

Plant Based Compounds Inhibit Proliferation, Alter Cytomorphology
and Decrease Migration of Adenocarcinoma cells

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What is cancer?

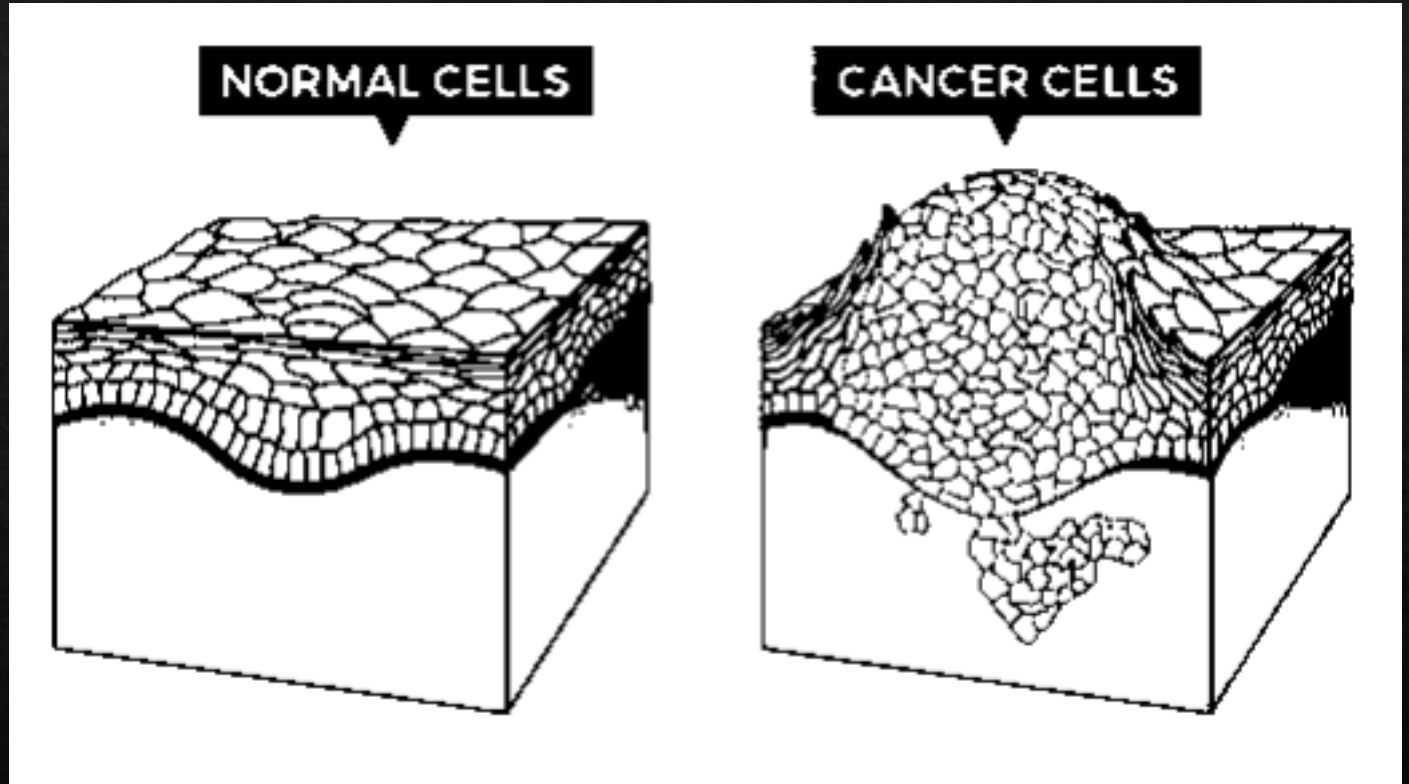
- ◆ Cancer is a disease caused by changes in the DNA that causes cells to divide uncontrollably and spread into surrounding tissues.
- ◆ Cancer cells continue growing and forms overgrowths in the body called tumors.
- ◆ Types of cancer

Malignant tumor

Benign tumor

Cancer cell vs Normal cell

- ❖ Cancer cells are less specialized than normal cells, which is a significant distinction.
- ❖ Cancer cells are a perversion of normal, functional differentiated cells.
- ❖ They differentiate into an abnormal and aggressive cell that no longer performs the functions of the healthy cell.



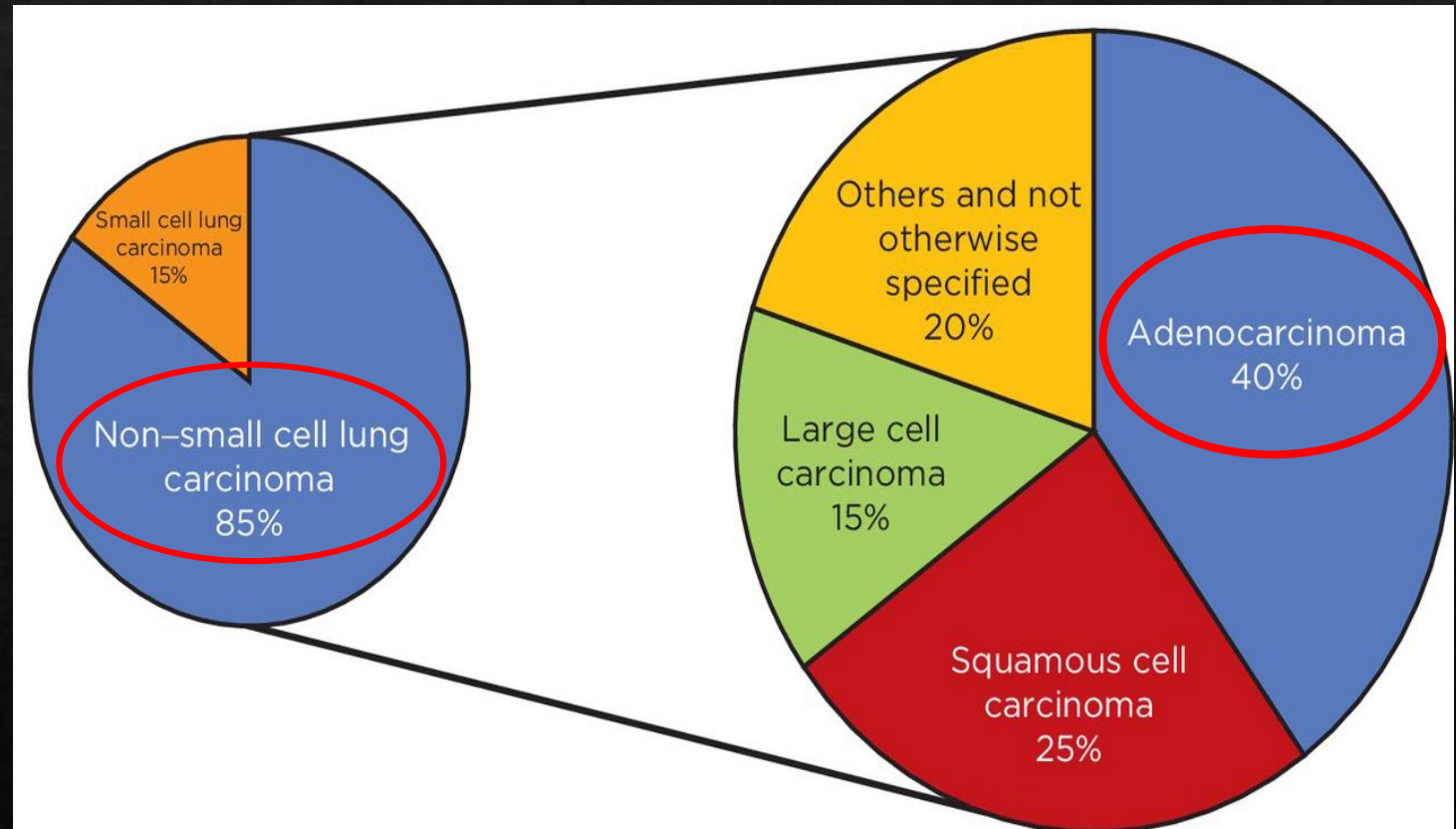
Uncontrollable division of cancer cells and spread into surrounding tissues vs regular division of normal cells ²

Lung Cancer and types

- ◈ Lung cancer occurs as a result of unchecked growth of unusual cells either in one or in both the lungs.
- ◈ This abnormality interferes with the lung's normal role of providing oxygen to the human body through blood.
- ◈ Lung cancer is usually classified based on its appearance in microscope:
 - Small cell lung cancer (SCLC)
 - Non-small cell lung cancer (NSCLC)

Non-Small Cell Lung Cancer

- ❖ Non-small cell lung cancer (NSCLC), the most prevalent form of lung tumor, is one of the main causes of death in humans.
- ❖ Most lung cancers, 85 percent are NSCLC.
- ❖ Adenocarcinoma including bronchi alveolar carcinoma accounts for approximately 40% of NSCLC.



Histologic classification of lung cancer. The two major lung cancer histologic categories (NSCLC and small cell lung carcinoma) and the most common histologic subtypes among NSCLC (adenocarcinoma, squamous cell carcinoma, and large cell carcinoma) ⁵

Polyphenols and Cancers

- ◆ Fruits and vegetables contain thousands of phytochemicals (phenolic compounds) with antioxidant, anti-inflammatory and anticarcinogenic properties.
- ◆ *In vivo* and *in vitro* research have indicated that

Polyphenol consumption \propto Risk of tumor growth

- ◆ In this study, we will assess the ability of several polyphenols to inhibit the growth and spread of cancer cells.



Polyphenols studied

Curcumin

Rutin

Resveratrol

Methods

01

A549 cells were cultured and treated with Rutin, Curcumin and Resveratrol separately. Tests were carried out for the following

02

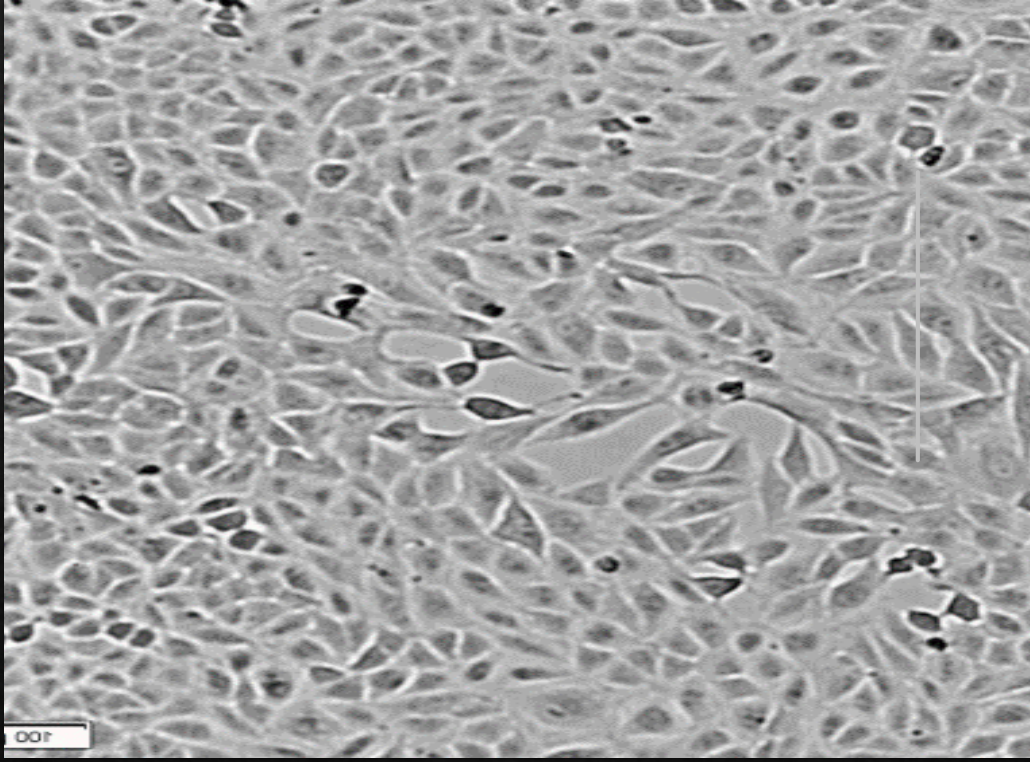
Viability test using MTT assay

03

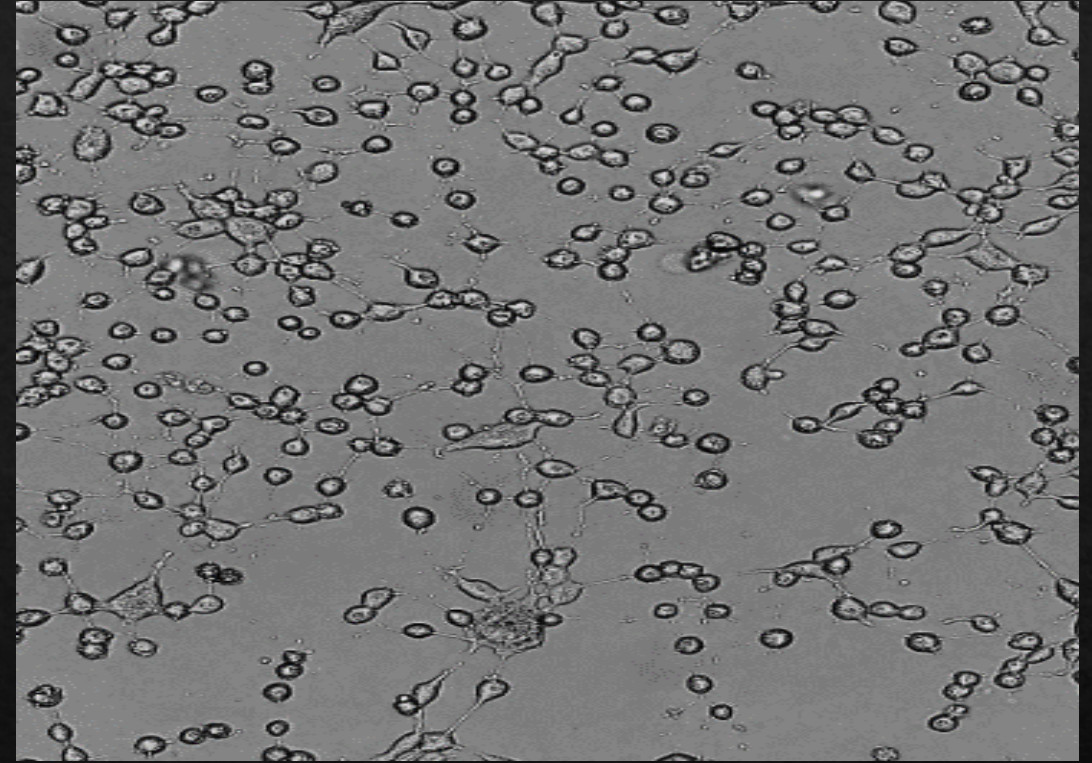
Morphological Observation using Fluorescence microscopy

04

Scratch assay to test migration



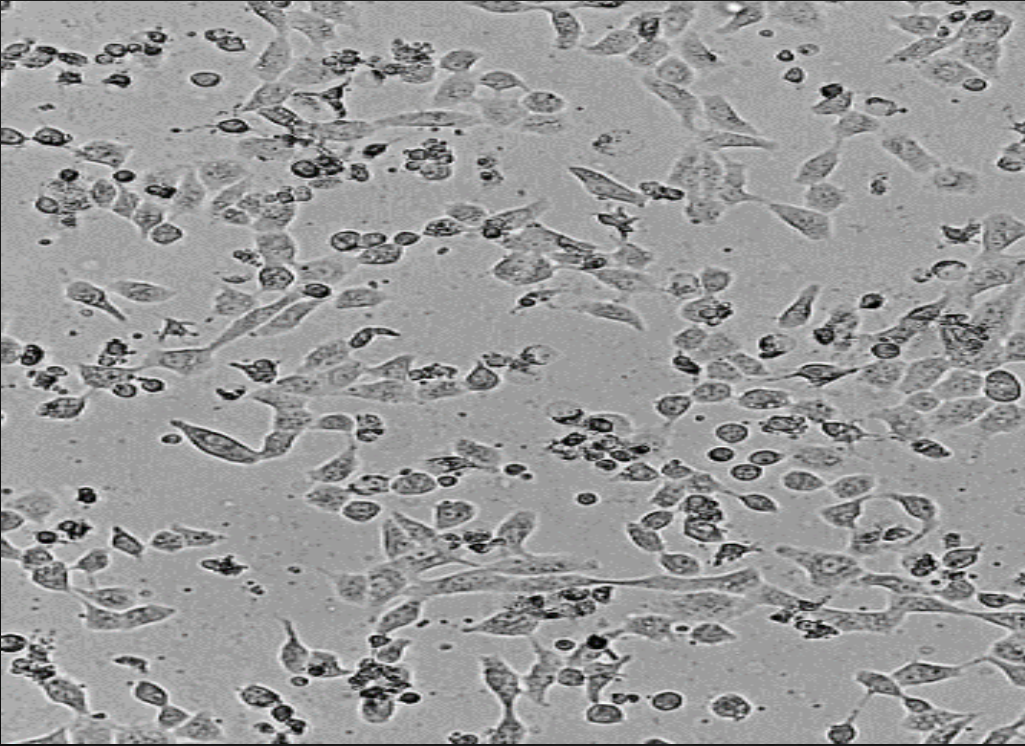
Control



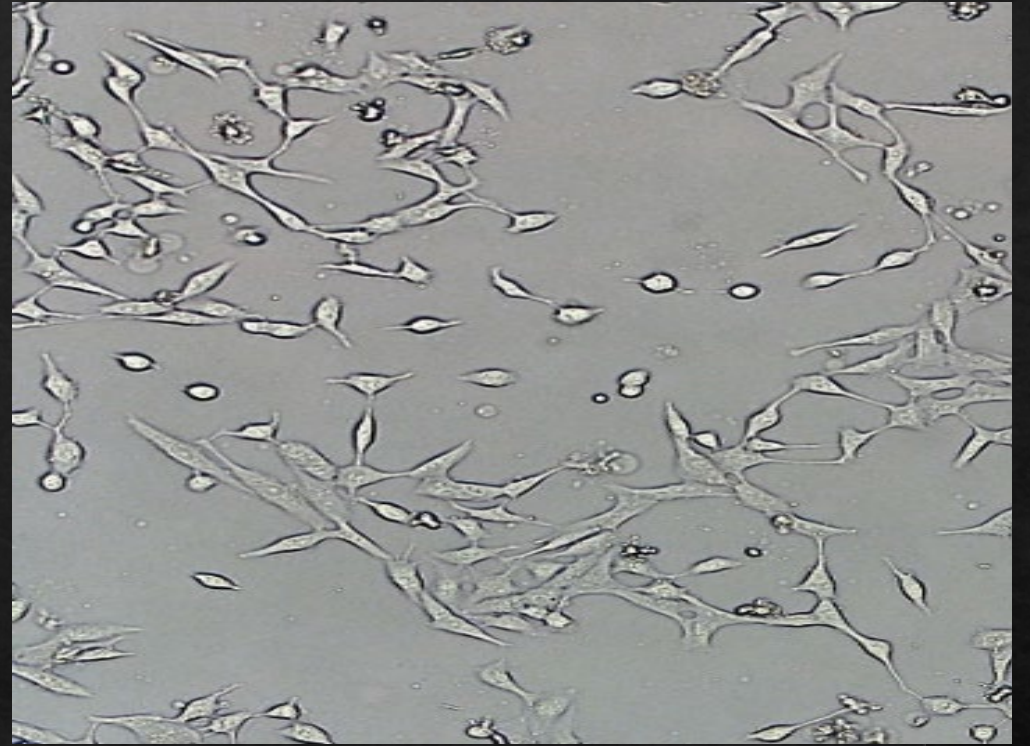
40 μ M Curcumin

Results

Cell Morphology

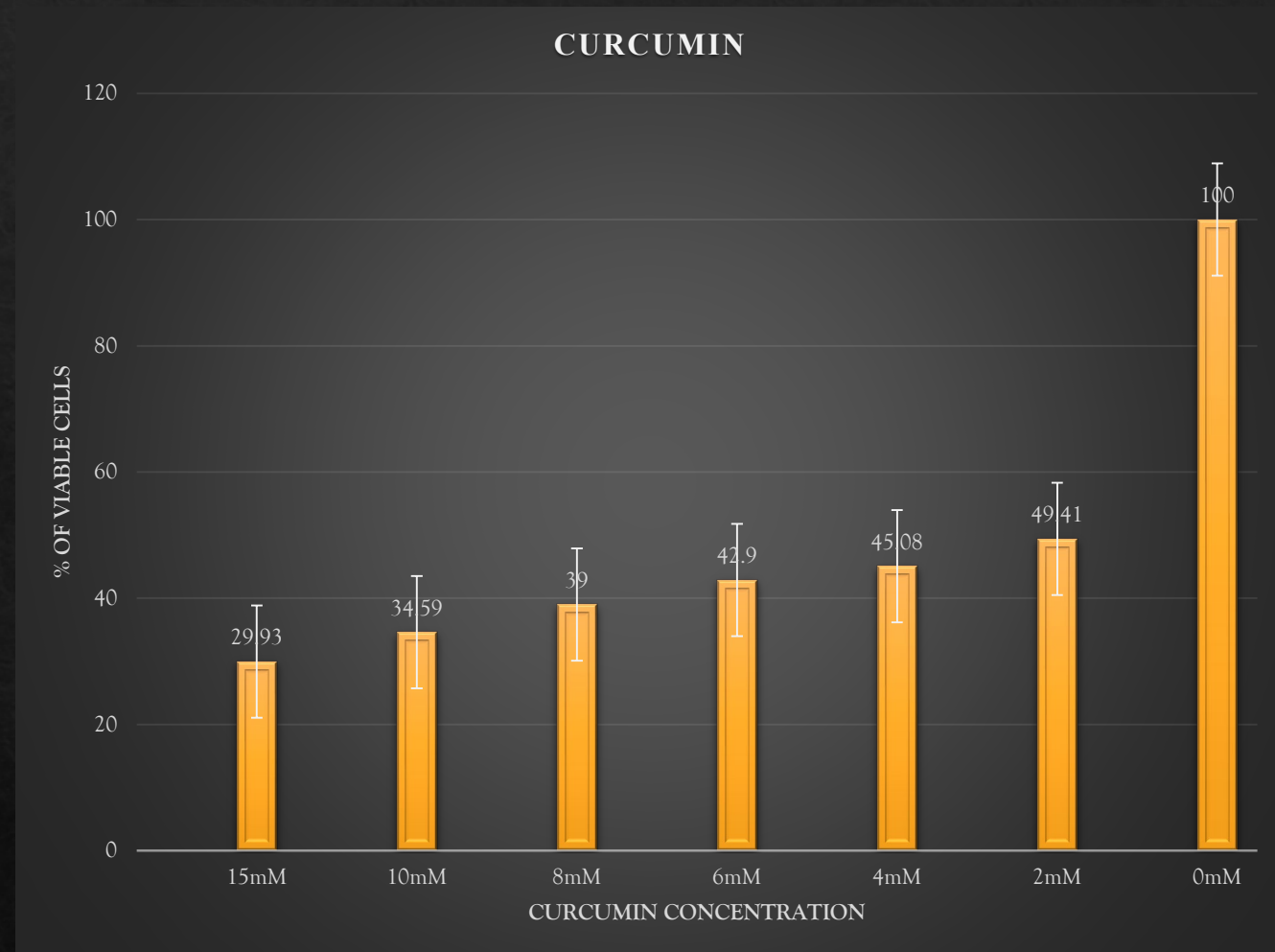


40 μ M Resveratrol

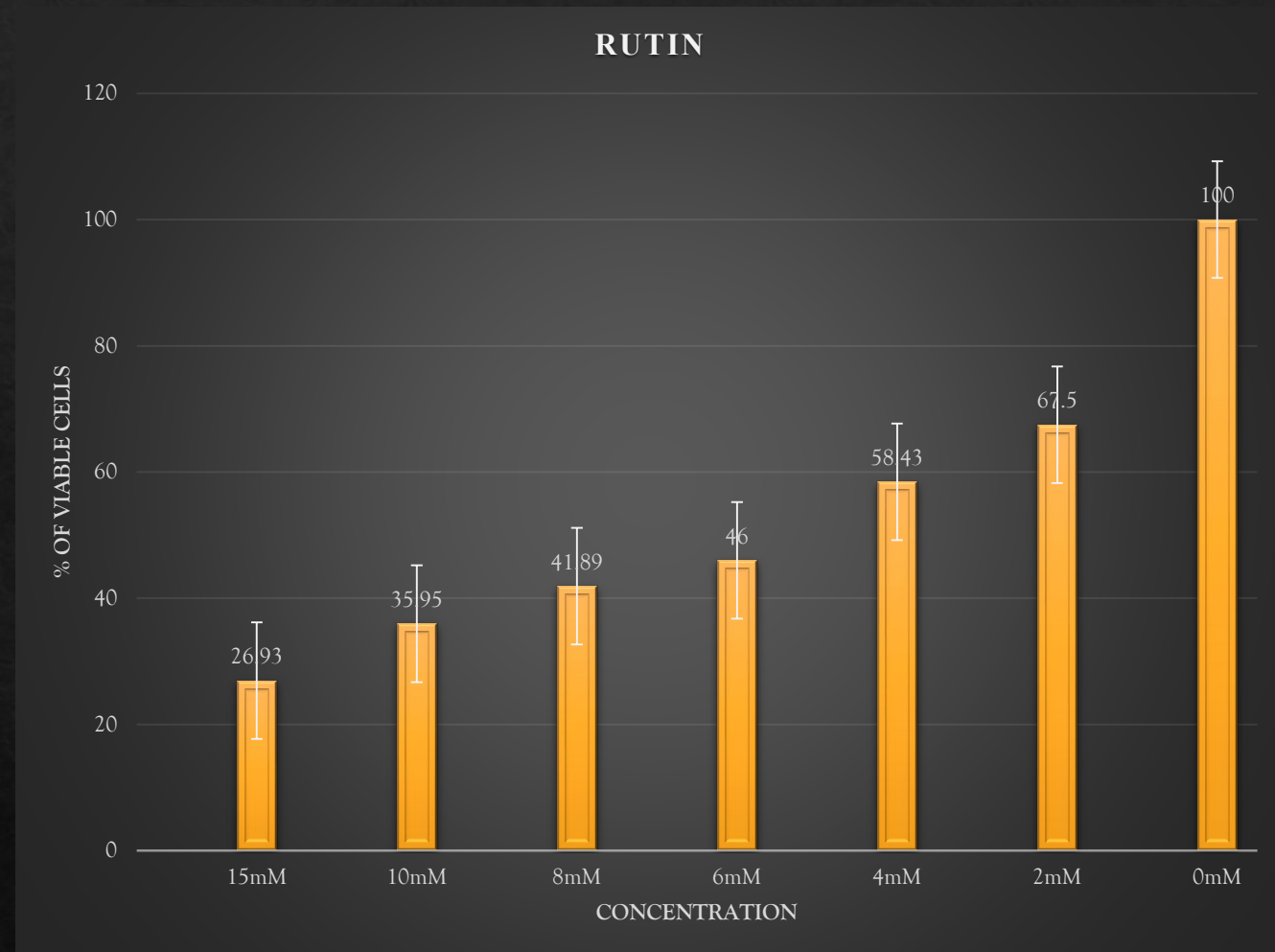


40 μ M Rutin

Cell Morphology

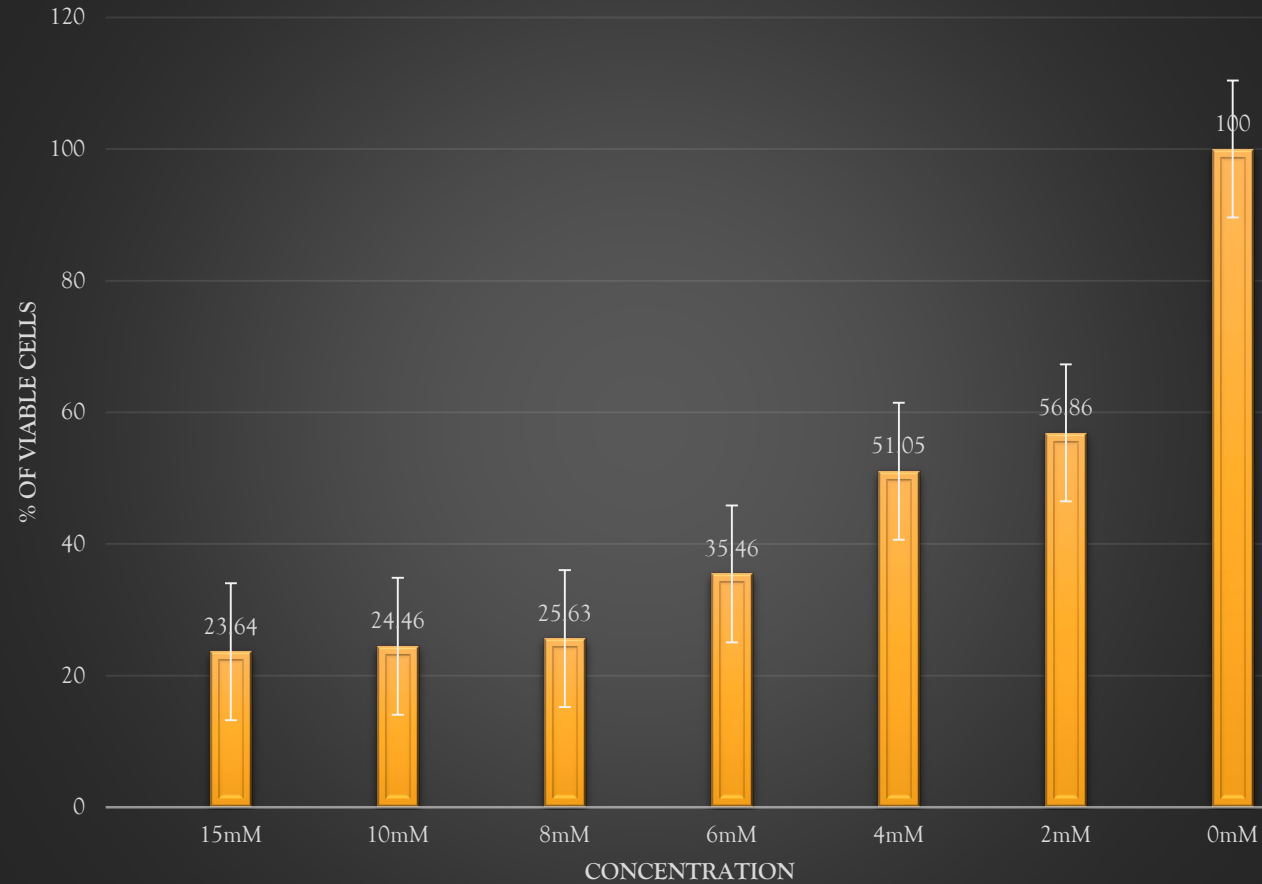


Cell Viability
Curcumin



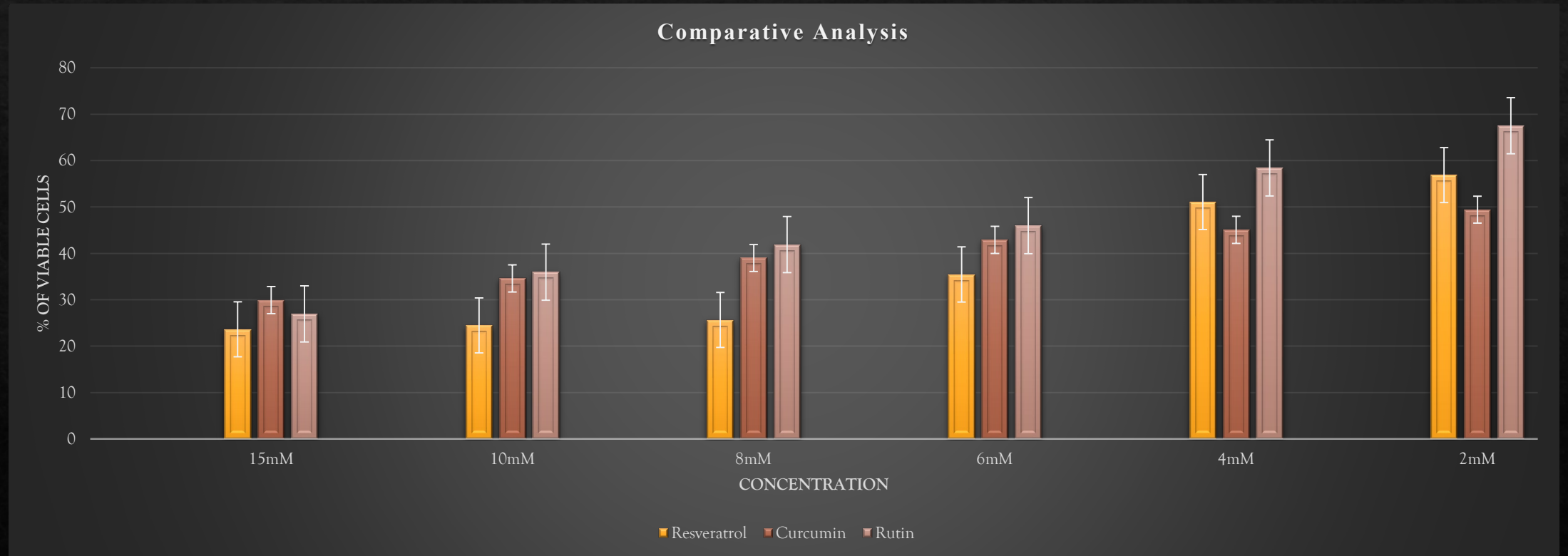
Cell Viability
Rutin

RESVERATROL

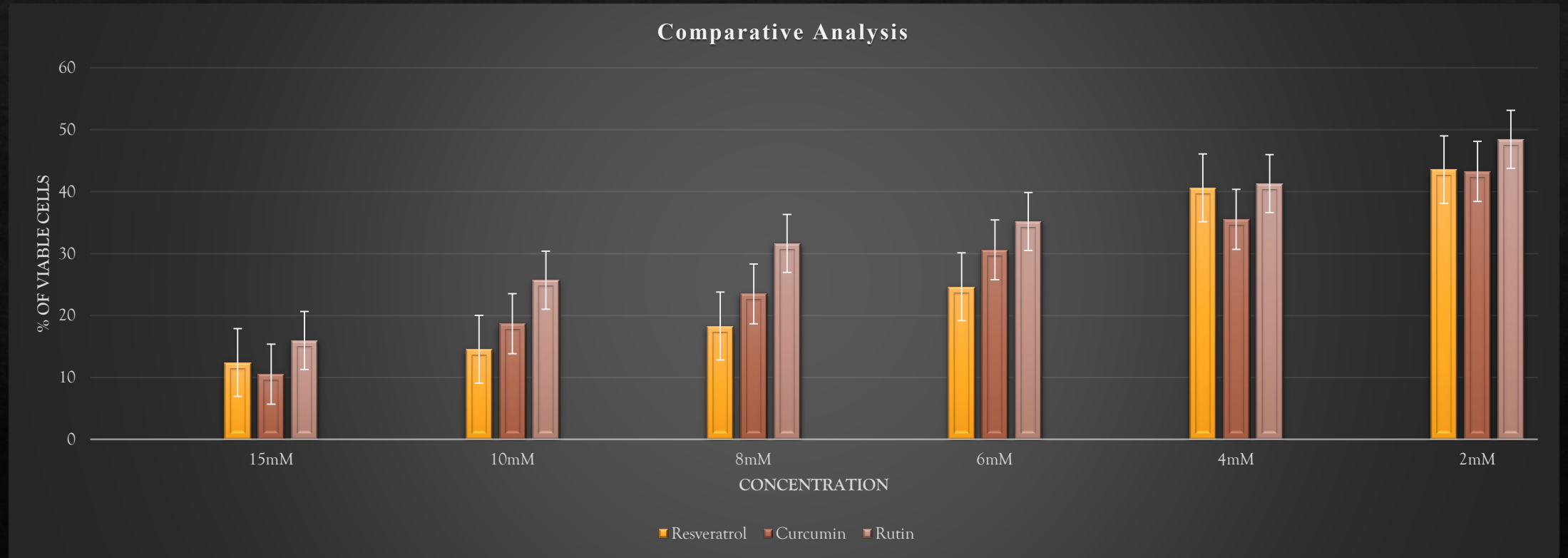


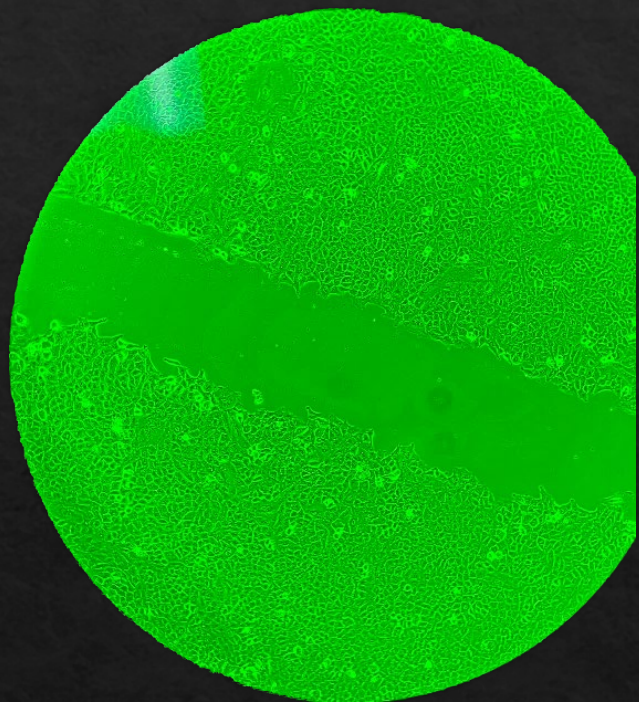
Cell Viability
Resveratrol

Comparative Analysis (24h)

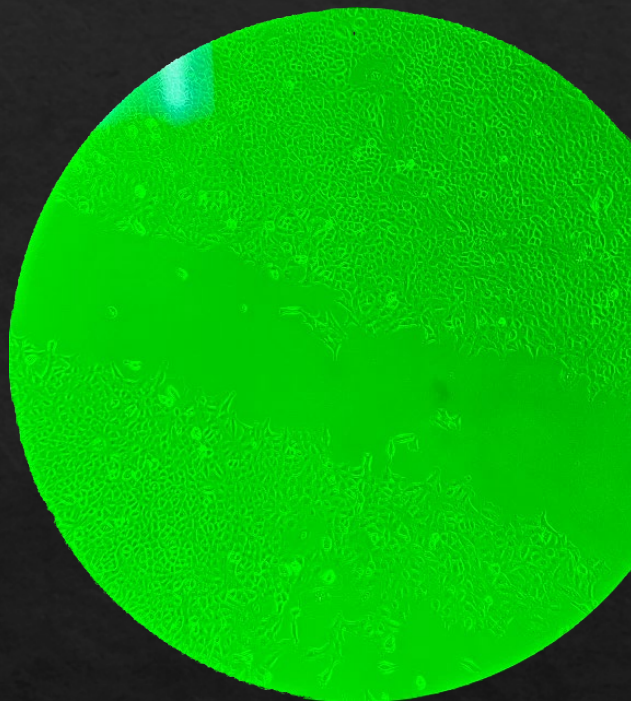


Comparative Analysis (48h)

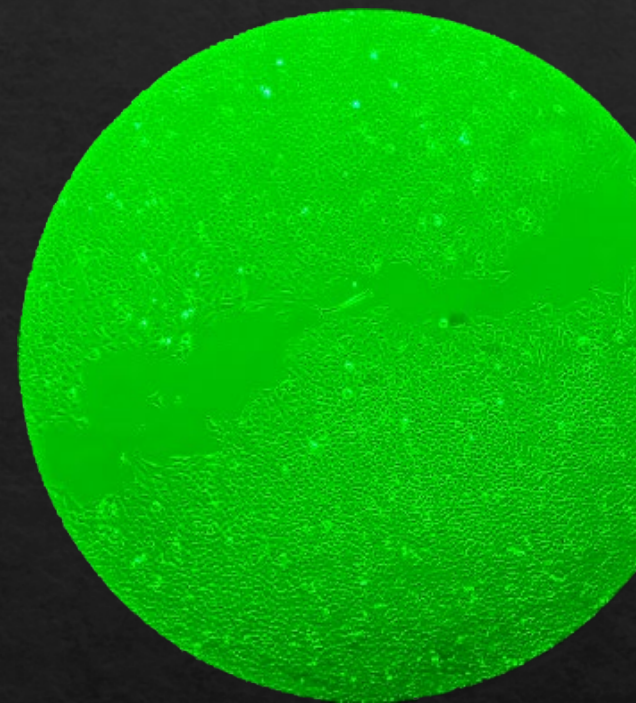




0th hour

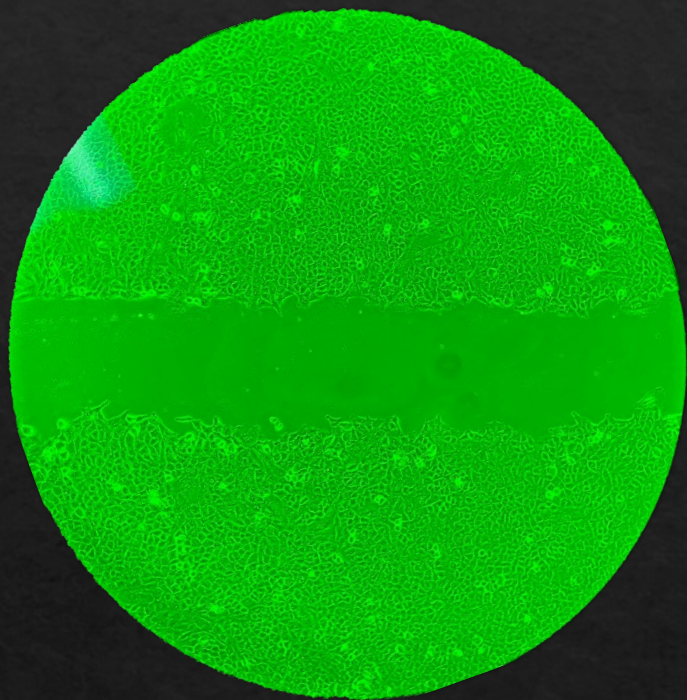


12th hour

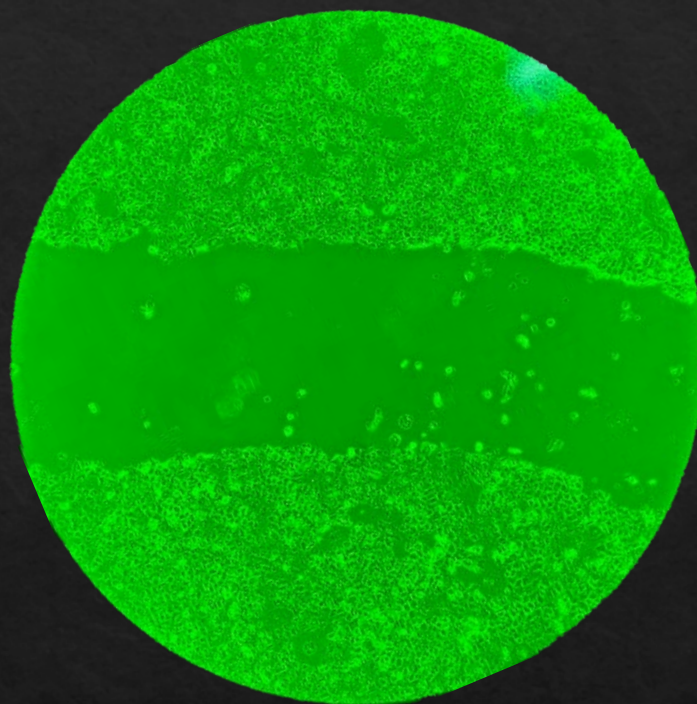


24th hour

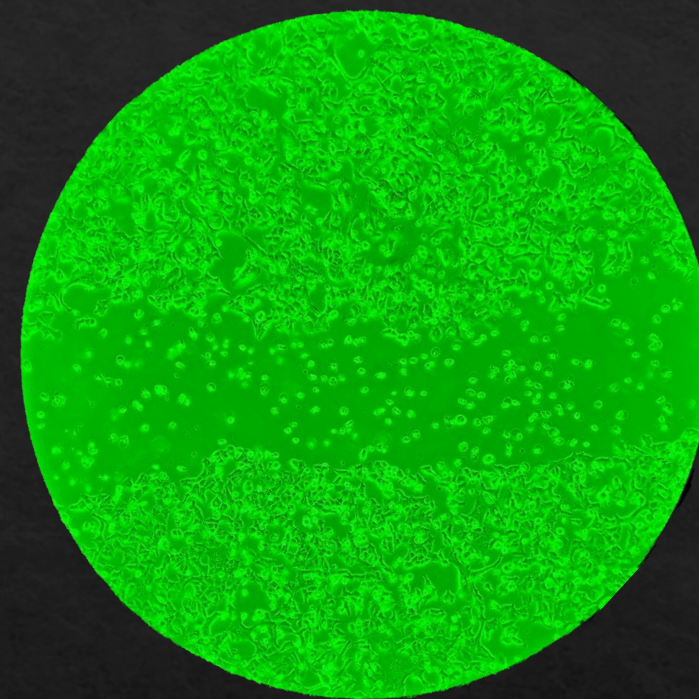
Scratch Assay
Control



0th hour

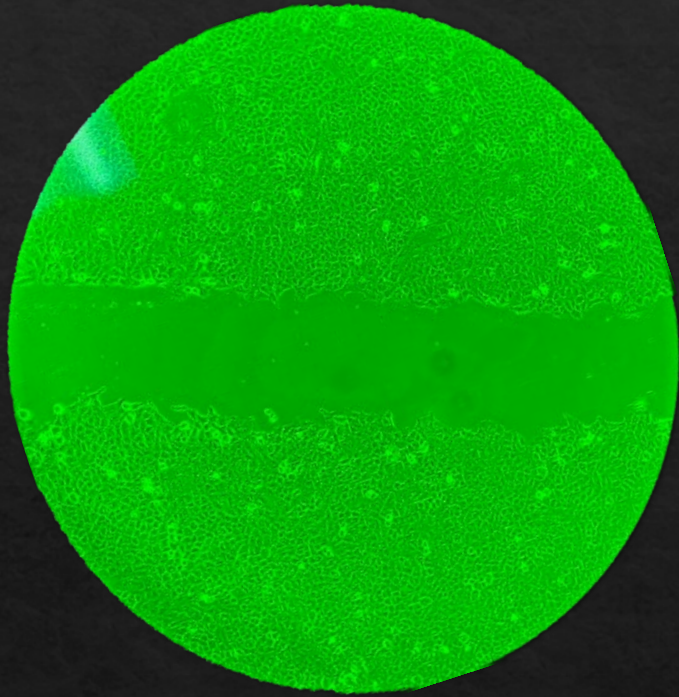


12th hour

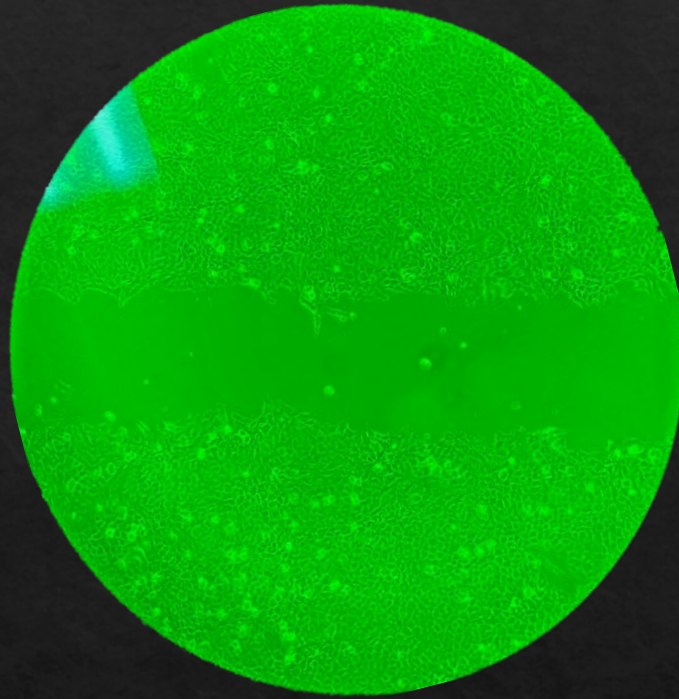


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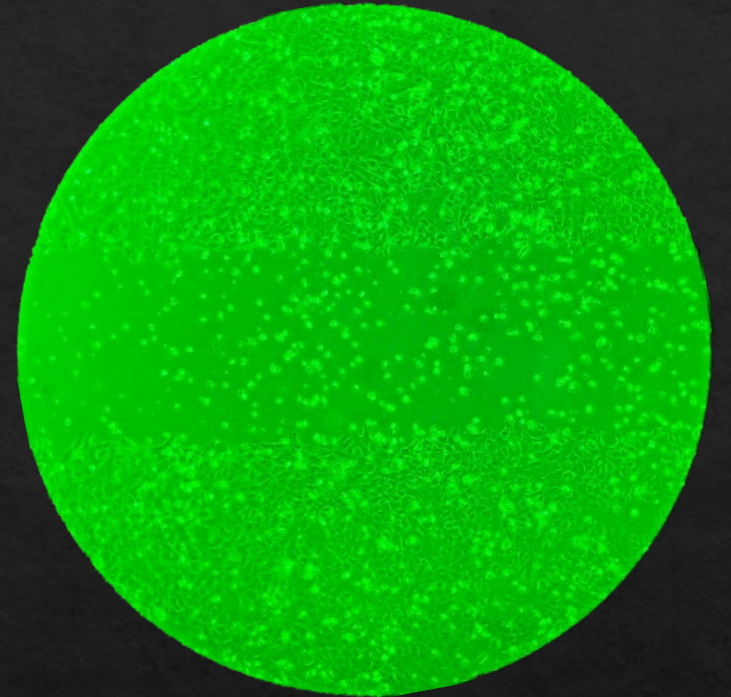
Scratch Assay
Curcumin



0th hour

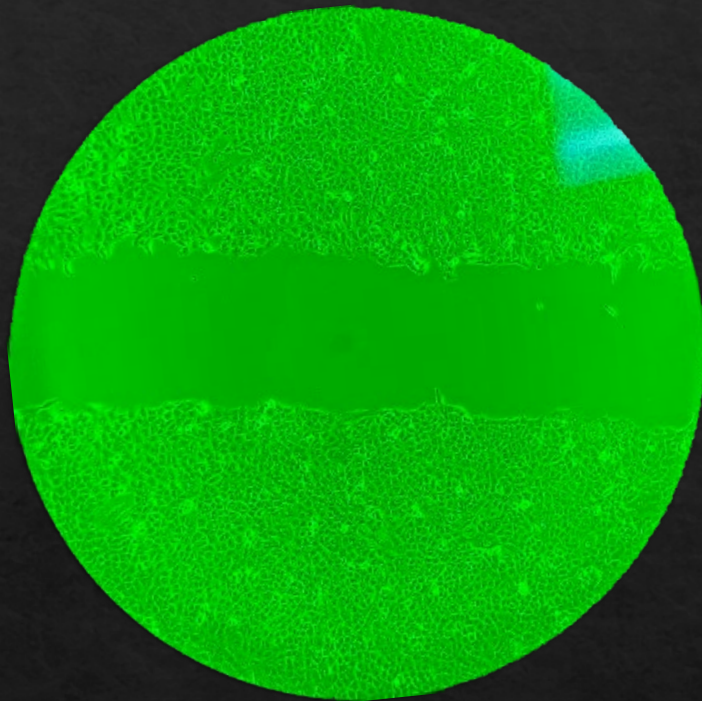


12th hour

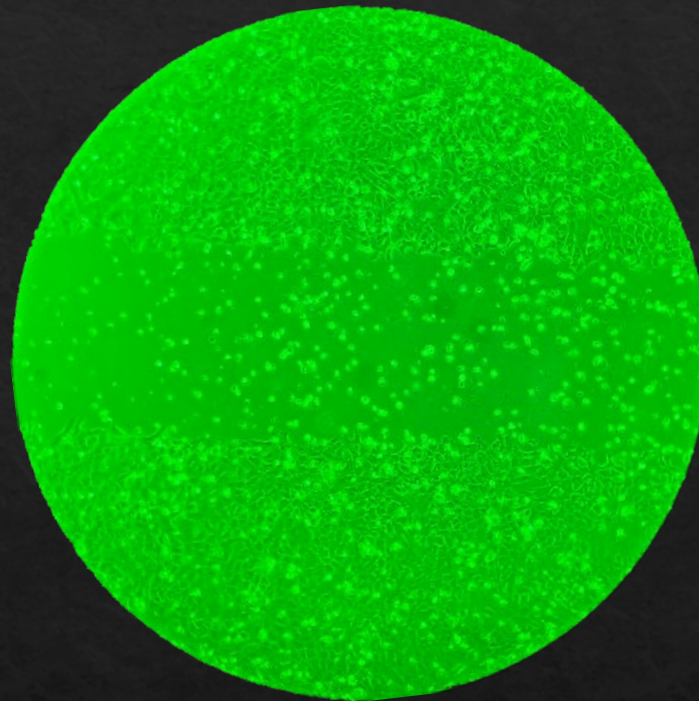


24th hour

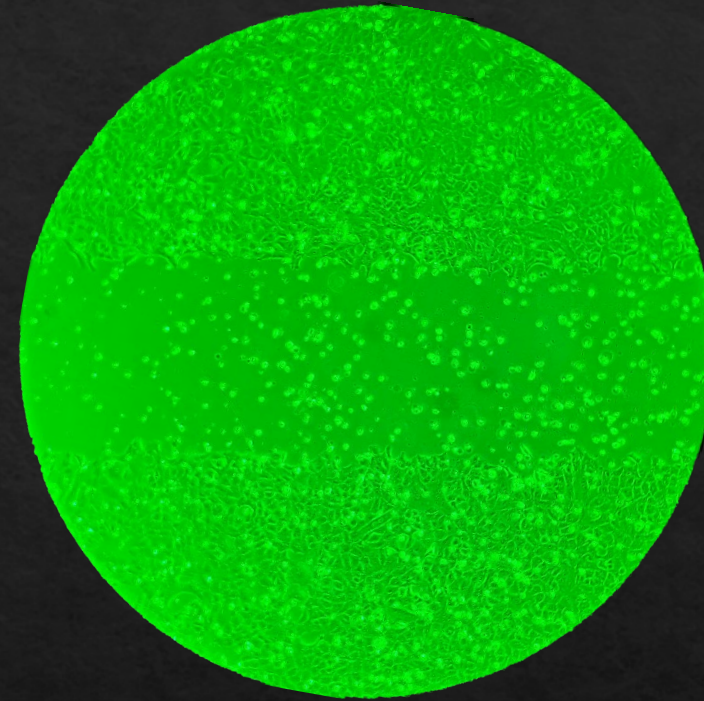
Scratch Assay
Rutin



0th hour



12th hour



24th hour

Scratch Assay
Resveratrol

Conclusion

- ◆ Polyphenols having a broad application prospects are considered to be a safe and effective antitumor drug.
- ◆ Evidences have been gained that curcumin, rutin and resveratrol could significantly inhibit the proliferation of A549 cells in this study.
- ◆ The study of non-apoptotic cell death mechanisms induced by polyphenols would provide targets of plant-derived compounds for future cancer therapeutics and become the new direction of antitumor researches.

References

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References

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THANK YOU