What we learned Yesterday

- Heard from successful patient advocates about their involvement in patient advocacy.

- Learned about how the FDA decides whether to approve drugs and devices.

- Discussed how important patient views and engagement is to the research process.

Goals for Today

- Training and discussion sessions

  - Become more confident in your understanding of clinical trials and some basic statistical concepts that are used.

  - Learn and practice advocating at federal agencies such as FDA or NIH

RESEARCH 101: CLINICAL TRIAL DESIGN

Margaret Dayhoff-Brannigan, PhD

National Center for Health Research

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Drug Development Process
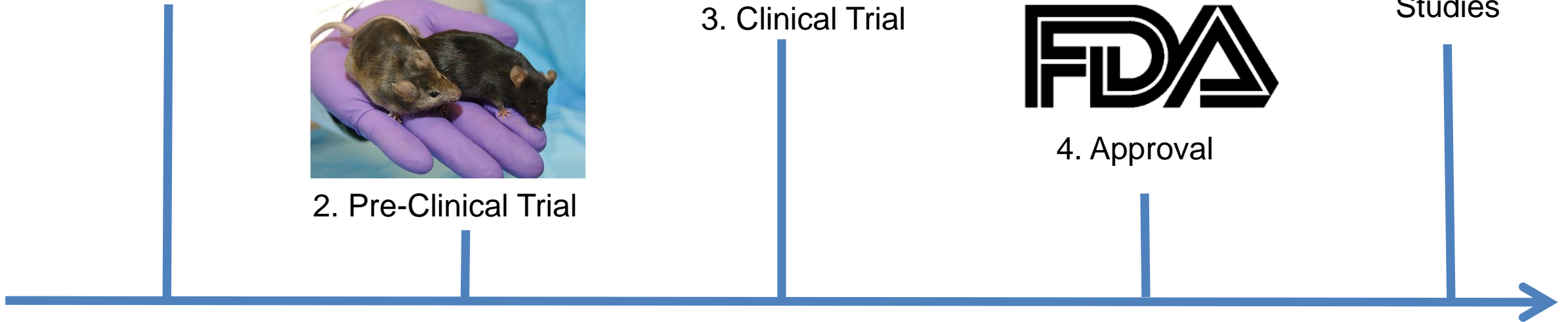

1. Laboratory Studies

2. Pre-Clinical Trial

3. Clinical Trial

4. Approval

Post Market Studies

Standard Drug Approval Criteria

- **Safe** (2 short-term Clinical Trials)

- **Effective** (compared to placebo)

- **Inspected**

How to set up a clinical trial

- Determine patient population and size of trial

- Decide on a control group and type of trial

- Decide on outcomes (endpoints)

Size of trial is affected by what you expect to learn

- If you think the product is very effective, you might choose a smaller number of patients

- If you think the product is modestly effective, you'll need more patients to statistically prove it works

- If you want to make sure it is safe and effective for different types of patients, you'll need a larger study.

How to set up a clinical trial

- Determine patient population and size of trial

- Decide on a control group and type of trial

- Decide on outcomes (endpoints)

Many different types of clinical trials

Randomized Double Blind Clinical Trial

- **Gold Standard**

- **Patients randomly assigned to get drug 1 or drug 2 (or placebo**)

- **Patient doesn't know which drug**

- **Doctor/researcher doesn't know which**

Many different types of clinical trials

Randomized <u>Single</u> Blind Clinical Trial

- **Patients randomly assigned to get drug 1 or drug 2 (or placebo).**

- **Patient doesn't know which drug.**

- **Doctor/researcher DOES know which drug was assigned.**

Many different types of clinical trials

Randomized Controlled Clinical Trial

- **Patients randomly assigned to get drug 1 or drug 2 (or placebo).**

- **Patient and doctor/researcher knows which drug they were assigned.**

Many different types of clinical trials

Controlled Clinical Trial

- **Patients or doctors choose who gets which drug.**

- **Compare patients receiving Drug #1 with patients receiving Drug #2 (or placebo).**

- **2 patient groups are similar or matched on age, sex, diagnosis.**

How to set up a clinical trial

- Determine patient population and size of trial

- Decide on a control group and type of trial

- Decide on outcomes (endpoints)

Outcomes

- Overall Survival
- Biomarkers or Surrogate Endpoints
  - Health outcomes
    - cholesterol levels
    - glucose levels
    - bacteria in a test tube
    - tumor size

What's the Difference?

* A drug can shrink cancer but not help a patient live longer

* Chemo can kill cancer cells and also make a patient's life miserable

* KEY QUESTION:

How sure are you that the biomarker = health?

Did Avastin actually work?

	Chemo + Placebo	Chemo + Avastin
Progression-free Survival	7.8 months	8.8 months
p-value	Highly significant	0.0003

Progression-free survival

Did Avastin actually work?

	Chemo + Placebo	Chemo + Avastin
Overall Survival	31.9 months	30.2 months
p-value	Not significant	0.98

Overall Survival worse with Avastin

Analyzing your data: types of statistics

- Compare percentage of successes or failures
  - Example: How many patients survived 5 years (yes/no)

- Compare scores or numbers
  - Example: Compare cholesterol levels of people who received treatment and people who did not.
  - Example: How many months did the person survive?

P-value tells you if the result is statistically significant

- **P-value** tells us how confident the results are due to the treatment, and not chance.

- P-value of 0.05 or less is **statistically significant.**

- Statistically significant does NOT mean that the difference is large or important. It means it probably didn't happen by chance.

Controlling for factors (variables)

- Does a drug work better than control? Or was one group inherently healthier than the other?

- Must take into consideration patients' BMI, age, smoking status, etc. when comparing treatment groups if there weren't large, random groups.

Clinical Trial Ethics

- How do you test a drug in children?

- What are the appropriate control groups?

- What about drugs or devices that have known risks?