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### Combining natural health products with standard chemotherapies as a novel therapeutic for Glioblastoma and Neuroblastoma

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**Submitter and Co-author information**

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# Combining natural health products with standard chemotherapies as a novel therapeutic for Glioblastoma and Neuroblastoma

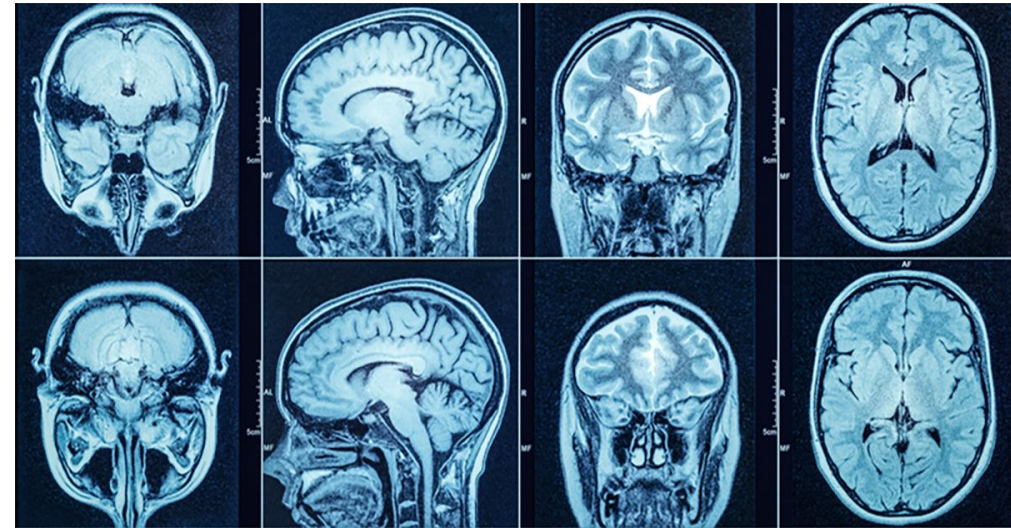
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By: Ibrahim Alsalkhadi, Karolina Konior, Darcy Wear, Micheal Okoko, Eesha Bhagirath, Caleb Vegh, Victoria Iannetta, Anumita Jain & Siyaram Pandey



# Cancers

- Glioblastoma
  - Cancer of the glial cells, U-87 Mg cell model
  - Primarily occurs in adults
  - Accounts for 52% of brain tumours
  - Extremely resistant to treatment (TMZ)
- Neuroblastoma
  - Cancer of the neurons
  - Typically presents in the stomach
  - Most common tumour diagnosed in children under 1 years old



# Motivation / Current treatments

- Need for **more efficacious** treatments that **reduce toxicity** of current treatments
  - Combining chemotherapeutics with Natural Health Products
- Surgical removal is primary combined with radiation and chemotherapy
- Considered stage-dependent and invasive
- Radiation and chemotherapy are non-selective, and thus toxic to healthy cells



# Natural Extracts

- Long Pepper Extract (LPE)
  - *Piper longum*
  - Contains piperlongumine
  
- Synthite Tea Extract (STE)
  - *Camellia sinensis*
  - Antioxidant, selective DNA protector



# Objectives

- Do STE and LPE have selective anti-cancer activity in Neuroblastoma and Glioblastoma?
- How do they interact with standard chemotherapeutic treatments?
- What is the mechanism of STE and LPE?



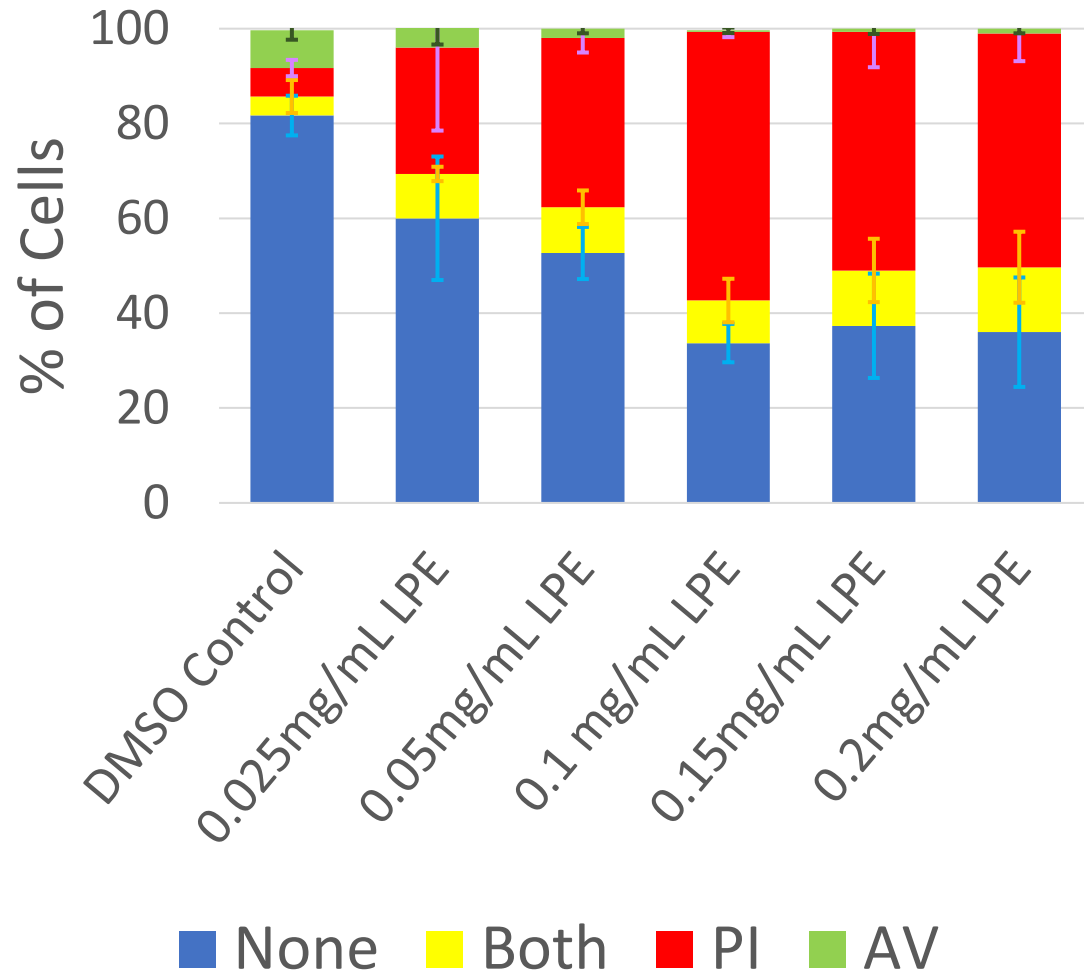


**Objective 1:**

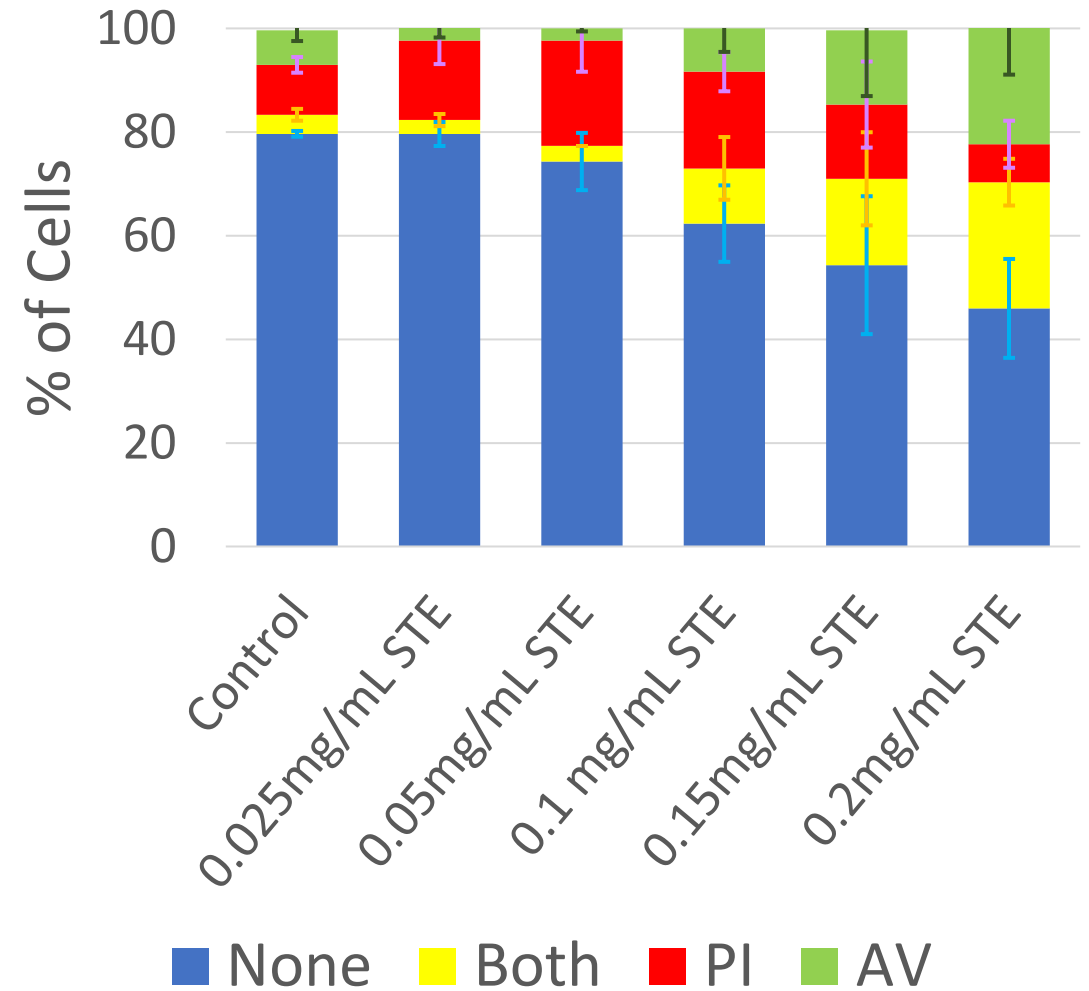
**STE and LPE have selective  
anti-cancer properties**



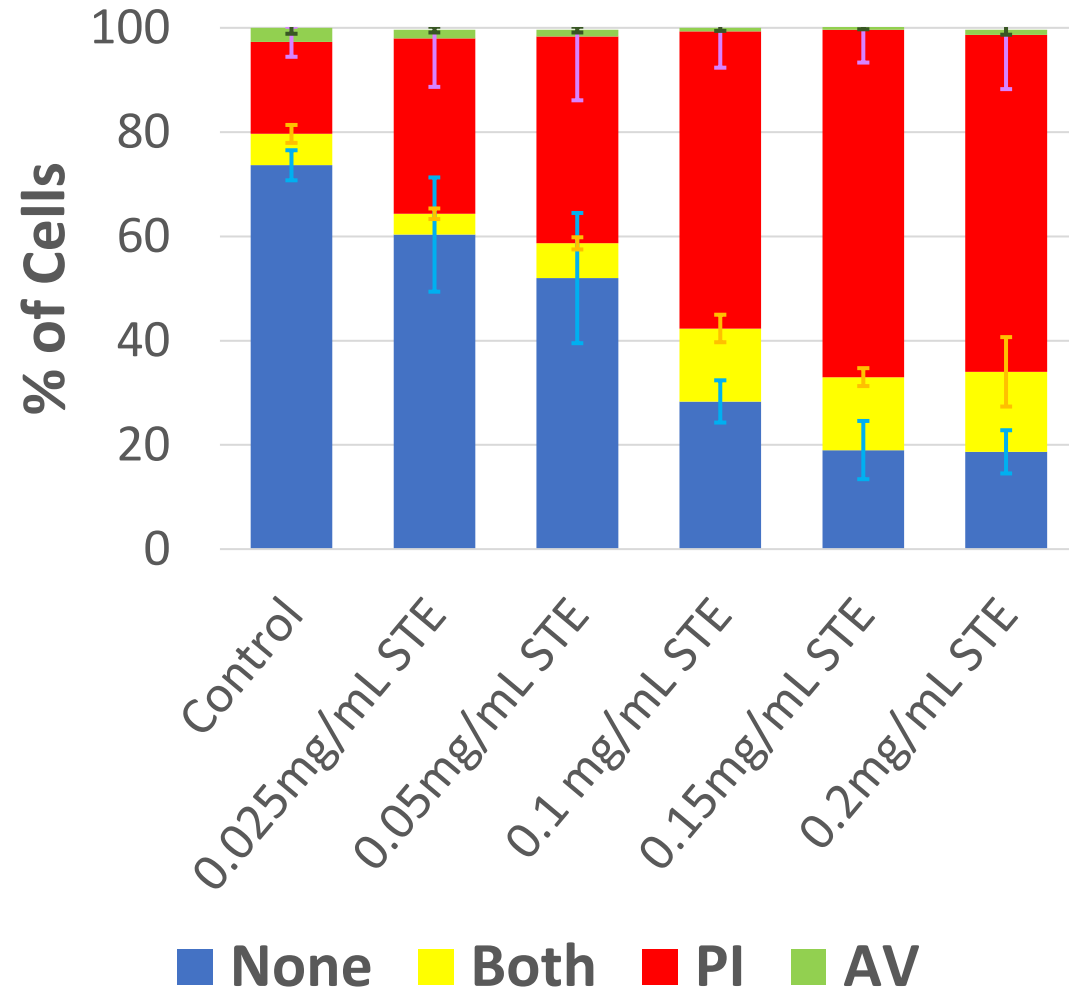
## U-87 Mg 24 Hour LPE



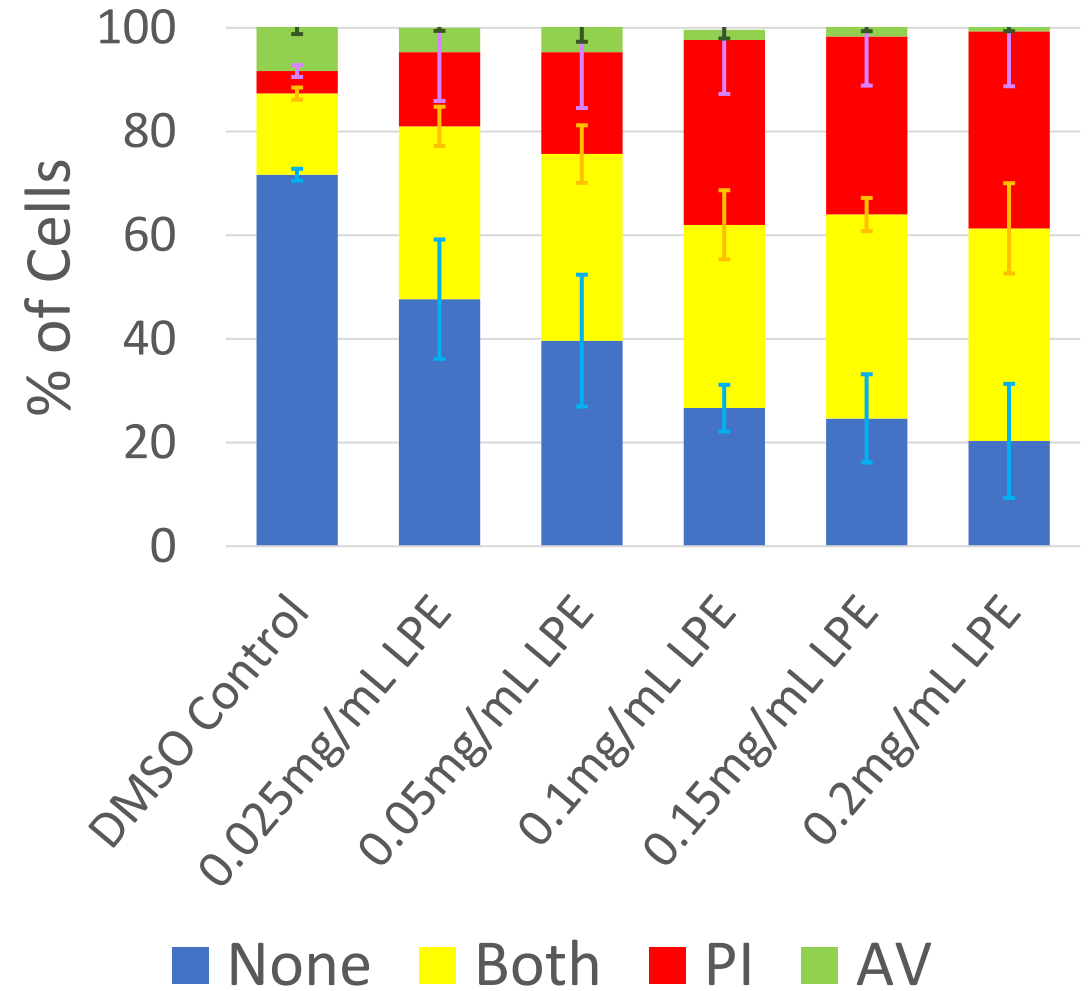
## U-87 Mg 48 Hour STE



## SH-SY5Y 48 Hour STE



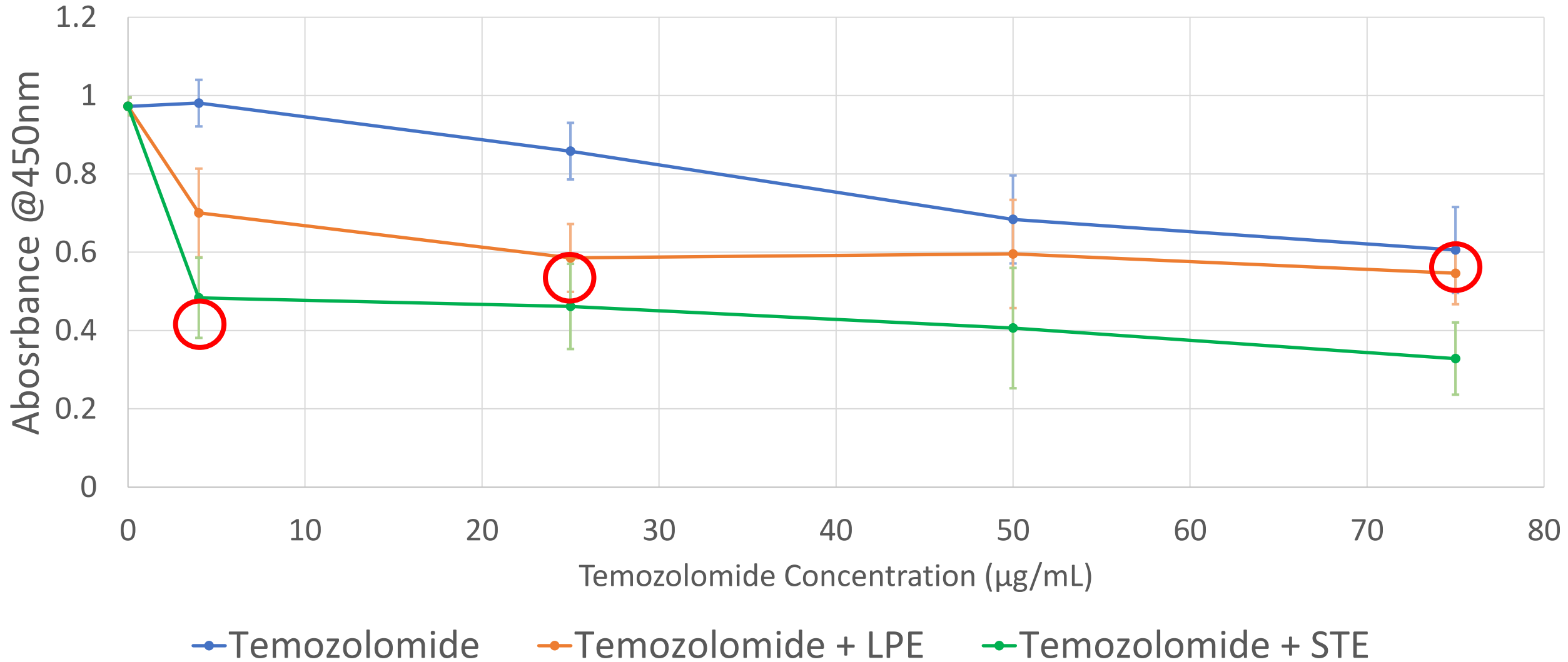
## SH-SY5Y 24 Hour LPE



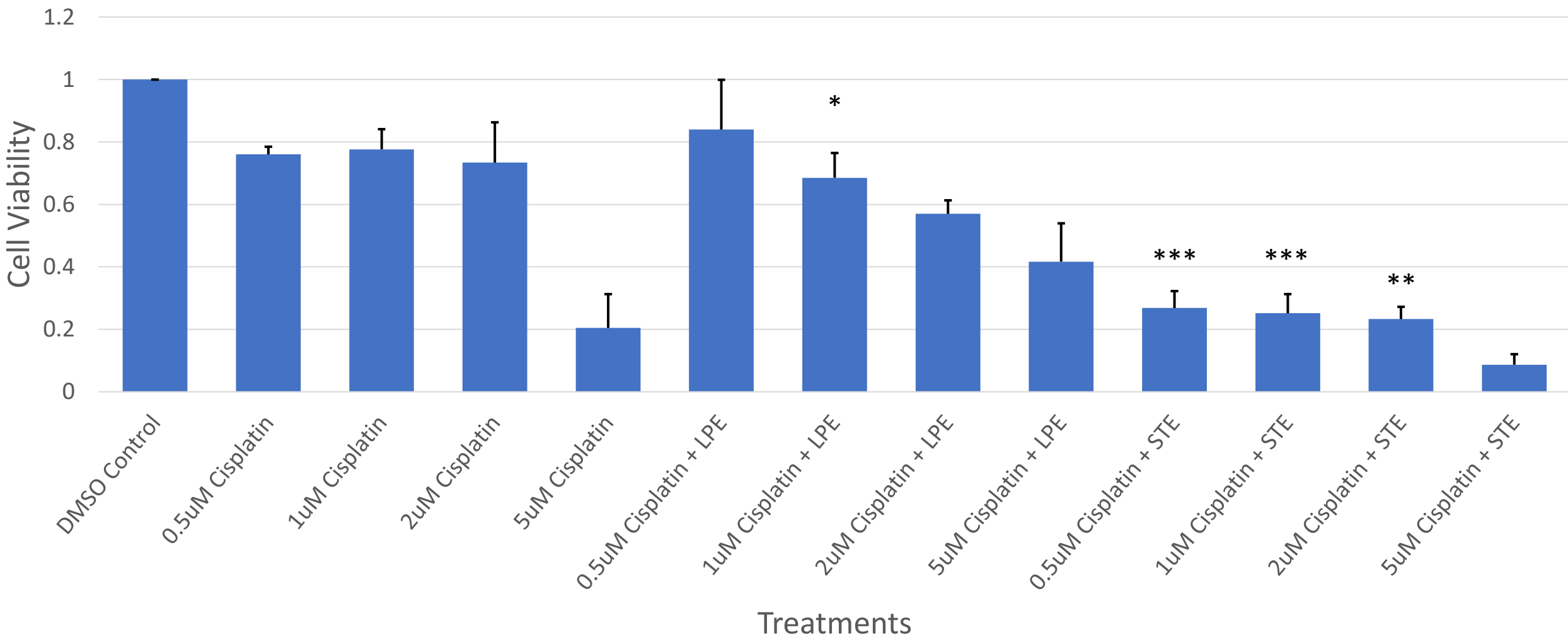
# Objective 2

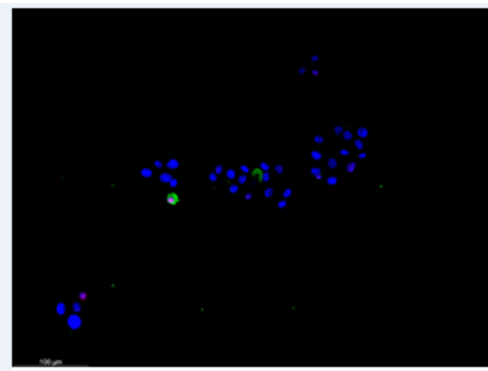
**STE and LPE interactions with  
standard chemotherapeutic  
treatments**

# U-87 Mg Cell Viability After 48 Hours

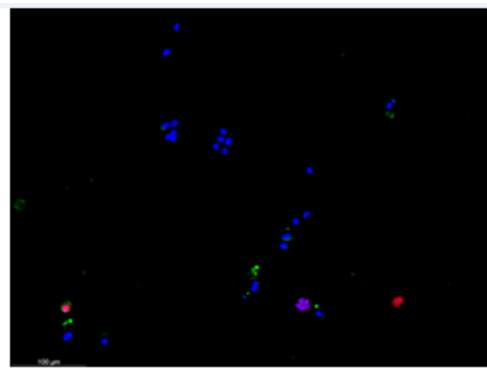


# Cell Viability of SH-SY5Y Treated with Cisplatin + LPE + STE for 48 Hours

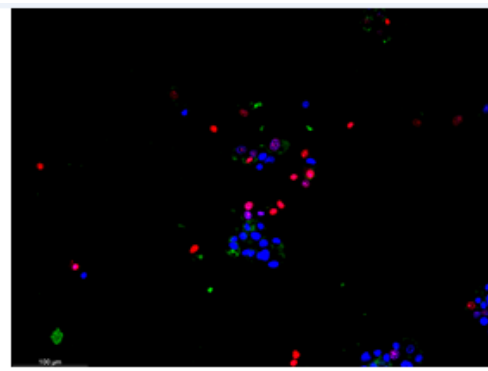




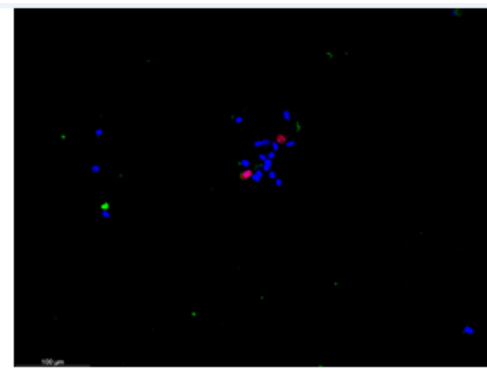
Control



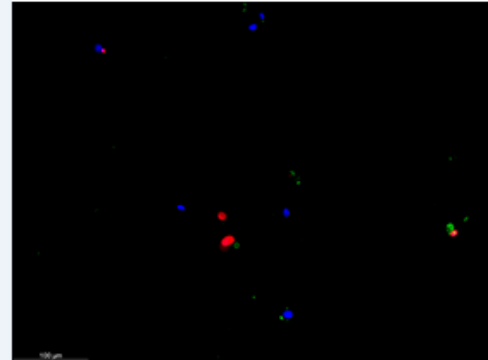
0.1mg/mL LPE



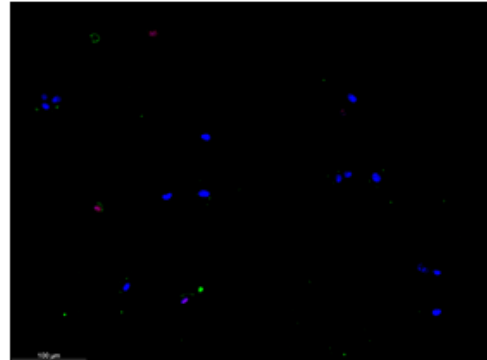
0.2mg/mL LPE



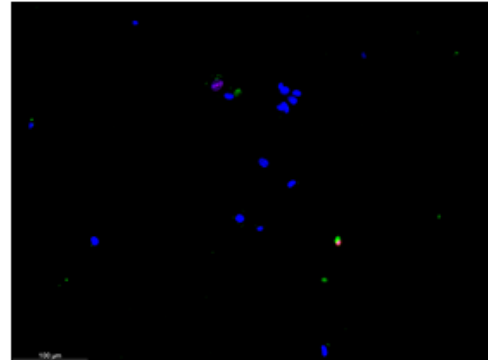
0.1mg/mL STE



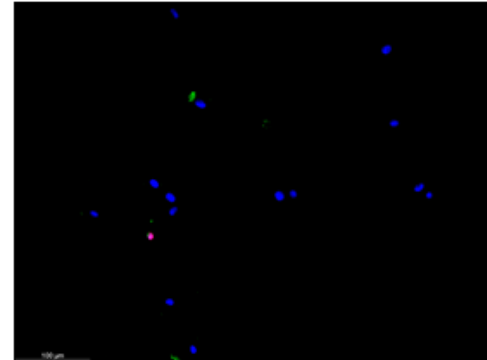
0.2mg/mL STE



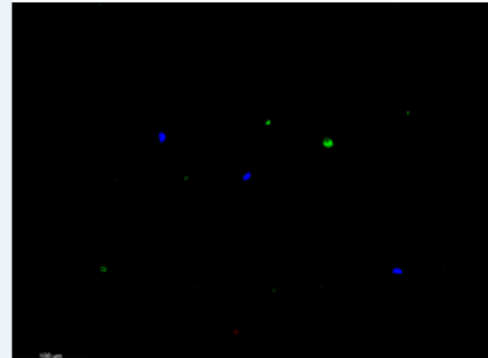
50µg/mL TMZ



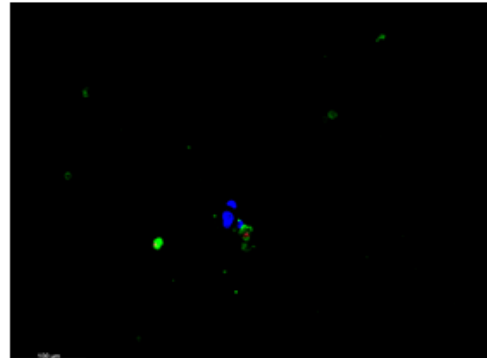
50µg/mL TMZ + 0.1mg/mL LPE



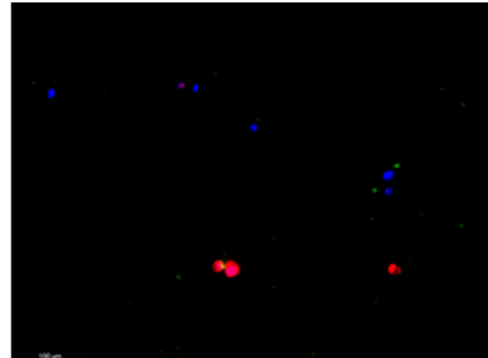
50µg/mL TMZ + 0.2mg/mL LPE



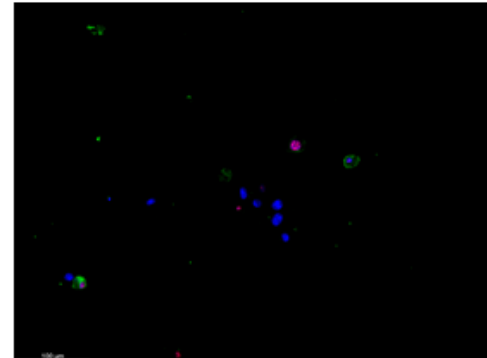
50µg/mL TMZ + 0.1mg/mL STE



50µg/mL TMZ + 0.2mg/mL STE



0.1mg/mL LPE + 0.1mg/mL STE



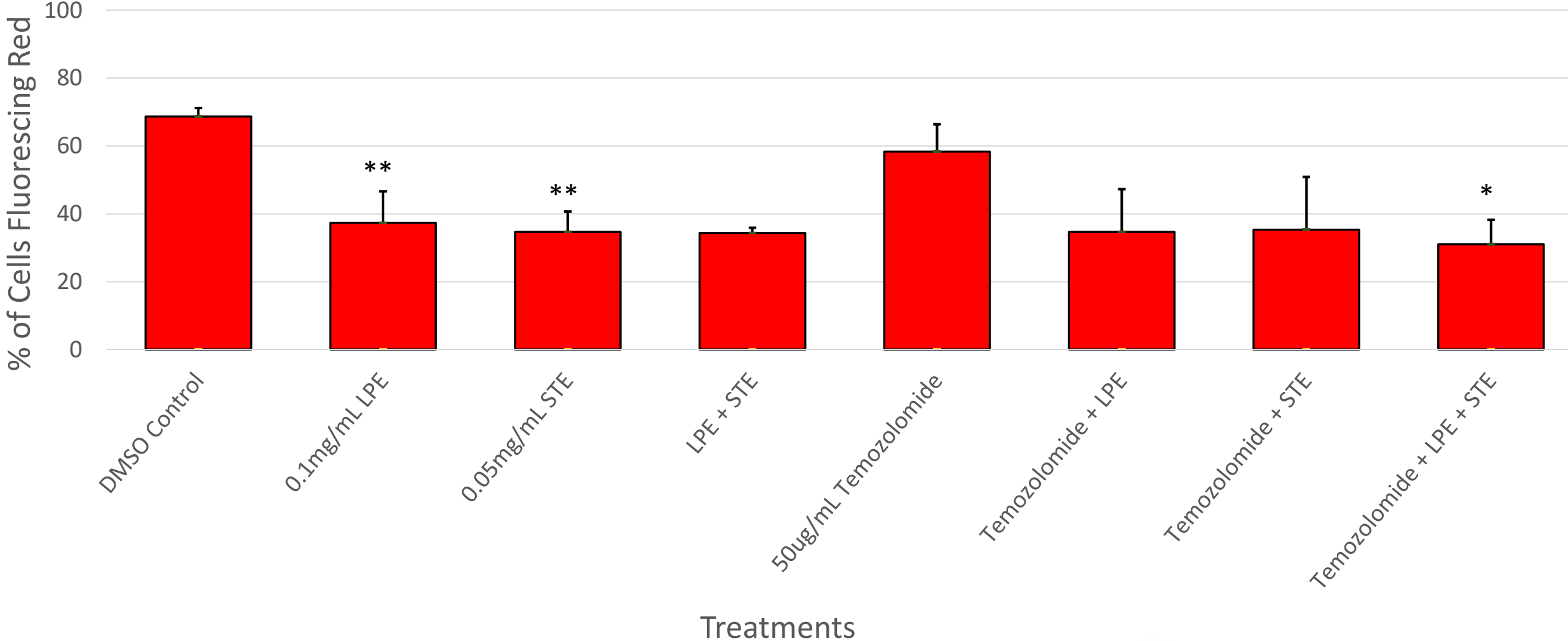
0.2mg/mL LPE + 0.2mg/mL STE



# Objective 3

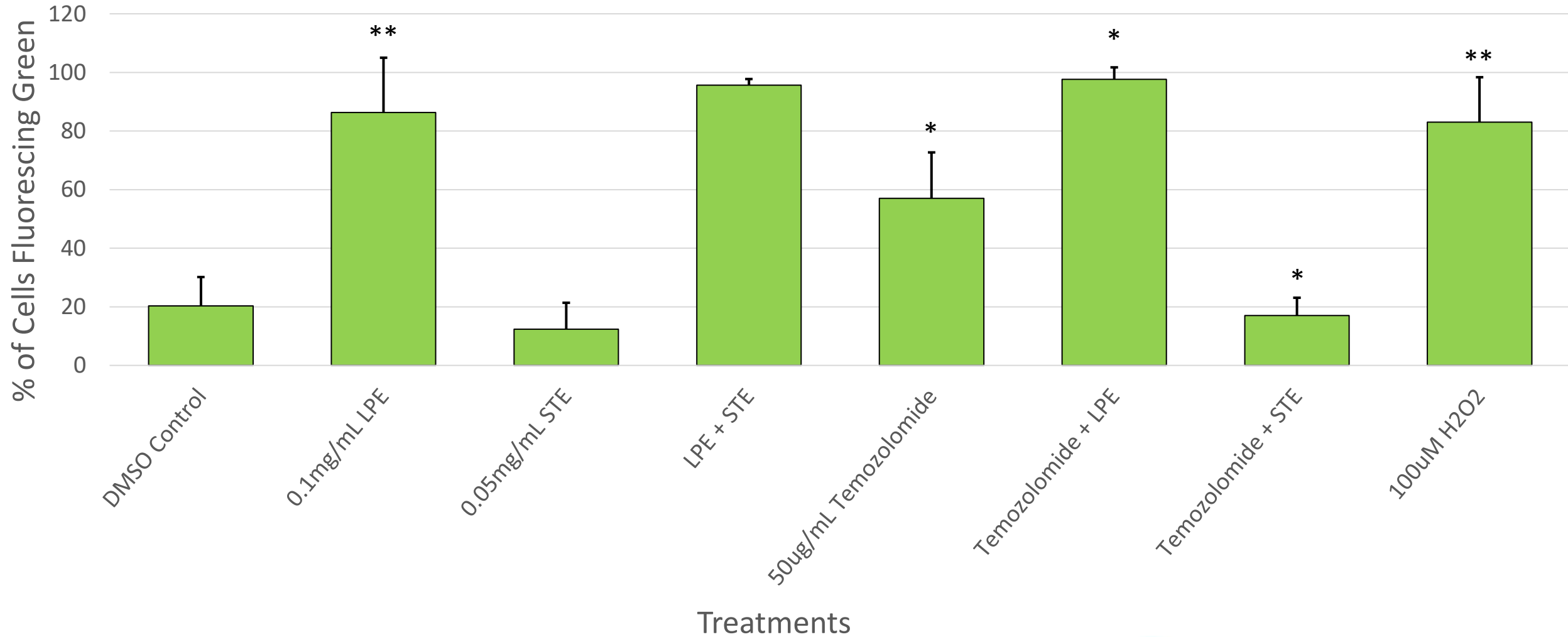
**STE and LPE Mechanisms  
(TMRM staining, DCF staining,  
MDC staining)**

# TMRM for U-87 Mg Treated with Temozolomide + LPE + STE for 24 Hours

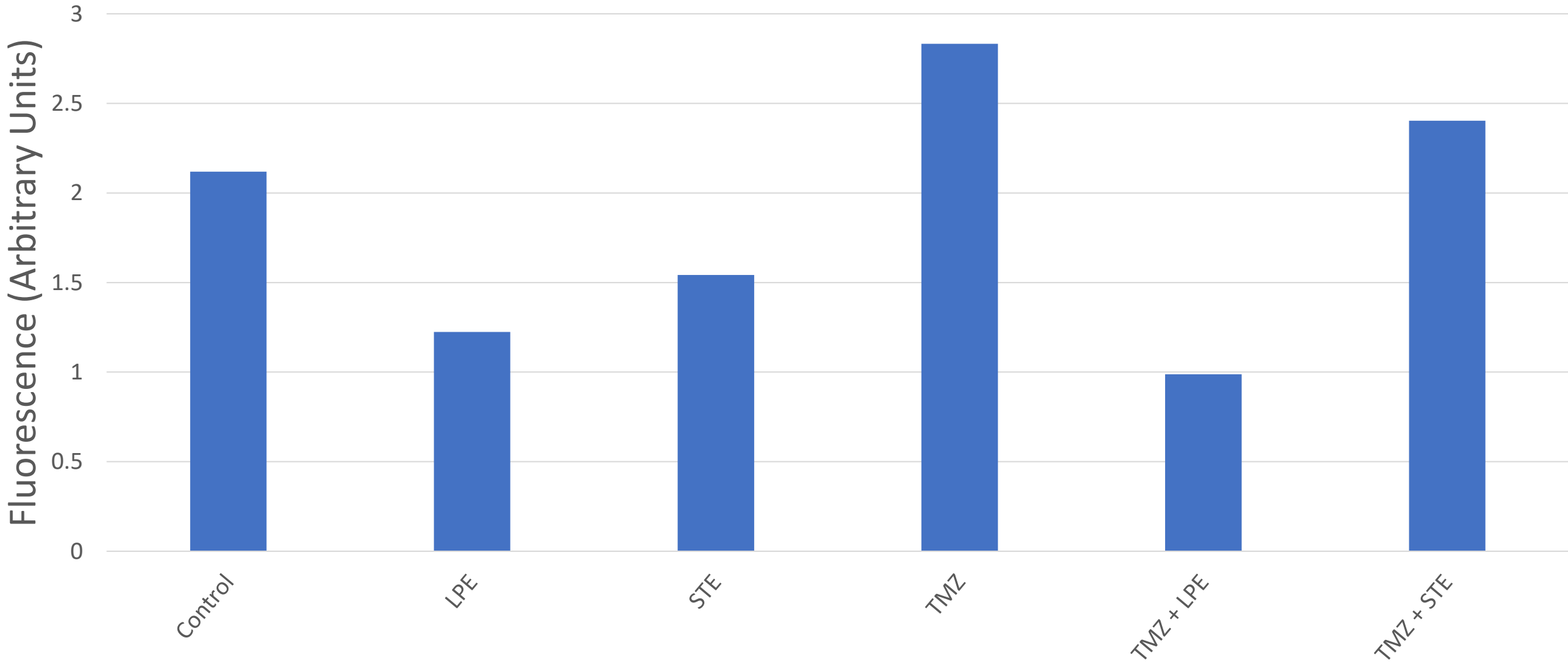




# H2DCFDA for U-87 Mg Treated with Temozolomide + LPE + STE for 3 Hours



# U-87 Mg MDC Fluorescence



# Conclusions

LPE and STE treatments on Glioblastoma and Neuroblastoma lead to:

- Selective apoptosis in Glioblastoma and Neuroblastoma cancer cells
- Positive interaction with the chemotherapeutics TMZ and cisplatin in-vitro
- LPE induces oxidative stress and inhibits autophagy while STE is a mitochondrial destabilizer



# Acknowledgements

- The Couvillon Family (Windsor)
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ANY  
QUESTIONS?

