Characterizing the Anti-Cancer Efficacy of Rosemary Extract on Human Melanoma Cells

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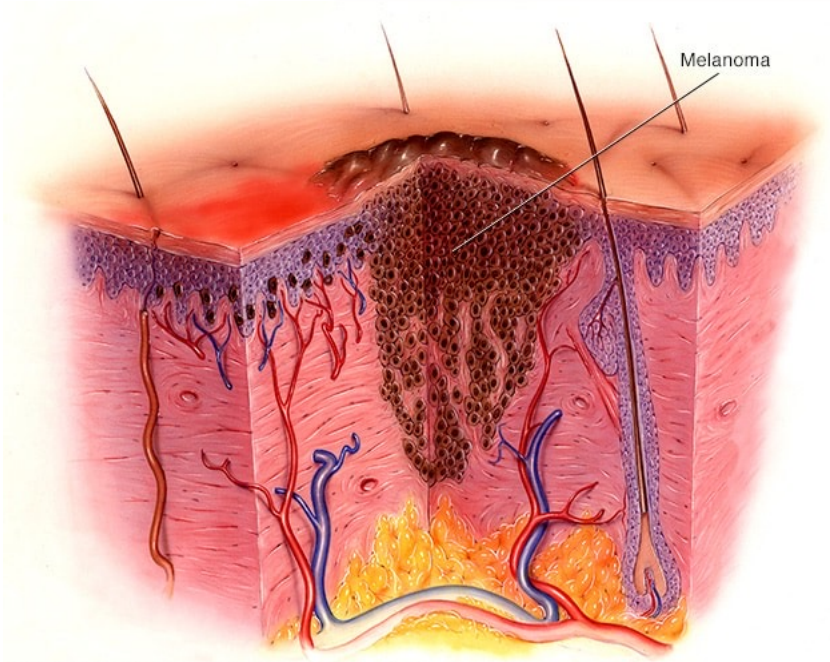
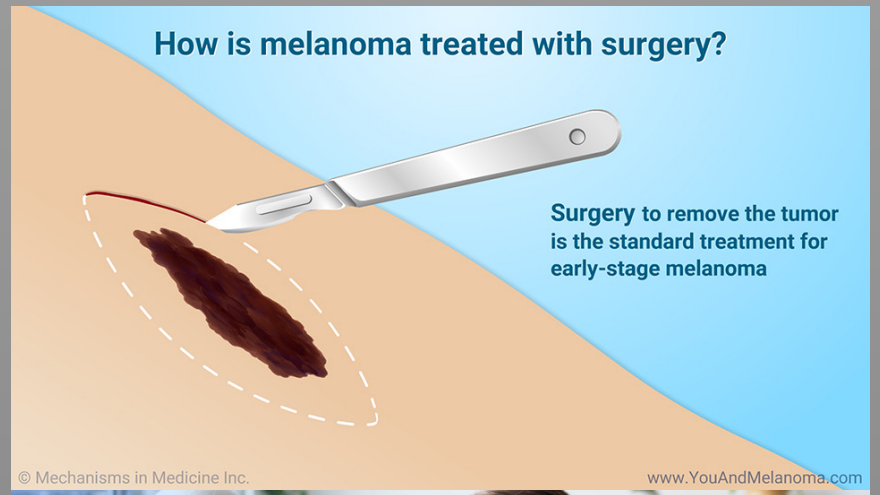
Melanoma

- Deadliest form of skin cancer
- Derived from melanocytes, pigment-producing cells in skin
- UV light exposure causes DNA mutations
- Aggressive growth and rapid metastasis to lymph nodes
- Current Treatments:
  - Surgery
  - Radiation
  - Chemotherapy
  - Immunotherapy



Drawbacks of Current Treatments



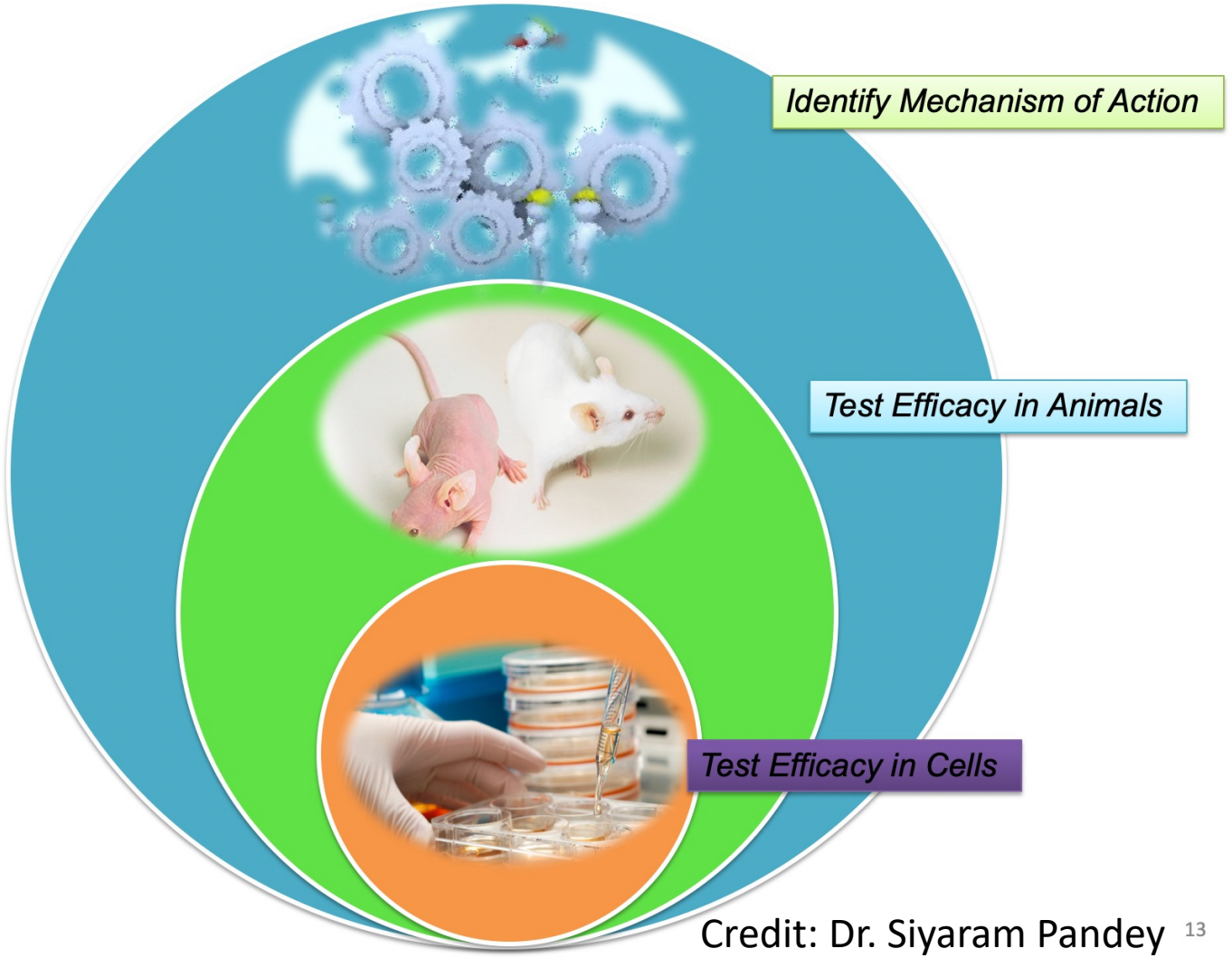
- Surgical resection is effective, but stage-dependent and invasive
- Radiation and chemotherapy are non-selective, and thus toxic to healthy cells
- Immunotherapy often causes unpleasant side effects
  - Fatigue, cough, nausea, skin rash, poor appetite, constipation, joint pain, and diarrhea
  - Infusion or autoimmune reactions

Motivation

- Need for **more efficacious** treatments that **reduce toxicity** of current treatments
  - Combining chemotherapeutics with Natural Health Products
- Rosemary Extract (*Salvia rosmarinus)*
  - *Historically used as medicinal herb*
  - *Antioxidant, Anti-inflammatory, Chemoprotective, Anti-proliferative properties in literature*

Credit: Andrew Fogg https://www.flickr.com/photos/ndrwfgg/101554662

Scientific Validation Process



Credit: Dr. Siyaram Pandey

Objectives

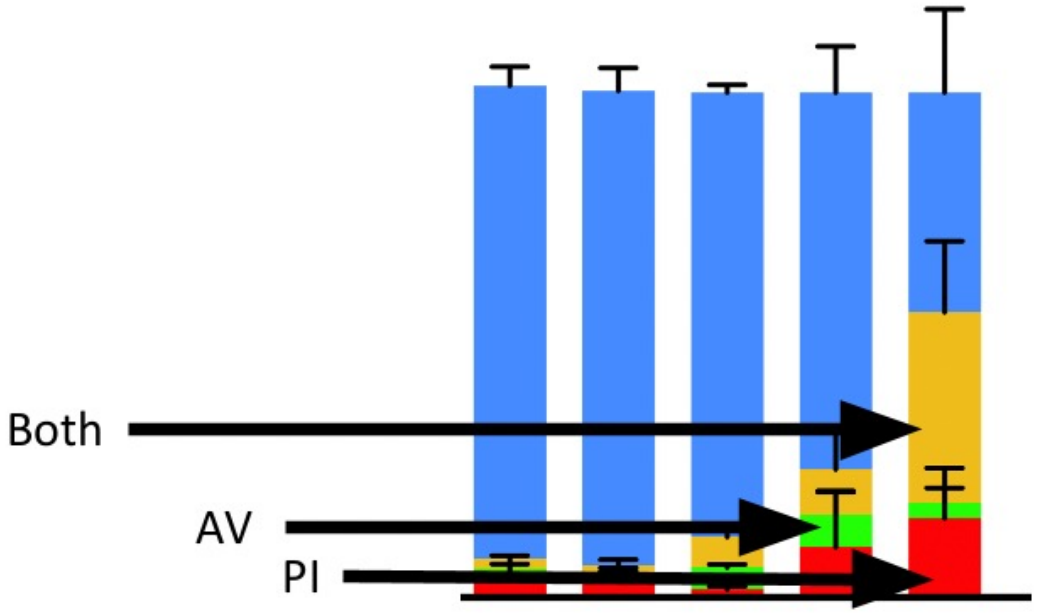
1
- Testing for Rosemary Extract (RE) Cytotoxicity
- Determining dose for combination experiments

2
- Quantifying RE interaction with chemotherapeutics

Future
- Testing chemoprotective effect on healthy cells
- Elucidating mechanism of action for apoptosis induction

Methods

- A375 and G361 cell lines
- AVPI assay to quantify apoptosis



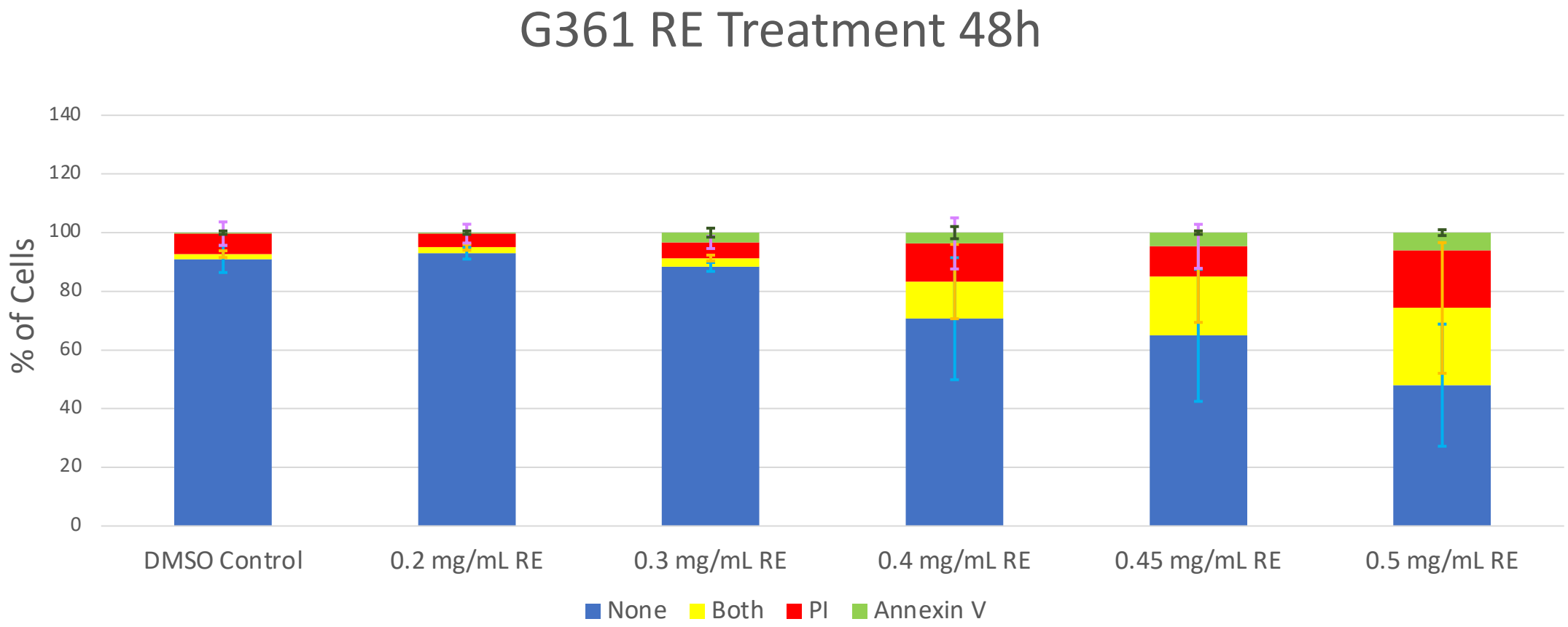
Annexin V binds to phosphatidylserine on outer membrane → Early Apoptosis

Propidium Iodide intercalates with mitochondrial DNA → Necrotic

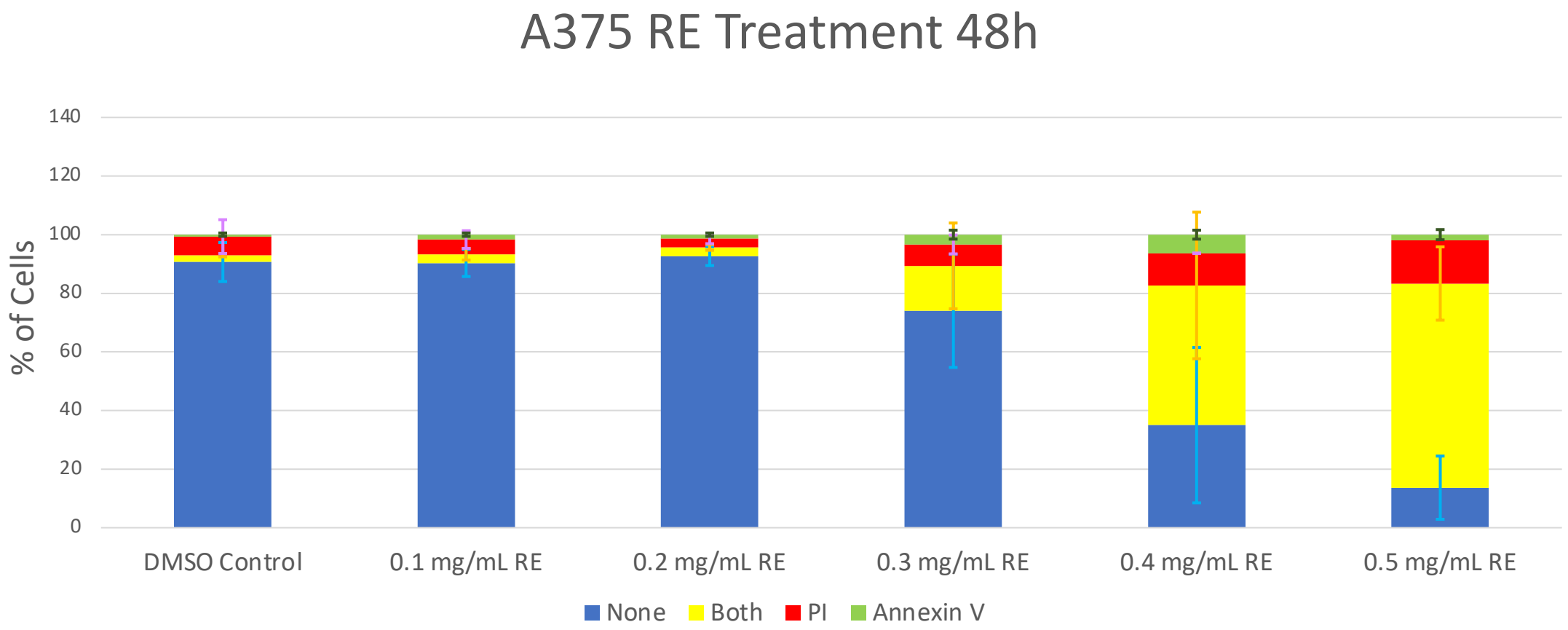
Both AV & PI binding → Late Apoptosis

Neither AV nor PI binding → Viable

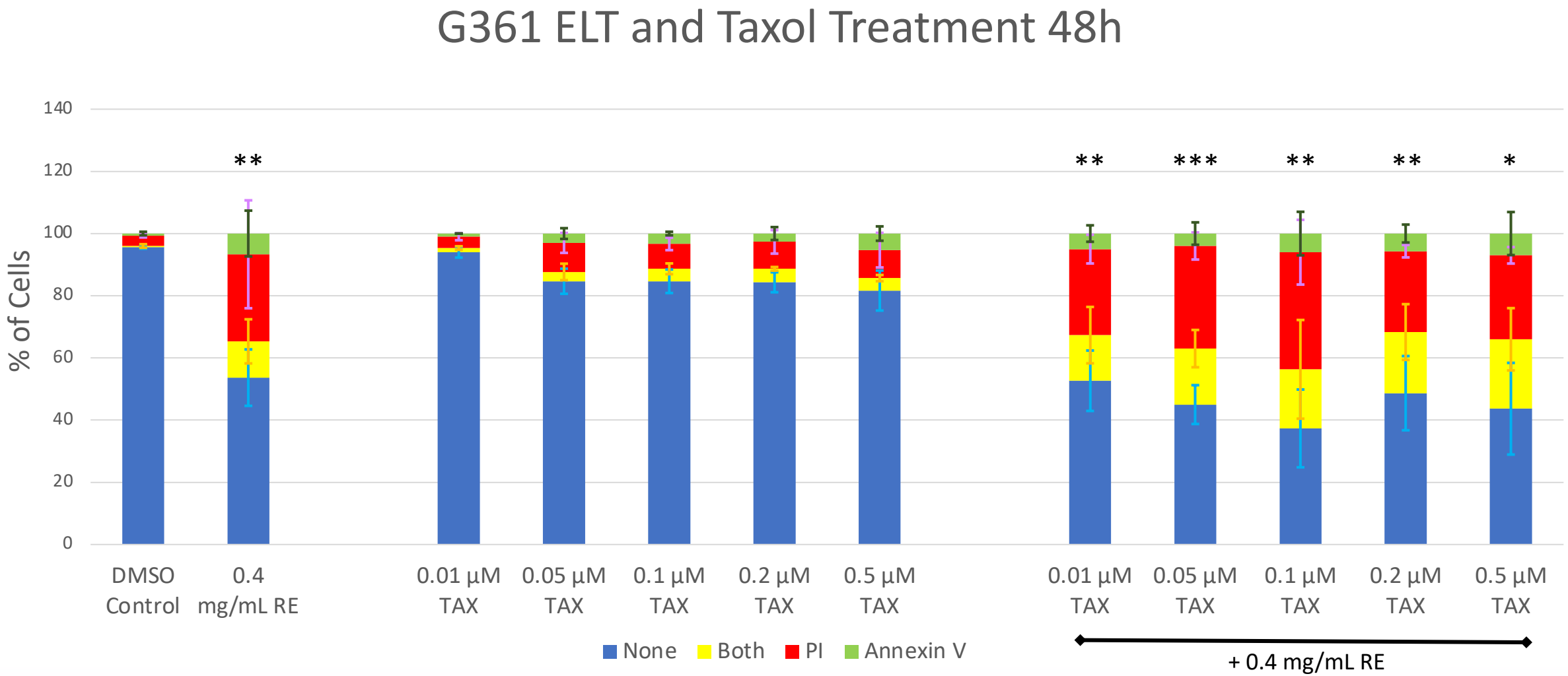
Dosing G361


G361 RE Treatment 48h
% of Cells
140
120
100
80
60
40
20
0
DMSO Control
0.2 mg/mL RE
0.3 mg/mL RE
0.4 mg/mL RE
0.45 mg/mL RE
0.5 mg/mL RE
None
Both
PI
Annexin V

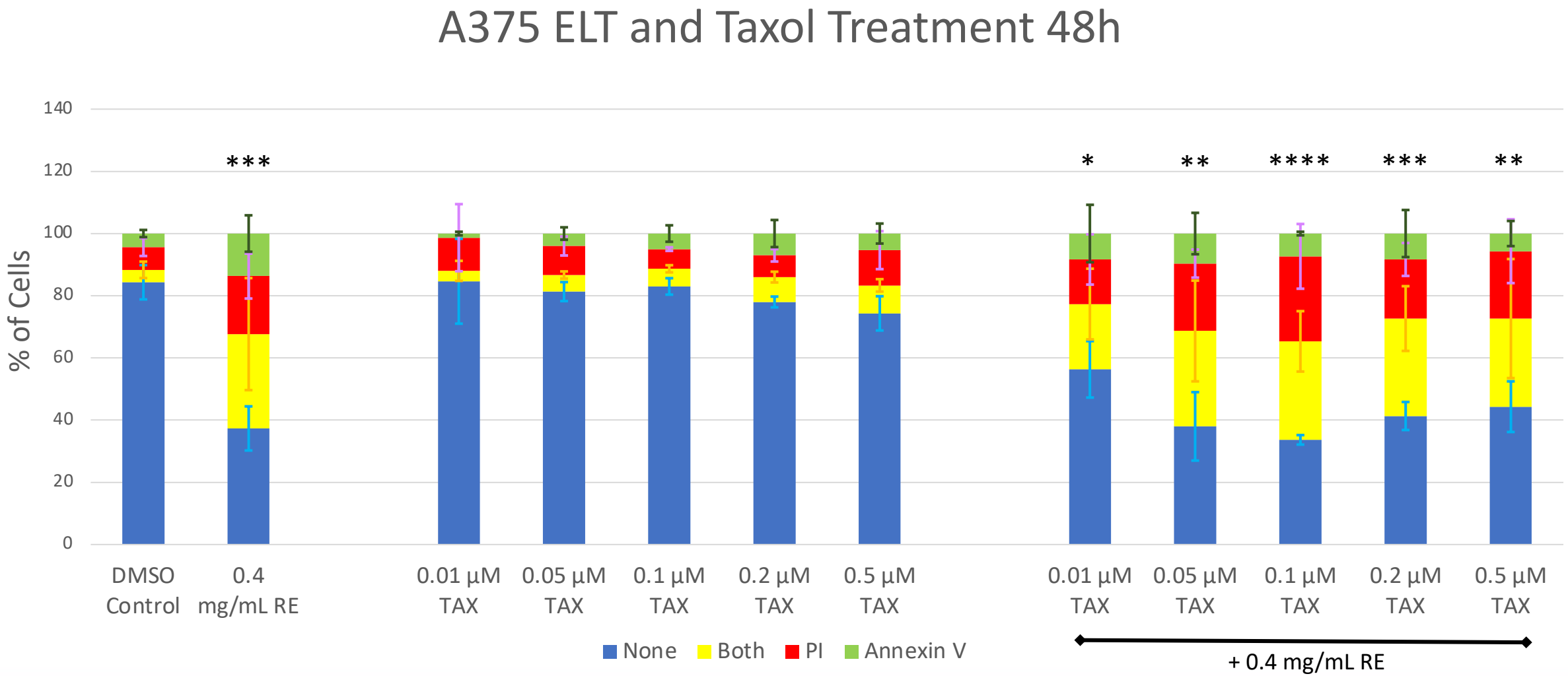
Dosing A375



G361 RE-Taxol Combination



A375 RE-Taxol Combination



Next Steps

- Continue combination trials (RE with Dacarbazine, TMZ)
- Biochemical assays to elucidate apoptotic mechanism
- Assess RE toxicity and combination toxicity on a healthy cell line

Thank You!

Thank you to donors, sponsors, and all members of Pandey Lab for your continued support!

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