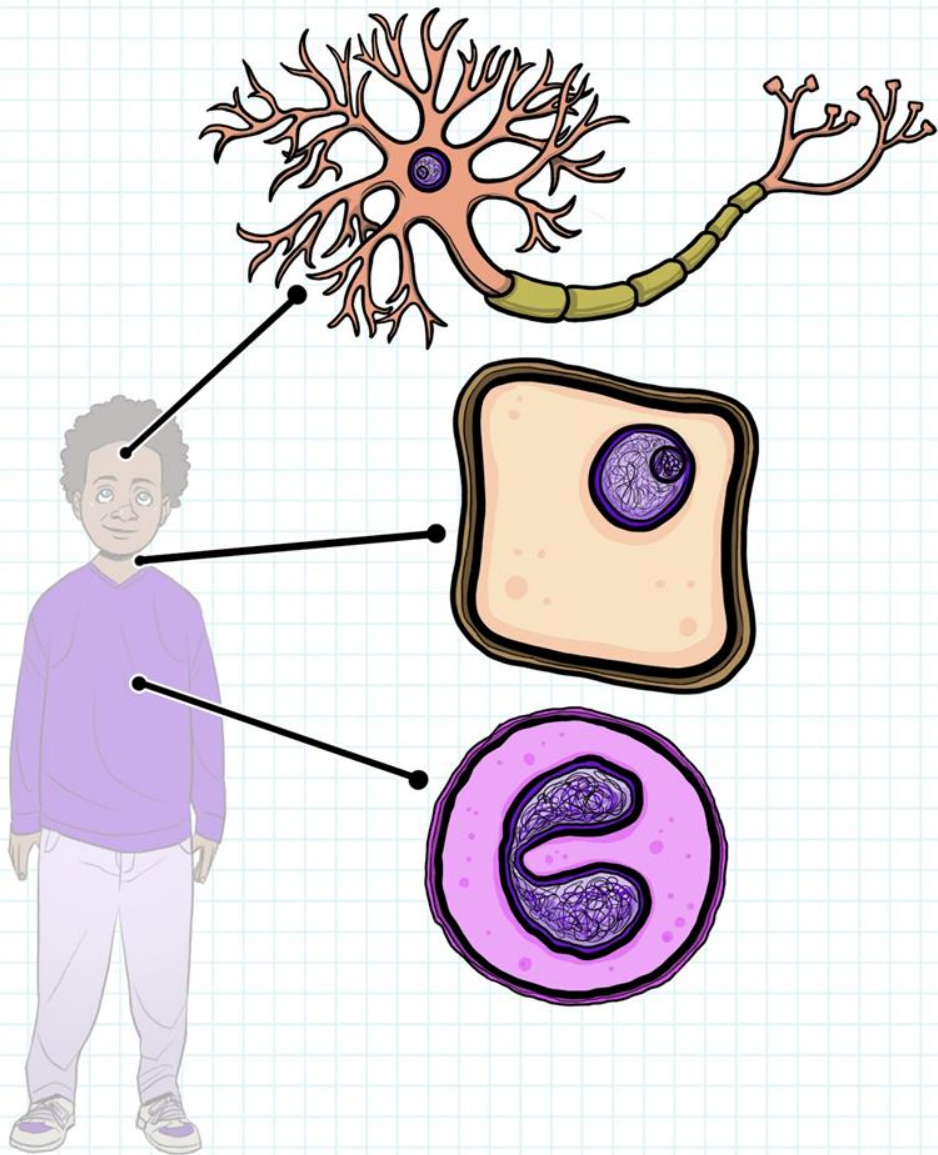


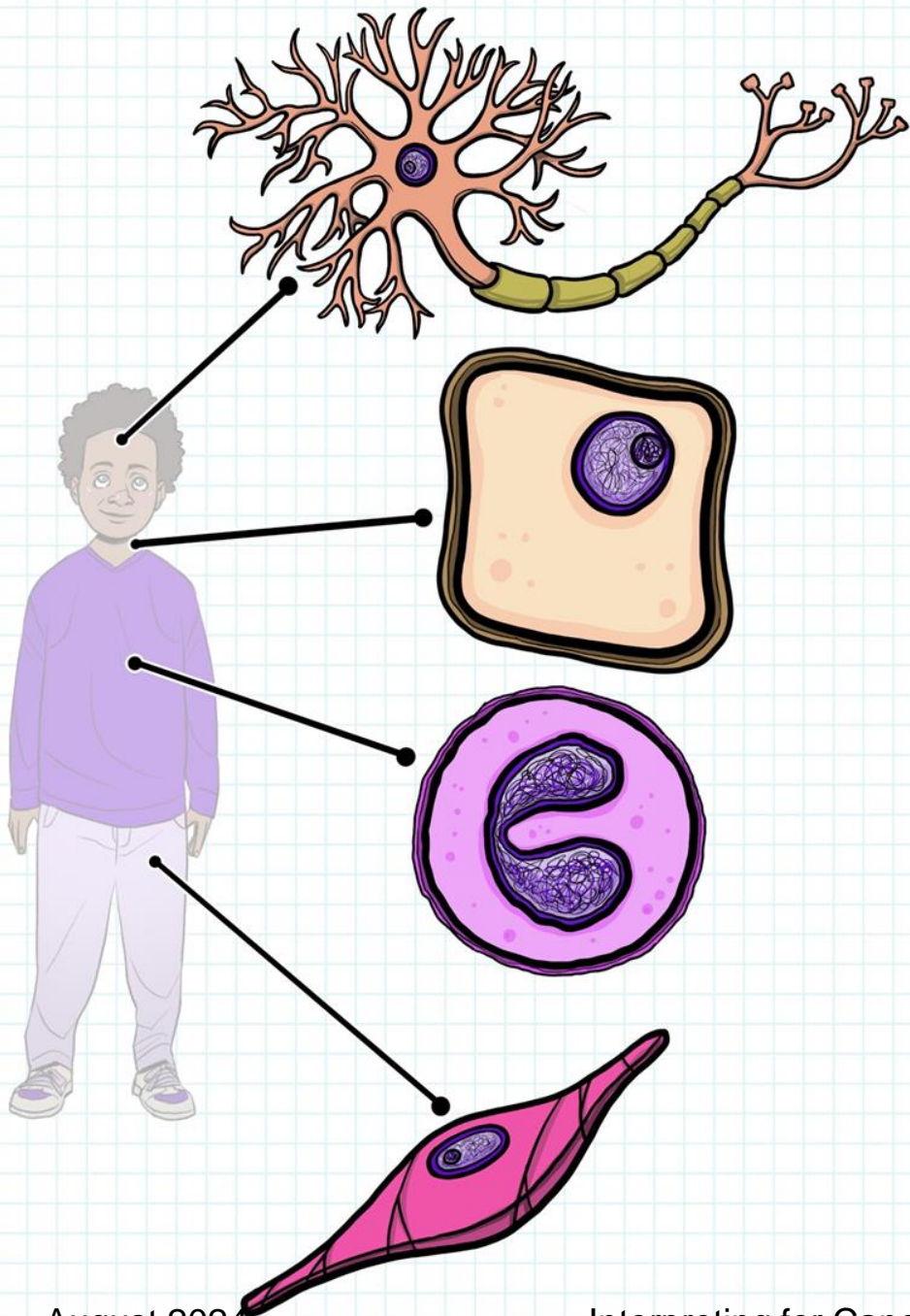


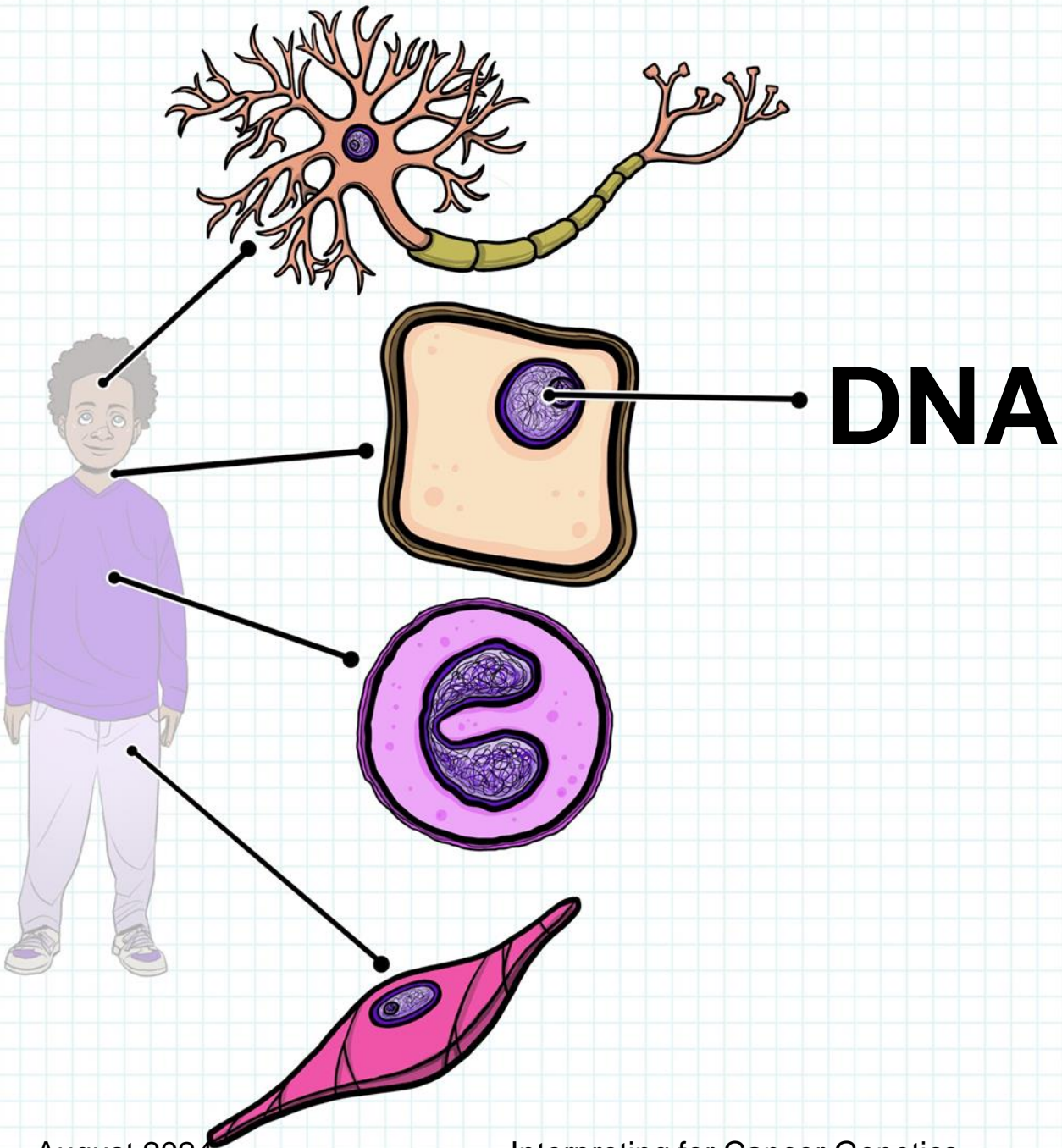






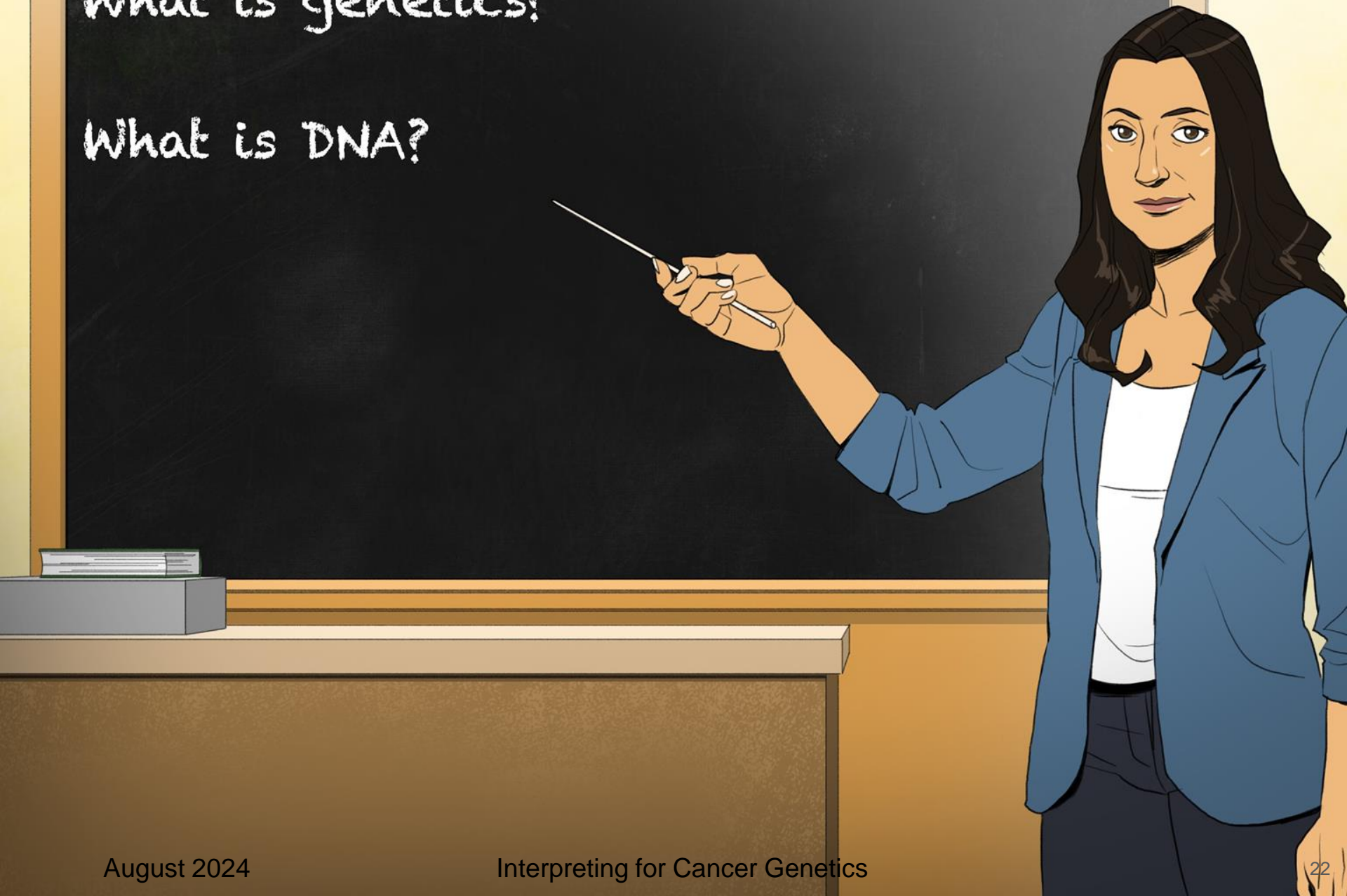


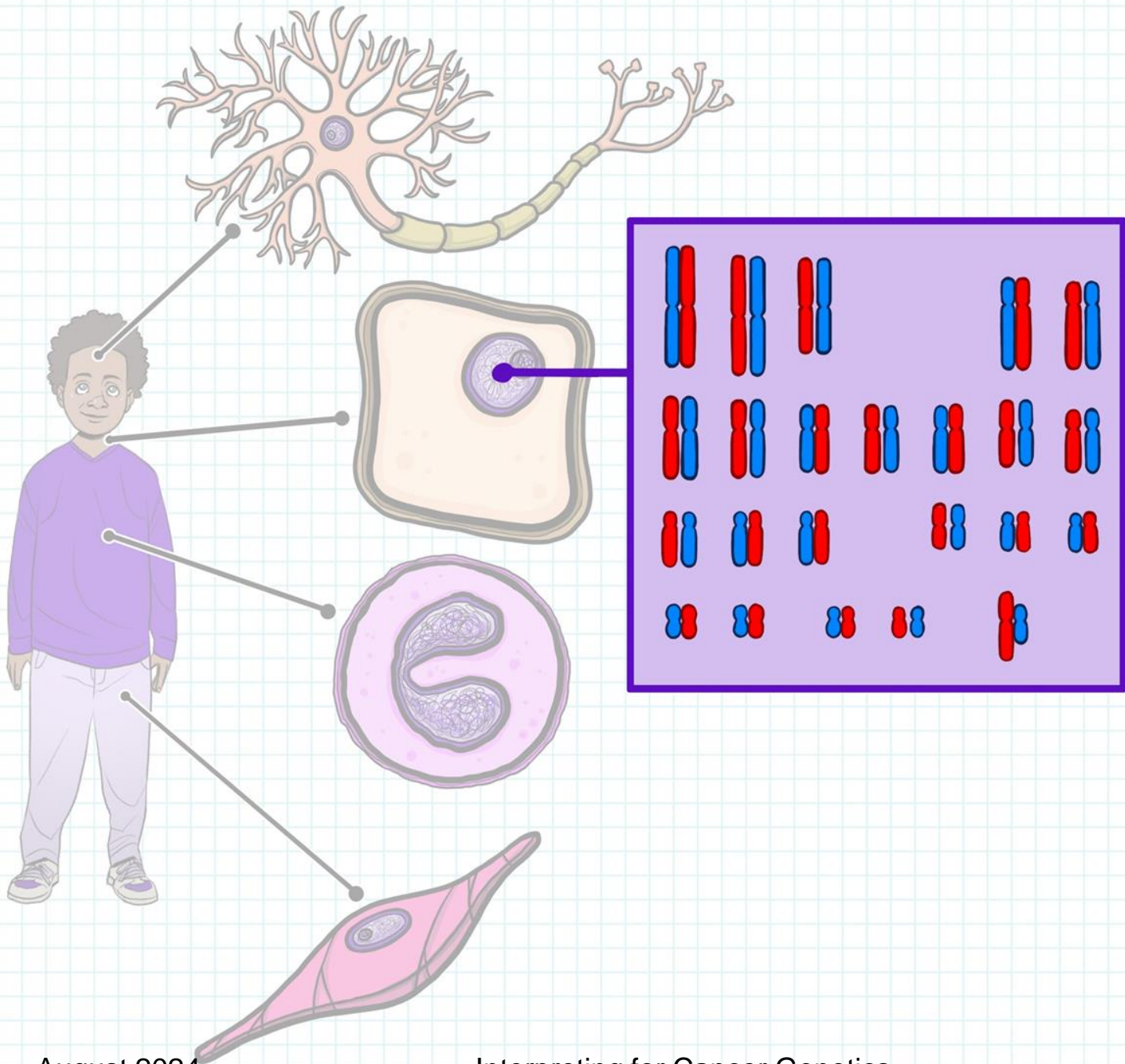


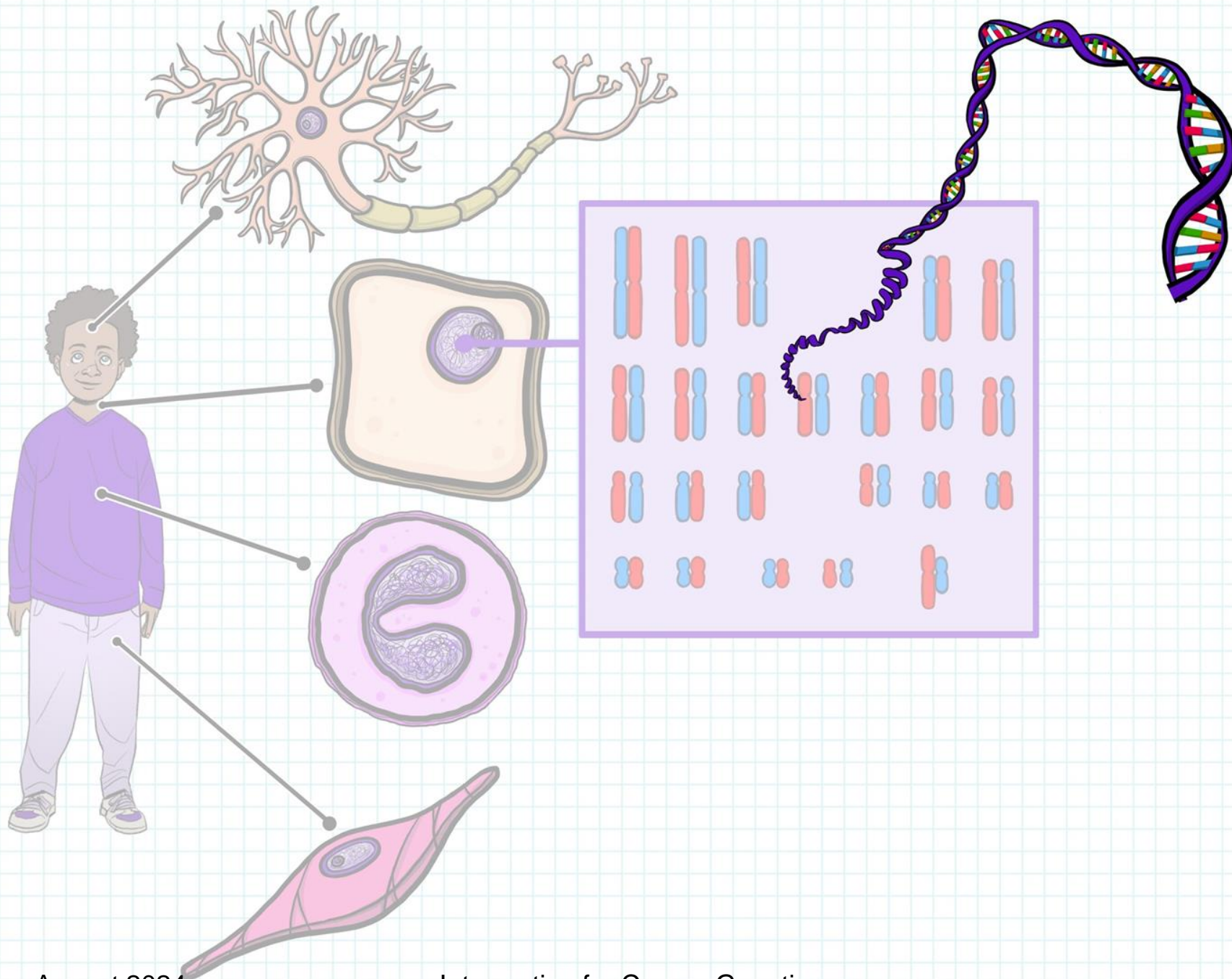


What is genetics?

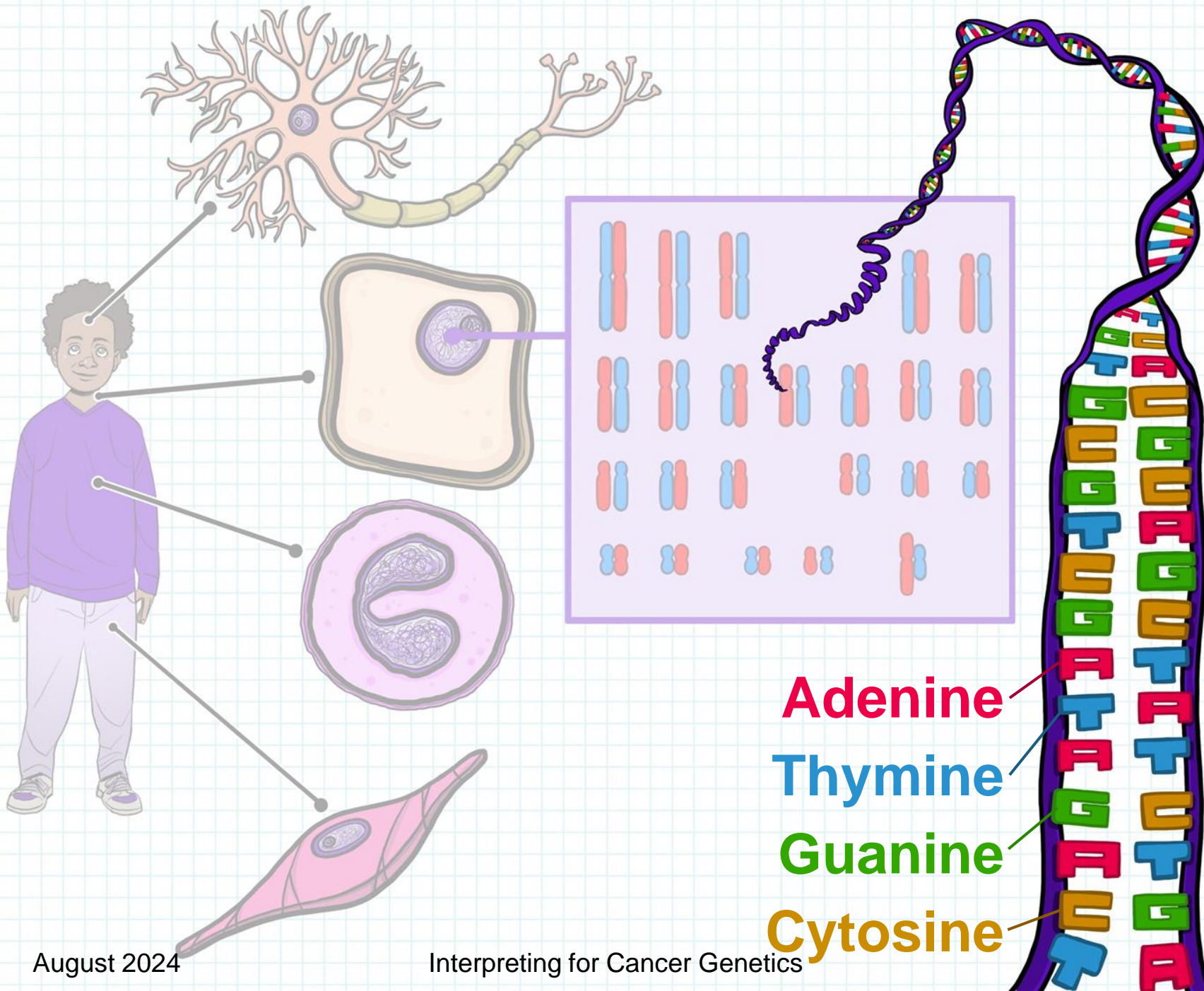
What is DNA?





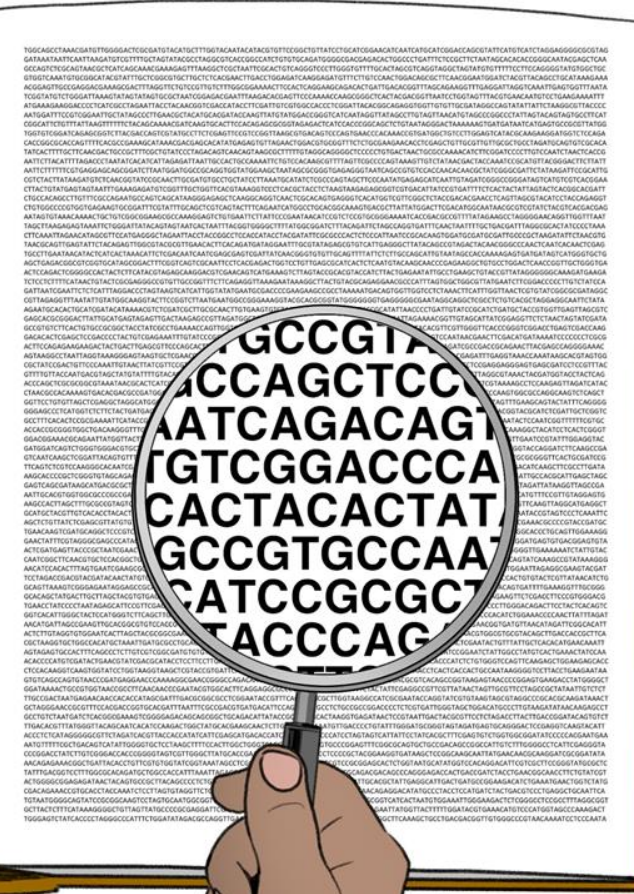










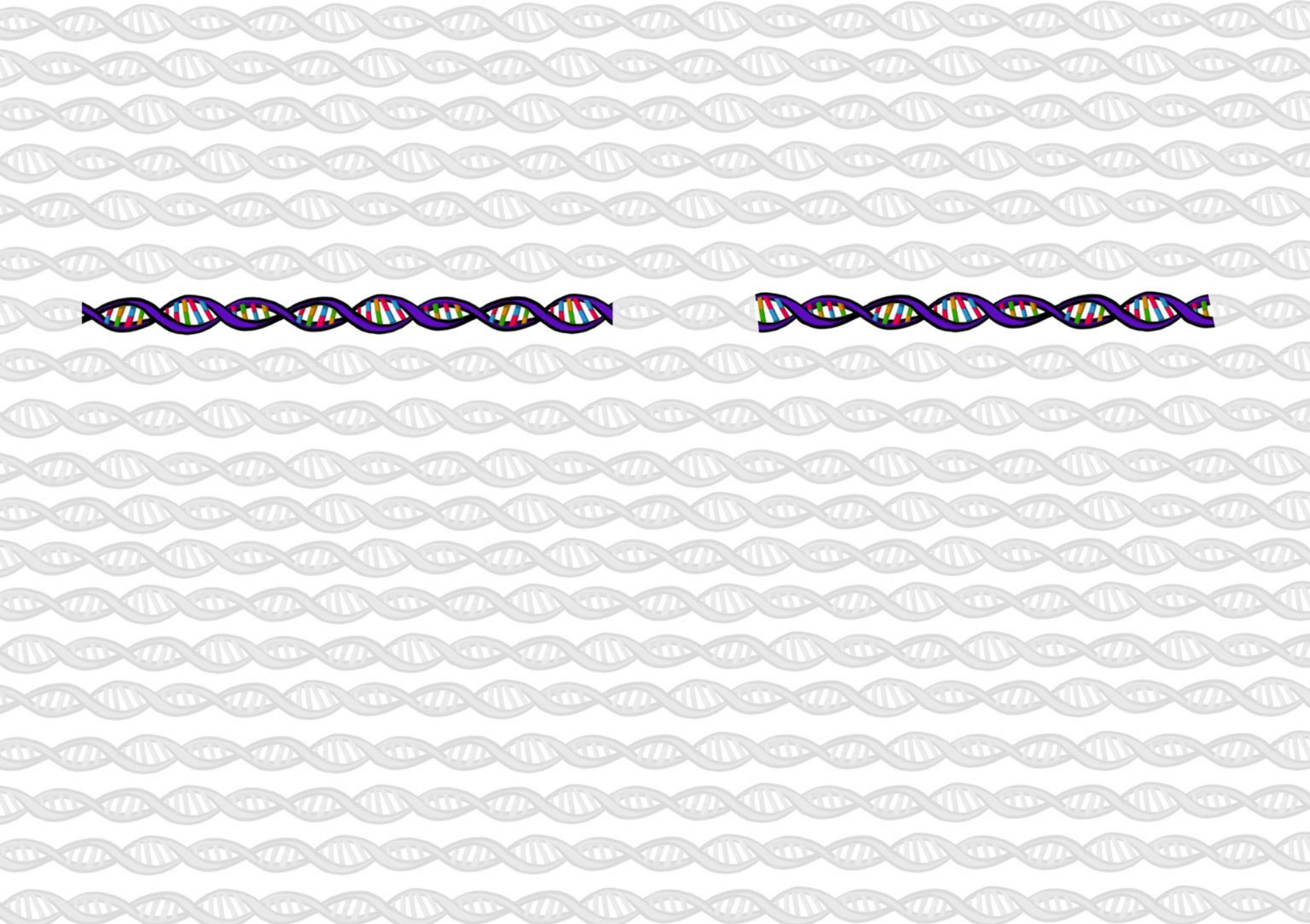


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**TACC**

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TGGGC **ATGGTGATAAC** Interpreting for Cancer Genetics **CAGAGCAACCGAGCTTTCT** 31





# Quiz!

- What is the function of DNA in our bodies?
- What is a chromosome?
- What is a gene?

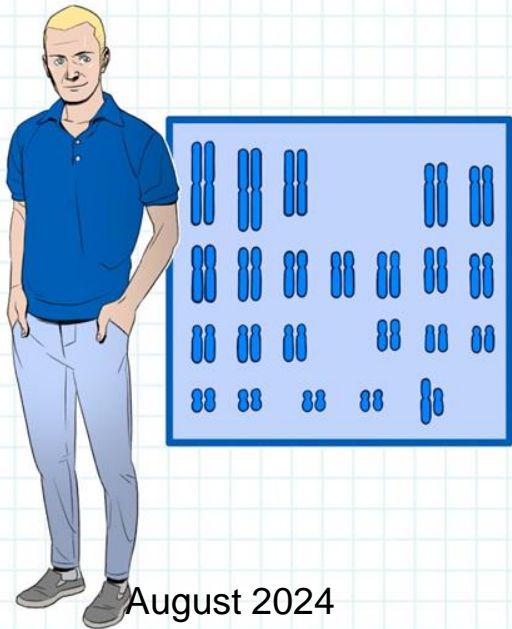
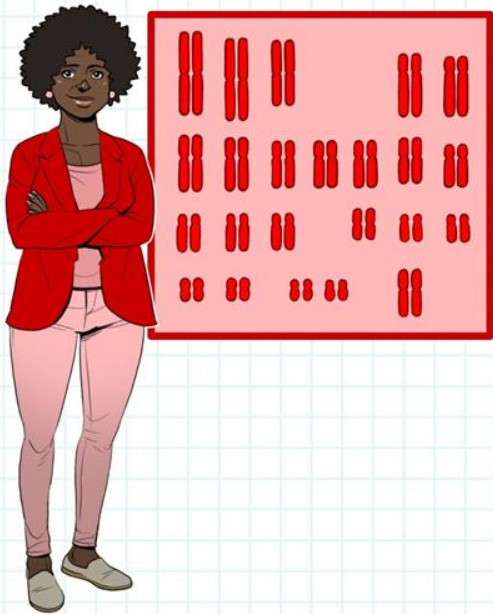
What is genetics?

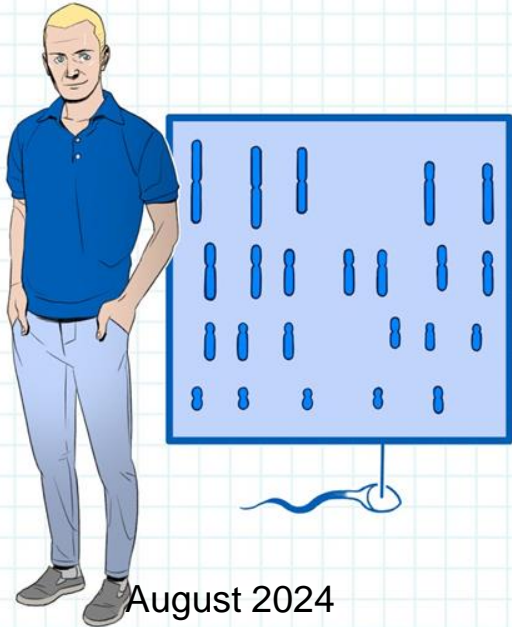
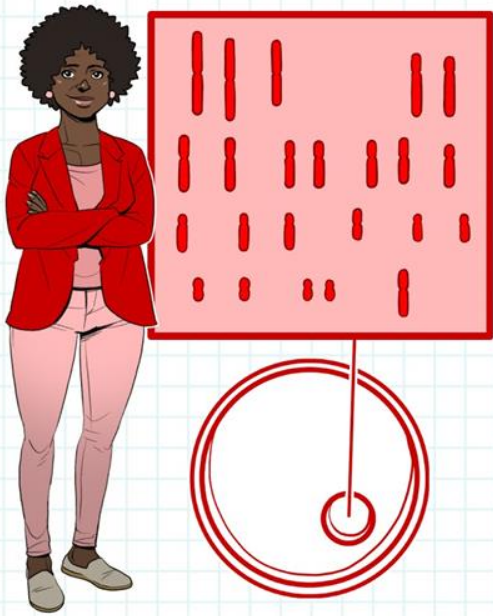
What is DNA?

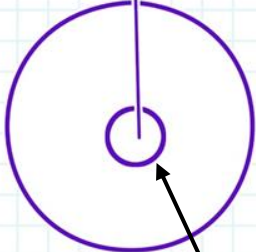
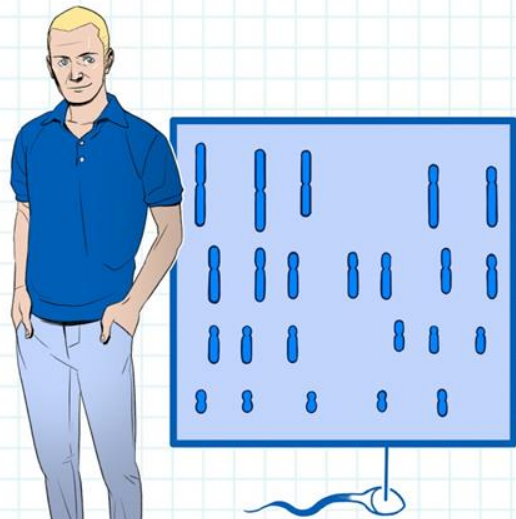
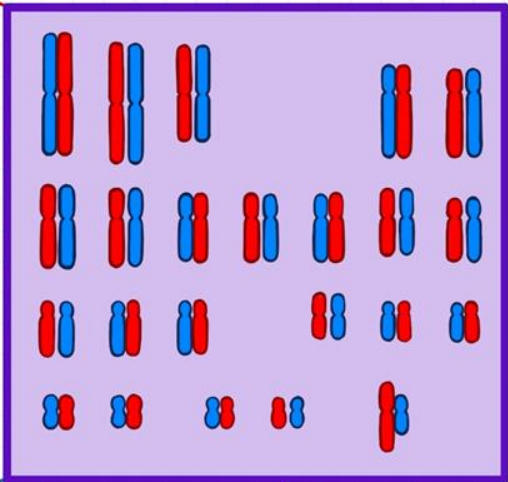
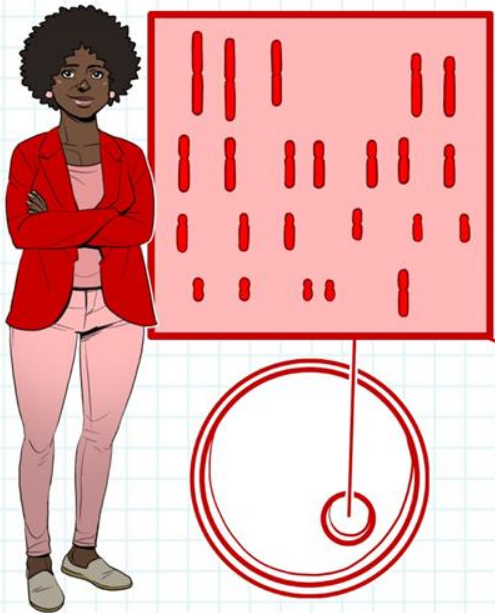
How do we pass on DNA?



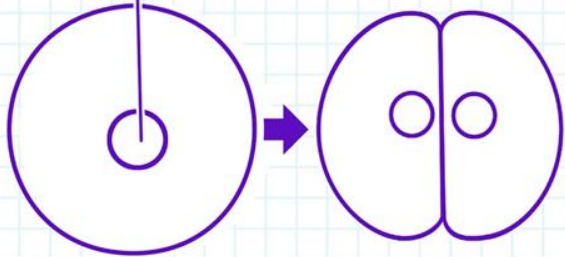
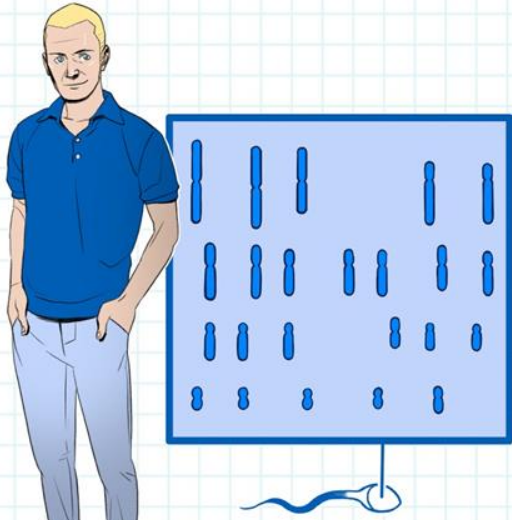
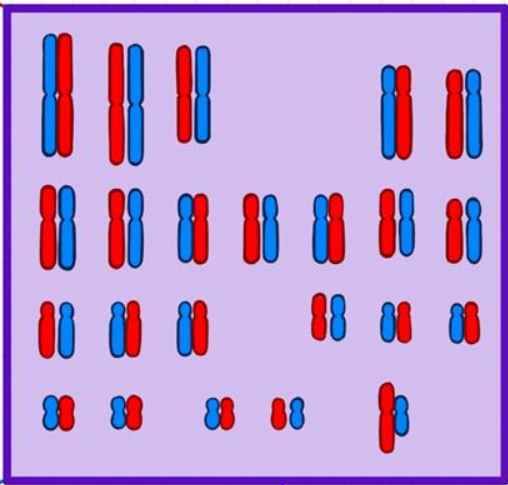
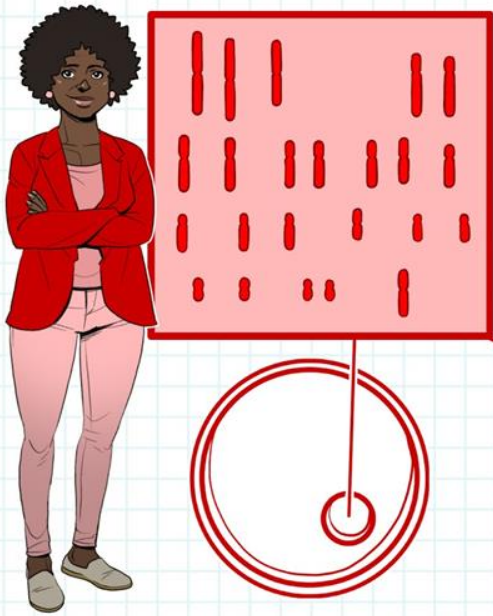


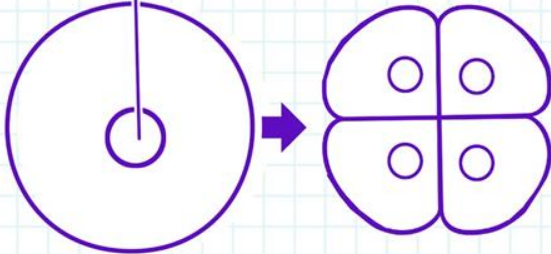
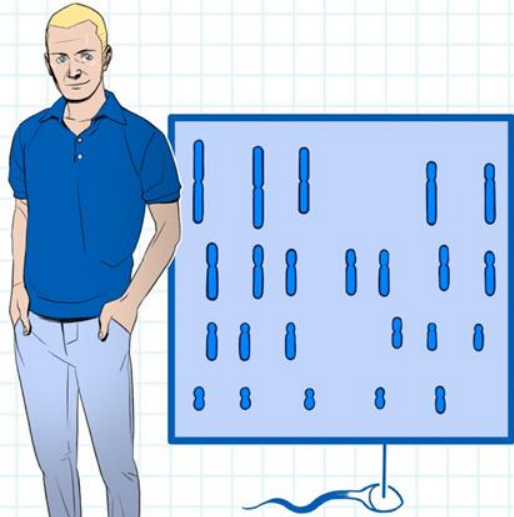
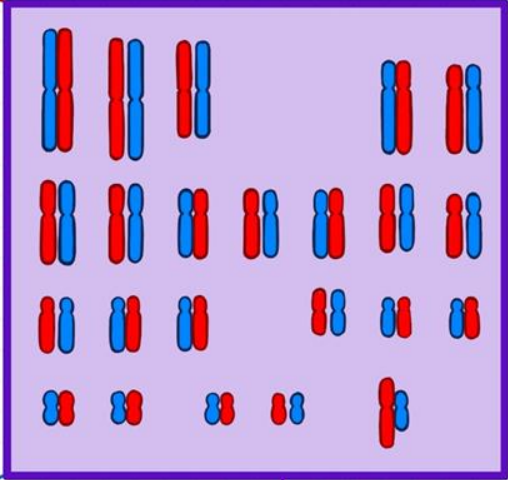
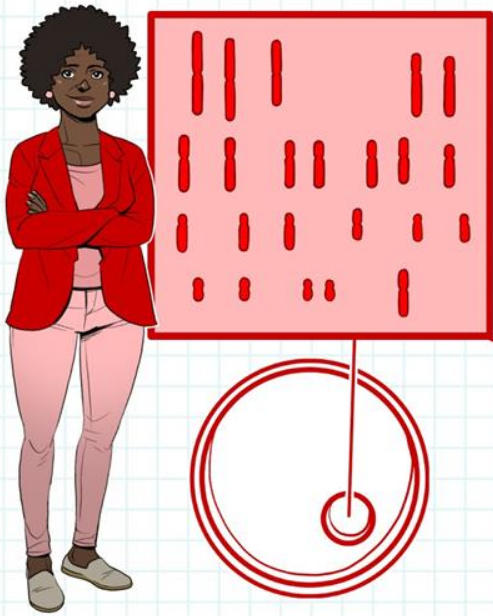




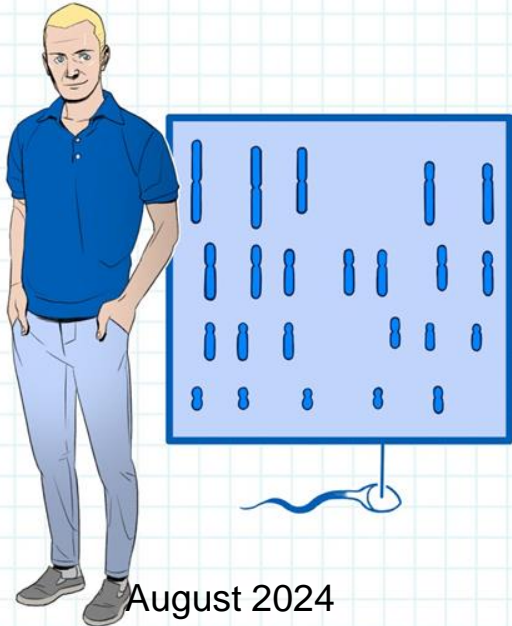
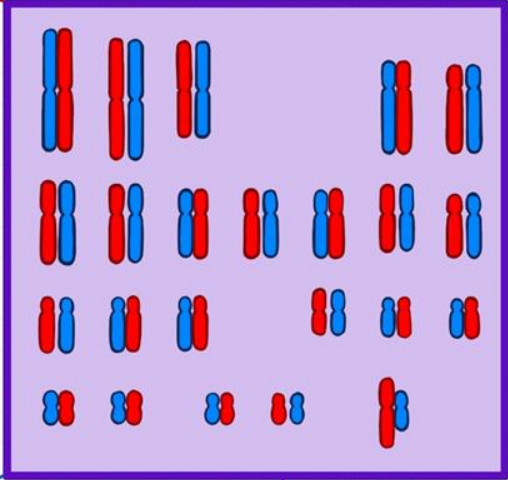
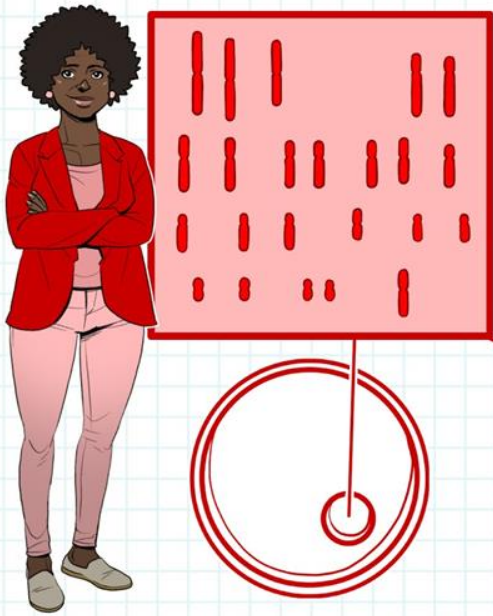


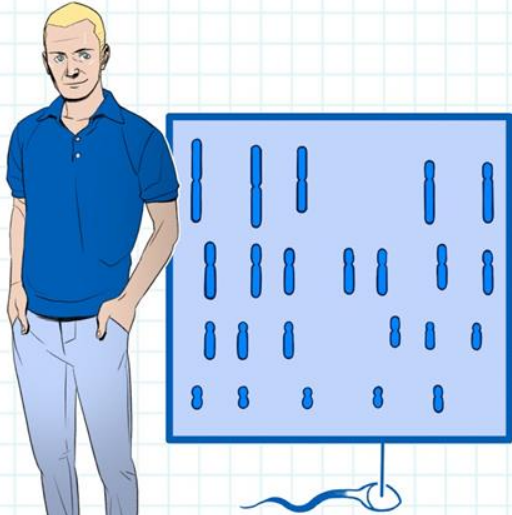
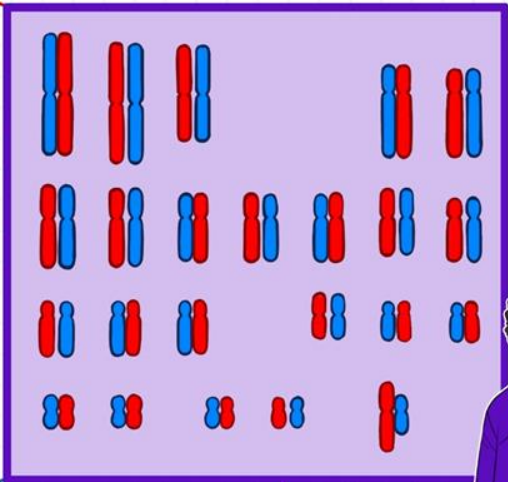
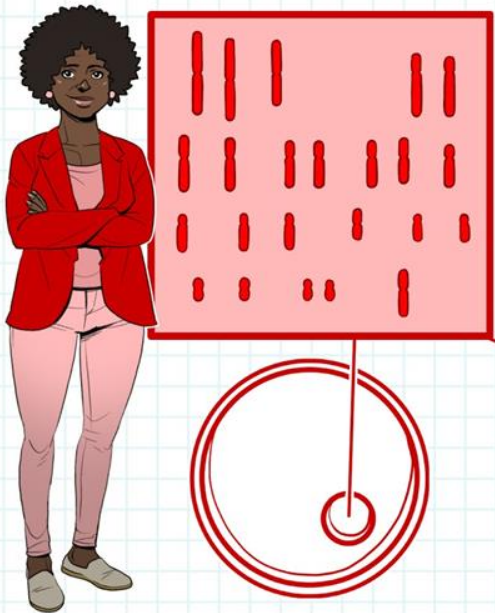
**Nucleus**

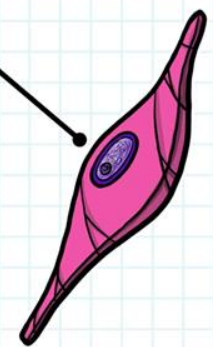
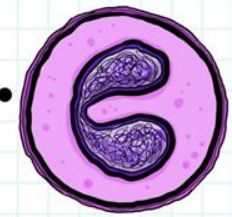
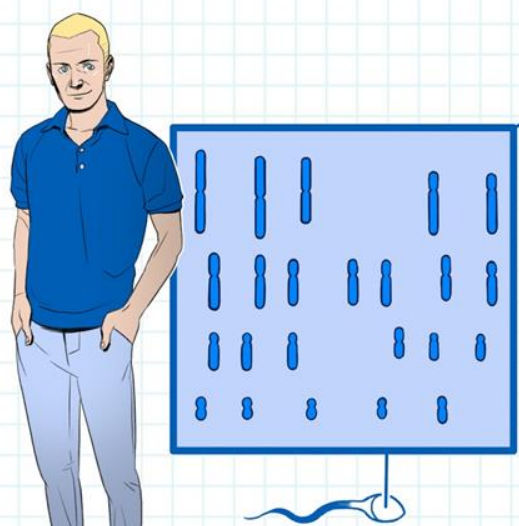
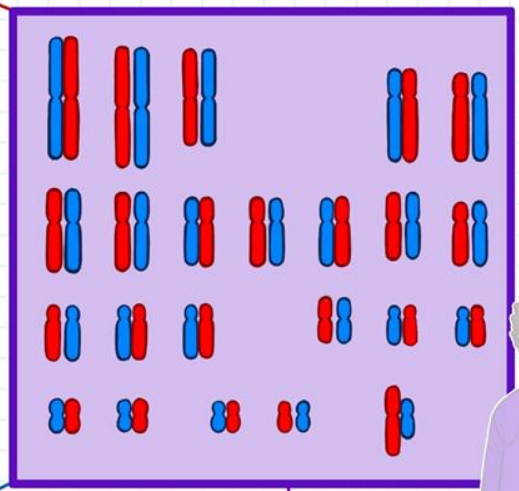
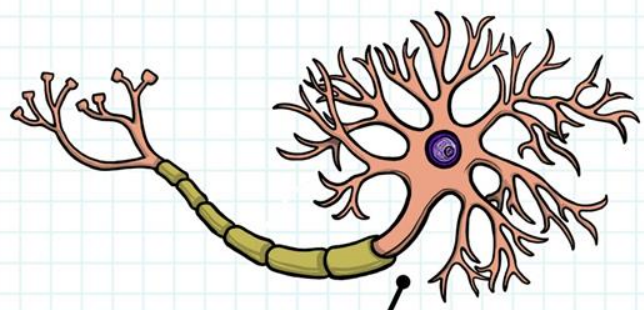
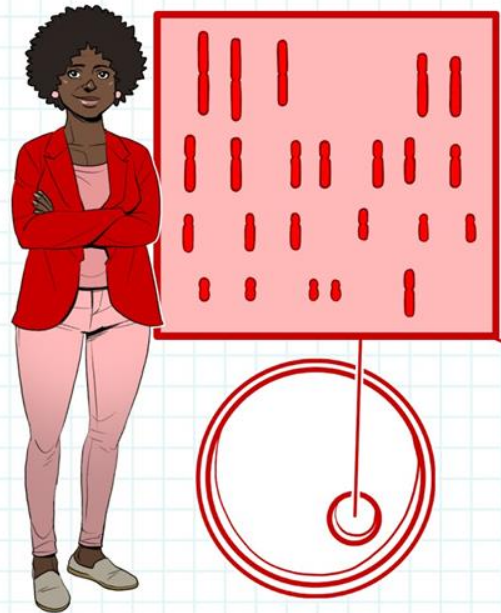


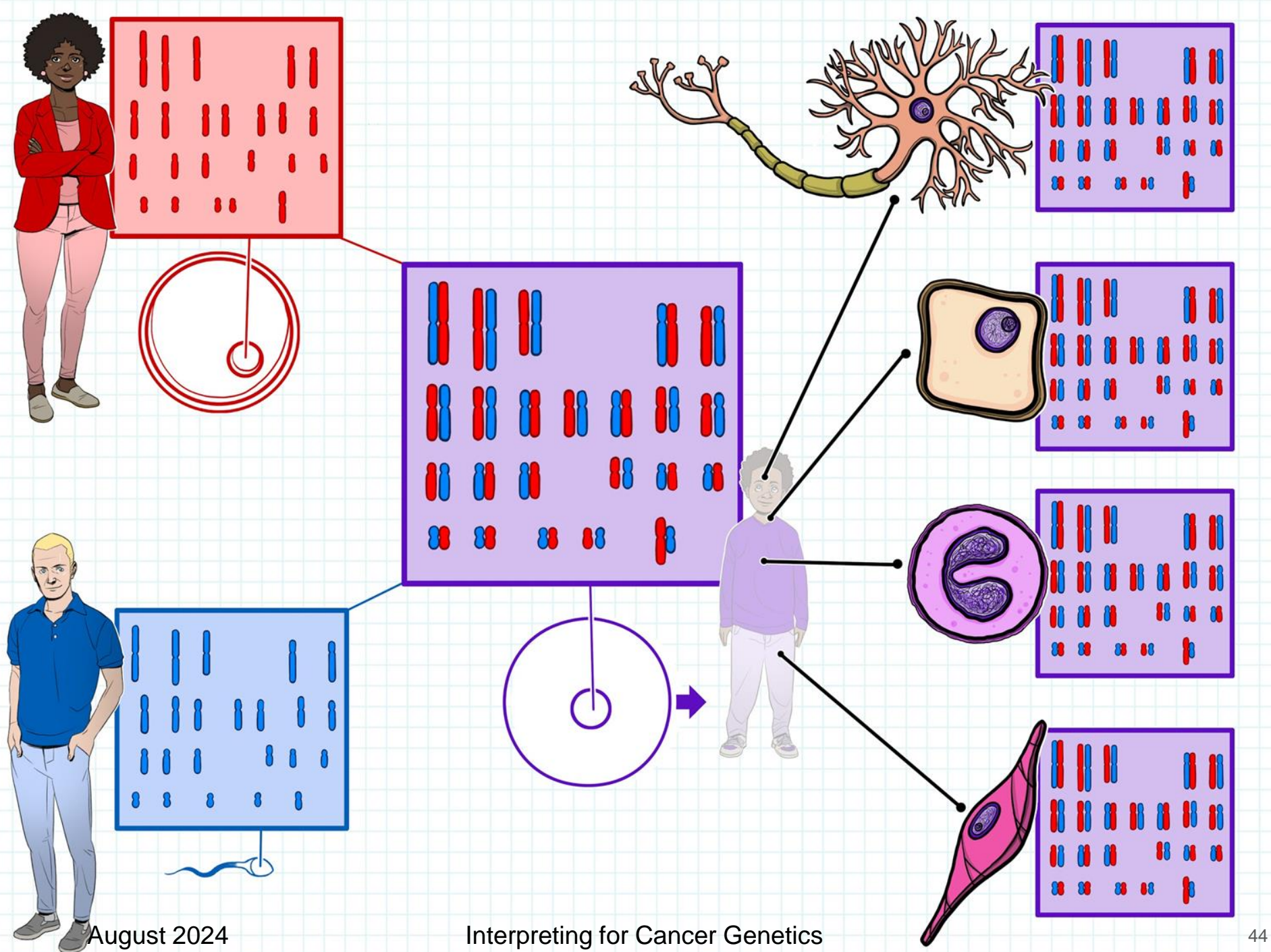










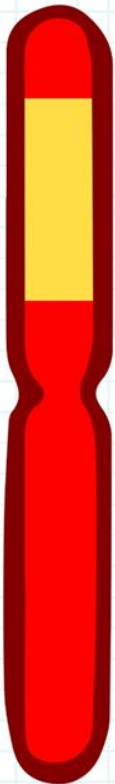


**DOMINANT**

*recessive*

**Brown**

**Blonde**



**Brown**

**Blonde**



Blonde

Blonde





# Quiz!

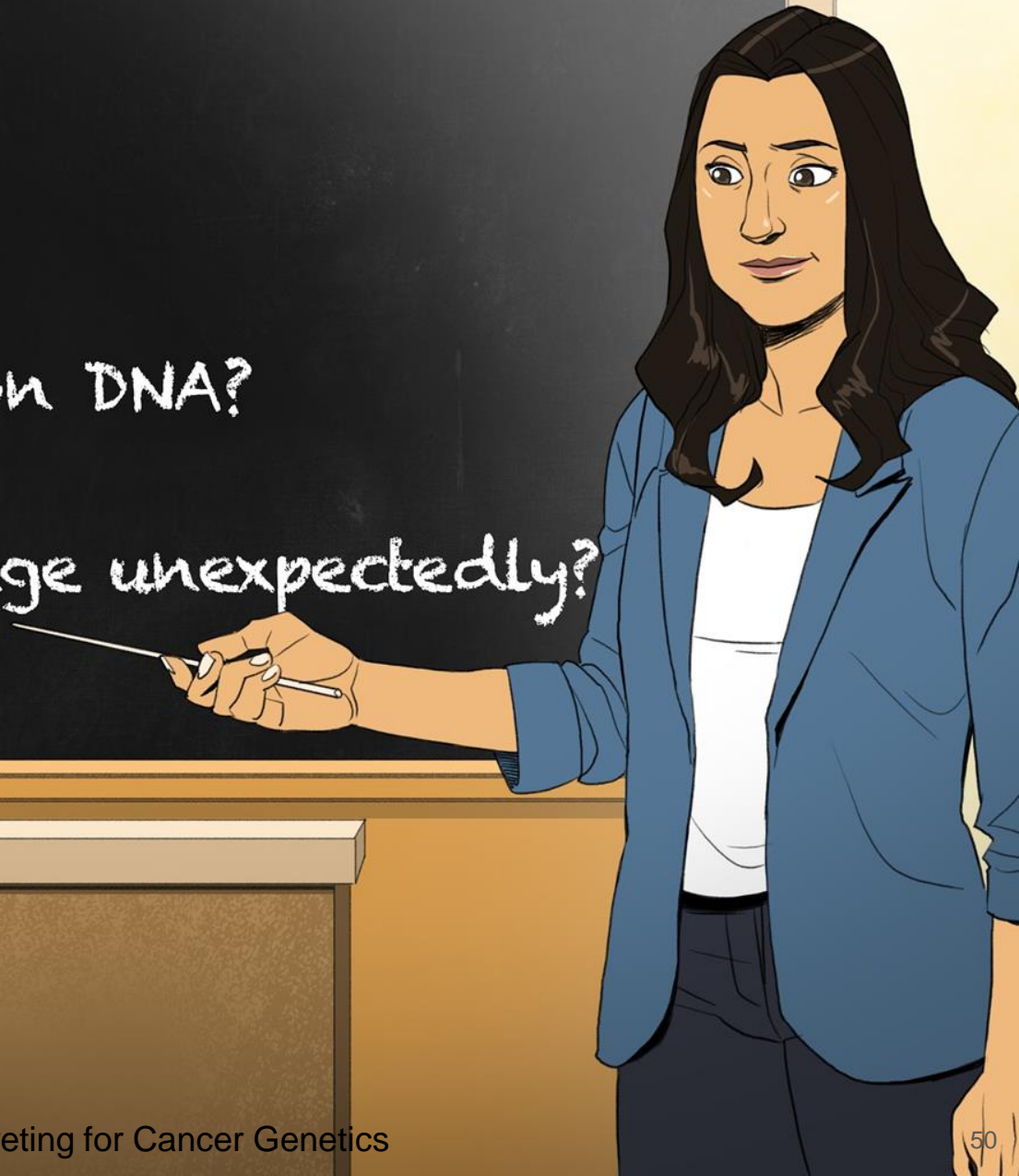
- How many chromosomes does a person typically have?
- How many chromosomes does an egg or sperm have?
- What does “replicate” mean?
- What does it mean if a gene is “dominant” or “recessive?”

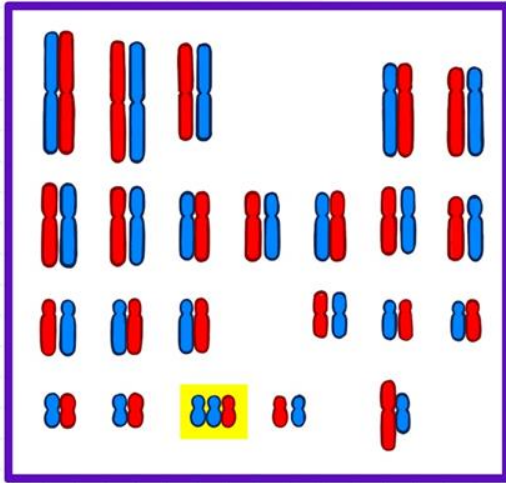
What is genetics?

What is DNA?

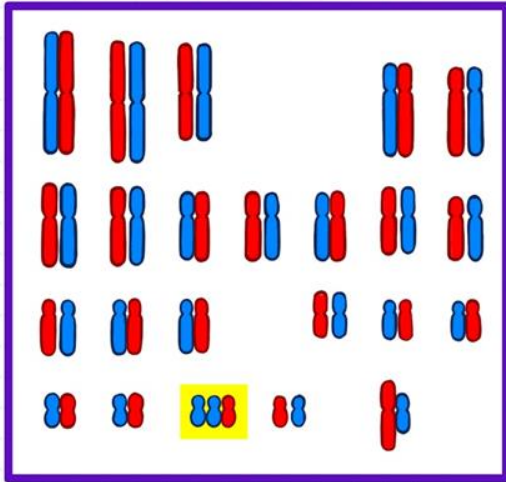
How do we pass on DNA?

How can DNA change unexpectedly?

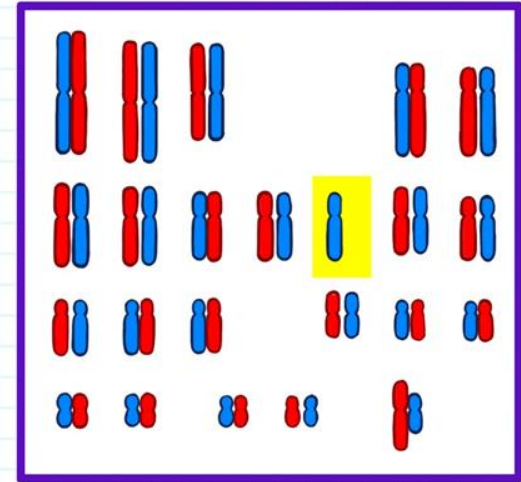




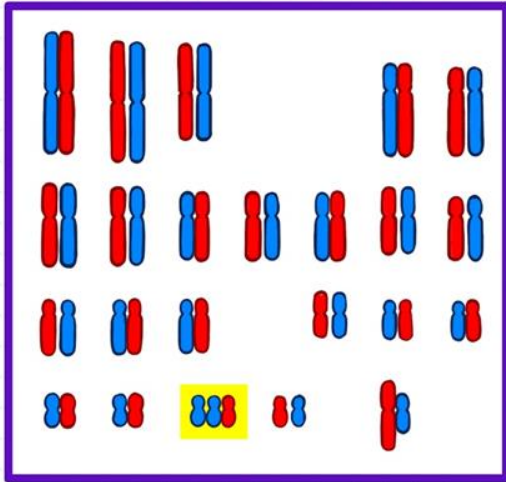
**Extra chromosome**



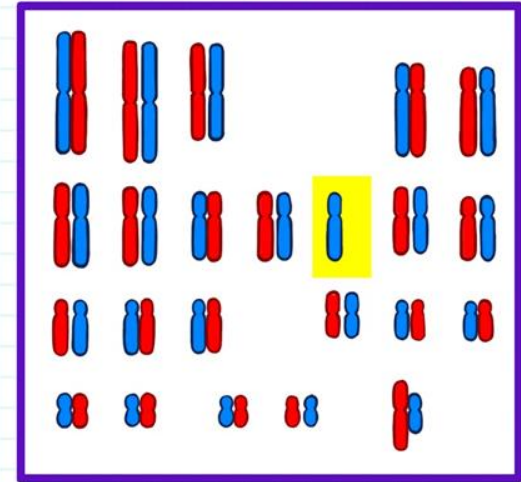
**Extra chromosome**



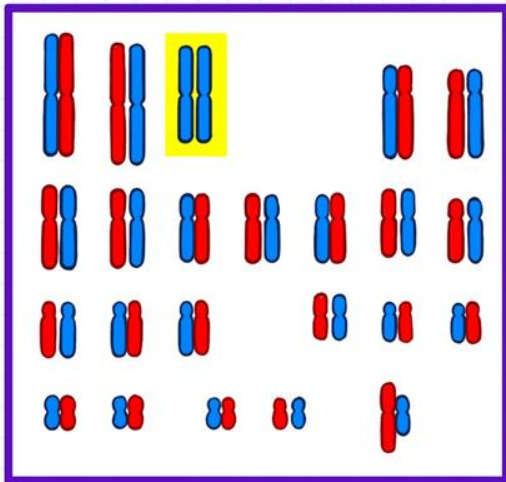
**Missing chromosome**



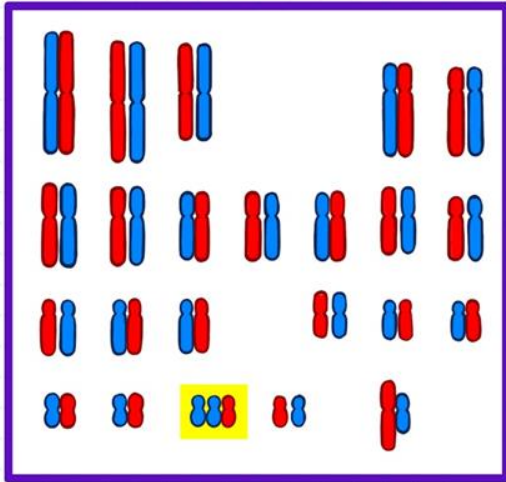
**Extra chromosome**



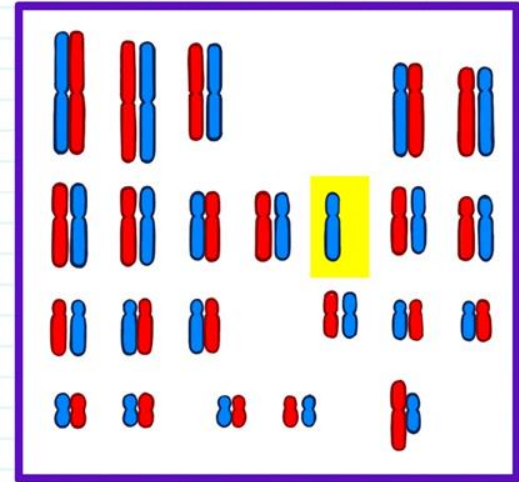
**Missing chromosome**



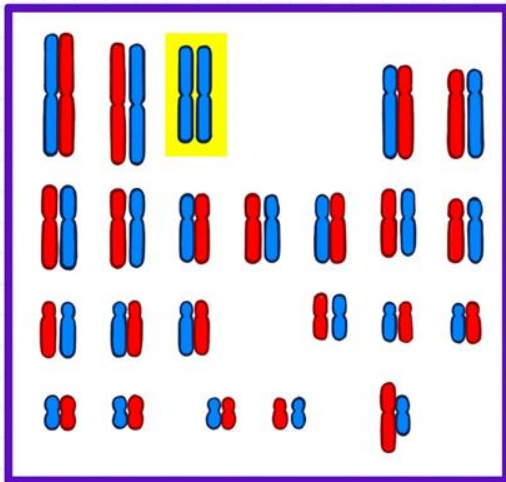
**Pair from one parent**



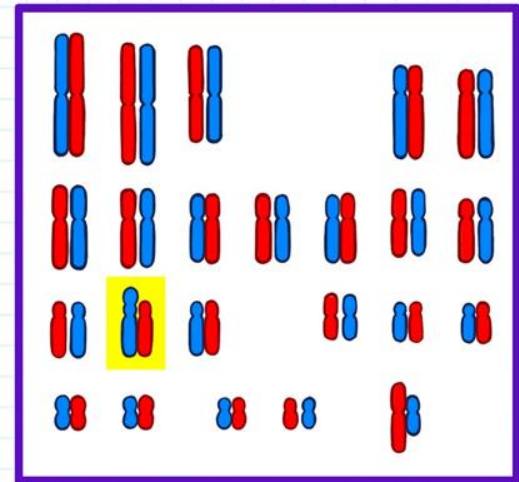
**Extra chromosome**



**Missing chromosome**



**Pair from one parent**



**Fragment duplicated**



**In genetics, a change at the gene-level  
is called a variant.**



**Change letters**





**Change letters**



**Change letters**



**Mix Up letters**



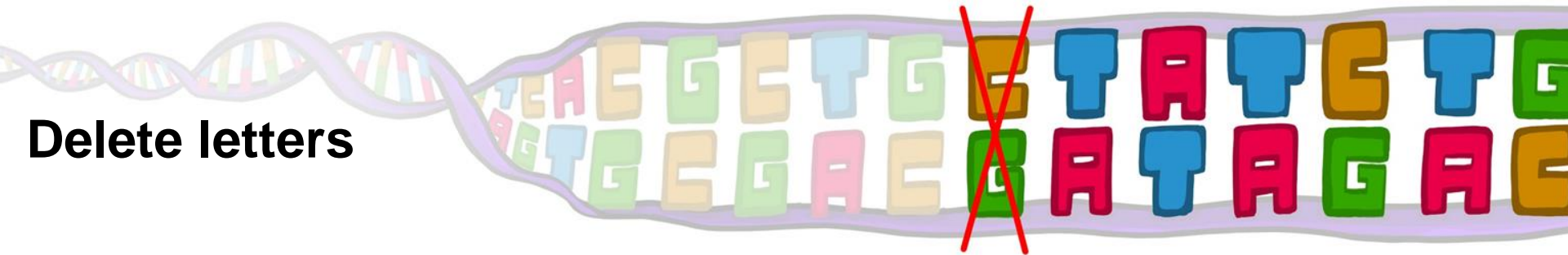
**Change letters**



**Mix Up letters**



**Delete letters**



**Change letters**



**Mix Up letters**



**Delete letters**



**Change letters**



**Mix Up letters**



**Delete letters**



**Change letters**



**Mix Up letters**



**Delete letters**



**Add letters**



**Change letters**



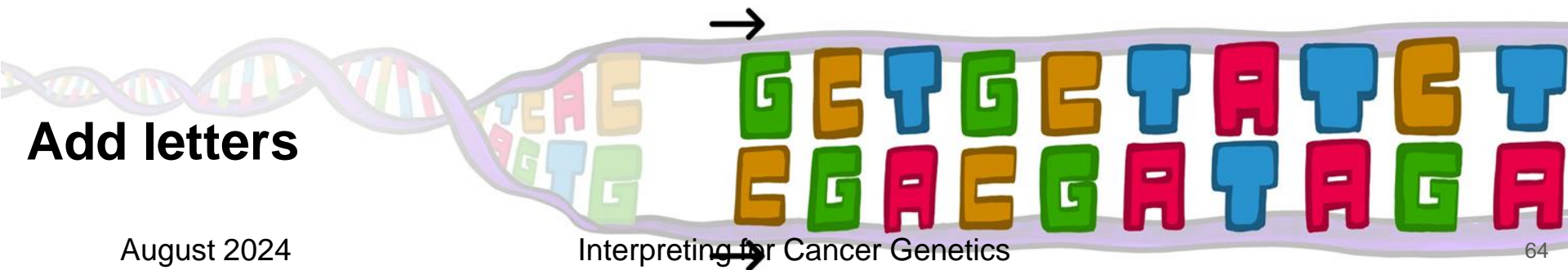
**Mix Up letters**



**Delete letters**



**Add letters**





**Change letters**



**Mix Up letters**



**Delete letters**



**Add letters**





# “Benign”

Variant but no harm



# “Benign”

Variant but no harm



# “Deleterious” or “Pathogenic”

Variant may cause harm or increase risk



## “Benign”

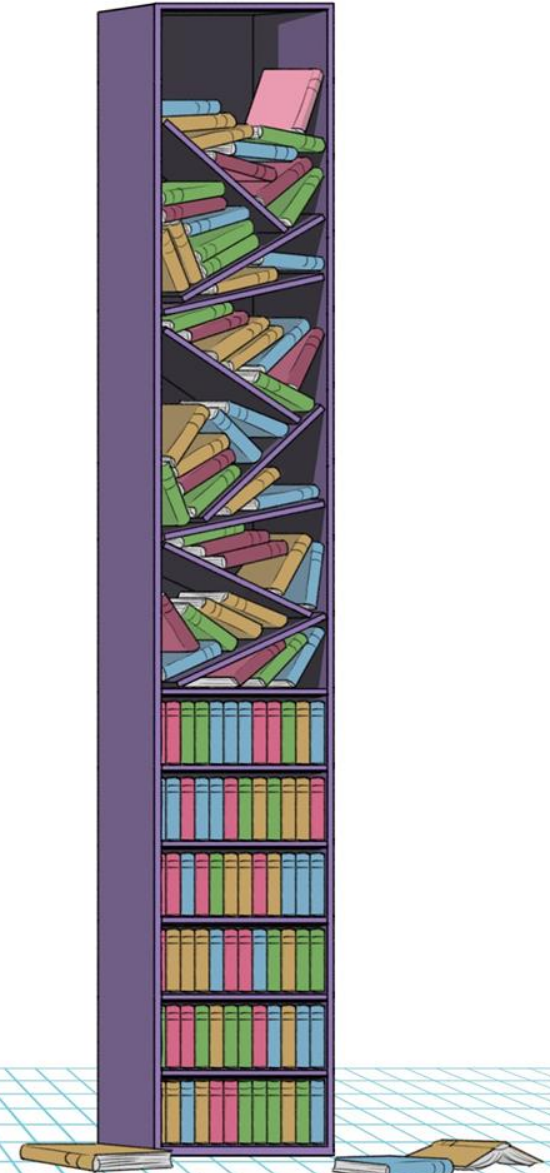
Variant but no harm



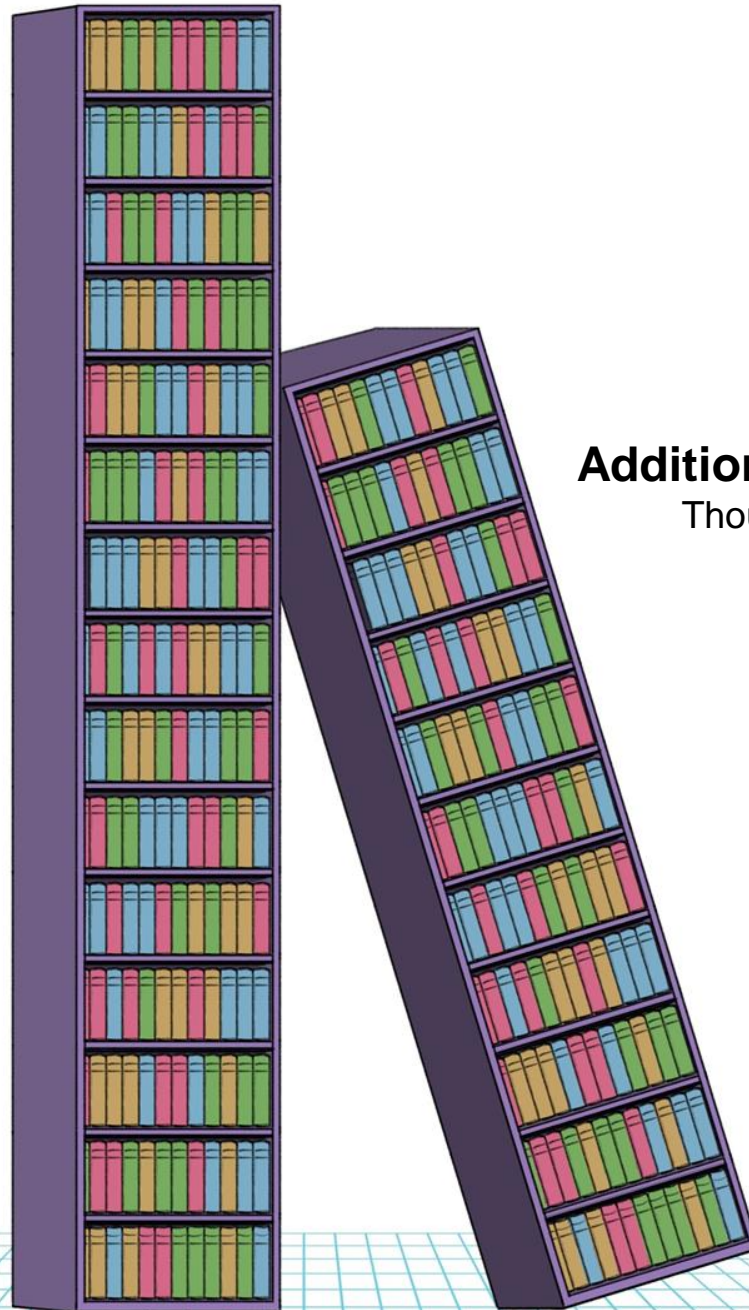
August 2024

## “Deleterious” or “Pathogenic”

Variant may cause harm or increase risk



Interpreting for Cancer Genetics

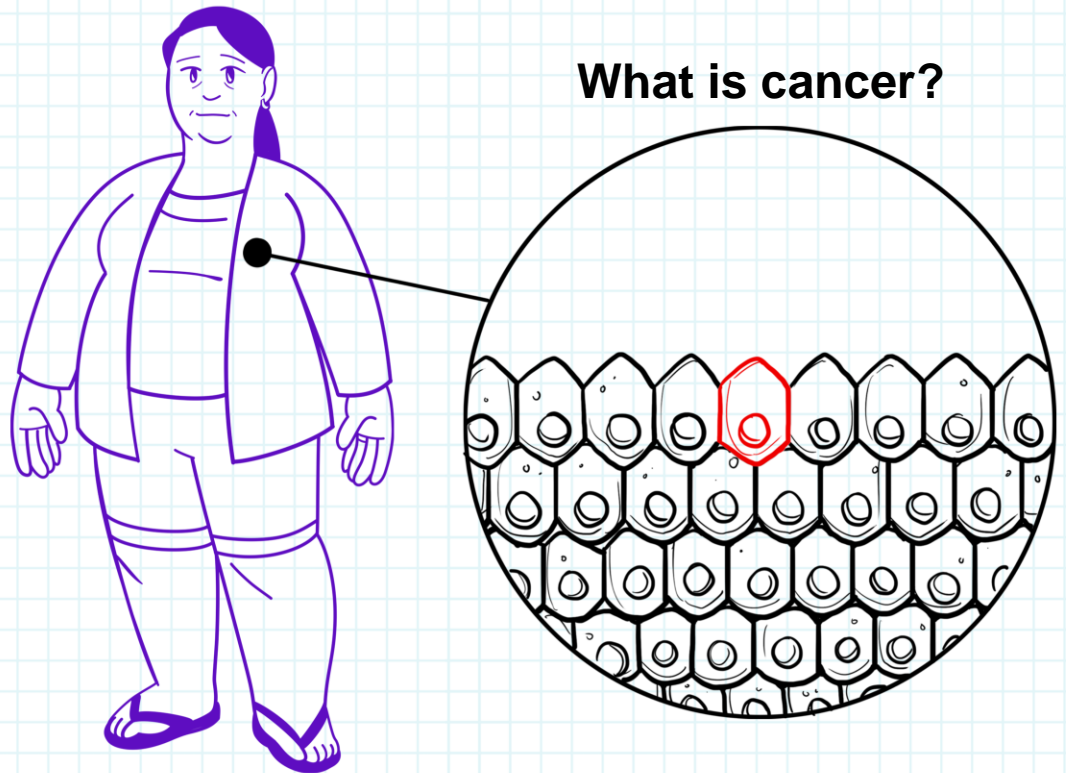


**Additional Chromosome**  
Thousands of genes!

# Quiz!

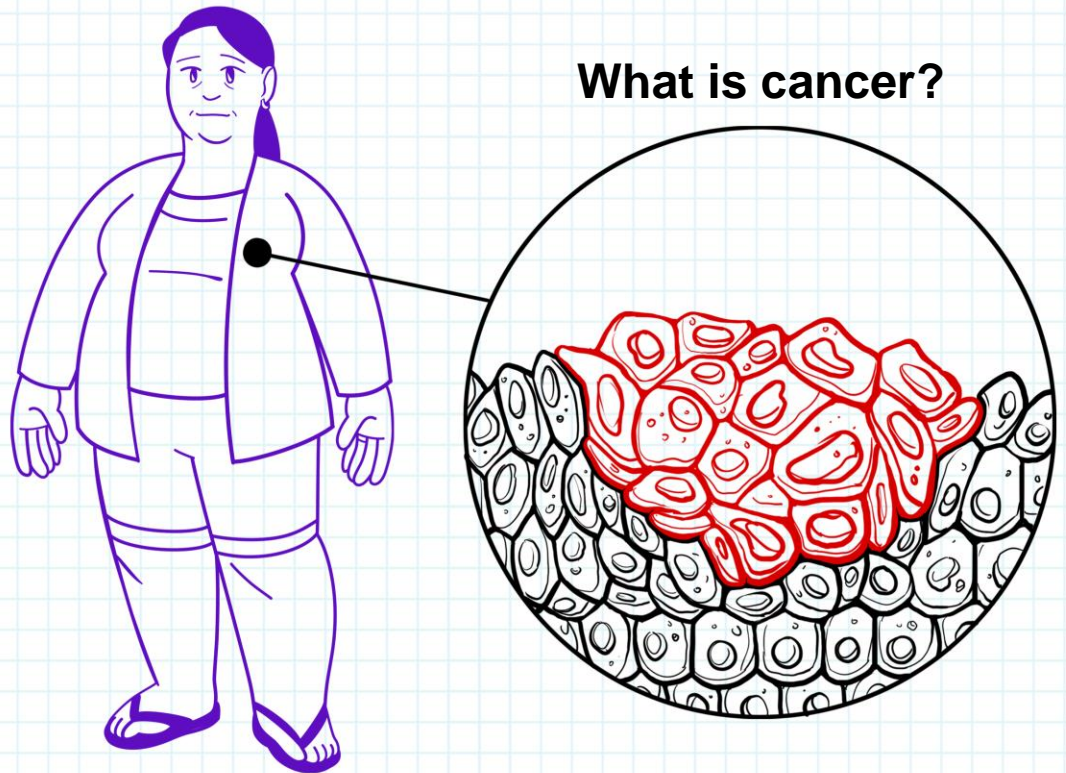
- What is a genetic change at the chromosomal level called?
- What is a genetic change at the gene level called?
- What does it mean if a change is “benign”?
- What does it mean if a change is “deleterious”?
- What is a mutation?

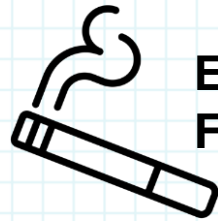
## What is cancer?





## What is cancer?





## Environmental Factors

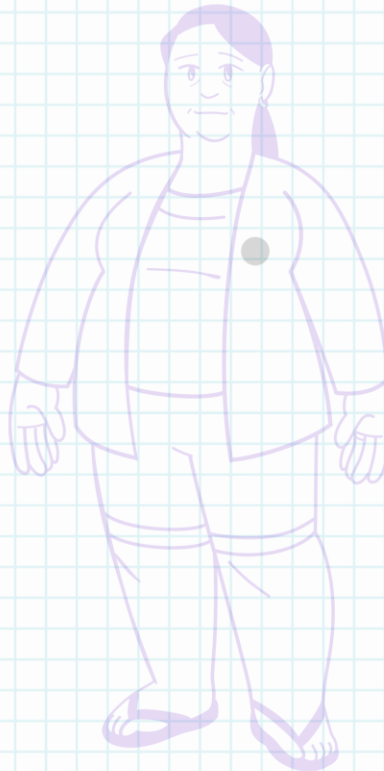




**Random  
Mutations**



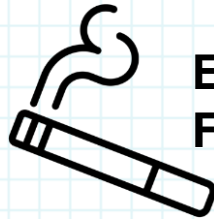
**Environmental  
Factors**



# Sporadic Cancer



**Random  
Mutations**



**Environmental  
Factors**



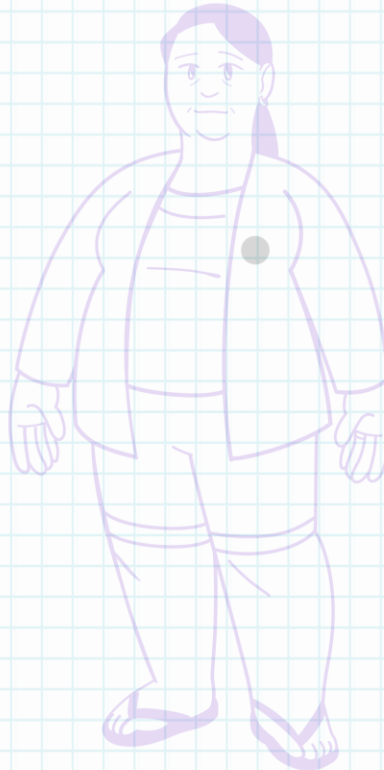
# Sporadic Cancer



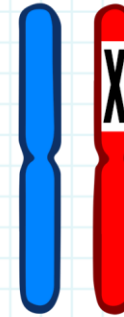
Random Mutations



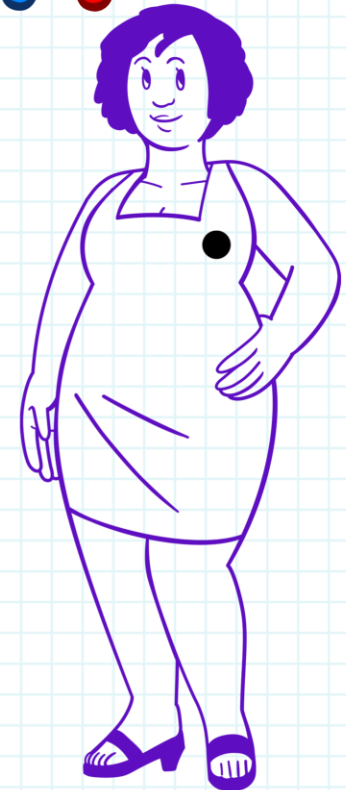
Environmental Factors

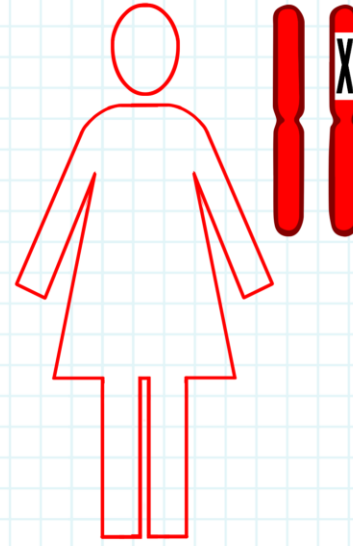
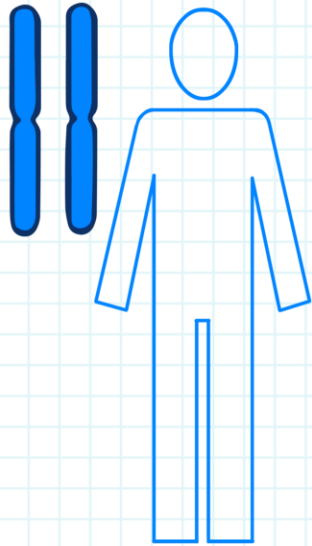


# Hereditary Cancer



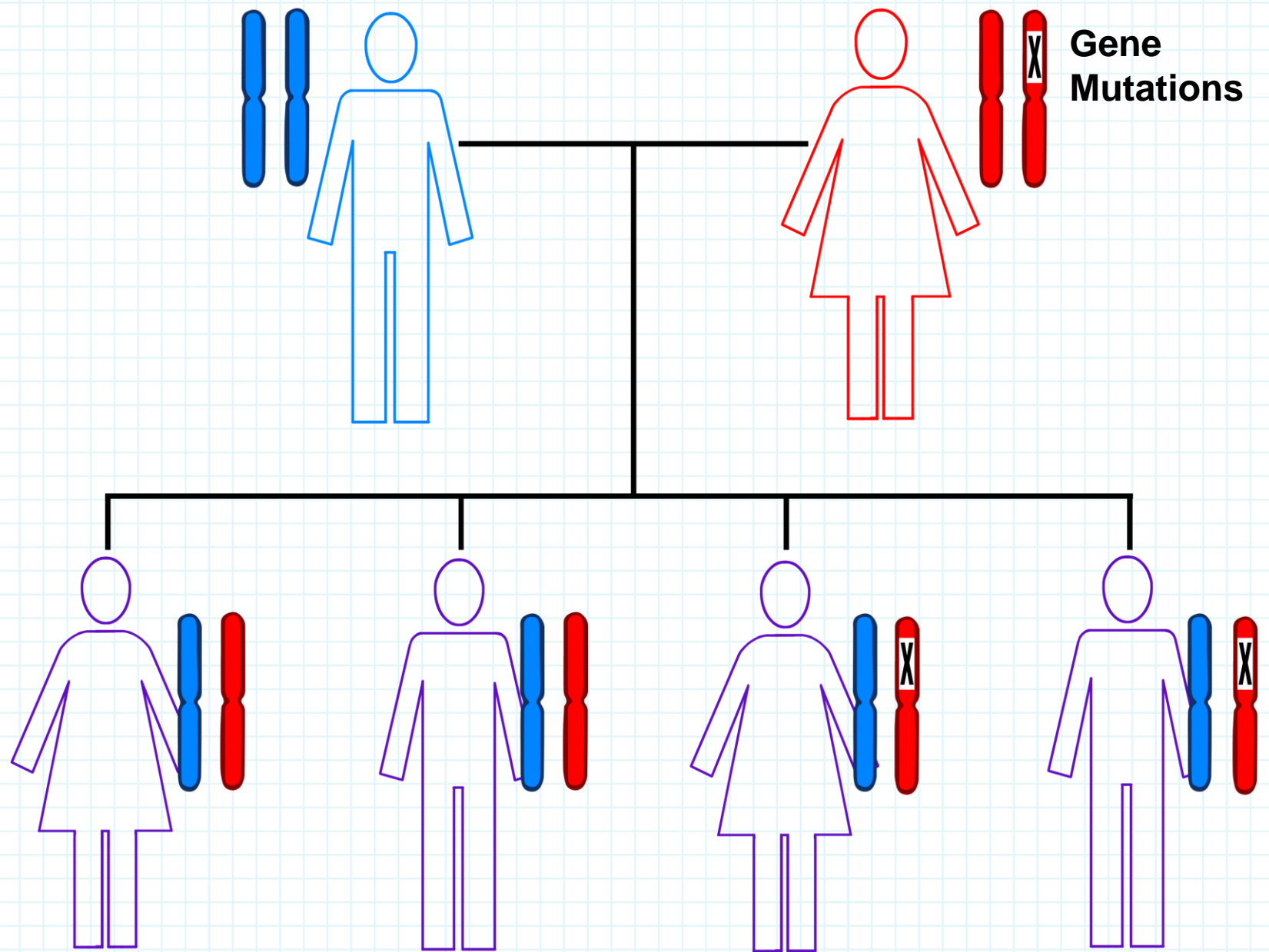
Gene Mutations

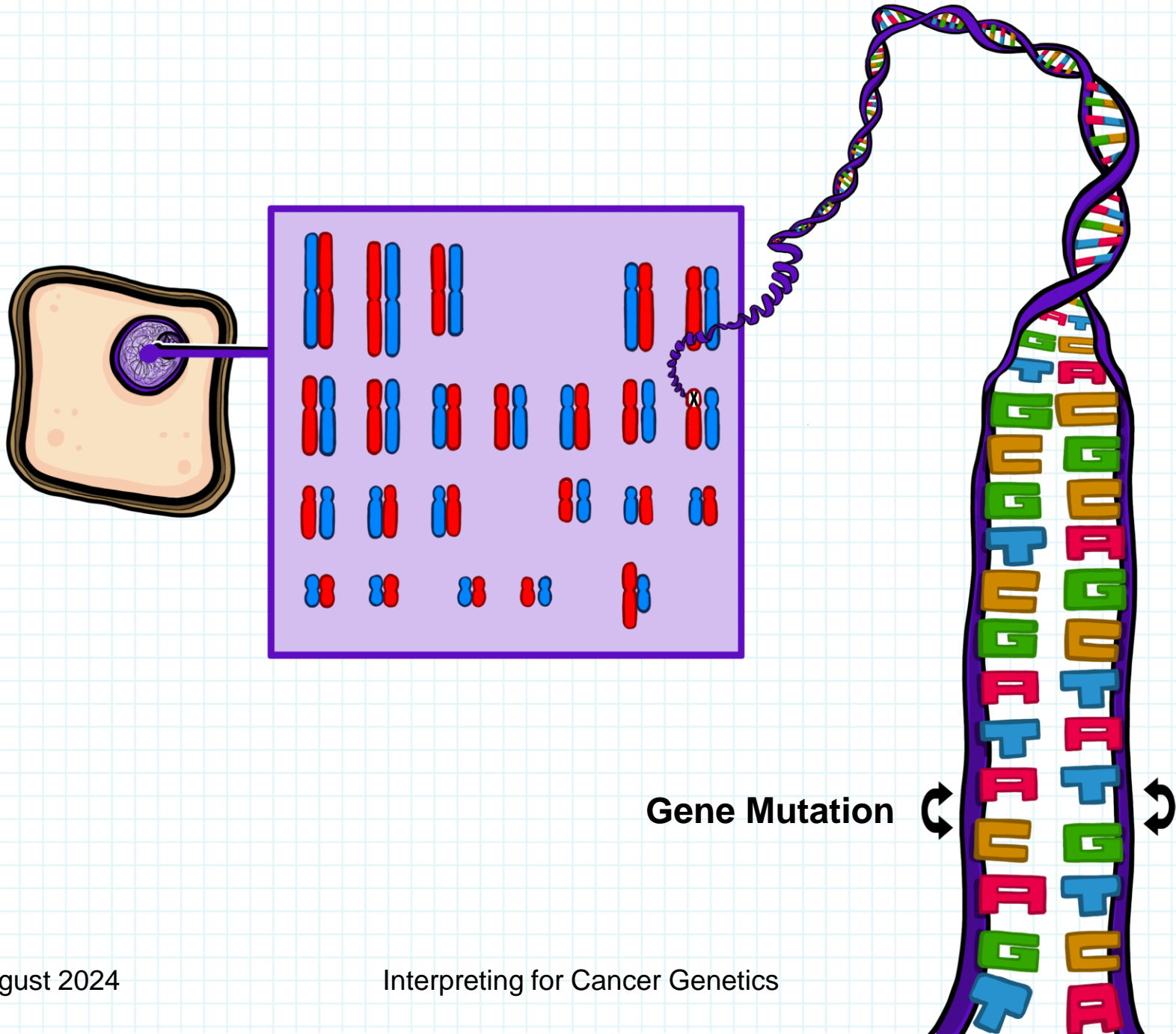




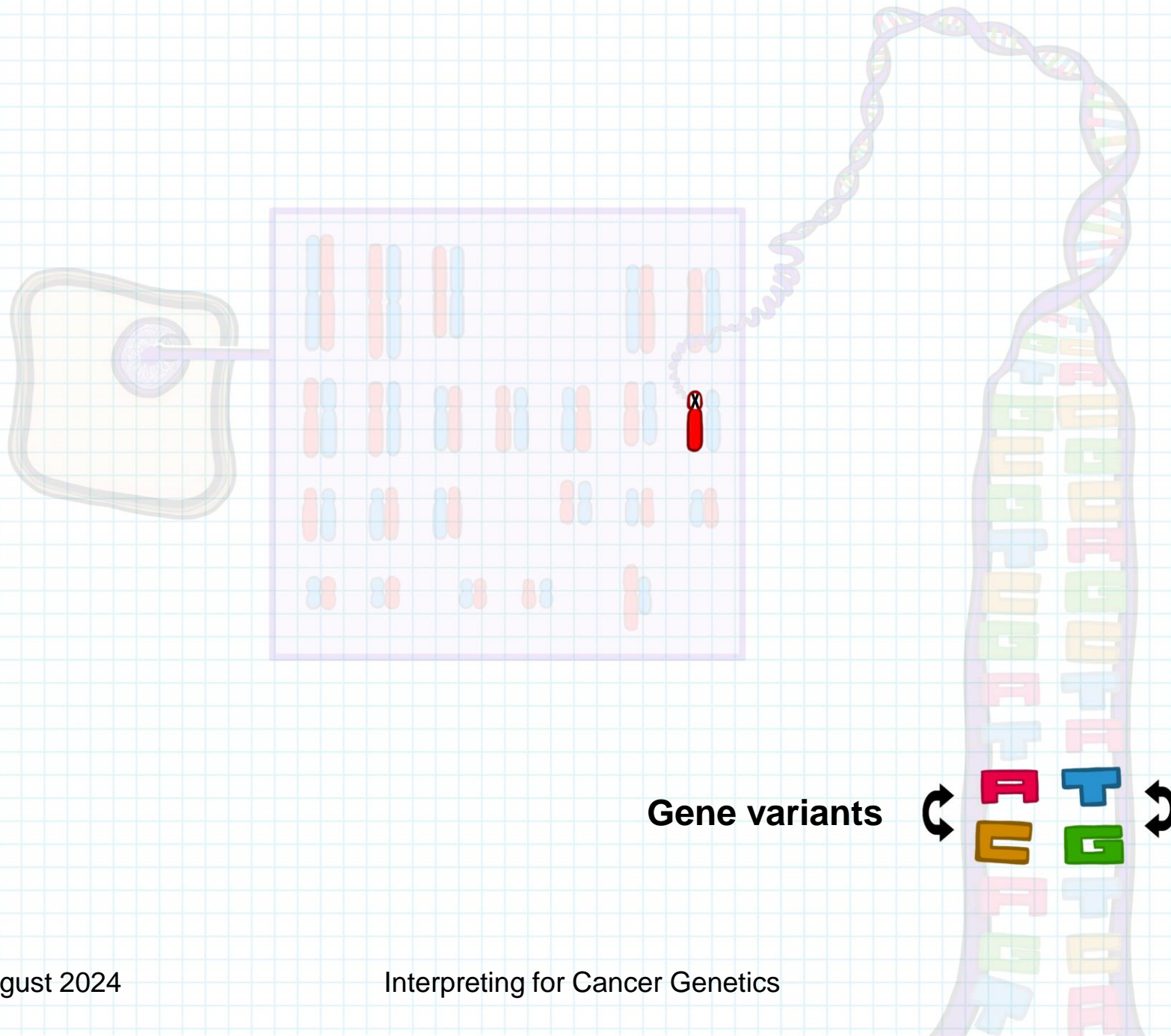
**Gene  
Mutations**

**Gene Mutations**

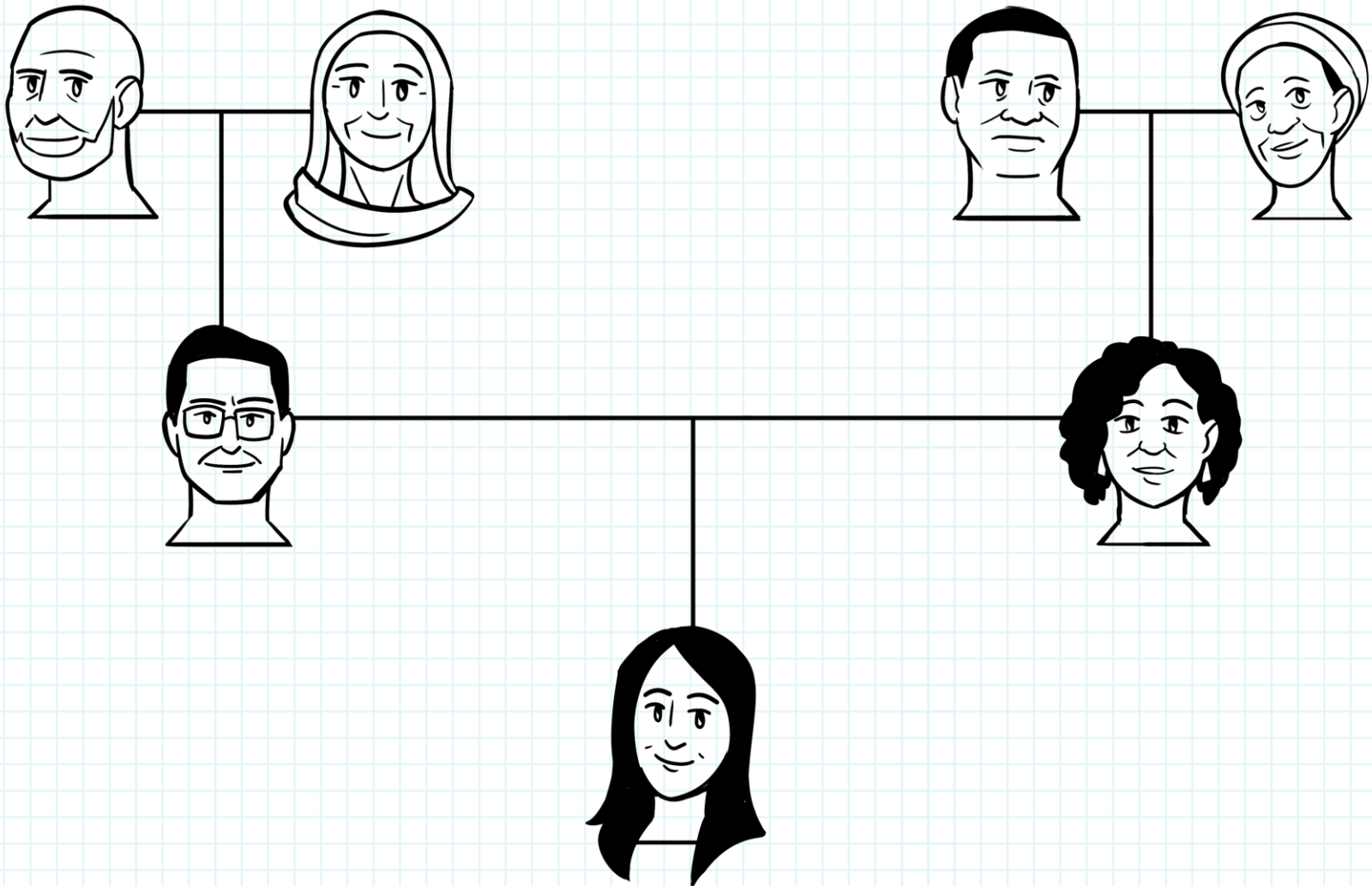




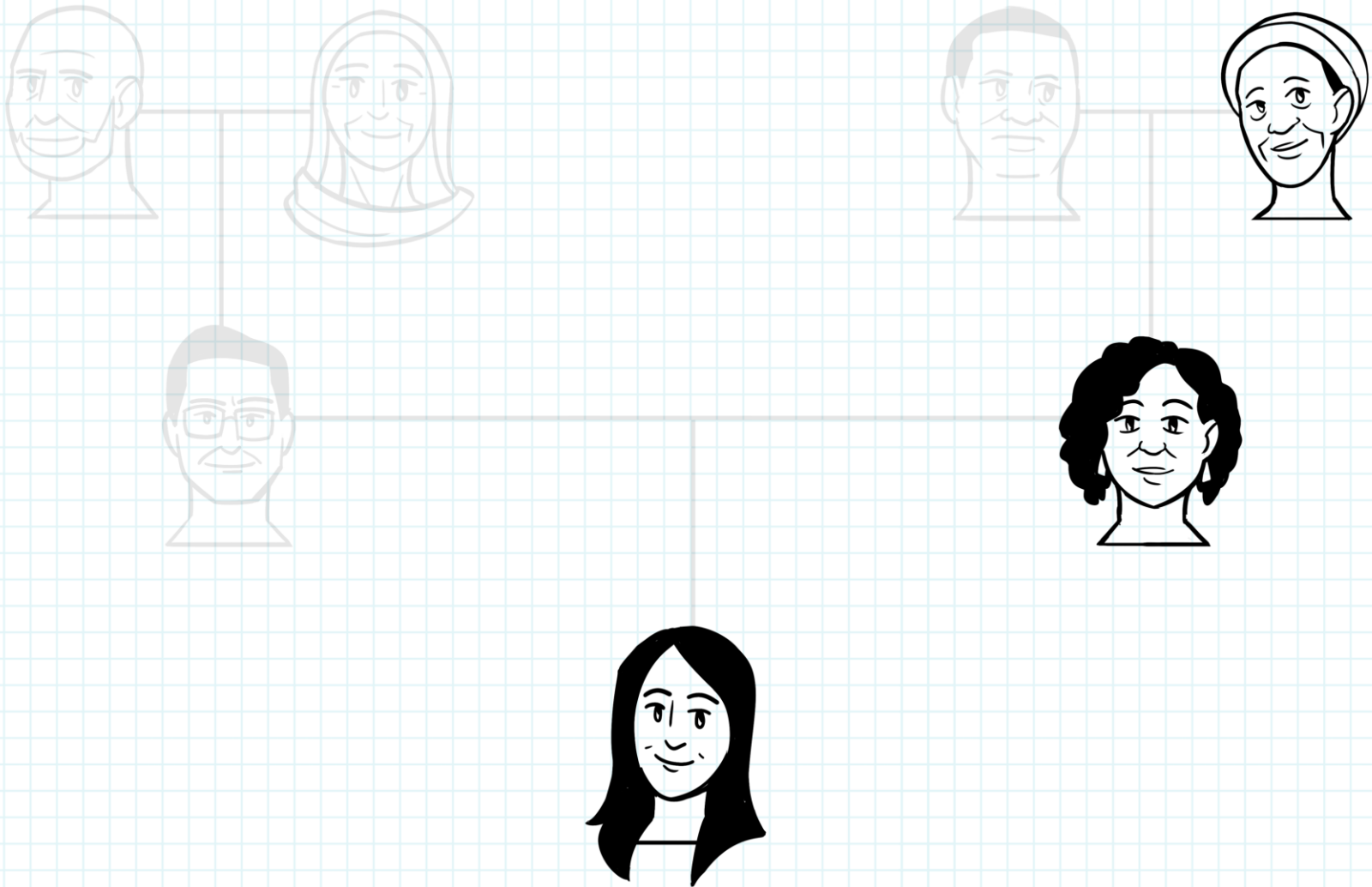




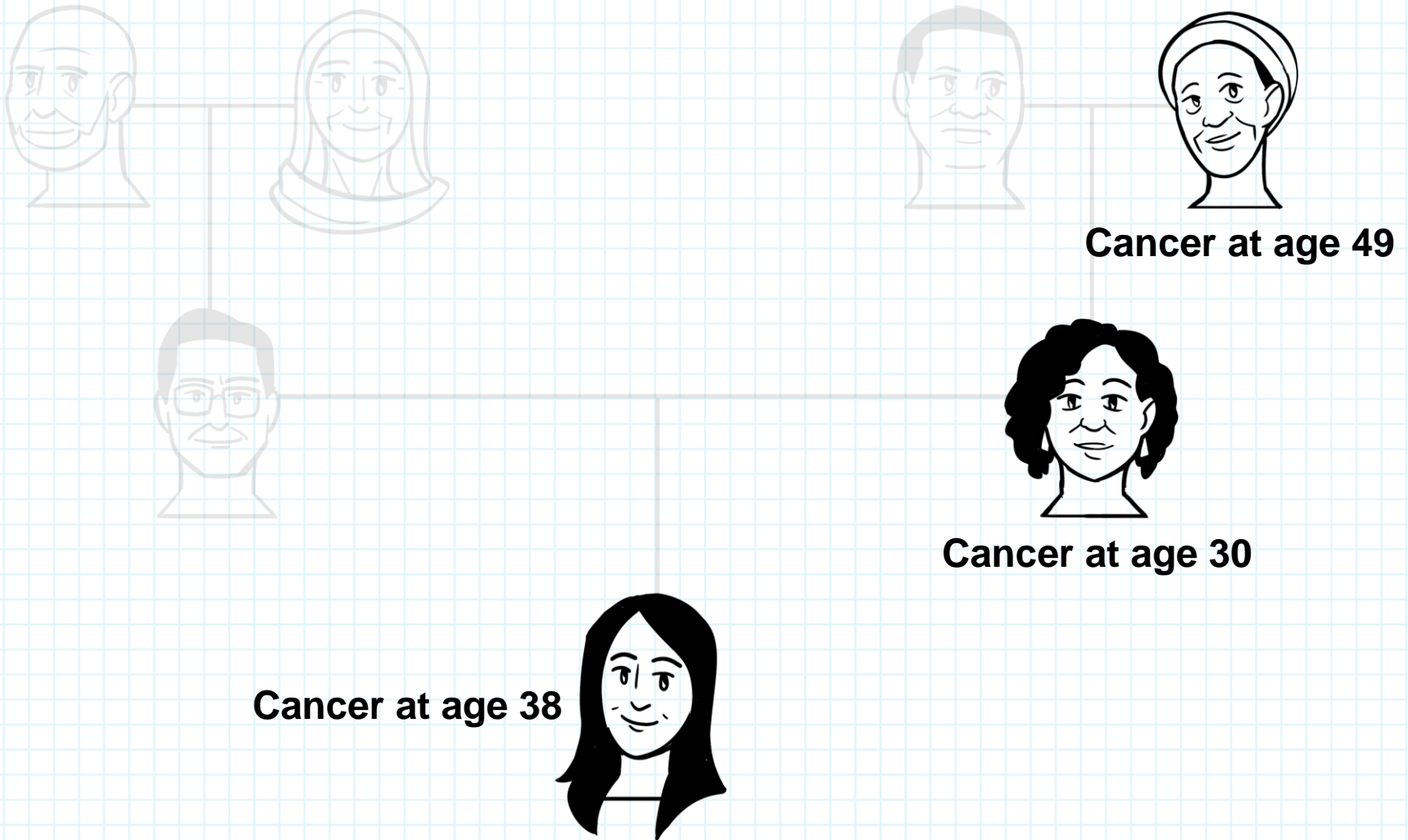
# Hereditary Cancer



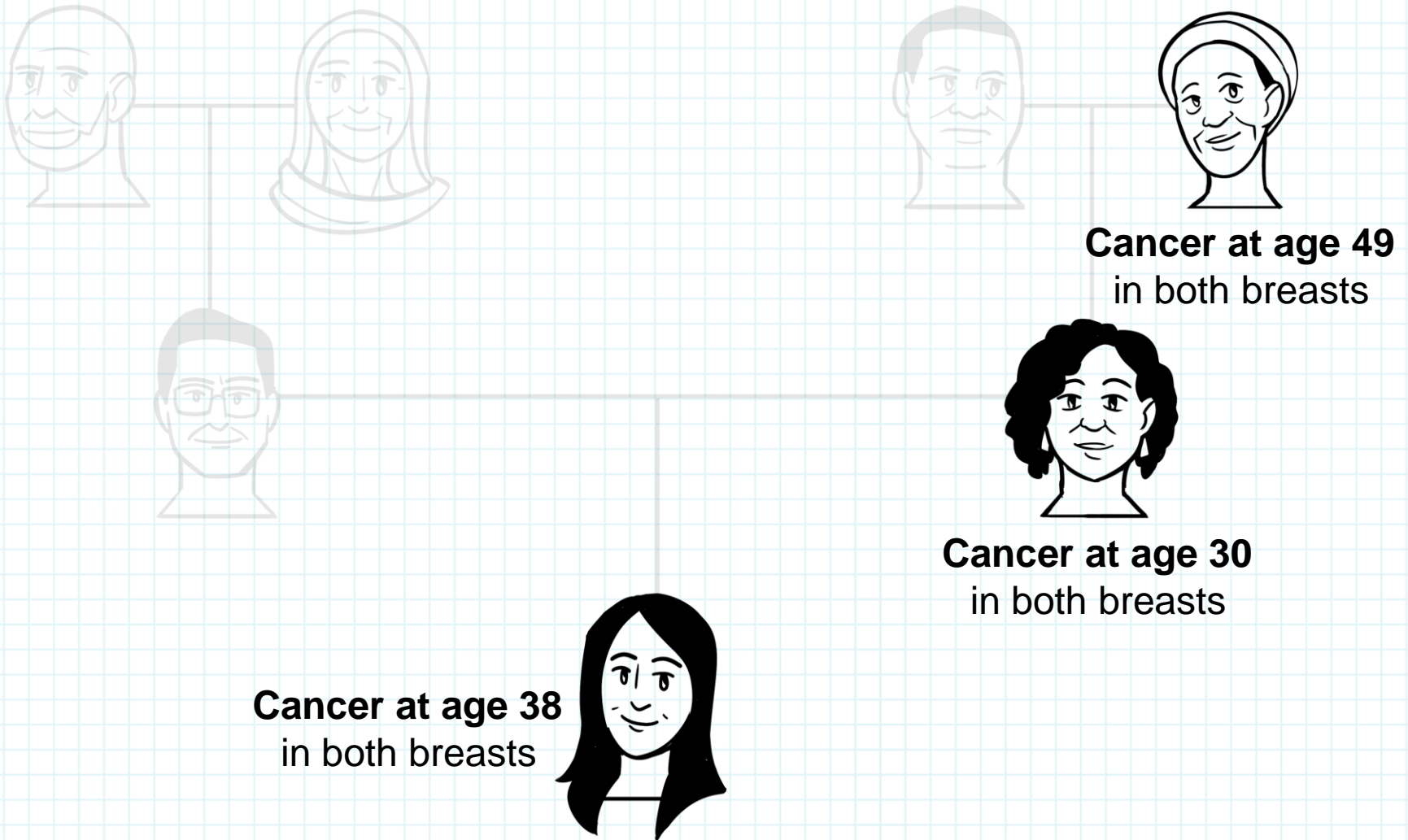
# Hereditary Cancer



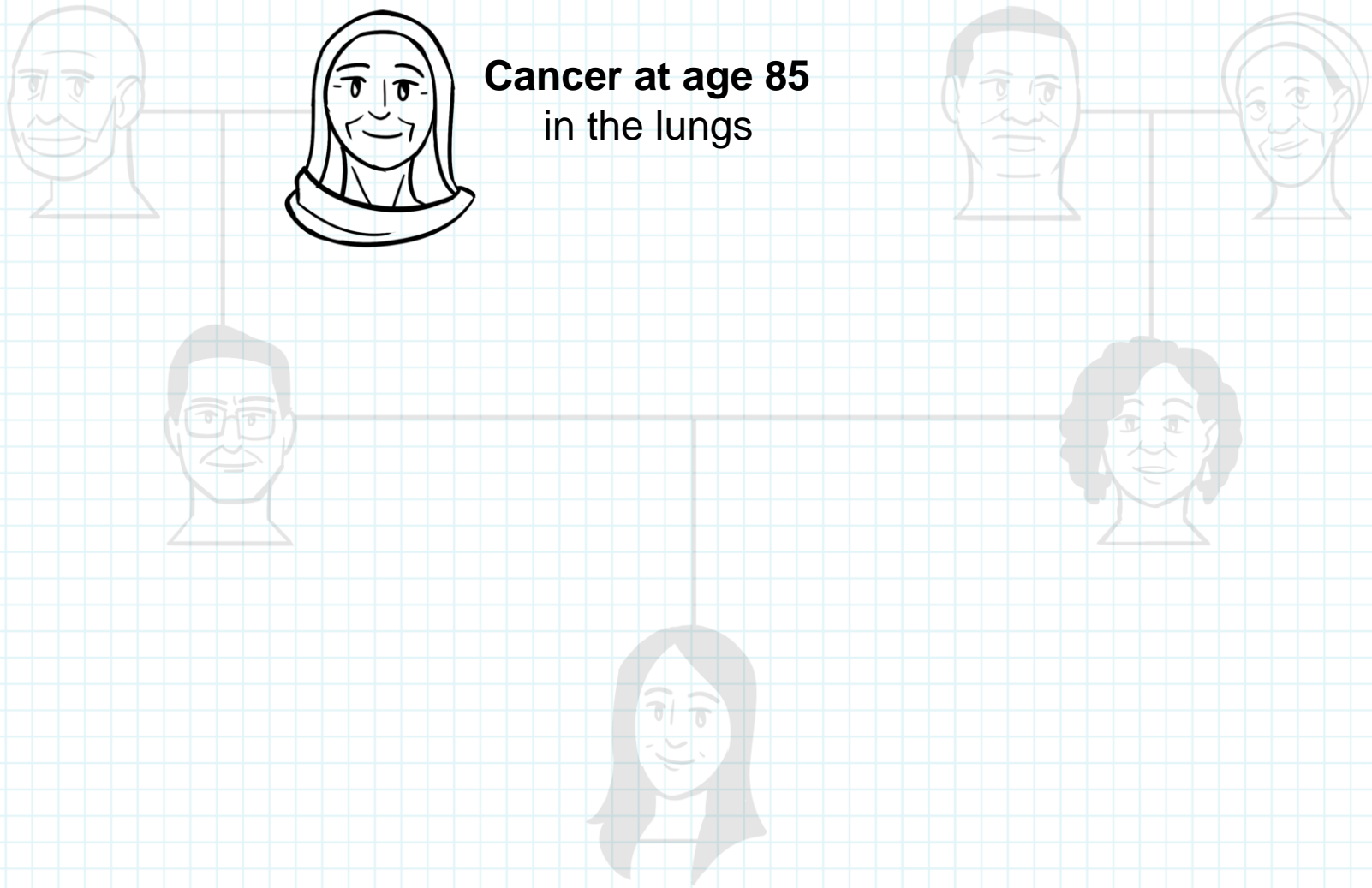
# Hereditary Cancer



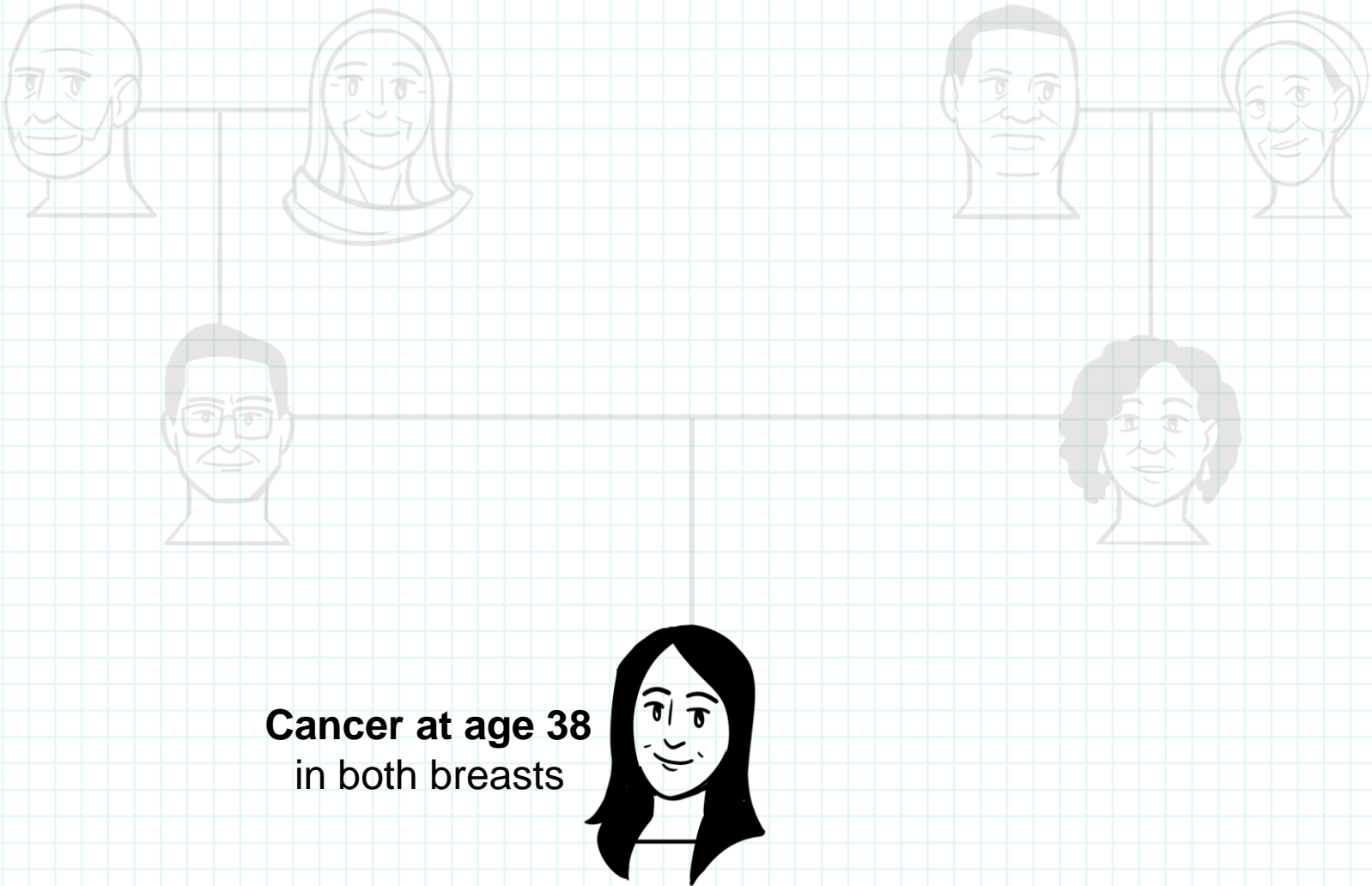
# Hereditary Cancer

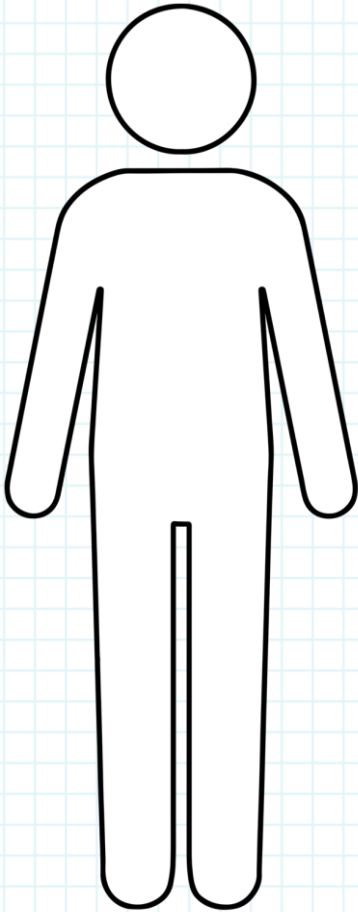


# Hereditary Cancer



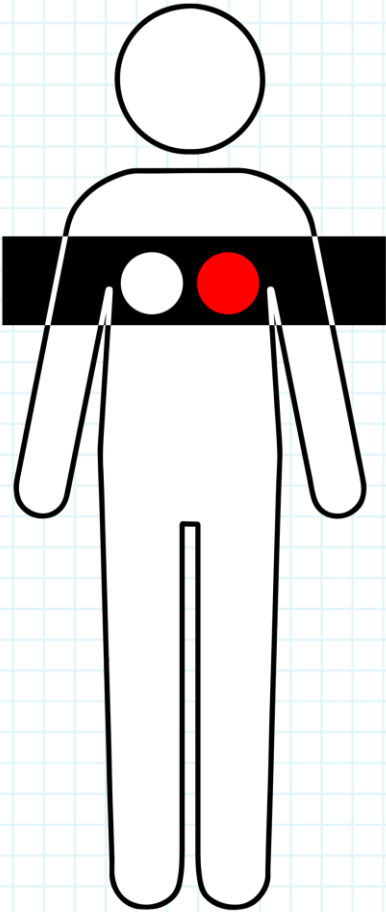
# Hereditary Cancer



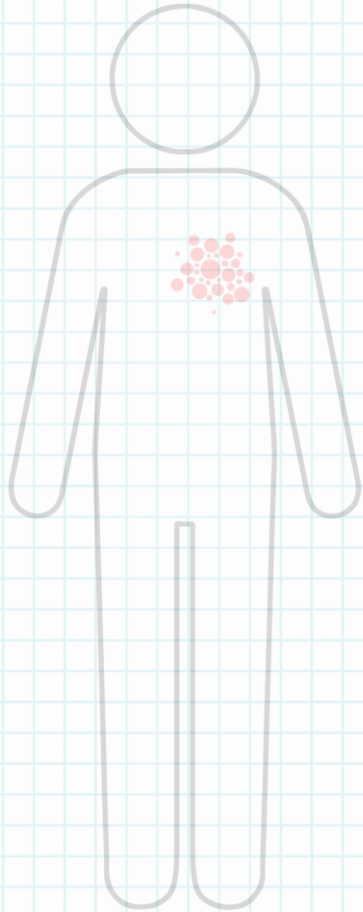




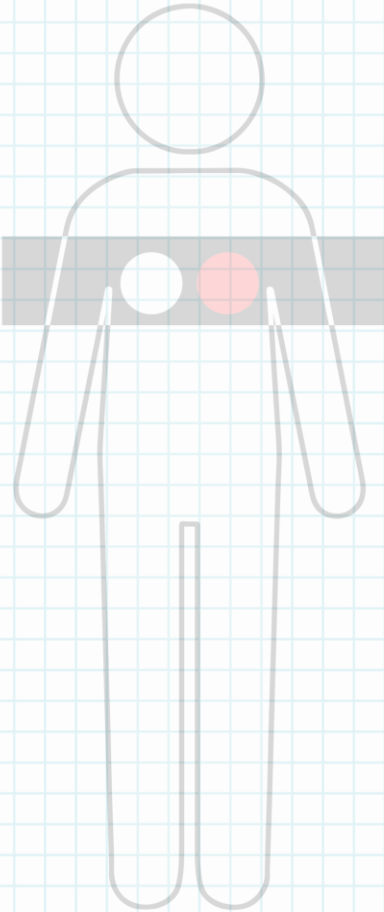
# Surveillance



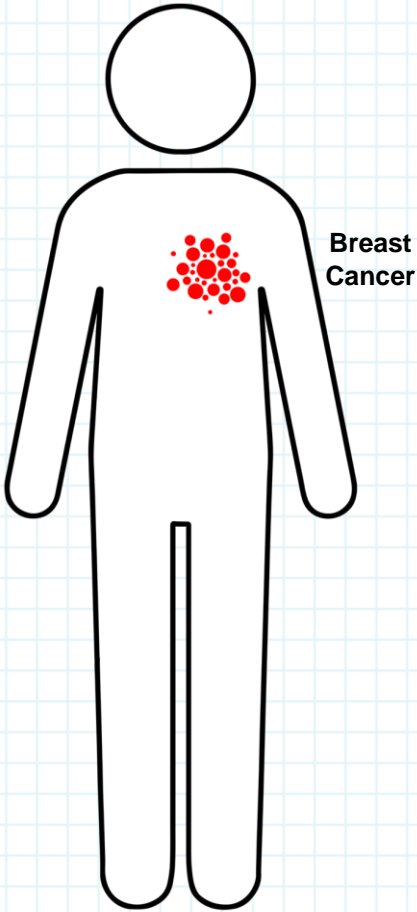
# Primary Cancer



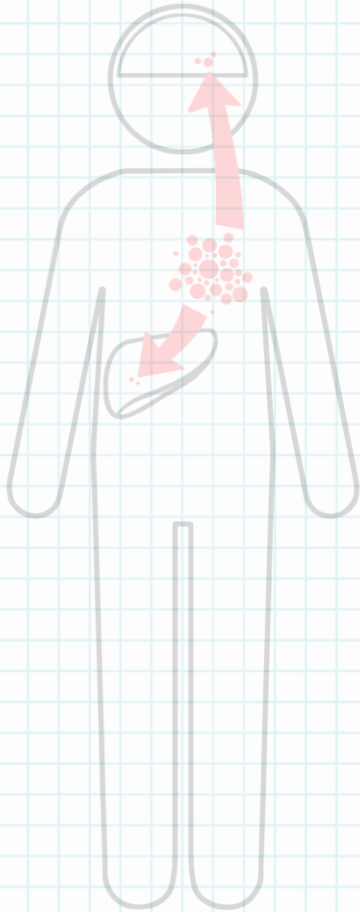
# Surveillance



# Primary Cancer



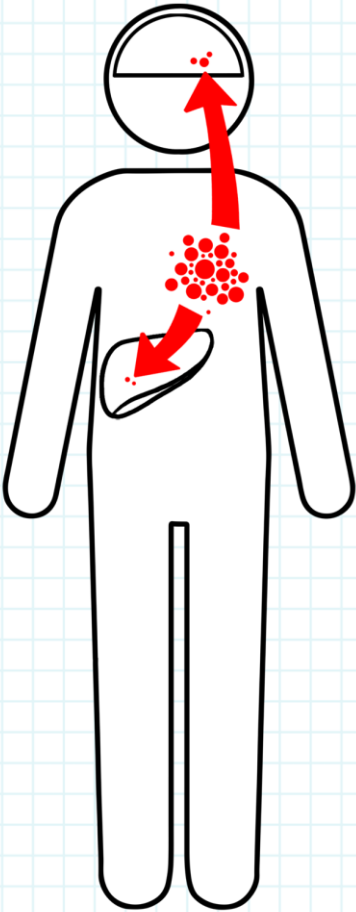
# Metastasis



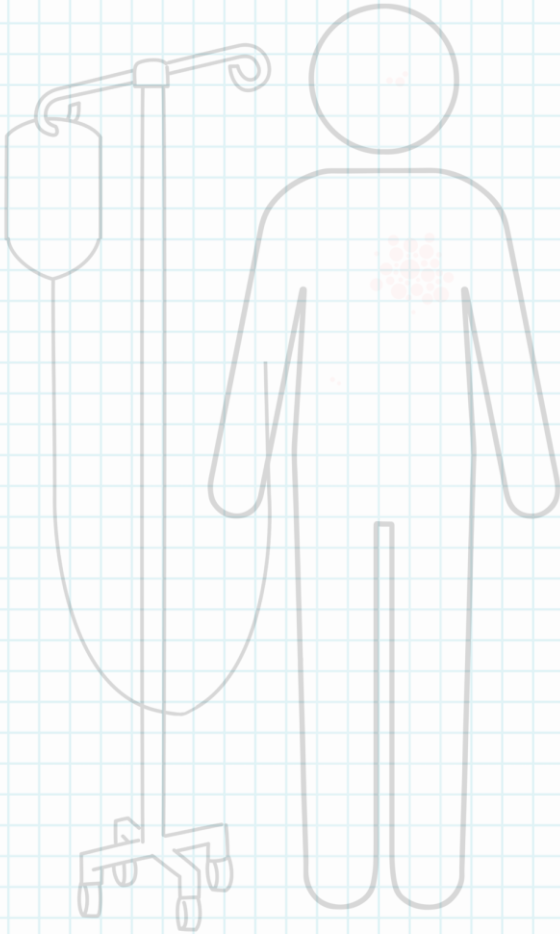
Primary Cancer



Metastasis



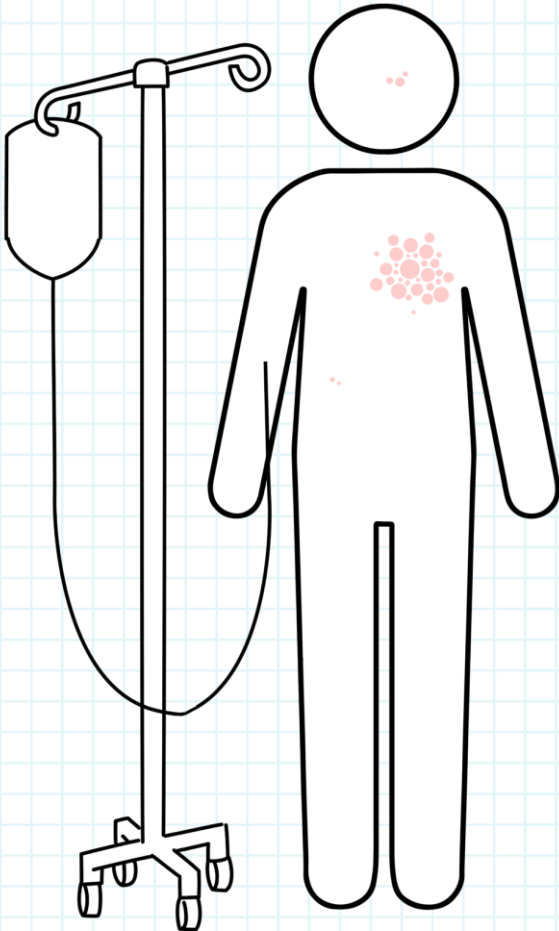
Treatment



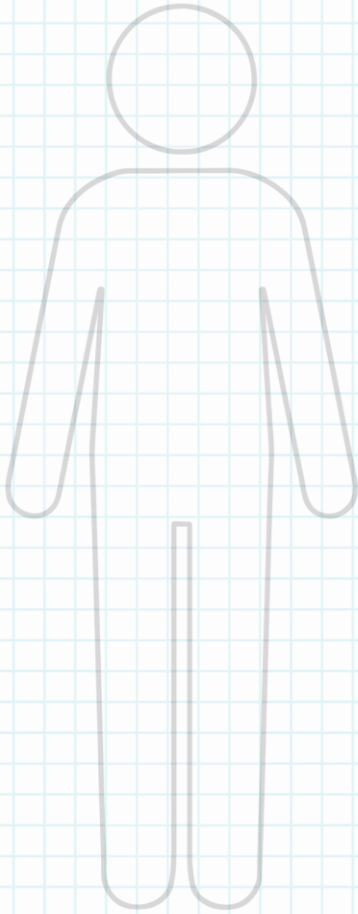
### Metastasis



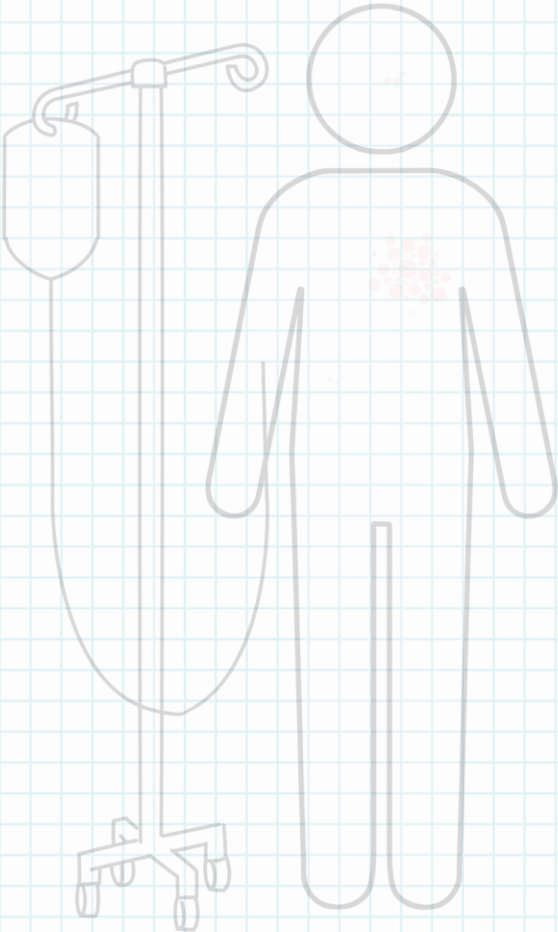
### Treatment



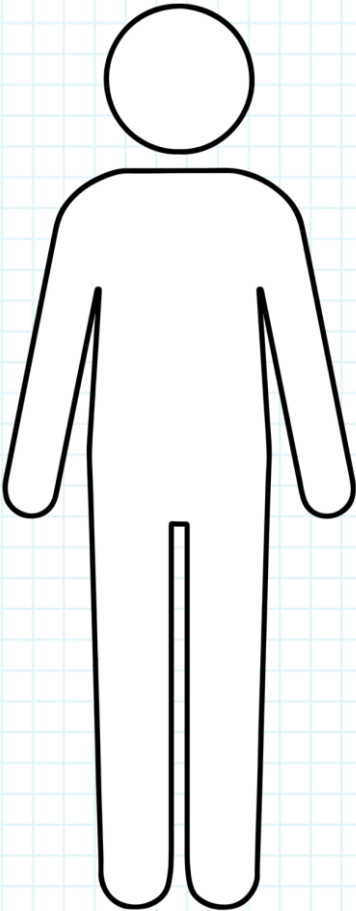
### Remission



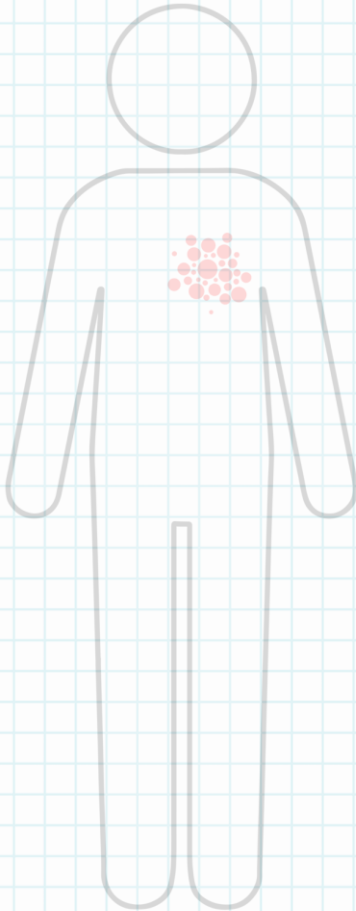
Treatment



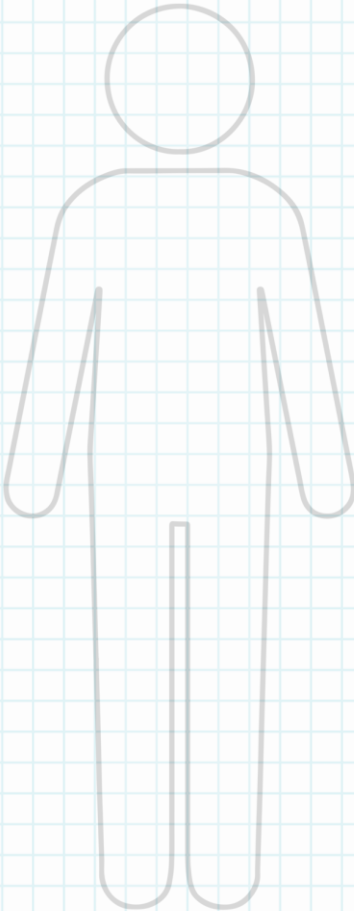
Remission



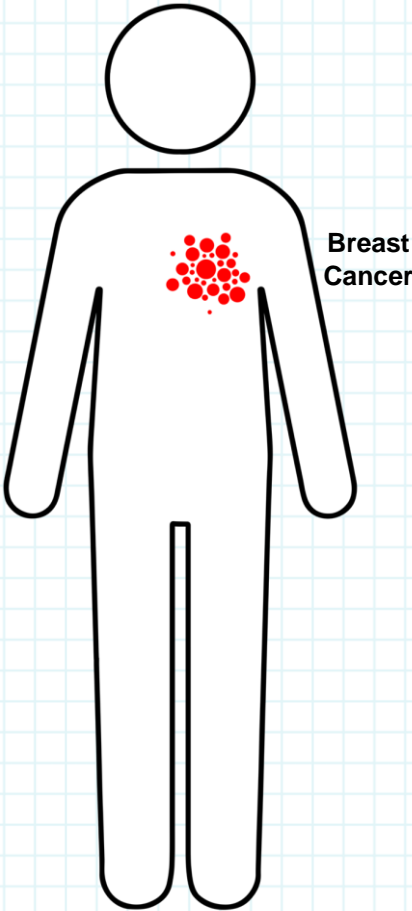
Recurrence



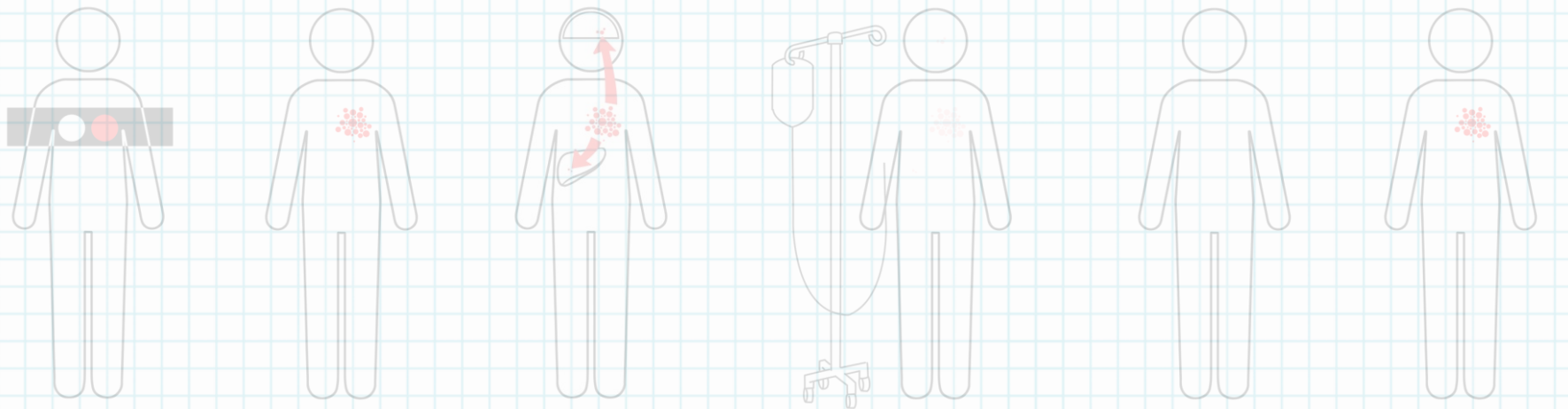
# Remission



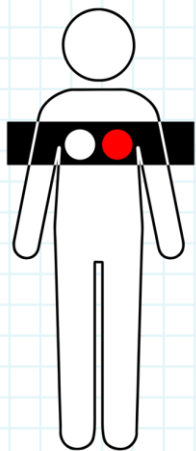
# Recurrence



# Important moments in cancer care



## Surveillance



## Primary Cancer

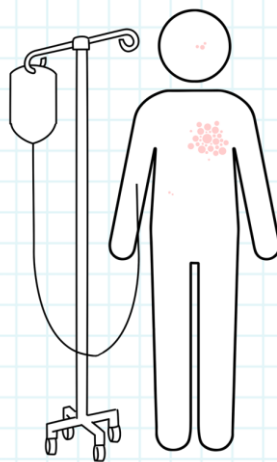


Breast Cancer

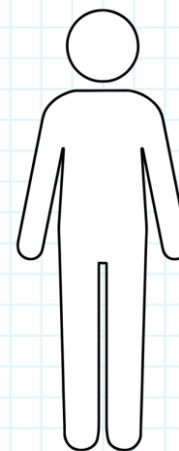
## Metastasis



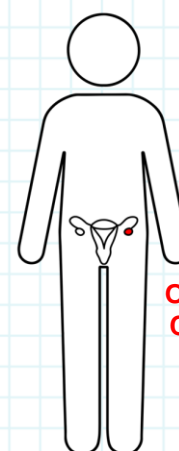
## Treatment



## Remission



## Second Primary Cancer



Ovarian Cancer

# Quiz!

- What is cancer?
- What is the difference between sporadic cancer and hereditary cancer?
- Which is more common?
- What are three red flags that suggest a person might have the gene for hereditary cancer?