

Background

- **Animal-based drug assay**
 - Preclinical trial gold standard
 - Ethical questions and limitations
 - Economic disadvantages
- **Plant-based drug assay**
 - *Mimosa pudica* thigmonasty
 - Different responses to drug solutions
 - Feasibility of the development of a plant-based drug assay

Research Aims

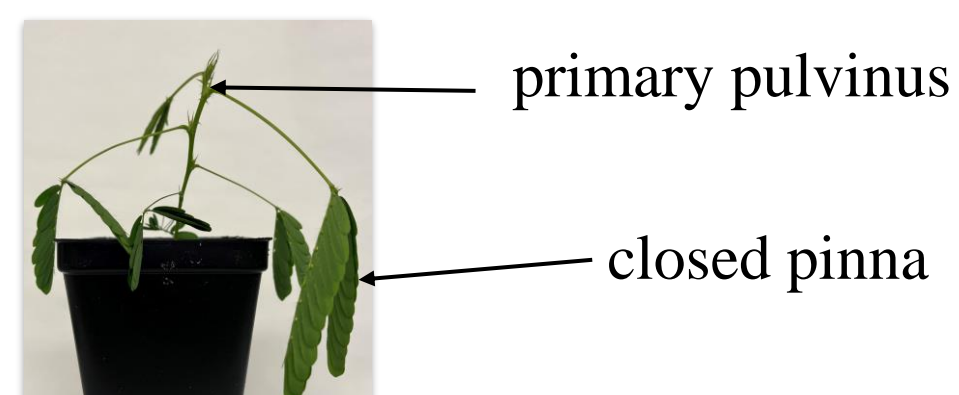
Hypothesis: Thigmonastic movements of *Mimosa pudica* change in response to different drugs

- Grow *Mimosa pudica* plants from seed for experiments
- Standardize and troubleshoot drug testing procedures on plants samples
- Observe and summarize the responses to different drugs or different concentrations

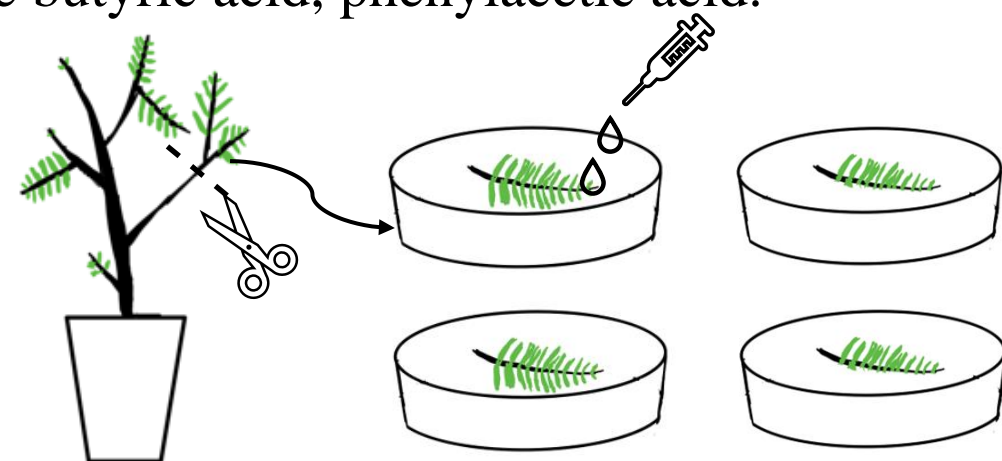
Methods

Finished Procedures

- Plant *Mimosa pudica* from seeds
- Harvested the whole leaf by primary pulvinus, the samples have 4 pinnae and all samples closed after dissection.



- Standardize the drug assay procedures and recordings. Each whole leaf is put in a petri dish filled with drug solution.
- Observe and record the initial response, then every 10-15 minutes until fully recovery. Touch stimulation is introduced by fixed-length monofilament.
- Tested solution and drugs: distilled water, shive solution, lysine, 0.1% DMSO, ibuprofen, ketoprofen, gibberellic acid, indole butyric acid, phenylacetic acid.



Development of a semi-quantitative plant based drug assay using *Mimosa pudica*



Pinnae all closed upon severance



Pinnae recovered overtime

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Results



Thigmonasty
✓ shive
✓ gibberellic acid

Inhibition
✓ Indole butyric acid
✓ ketoprofen



Findings

- Samples in the distilled water lost their thigmonastic response very quickly.
- 0.1% DMSO inhibits thigmonasty of pinna and is not eligible for organic solvent.
- Shive solution maintains thigmonasty in *Mimosa pudica* for over 7 days.
- NSAIDs and plant auxins can form salt with lysine by lyophilization to dissolve in water solvent.
- 1 mmol/L indole butyric acid and ketoprofen inhibits thigmonastic response in *Mimosa pudica*.

Conclusions & Significance

- Establish a protocol of *in vivo* drug test on *Mimosa pudica*
- Represent potential for plant-based drug assay which can replace an animal-based assay

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