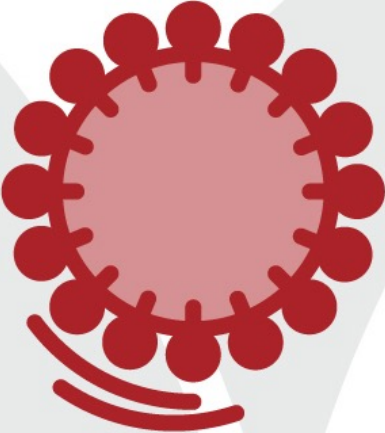




THE JACKSON LABORATORY

OPENHOUSE



Today's cancer genetics workshop

- **Introduction**
 - Cancer research
 - Genetics & personalized medicine
 - Our melanoma research project
- **Research Labs:** Join a Cancer Research Team and complete various research tasks
- **Conclusion:** Put together each Research Team's findings and discuss the overall study results



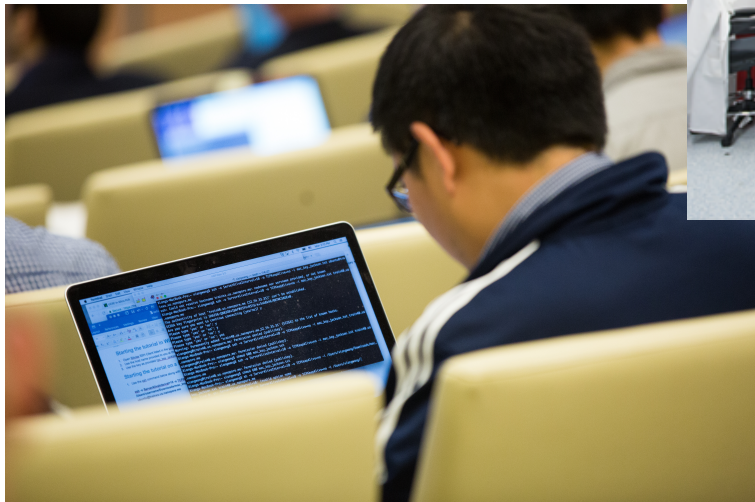
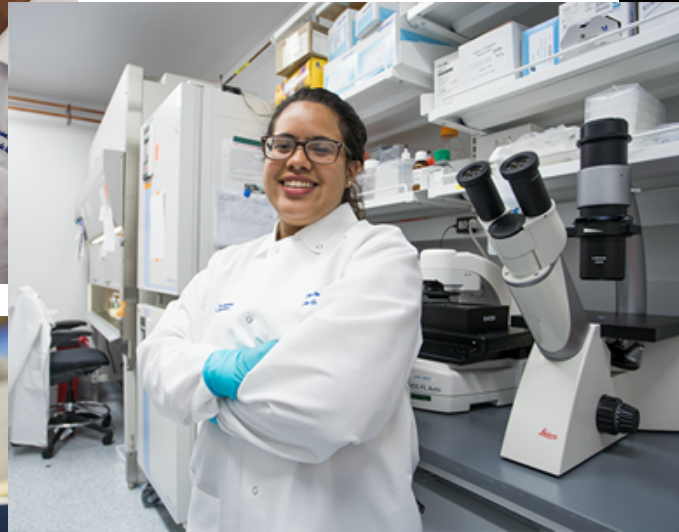
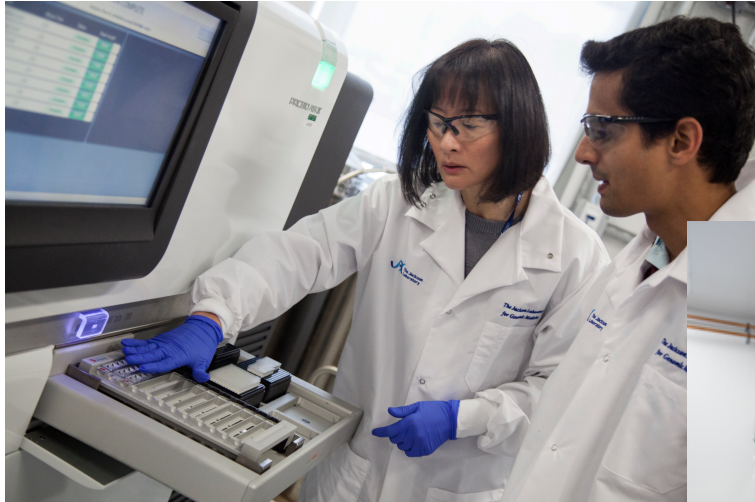
The Jackson Laboratory is an independent, nonprofit biomedical research institution with a mission to discover precise genomic solutions for disease and empower the global biomedical community in the shared quest to improve human health.

Learn more about JAX Genomic Education at www.jax.org/stem





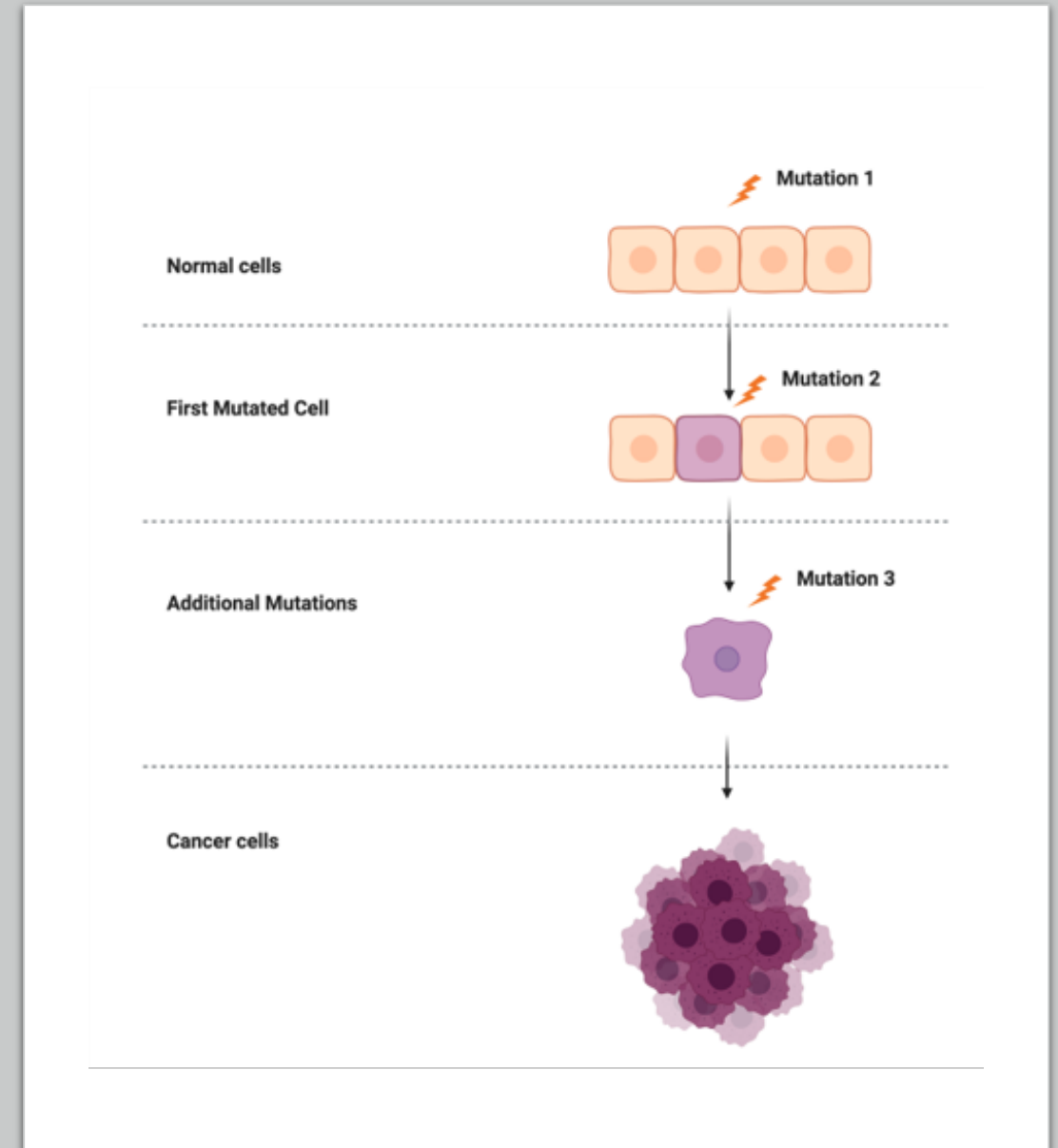
The Jackson Laboratory



What is cancer?

Cancer is a process that occurs over time

- Cancer is a disease that arises when cells grow out of control
- Mutations in certain genes can drive this overgrowth
- What are mutations?
 - DNA changes or variants
 - Inherited or spontaneous
 - Can lead to natural variation in phenotypes, or disease

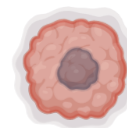


Complexity of cancer

- Cancer is one word used to describe many different diseases
- Different types of cancer means different causes, progression, and treatments
- Even the same cancer type can look different in different people



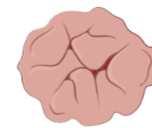
Melanoma



Glioblastoma



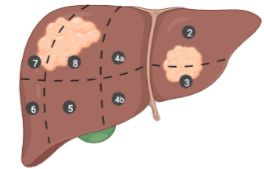
Round tumor



Round tumor
(cross-section)



Round tumor
(necrosis)



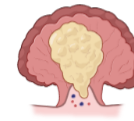
Liver cancer



Lung cancer



Colon cancer



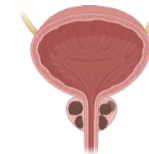
Colon cancer
(carcinoma)



Kidney
cancer



Breast cancer

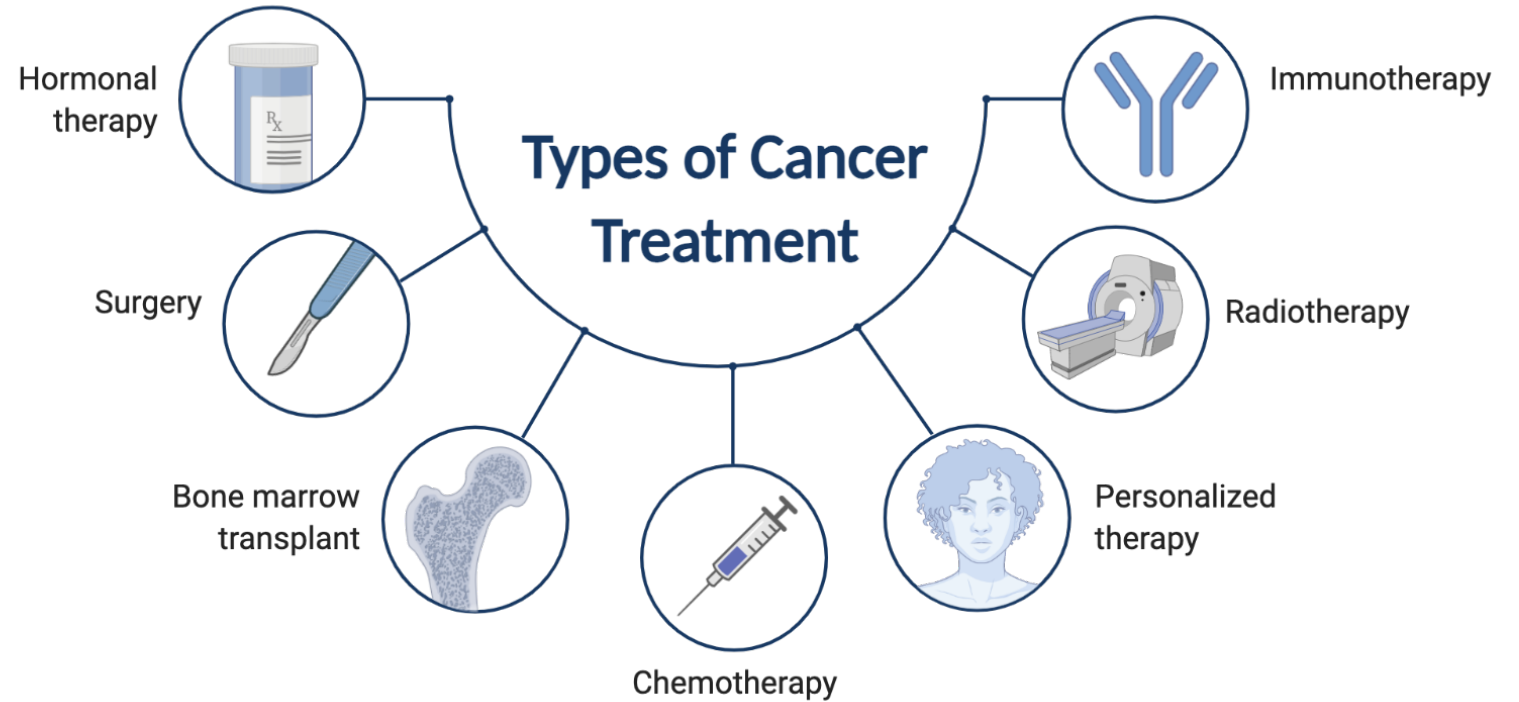


Prostate
cancer



Endometrial
cancer

Advances in cancer treatments

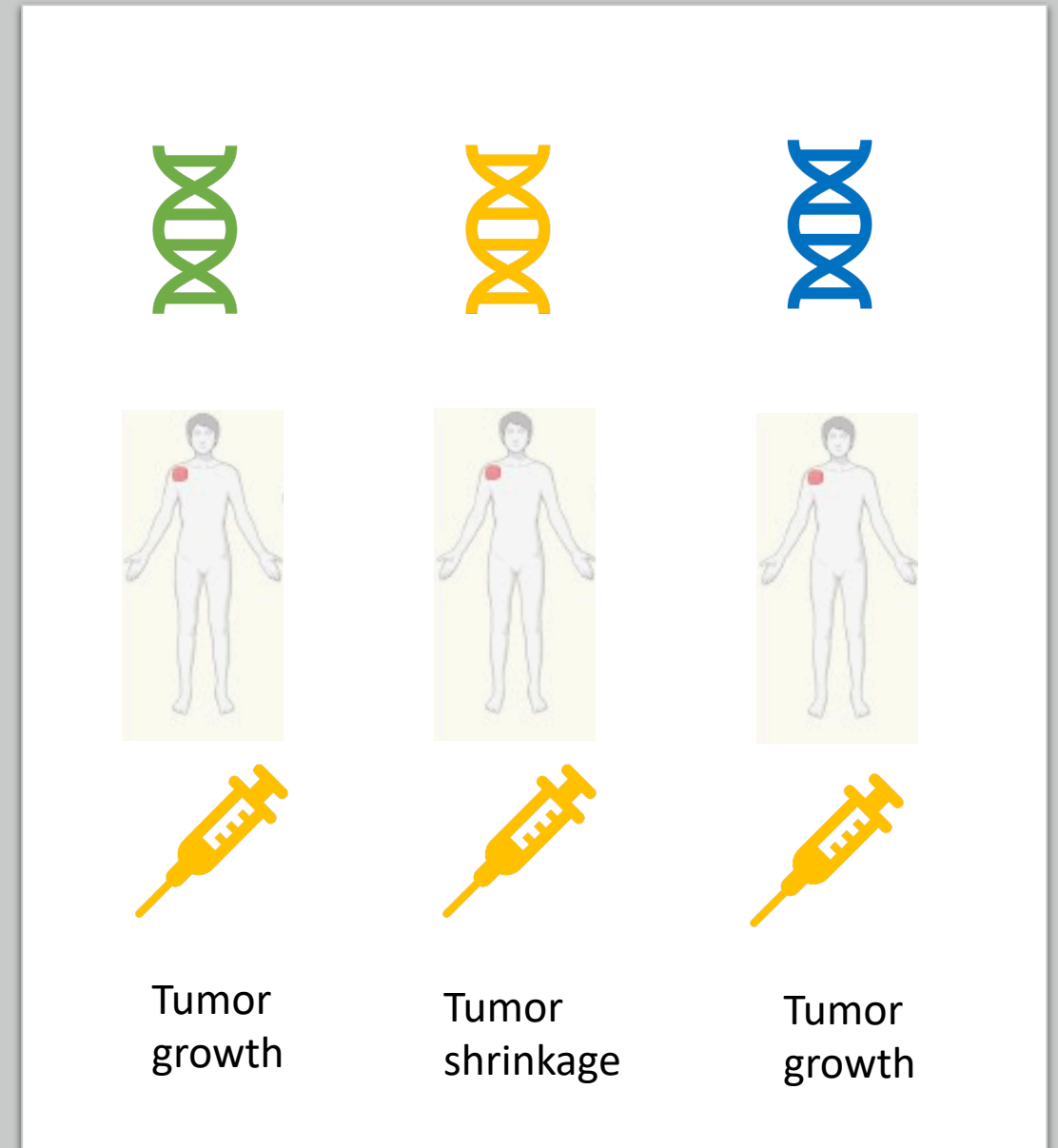


Personalized medicine uses an individual's genetic profile to guide disease prevention, diagnosis, and treatment

National Human Genome Research Institute

Untargeted therapies can lead to ineffective results

- Cancer patients with the same cancer type receiving the same treatment can exhibit very different results
- Individuals have unique genetics that influence response to treatment



Personalized medicine uses genetics to target effective treatments

- Profiling the genetics of the patient and their cancer leads to personalized treatment
- Custom treatment options may be needed for each unique genetic profile



Tumor shrinkage

Tumor shrinkage

Tumor shrinkage

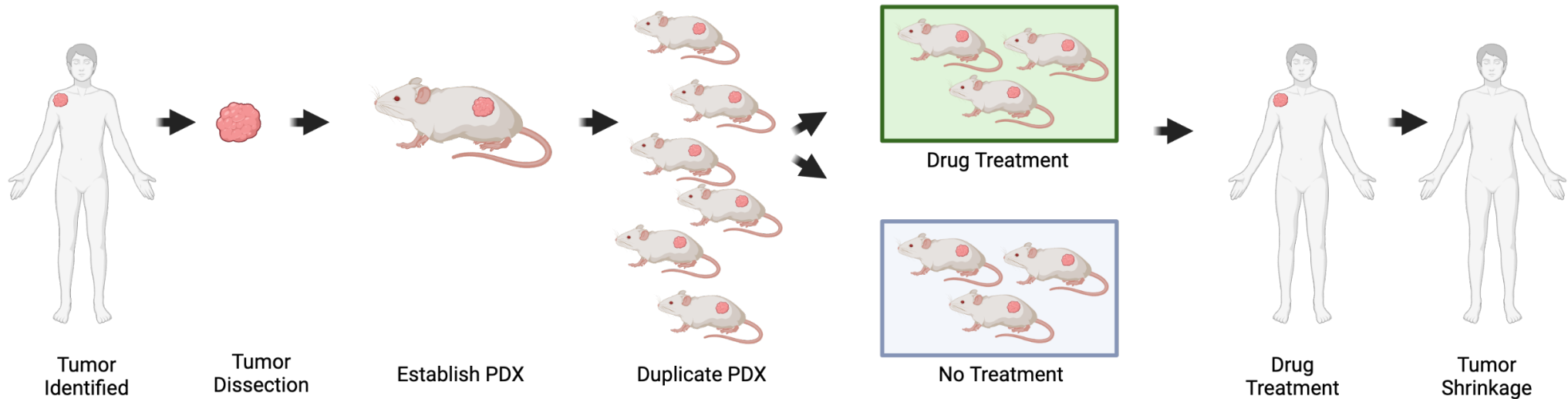
How are personalized medicines developed and tested?

How do research teams work together to study and treat cancer?

You will find out!

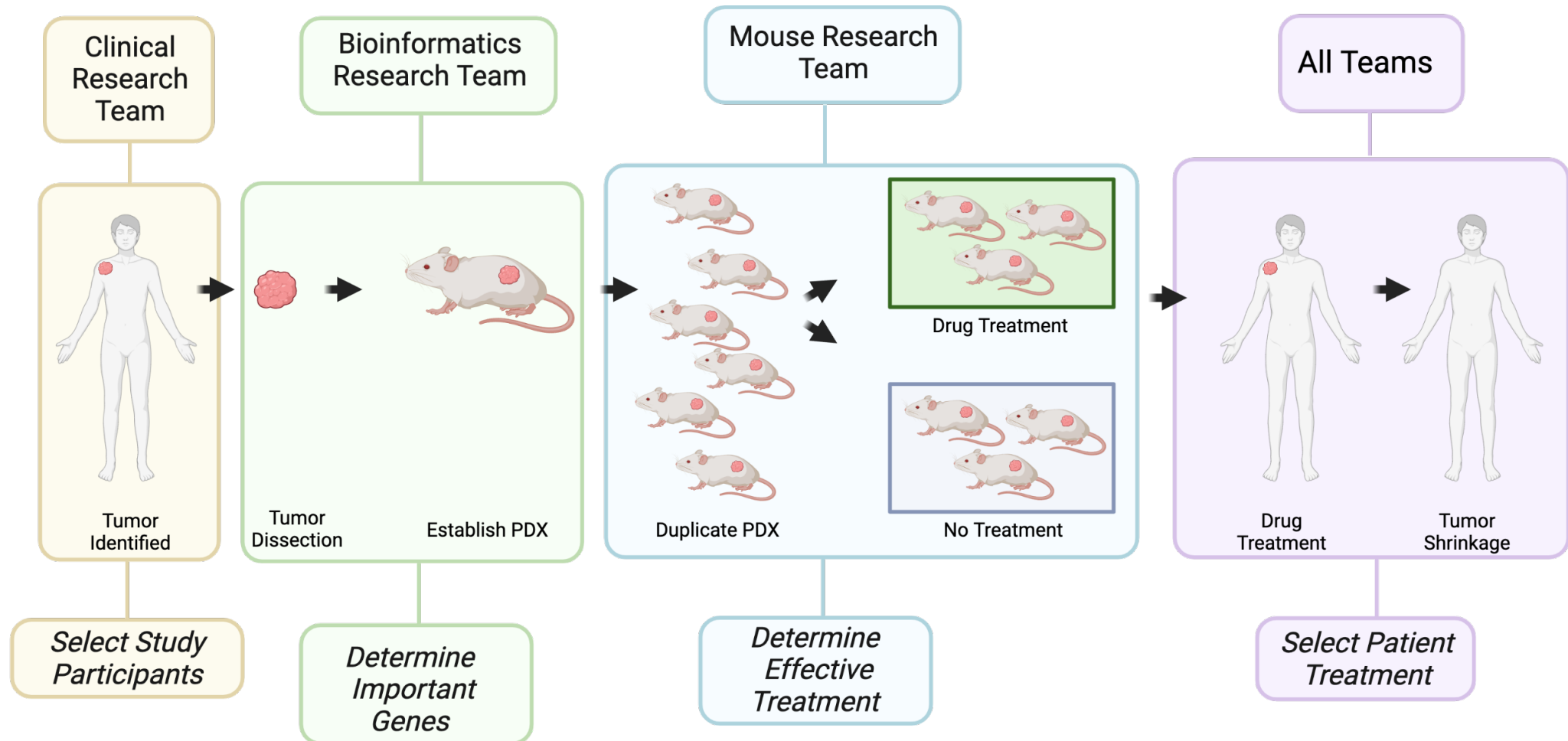
Using patient-derived xenograft (PDX) mouse models to target personalized treatments

Human tumors can be placed into laboratory mice to aid in the study of cancers and the discovery of effective, personalized treatments.



Join a Research Team

In this activity, you will join a research team to study human melanoma cancer, uncover tumor genetics, and test treatments in patient-derived xenograft (PDX) mouse models



Ready... Set... Research!

- **Now:** Join a Research Team to complete your research tasks.
 - If you're working in a group, split evenly into the 3 research labs.
 - If you're working solo, complete the activity for each research lab.
- **Later:** Discuss each Research Team's findings and the overall study conclusions.