

University of Windsor

## Scholarship at UWindsor

---

UWill Discover Undergraduate Conference

UWill Discover 2016

---

Mar 29th, 10:00 AM - 11:20 AM

### The anti-proliferative effect of turmeric and rooibos extracts on human Hodgkin lymphoma cells

Emily G. Kogel

University of Windsor, kogel@uwindsor.ca

Follow this and additional works at: <https://scholar.uwindsor.ca/uwilldiscover>



This work is licensed under a [Creative Commons Attribution-Noncommercial 4.0 License](https://creativecommons.org/licenses/by-nc/4.0/)

---

Kogel, Emily G., "The anti-proliferative effect of turmeric and rooibos extracts on human Hodgkin lymphoma cells" (2016). *UWill Discover Undergraduate Conference*. 3.

<https://scholar.uwindsor.ca/uwilldiscover/2016/session4/3>

This Event is brought to you for free and open access by the Conferences and Conference Proceedings at Scholarship at UWindsor. It has been accepted for inclusion in UWill Discover Undergraduate Conference by an authorized administrator of Scholarship at UWindsor. For more information, please contact [scholarship@uwindsor.ca](mailto:scholarship@uwindsor.ca).

# The Anti-proliferative Effects of Turmeric and Rooibos Extracts on Human Hodgkin Lymphoma Cells

Emily Kogel

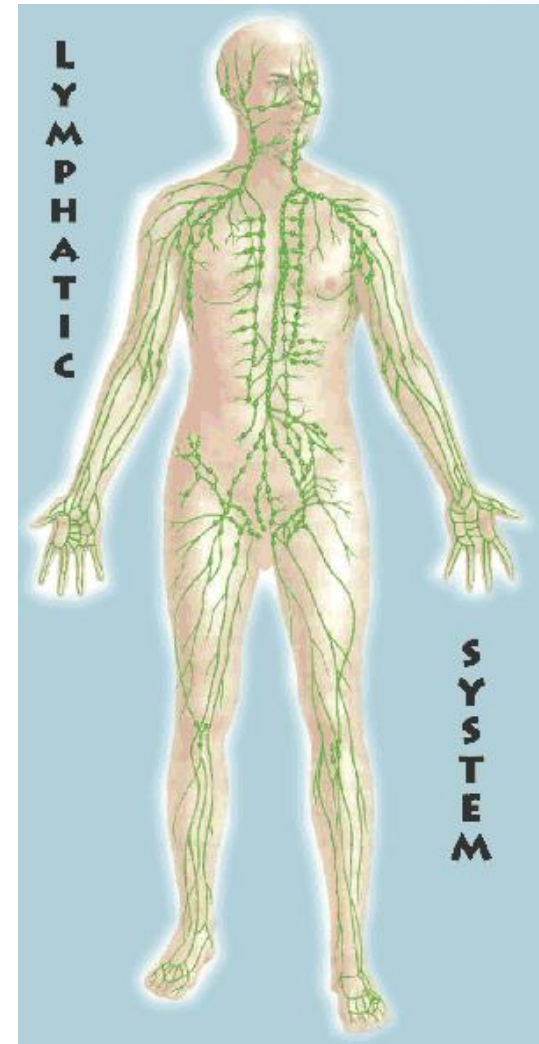
March 29, 2016



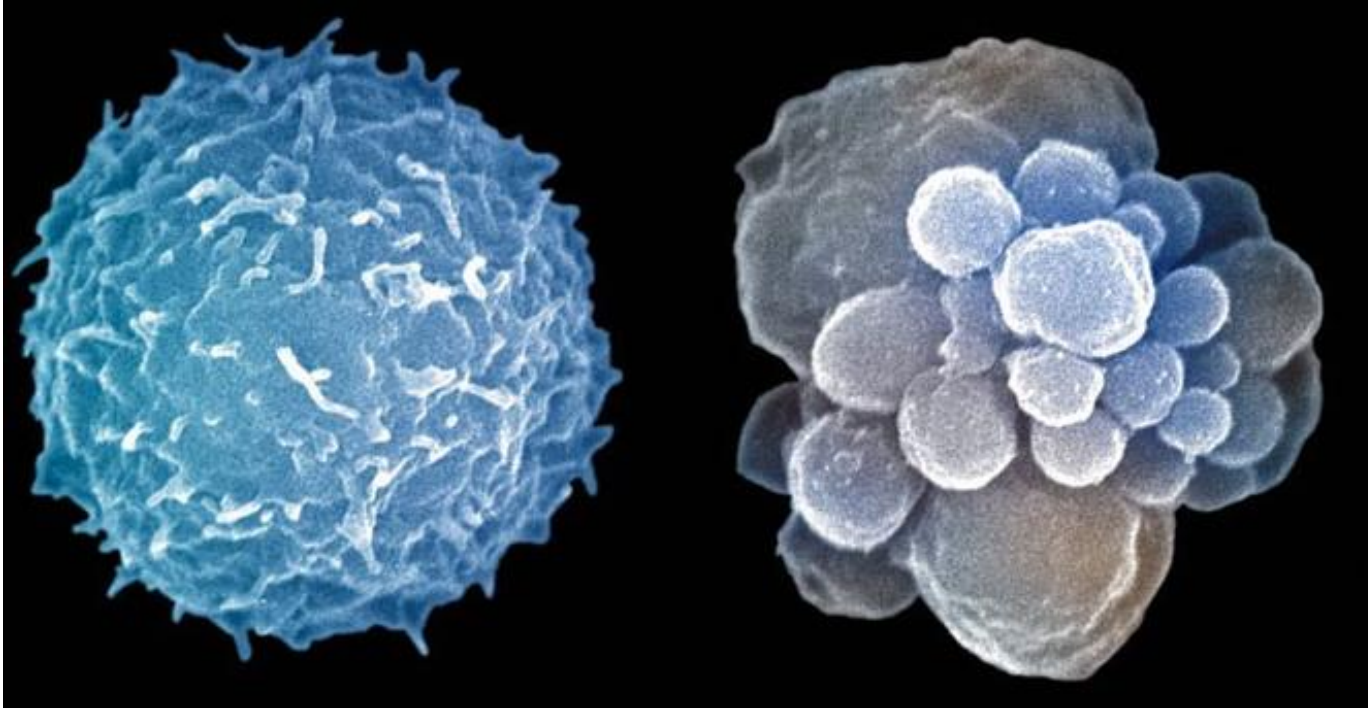
University  
of Windsor

# Hodgkin Lymphoma

- Immune system support
- Lymph
  - Lymphocytes + other white blood cells
  - Antibodies
  - Nutrients



# Apoptosis



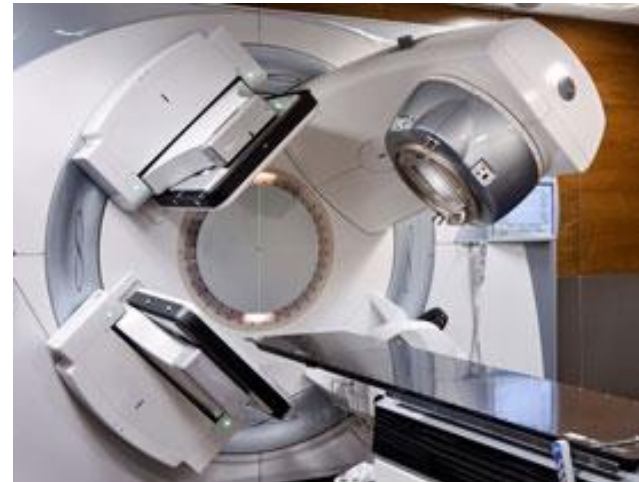
# Cancer Treatment: Options

- Surgery

Hodgkin

Lymphoma:

- Radiation therapy
- Chemotherapy



<http://www.cancer.ca/en/cancer-information/diagnosis-and-treatment/treatment/?region=bc>

<http://www.joshgitalis.com/pre-and-post-surgery-nutrition/>

<http://www.dailymail.co.uk/health/article-1177248/New-scans-reveal-chemotherapy-working.html>

<http://www.onclive.com/web-exclusives/Radiation-Therapy-After-Surgery-Shows-No-Survival-Benefit-for-Elderly-Lung-Cancer-Patients>

# Turmeric & Rooibos

- Natural health products - new cancer treatment options?

## Turmeric



- Strong anti-inflammatory agent
- Supports immune system
- Activates intrinsic apoptosis

## Rooibos



- Inhibitor of x-ray-induced cell transformation
- Anti-oxidant activity
- Free-radical scavengers, like flavonoids, induce apoptosis in cancerous cells



# Methods of Extraction

- 3 solvents
- Whole, complex mixture

Hot Water



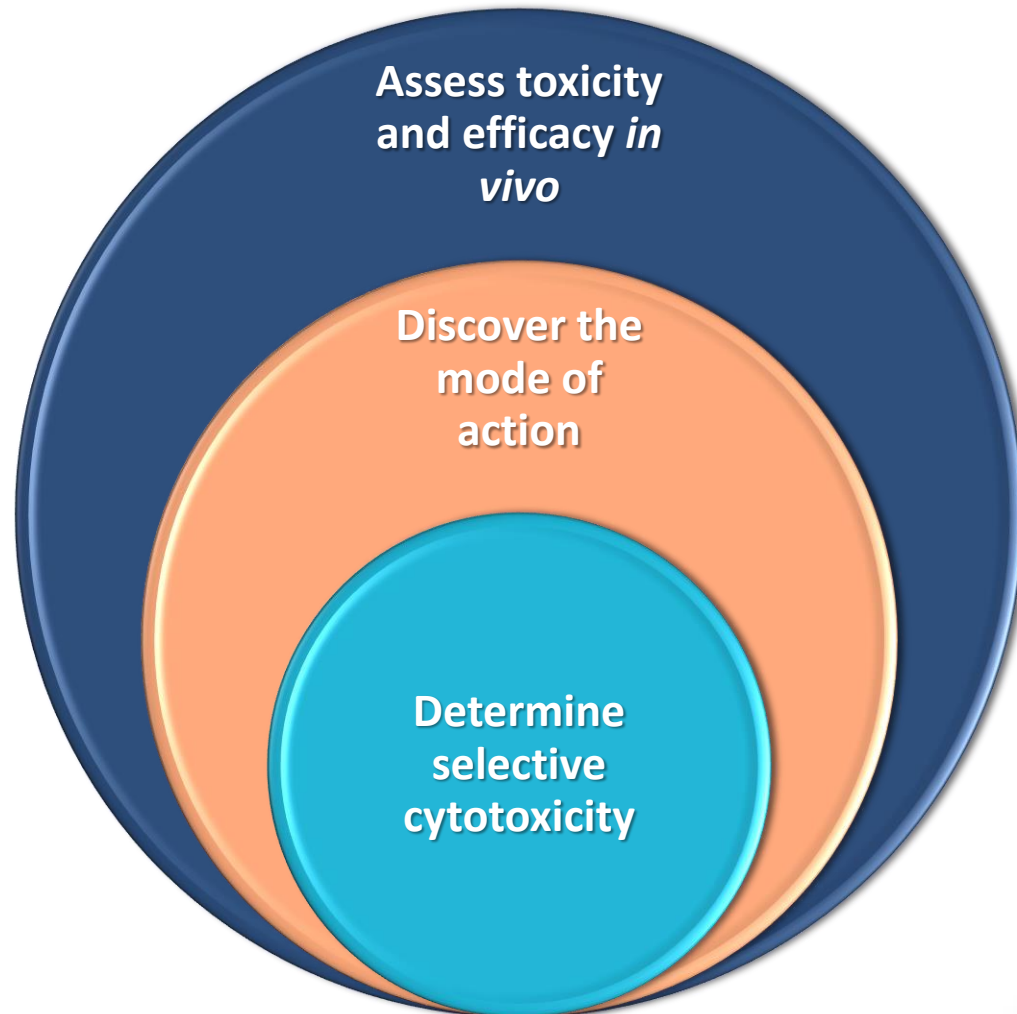
Cold Water




Ethanol



Do the **anti-proliferative properties of turmeric and rooibos extracts** in cancer cells translate to **Hodgkin lymphoma cells**, and if they do, is the mechanism of action **selective**?







Determine  
selective  
cytotoxicity

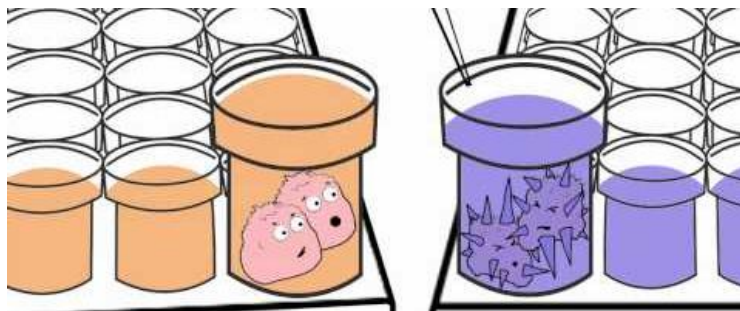
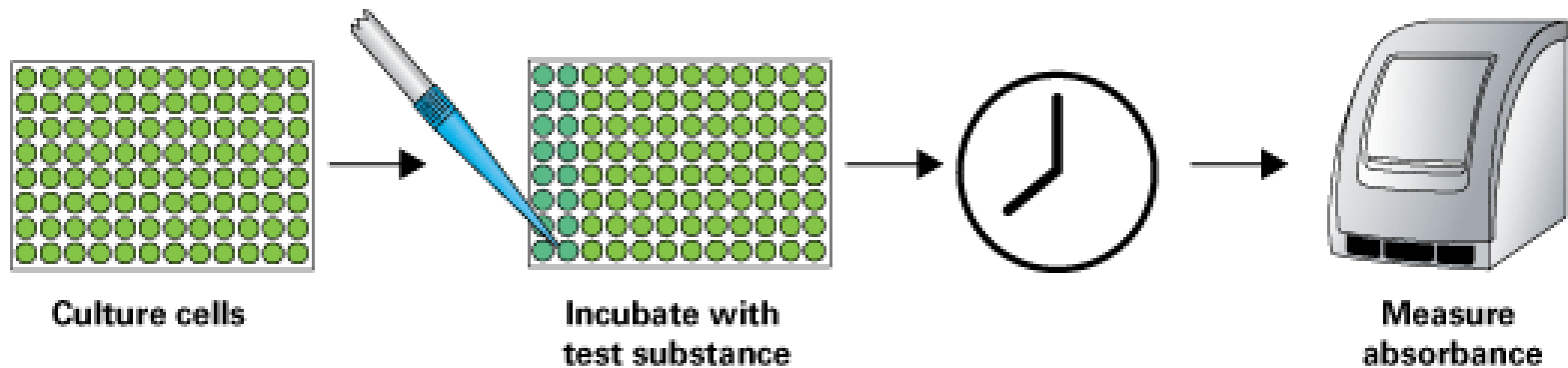
Do the **anti-proliferative properties of turmeric and rooibos extracts** in cancer cells translate to **Hodgkin lymphoma cells**, and if they do, is the mechanism of action **selective**?

## OBJECTIVES

1. Determine if turmeric and rooibos extracts, both individually and in combination, exhibit cytotoxic effects against Hodgkin Lymphoma cells (**WST-1 assay**)
2. Quantify cytotoxicity (**Trypan blue exclusion assay**)
3. Determine permanency of the drugs' effects (**Revival assay**)

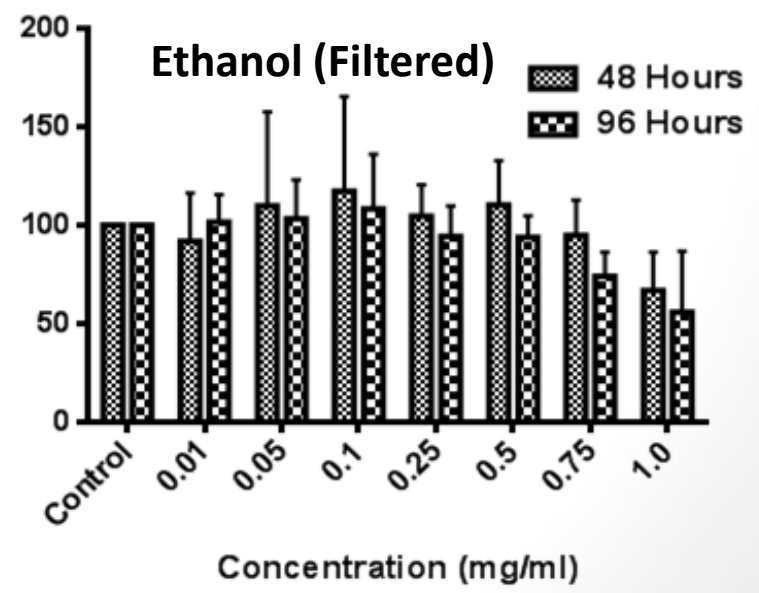
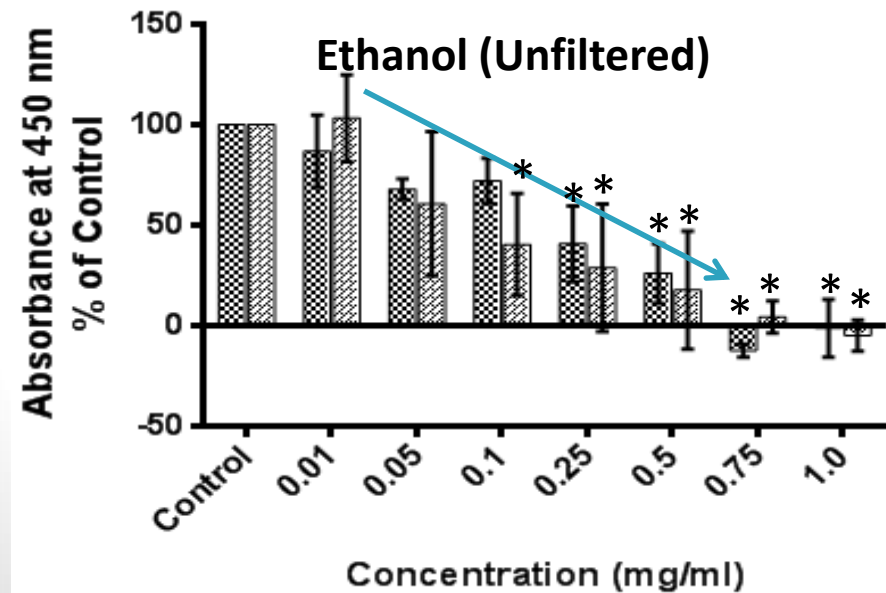
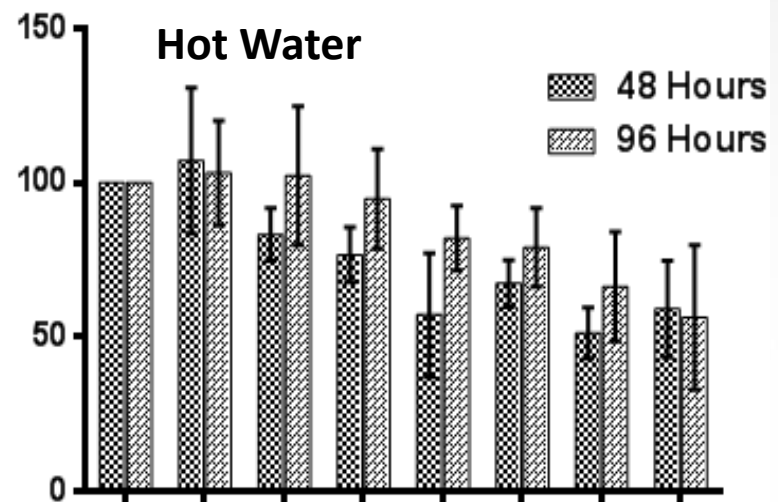
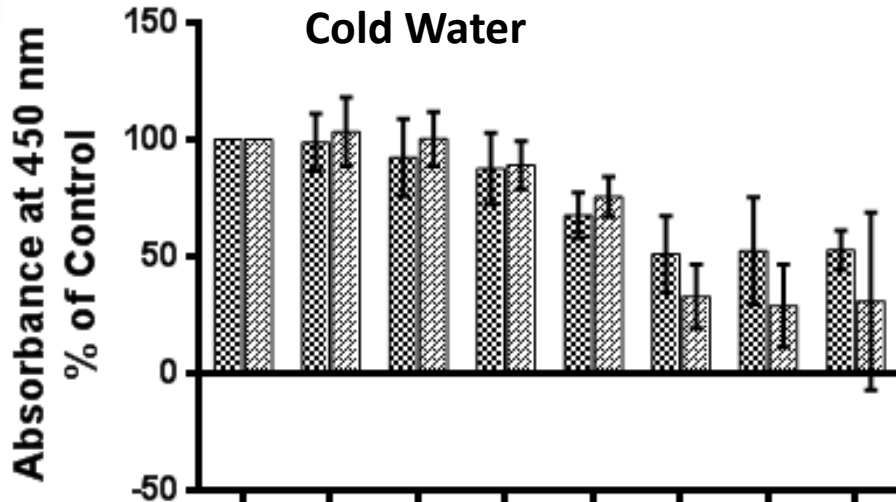
# 1. Determining cytotoxicity

- WST-1 Assay

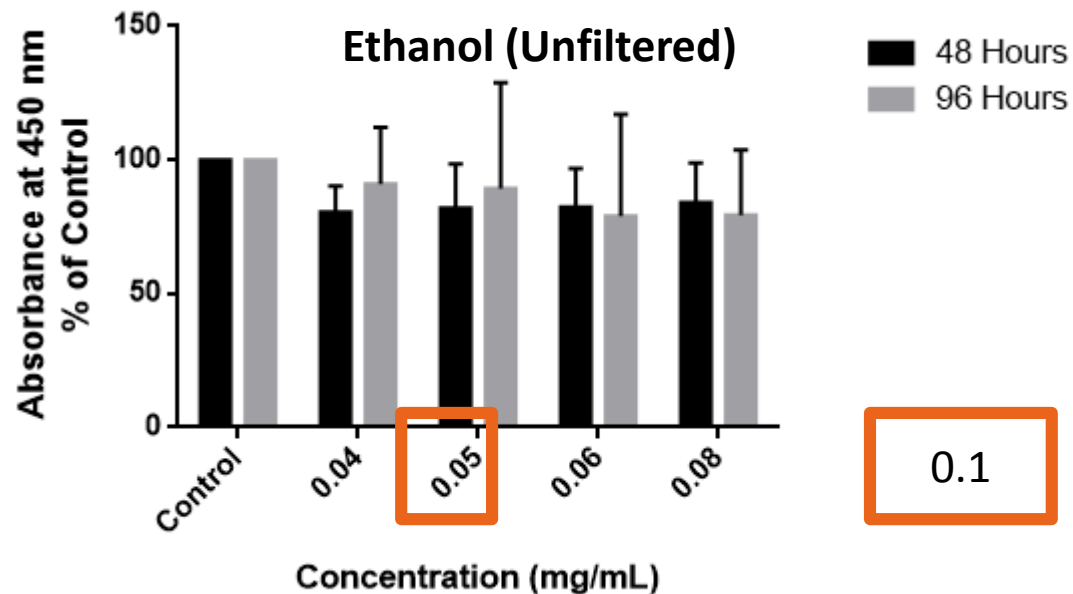
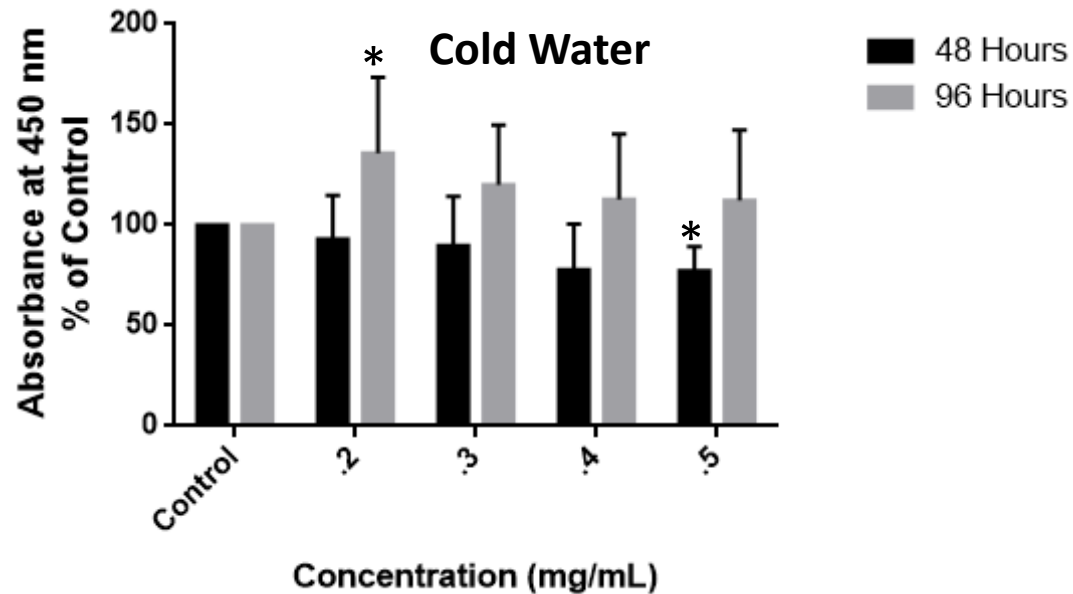


Lower absorbance  
=  
Lower viability

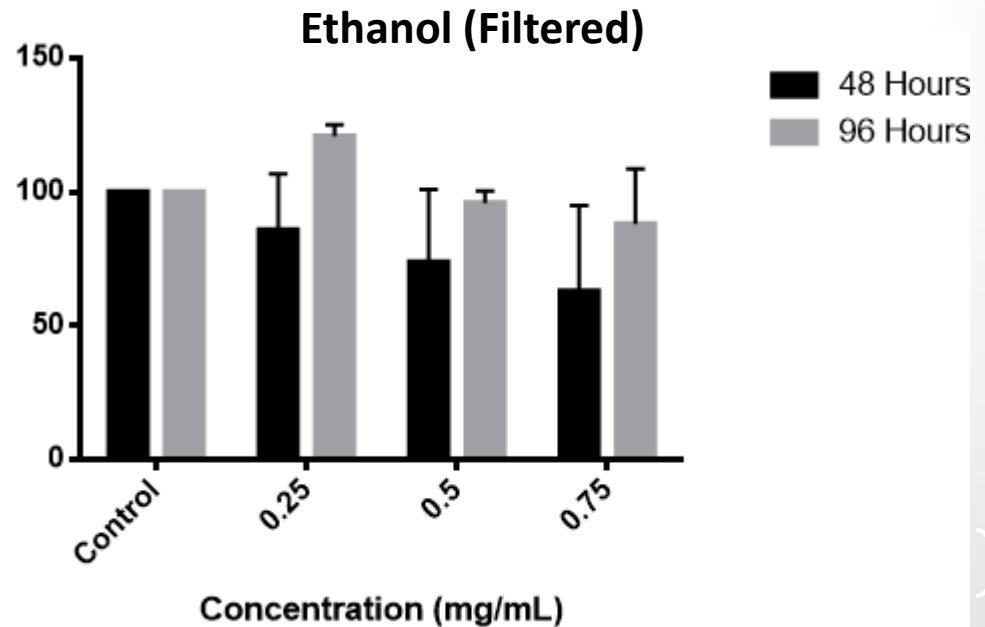
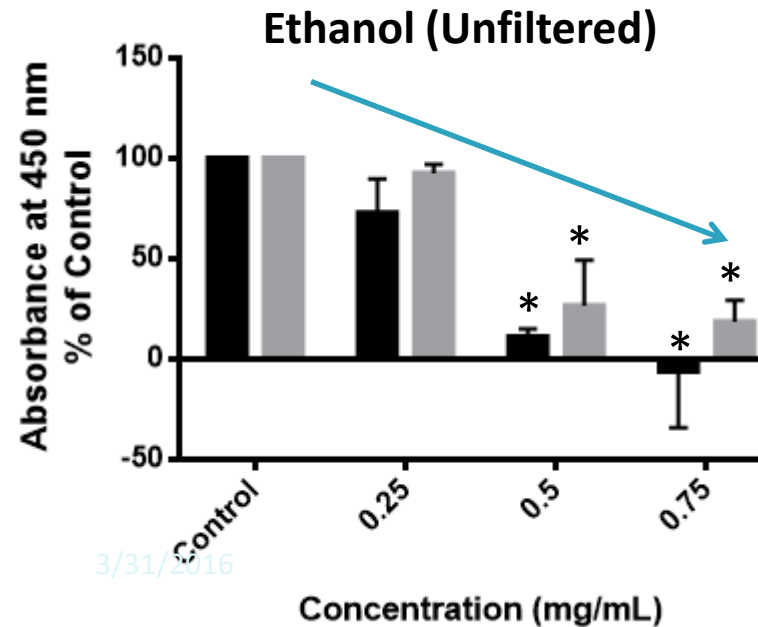
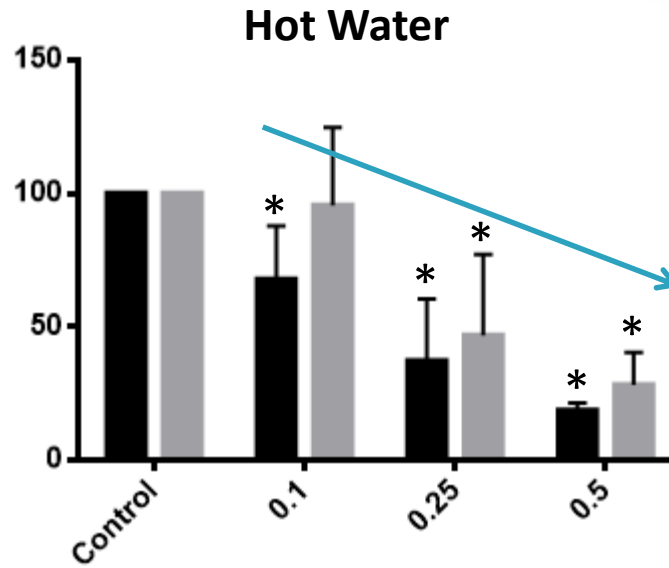
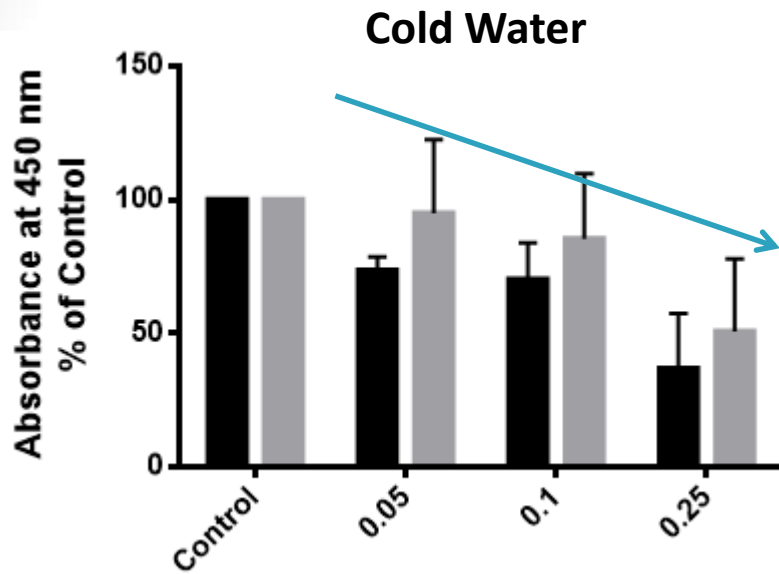
# Cytotoxicity of Turmeric Extracts (KM-H2)



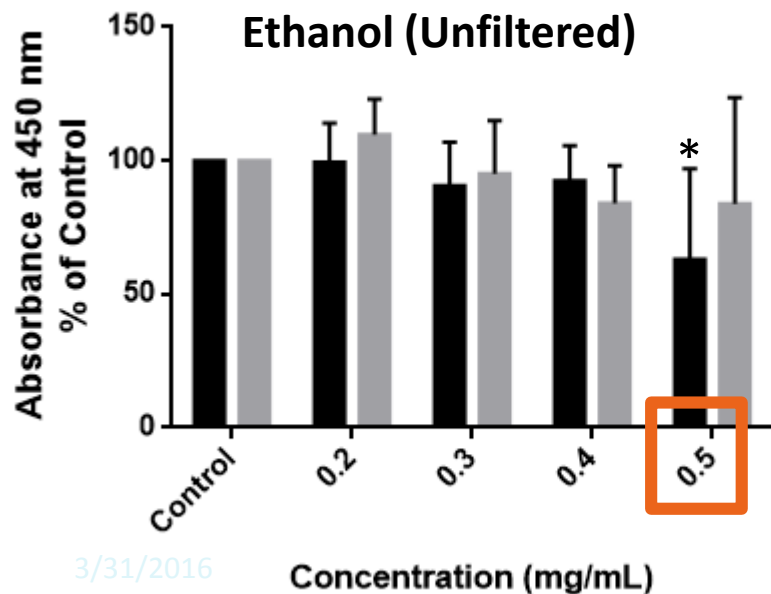
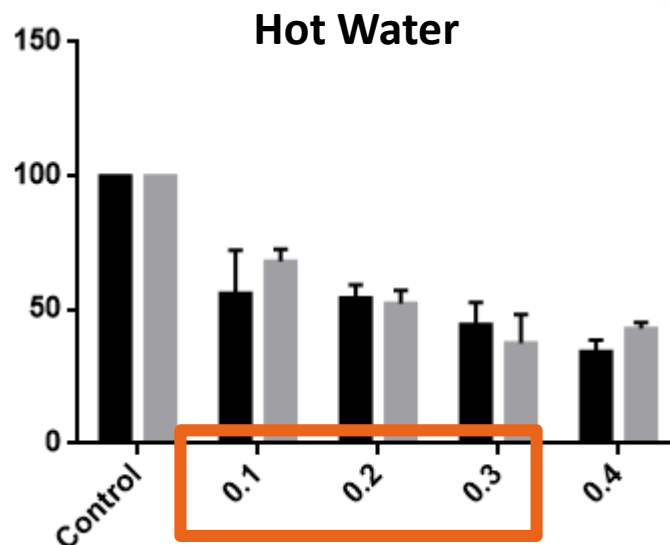
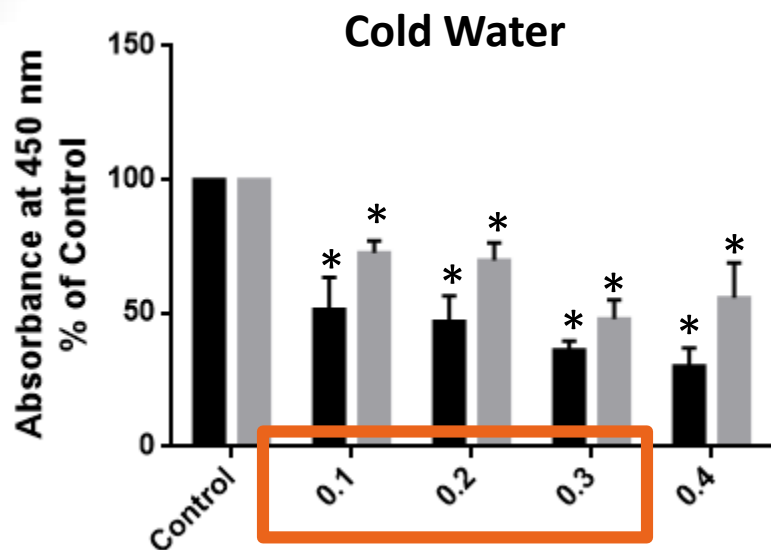
# Cytotoxicity of Turmeric Extracts (KM-H2) - ROUND 2



# Cytotoxicity of Rooibos Extracts (KM-H2)



# Cytotoxicity of Rooibos Extracts (KM-H2) – ROUND 2

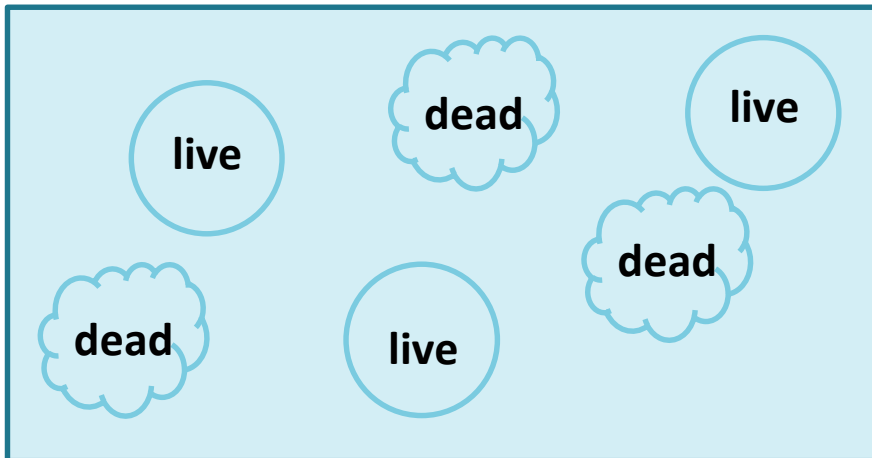


■ 48 Hours  
■ 96 Hours



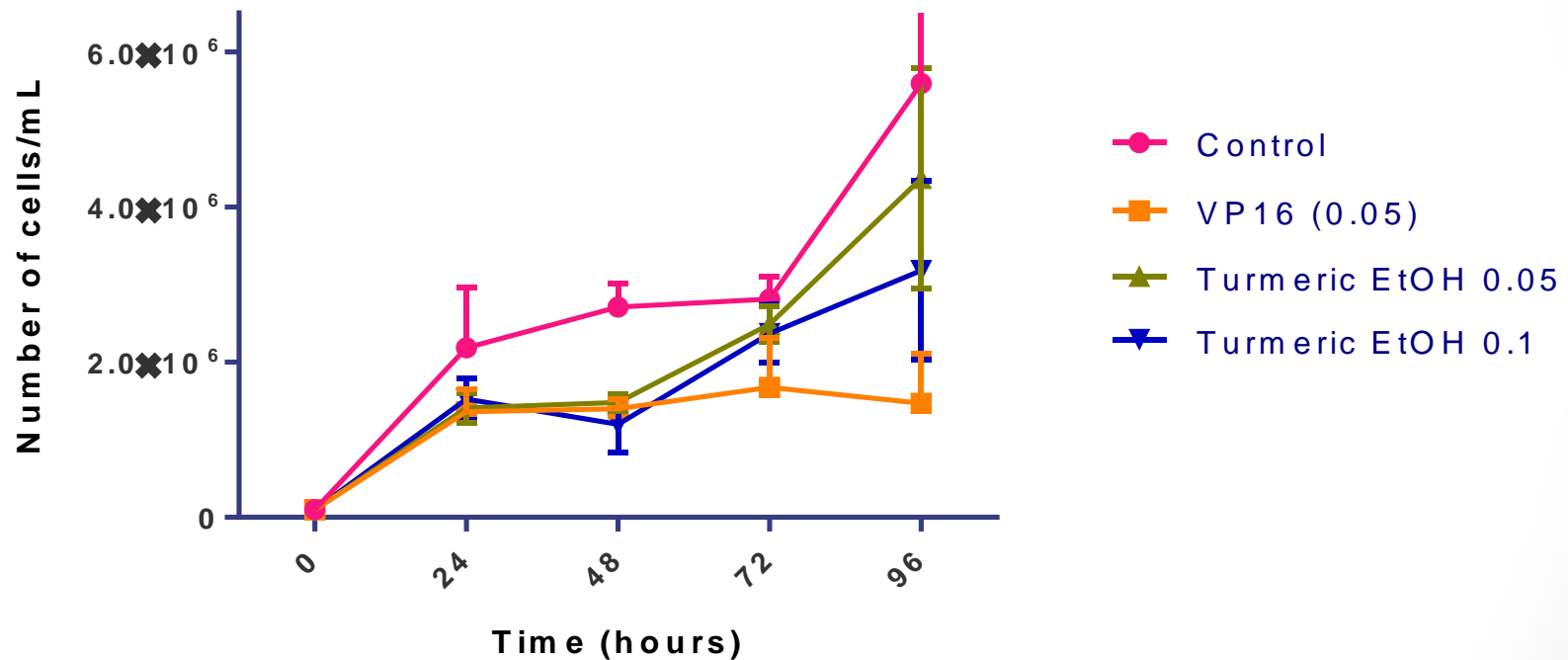
## 2. Quantify cytotoxicity

- Trypan blue exclusion assay



## 2. Quantify cytotoxicity:

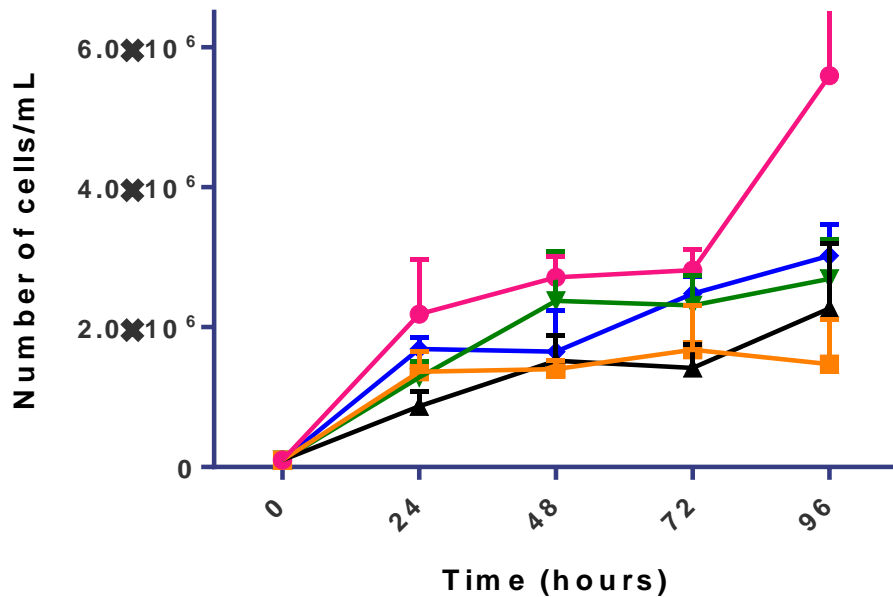
### Effect of ethanolic turmeric extract on the viability of KM-H2 cells



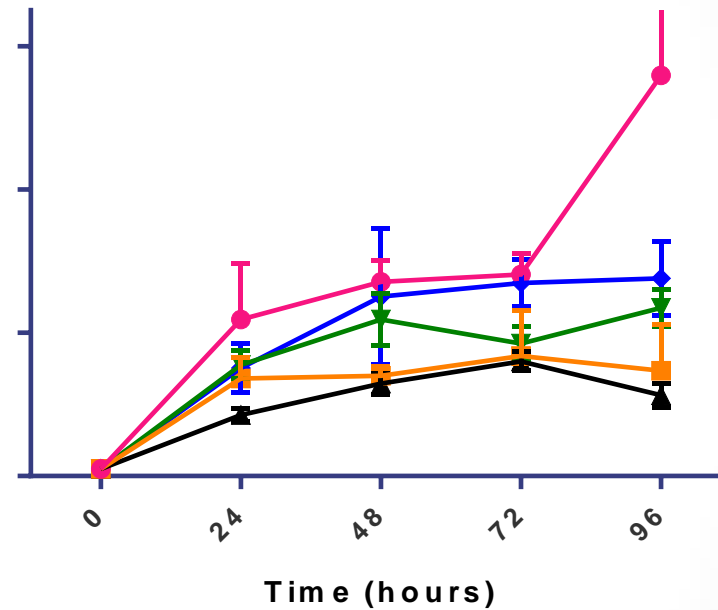
## 2. Quantify cytotoxicity:

### Effect of rooibos extracts on the viability of KM-H2 cells

Cold water rooibos



Hot water rooibos



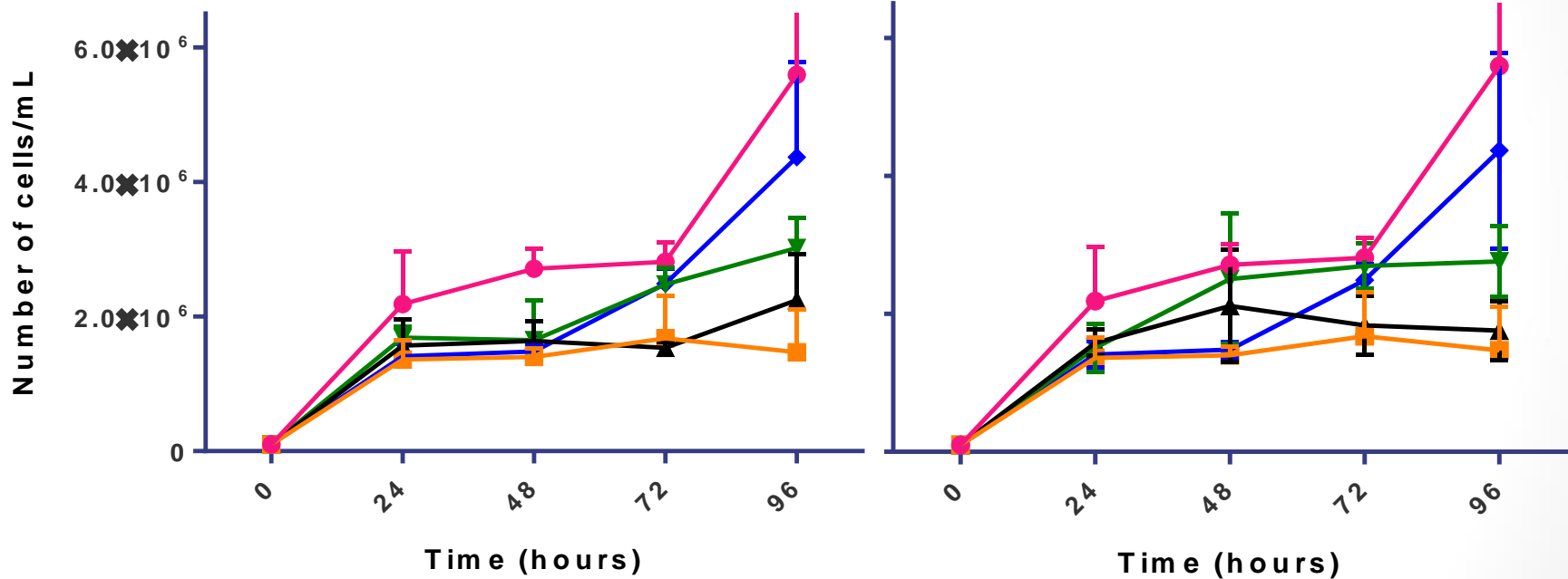
- ◆ Rooibos 0.1
- ▼ Rooibos 0.2
- ▲ Rooibos 0.3
- VP16 (0.05)
- Control

## 2. Quantify cytotoxicity:

### Effect of extracts in combination on the viability of KM-H2 cells

Cold water combination

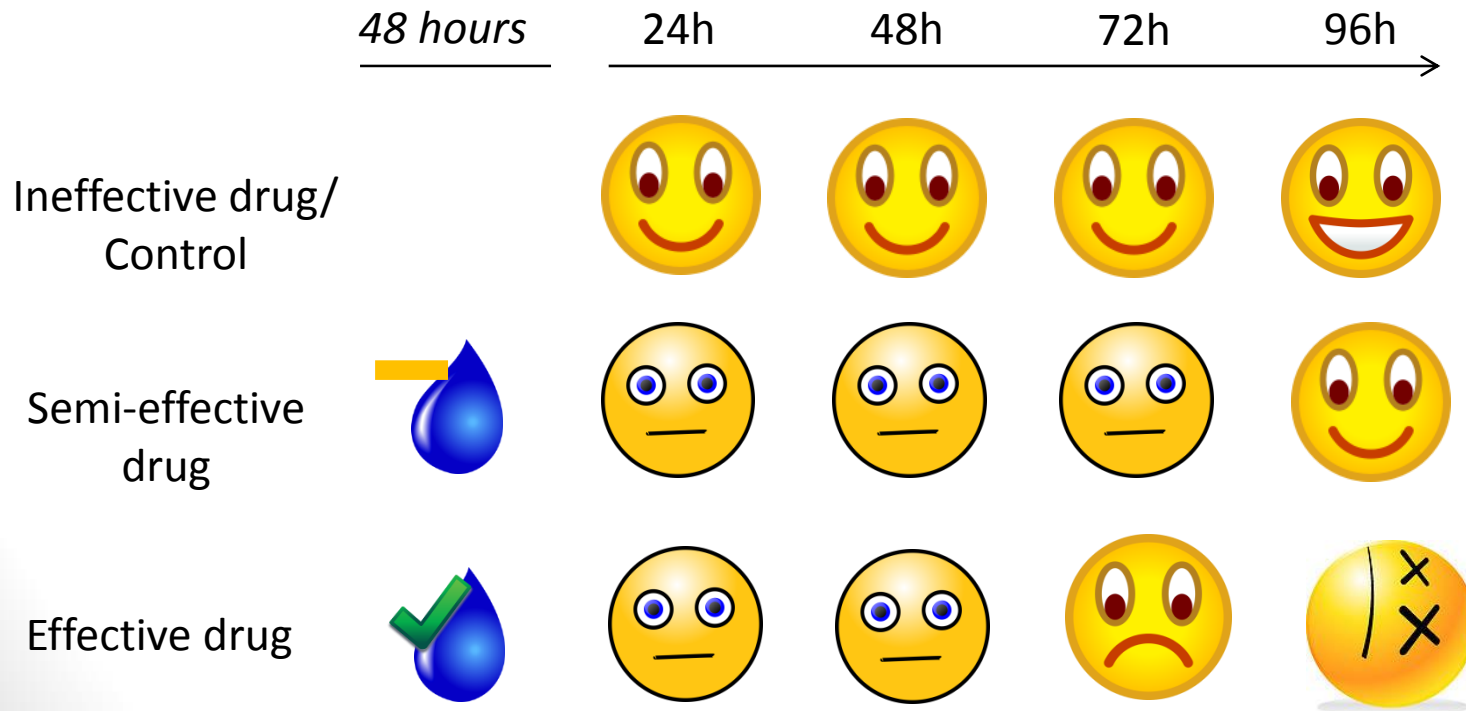
Hot water combination



- ◆ Turmeric EtOH 0.05
- ▼ Rooibos 0.1
- ▲ Turmeric EtOH 0.05 + Rooibos 0.1
- VP16 (0.05)
- Control

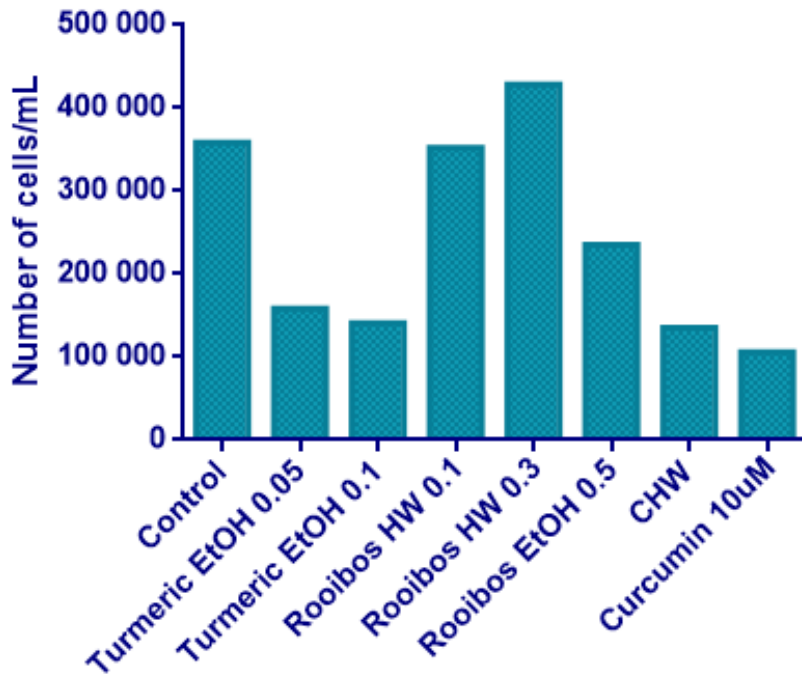
### 3. Determine permanency of the drugs' effects

- Revival assay

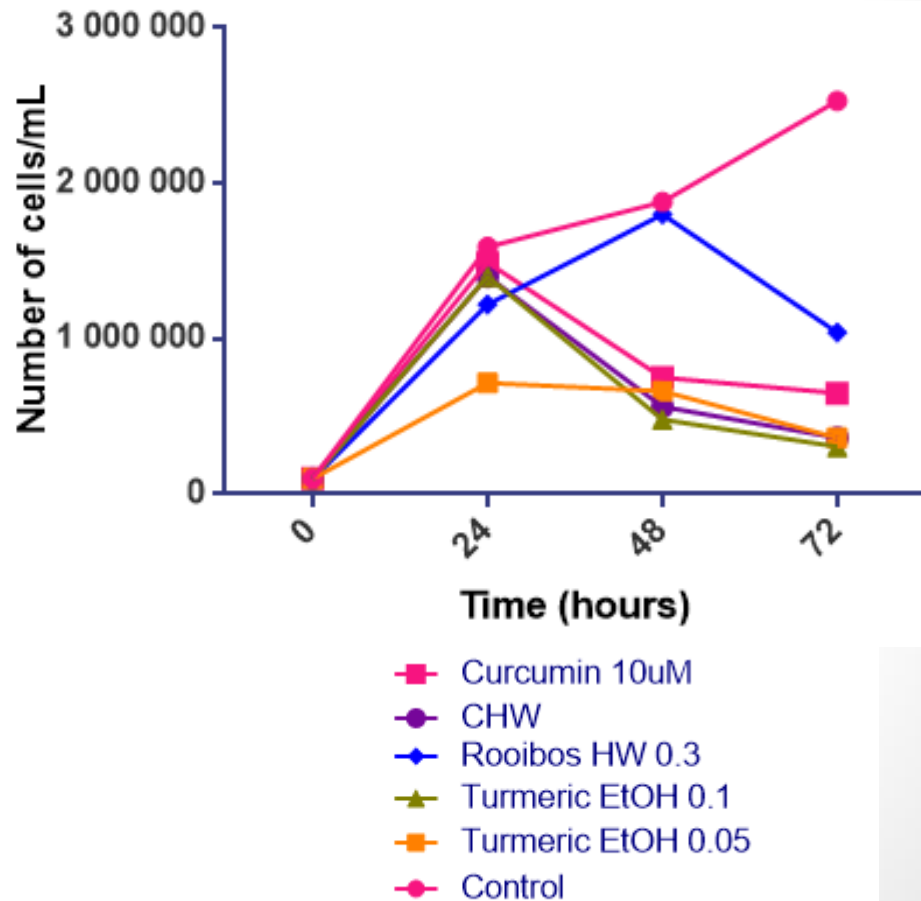


# Growth of KM-H2 cells in various treatment groups: **PRELIMINARY RESULTS**

48 hours (with drug)



24-72 hours (without drug)





# Conclusions

- Turmeric: ethanolic extracts exhibit anti-proliferative effects on Hodgkin lymphoma cells that are likely long-lasting
- Rooibos: hot water extracts show cytotoxicity against Hodgkin lymphoma cells
- A combinatorial effect exists when low doses of ethanolic turmeric and cold/hot water rooibos extracts are used together

These natural health products show potential to be studied further for the development of more effective chemotherapeutic agents.

# Future Work

- Assess selectivity of extracts by studying cytotoxicity in normal lymphocytes
- Evaluate the mode of cell death induction
- Assess toxicity and efficacy alone and in combination in animal models



# Dedication

- Dedicated to the memory of Kevin Couvillon, who lost his battle against Leukaemia in 2010.



# Acknowledgments

- Dr. Pandey
- Members of Dr. Pandey's Lab
- Funding



University  
of Windsor



Thank you!