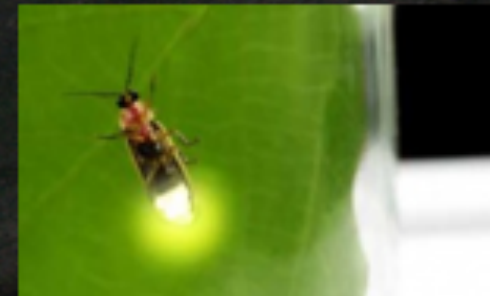
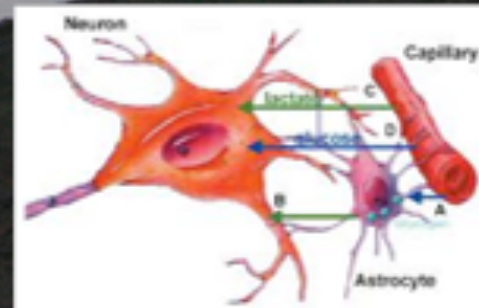
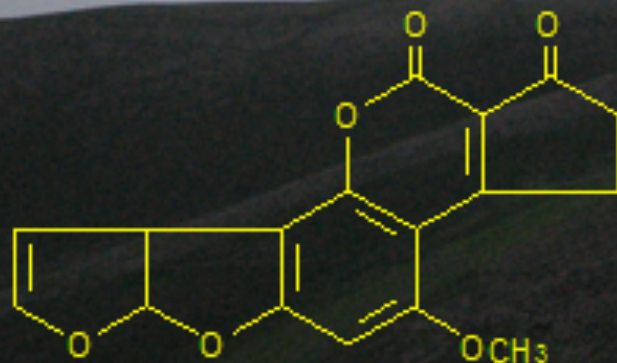


# Bioluminescence-based detection of brain immune cells apoptosis and ATP depletion induced by aflatoxin B<sub>1</sub>

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Slide's background location:

Alborz mountain ranges, Southern part of Caspian Sea, Iran  
>3800 m above sea level

*Friday, 22-07-2016, at 17:20*

# Contents

Location:

Alborz mountain ranges, Southern part of  
Caspian Sea, Iran  
>3800 m above sea level

Introduction

Methodology

Results

Conclusions

**Main emphasis on neurotoxicity,  
astrocytes and AFB<sub>1</sub>**



A wide-angle photograph of a rocky, arid landscape. The foreground is filled with numerous small, reddish-brown rocks and pebbles. The middle ground shows a gentle slope of similar terrain, dotted with sparse, low-lying green and yellow vegetation. In the background, a larger, more rugged hillside rises against a bright blue sky filled with large, fluffy white clouds. The overall scene is bright and clear, suggesting a sunny day in a high-altitude or semi-arid environment.

# INTRODUCTION

**Location:**

Alborz mountain ranges, Southern part of Caspian Sea, Iran  
>3800 m above sea level

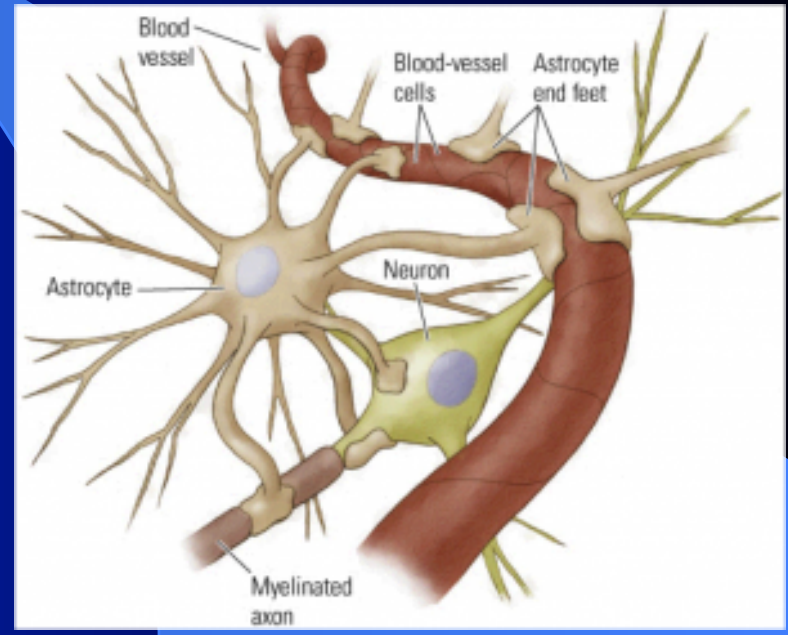
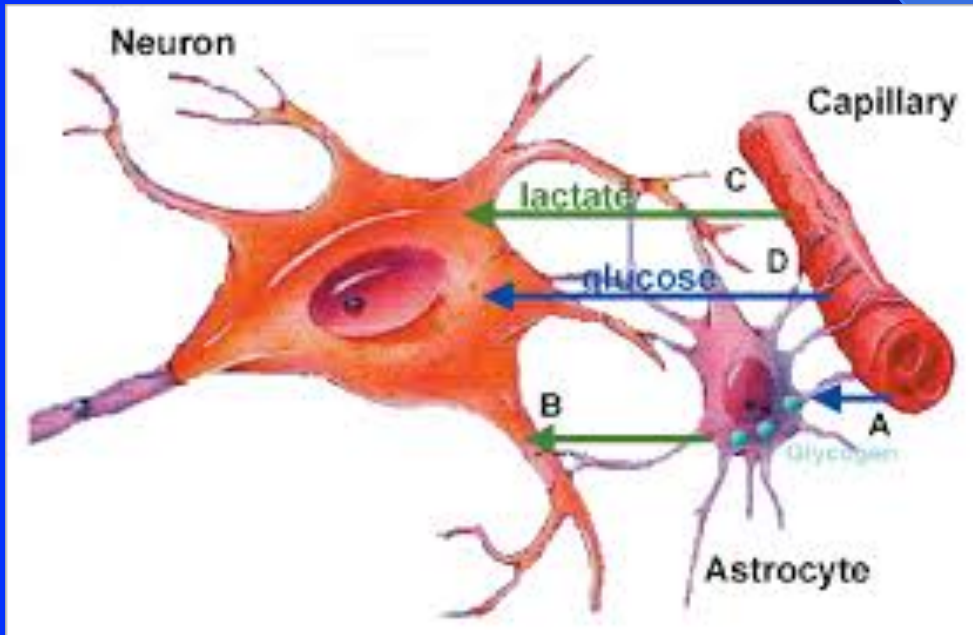
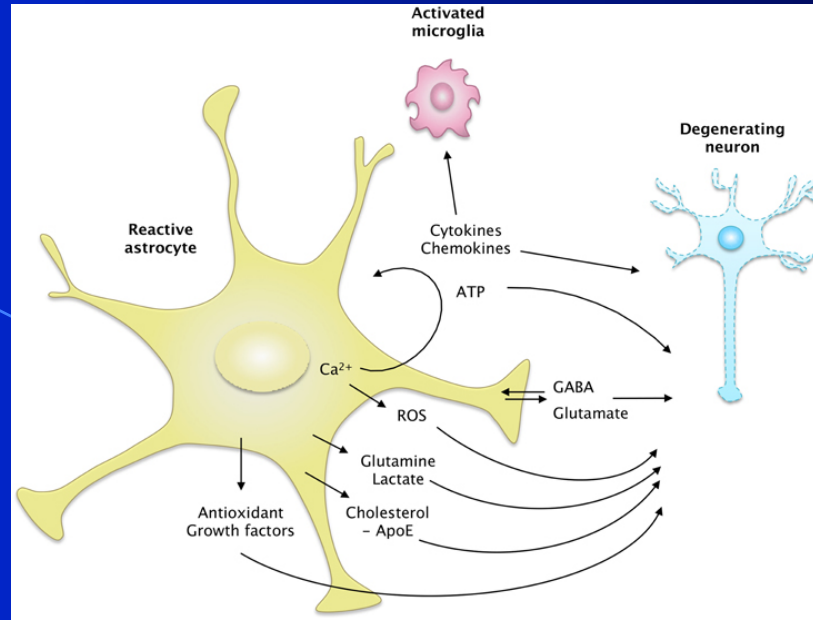
**The complex problem in today's humans and animals' macro/microenvironment: pollution and immune-dysregulation, infections and cancer**

**Many mycotoxins in our environment**

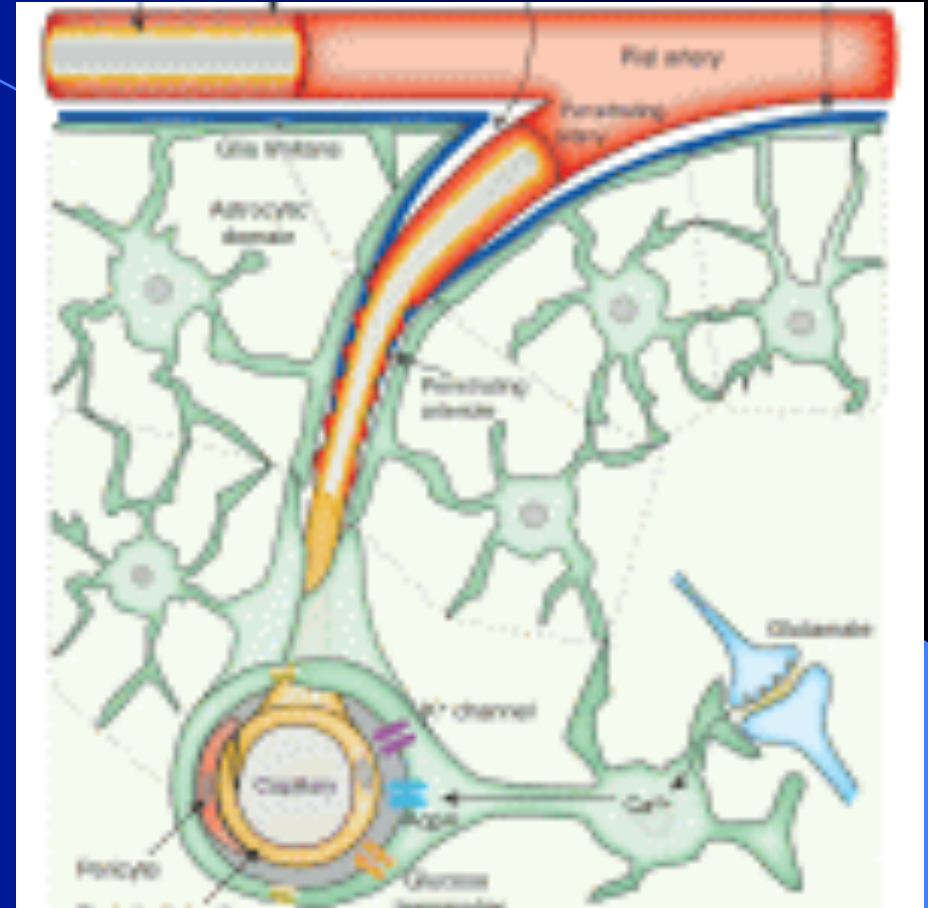
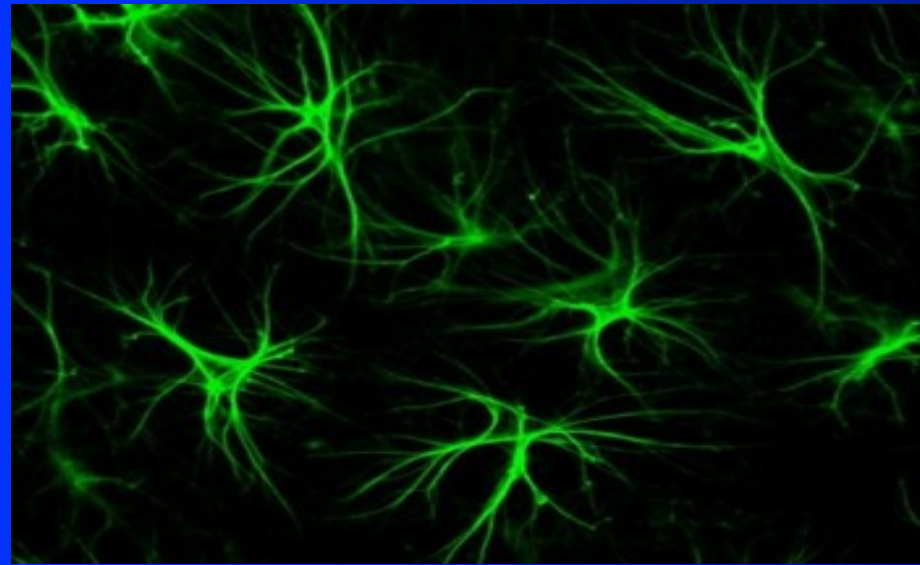
**Chronic low dose exposure!!!**

About neuroimmunotoxicity knowns >>> knowns

# Astrocytes



# Astrocytes protect/control neuron functions



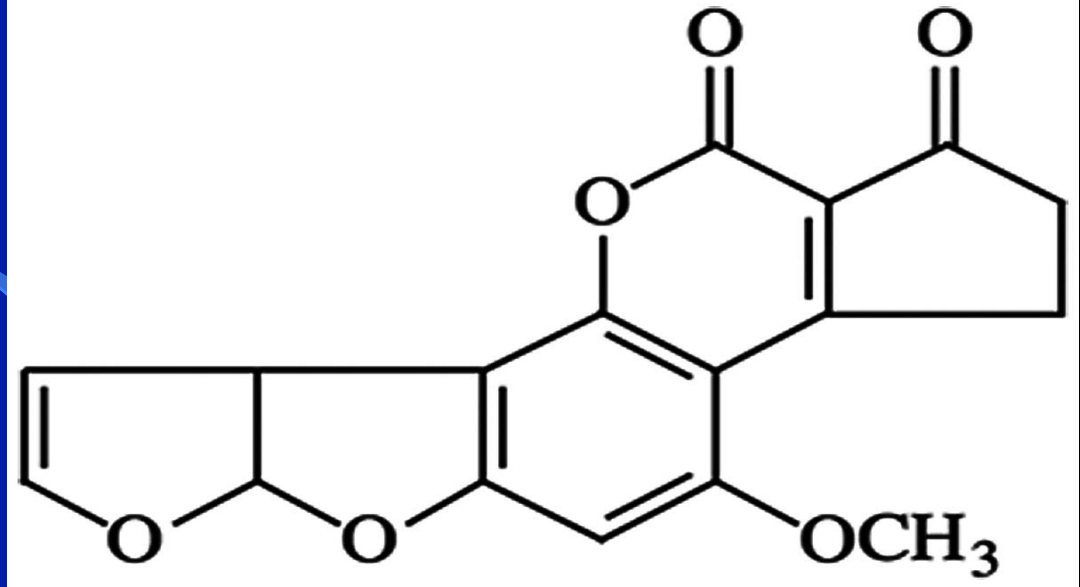
-Form BBB,

-CNS blood flow regulation

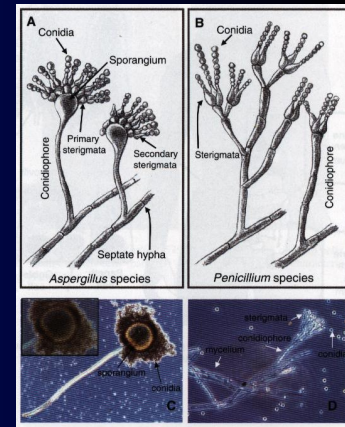
-Involve in diverse CNS and PNS physiopathology

-Possess huge immunological arms against pathogens... even immunosurveillance of P/M/DAMPs ....

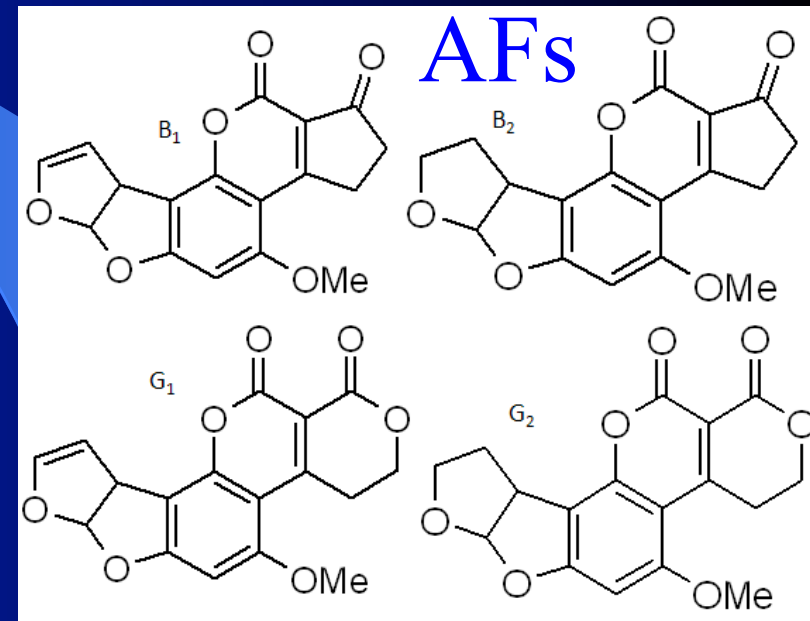
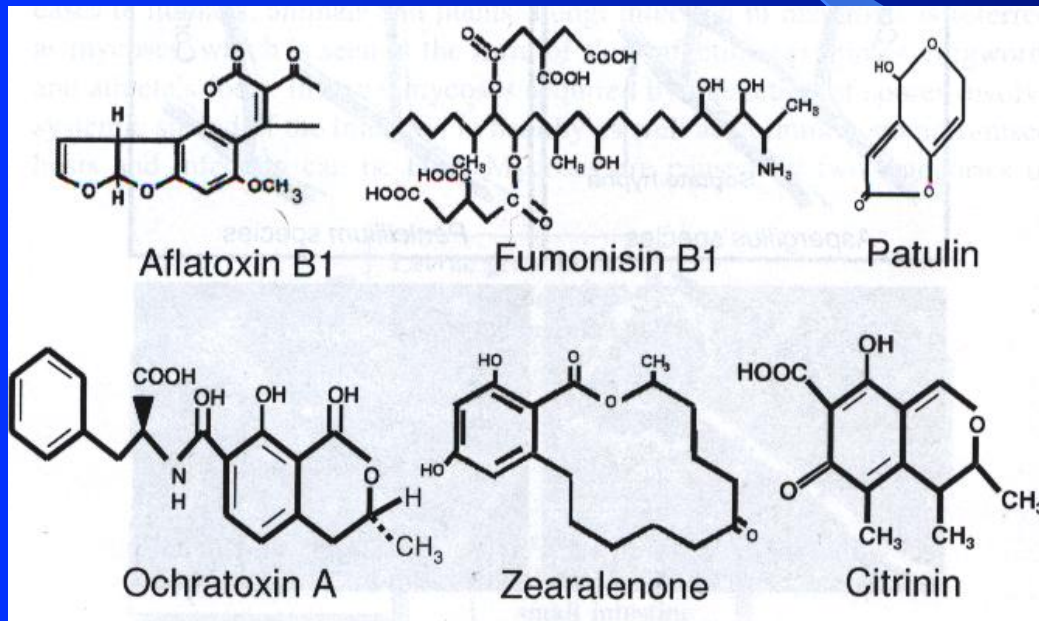
# Aflatoxins (AFs)



# Mycotoxins, Aflatoxins (AFs)



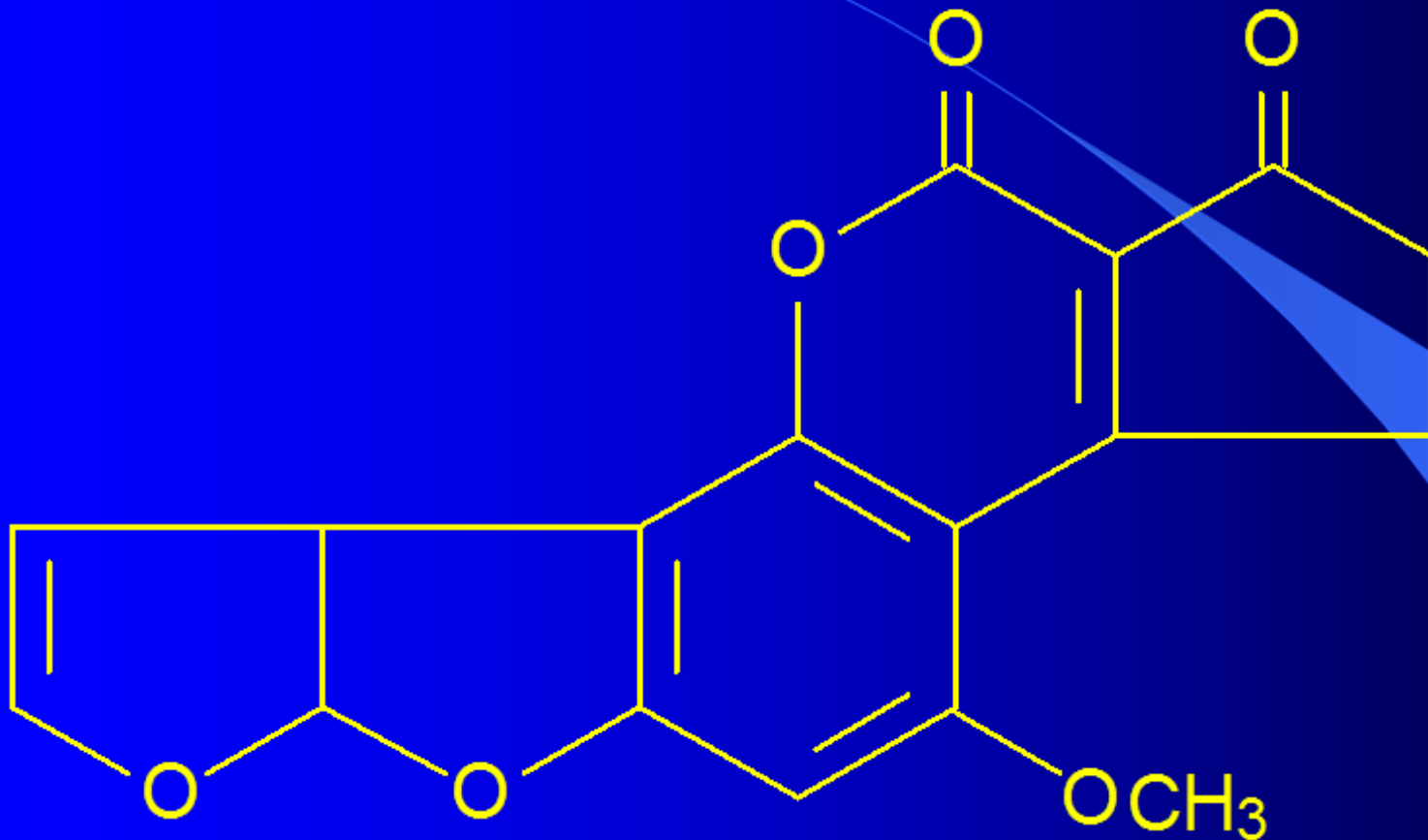
ubiquitous environmental carcinogens, and huge risk to humans and animals



small, low MW, tasteless, colorless, highly stable and hardly destroyable...



# Aflatoxin B<sub>1</sub>

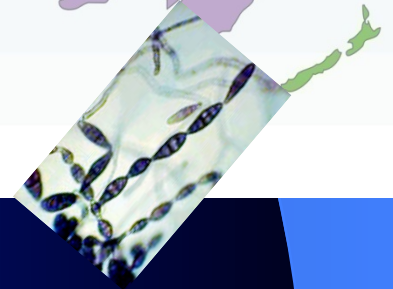
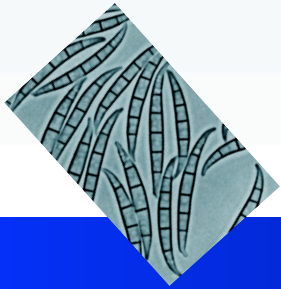


AFB<sub>1</sub> (C<sub>17</sub>H<sub>12</sub>O<sub>6</sub>) is the strongest, very lipophilic and easily and fast enters even via skin....

# AFB<sub>1</sub> exposure

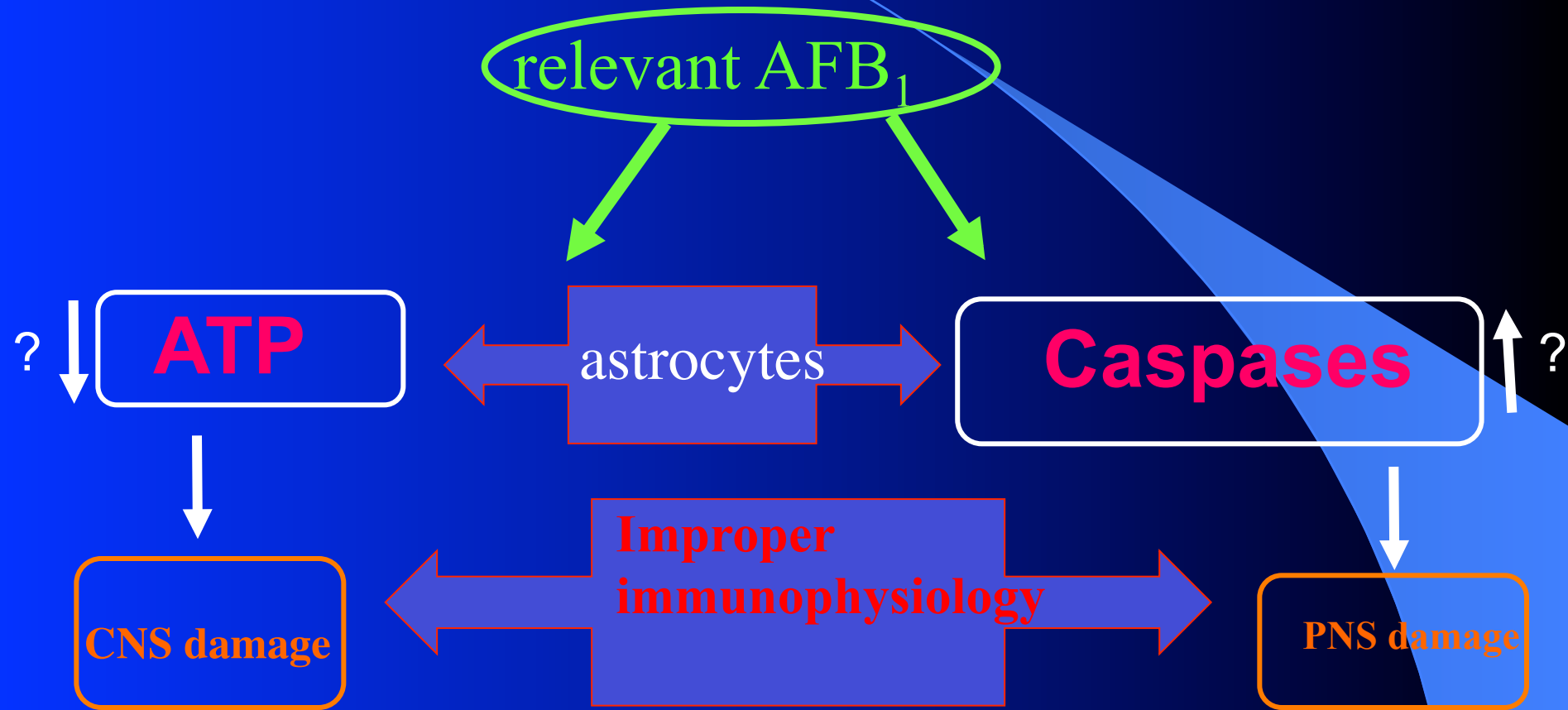


Very serious GLOBE issue



Chronic low dose !!

# Aims/hypotheses



Cell membrane and cytosolic damage of astrocytes caused by AFB<sub>1</sub>?



# Methodology

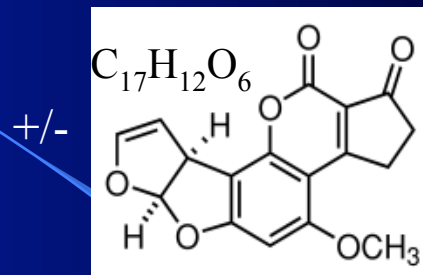
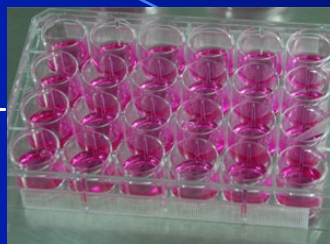
Location: Alborz mountain ranges, Southern part of Caspian Sea, Iran  
>3500 m above sea level

# Functional analyses on astrocytes

With some apparatus for analytical assays

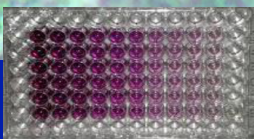
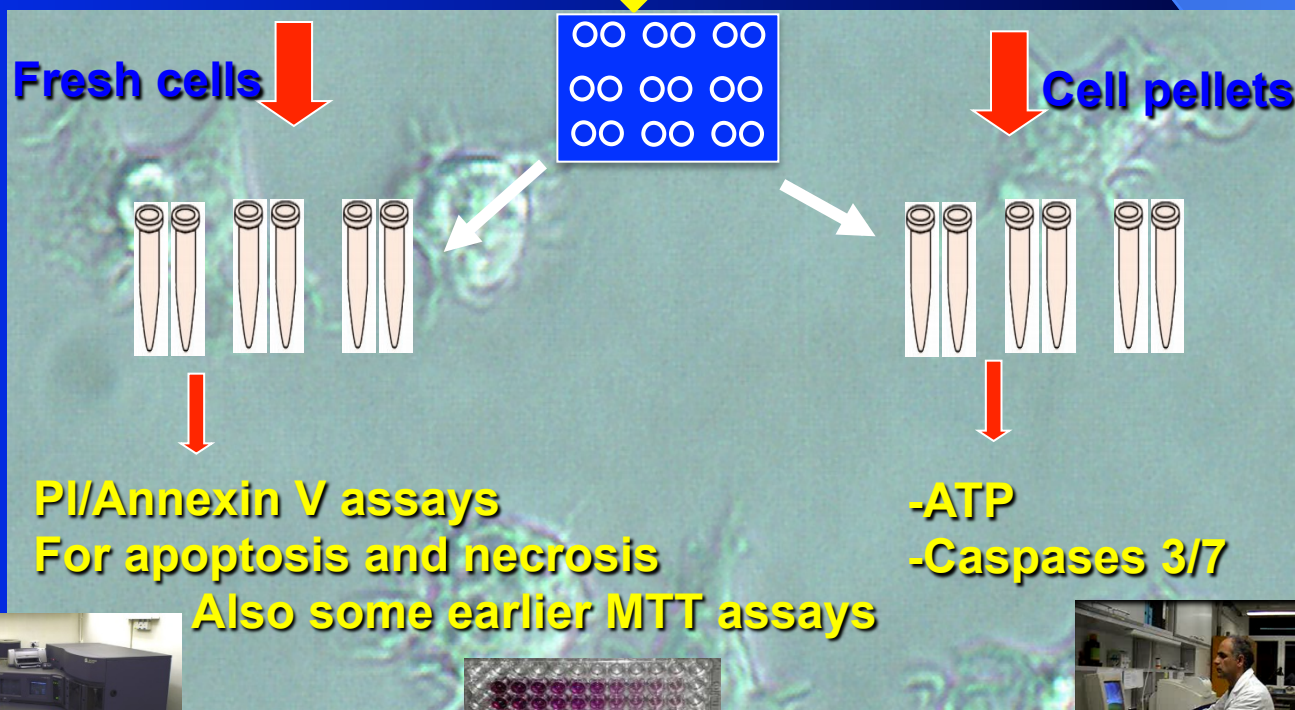


Murine astrocytes



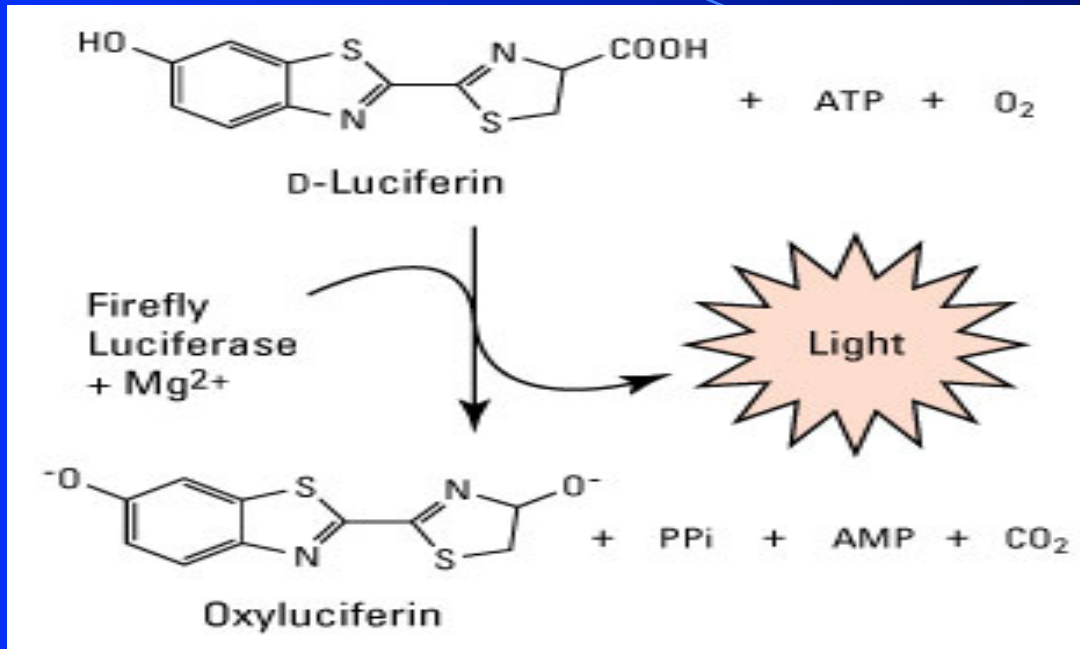
FACS

Bioluminescence



With various doses and exposure time

# Functional analyses on astrocytes



BL probes

Luciferin, luciferase, and ATP → Key.....

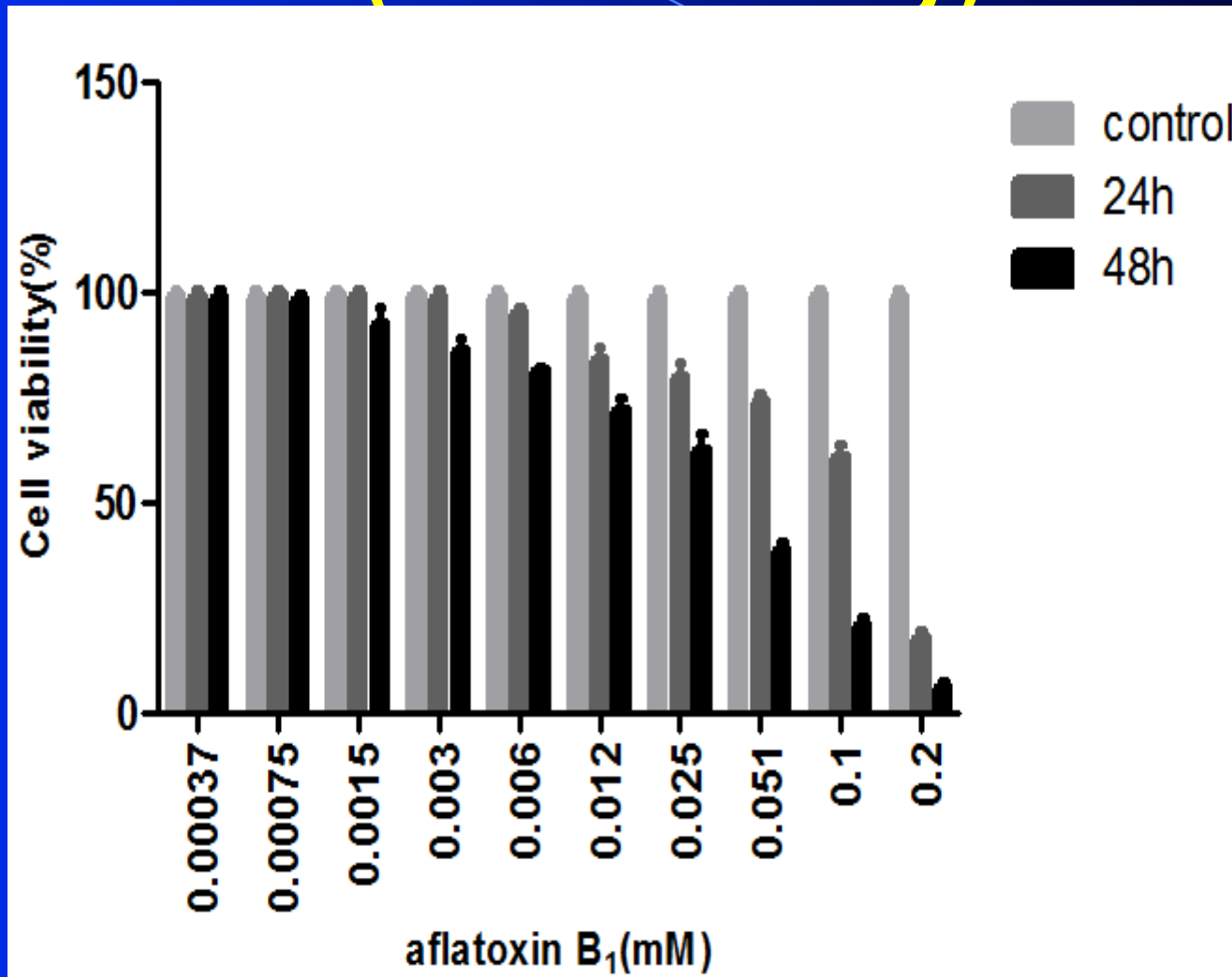
DEVD (caspase 7/3 substrate)-conjugated luciferin

Both in ATP and caspases assays, with high quantum yields BL is generated and measured

A wide-angle photograph of a rocky, arid landscape. The foreground is filled with numerous small, reddish-brown rocks and pebbles. The terrain slopes upward to the right, leading to a hillside covered in sparse, low-lying green and yellow vegetation. The sky is a deep blue, filled with large, fluffy white clouds. The overall scene is bright and clear, suggesting a sunny day in a high-altitude or desert environment.

# Some results and discussions

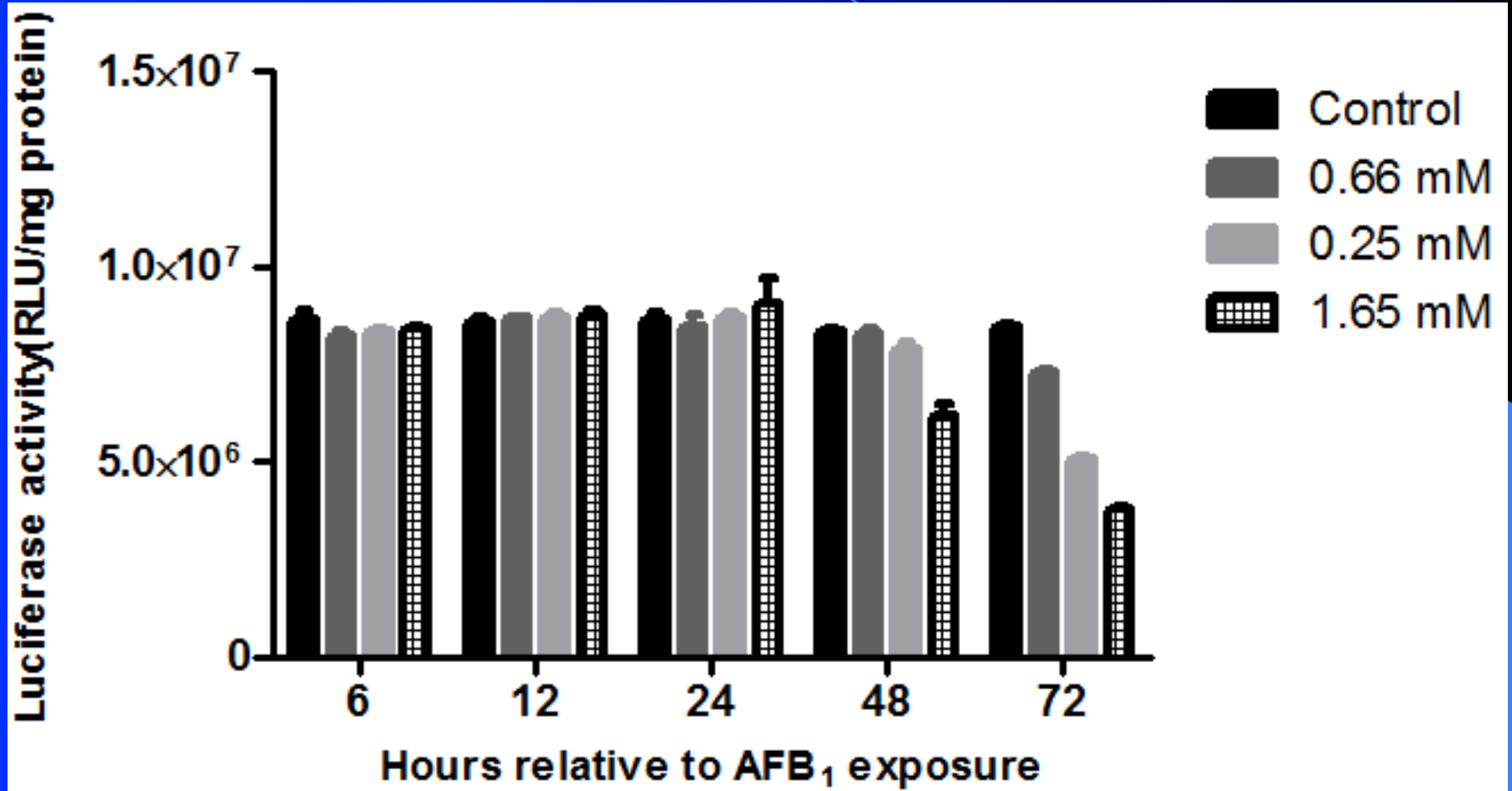
# AFB<sub>1</sub> decreases viability of astrocytes (in MTT assay)



With LC<sub>50</sub> of 0.11 and 0.03 mM for 24 and 48h, respectively

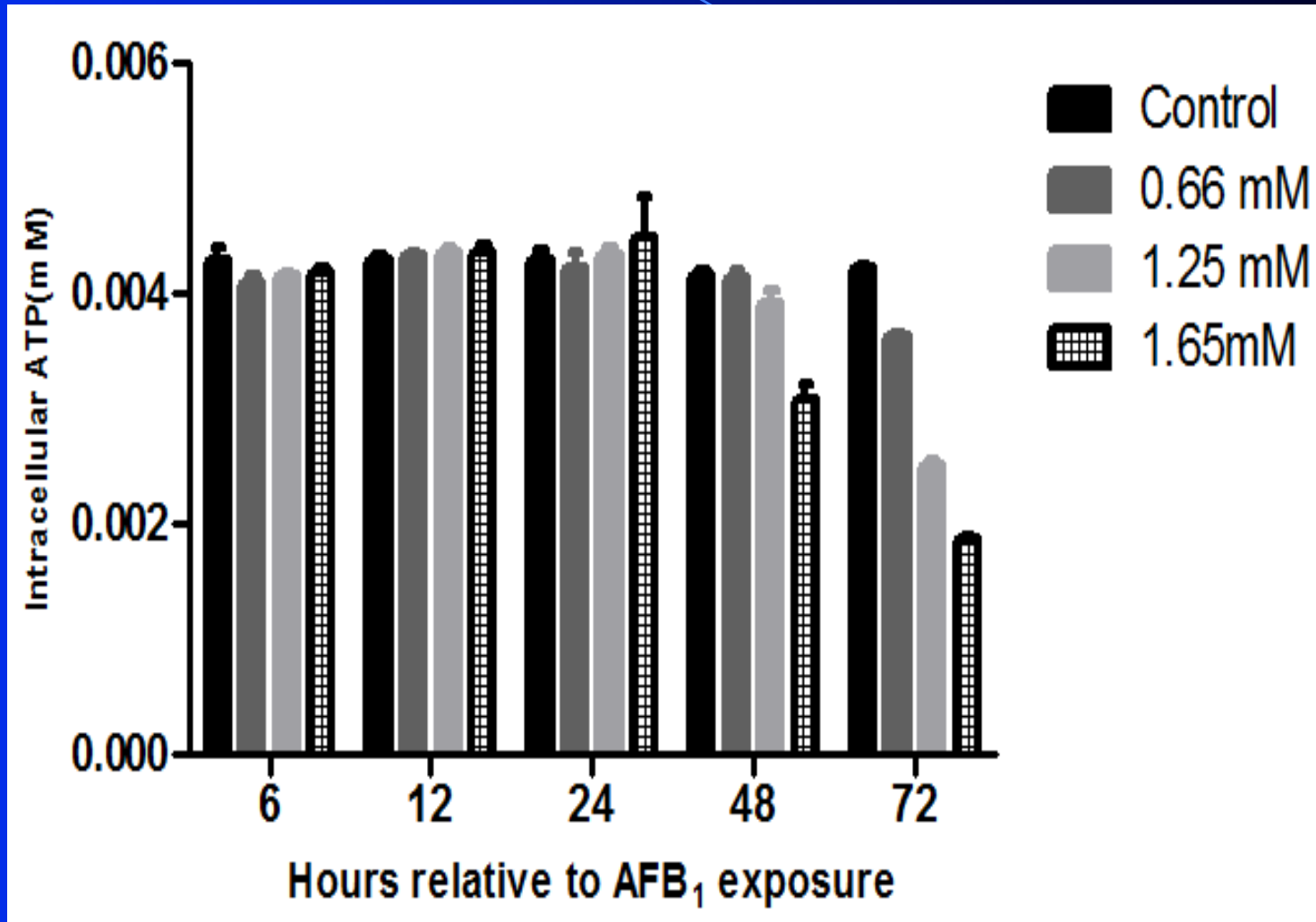


# AFB<sub>1</sub> decreases intracellular ATP of astrocytes (in bioluminescence assay)



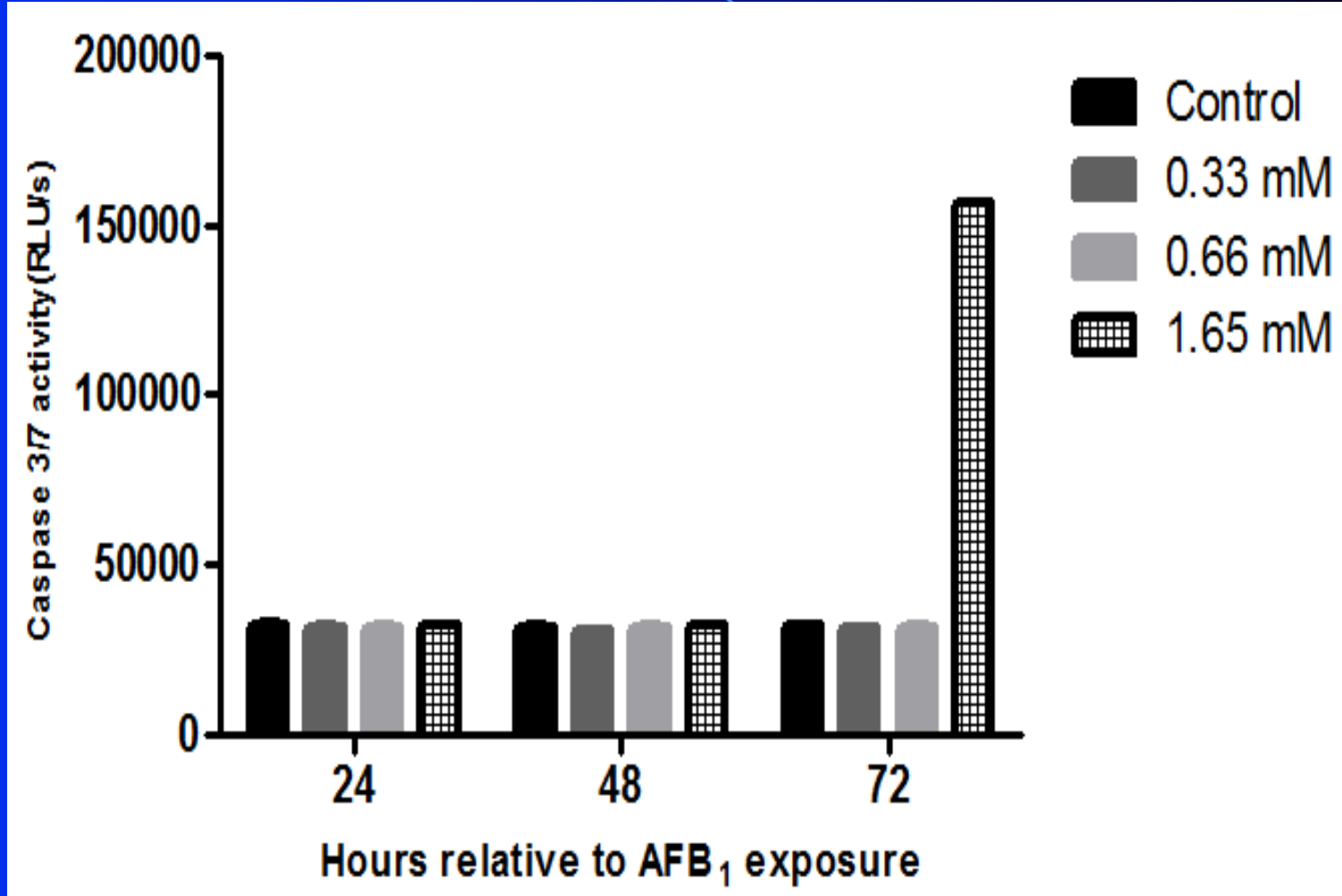
Dose-and-time dependent manner

# AFB<sub>1</sub> decreases intracellular ATP of astrocytes (in bioluminescence assay)



Dose-and-time dependent manner

# AFB<sub>1</sub> increases caspases activity of astrocytes (in bioluminescence assay)



Dose-and-time dependent manner

# AFB<sub>1</sub> and apoptosis/necrosis in astrocytes (in FACS assay)

Cell membrane and cytosolic damage

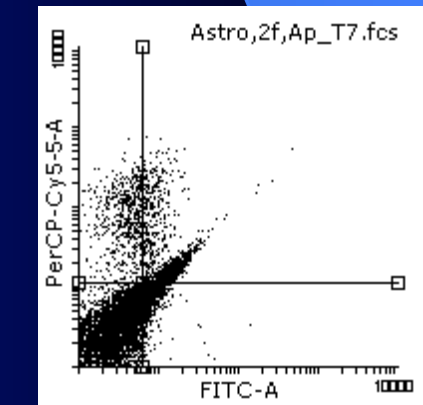
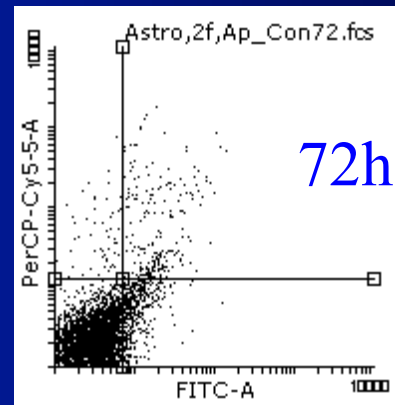
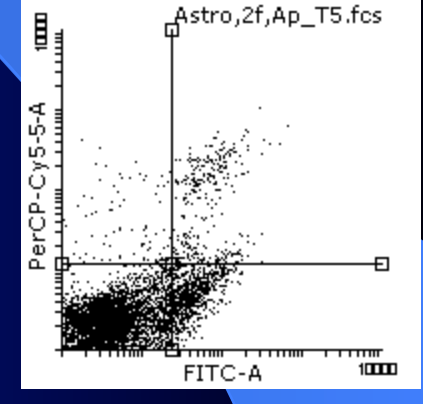
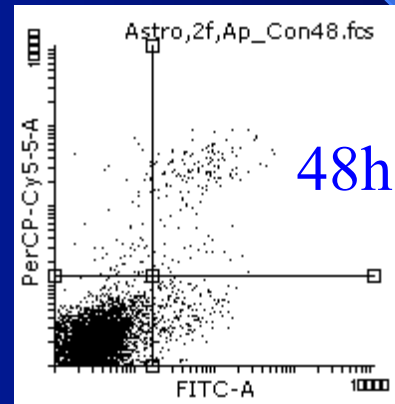
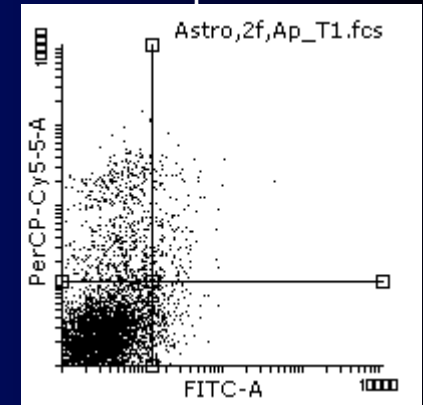
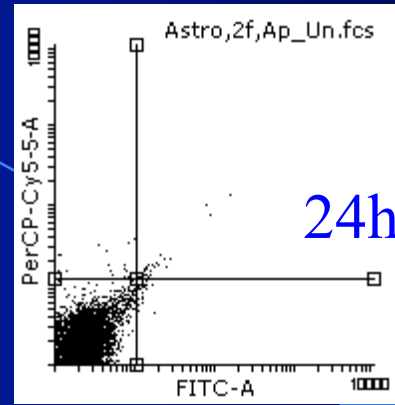
Two dimensional plots

Four distinct cell populations

Representative

Control

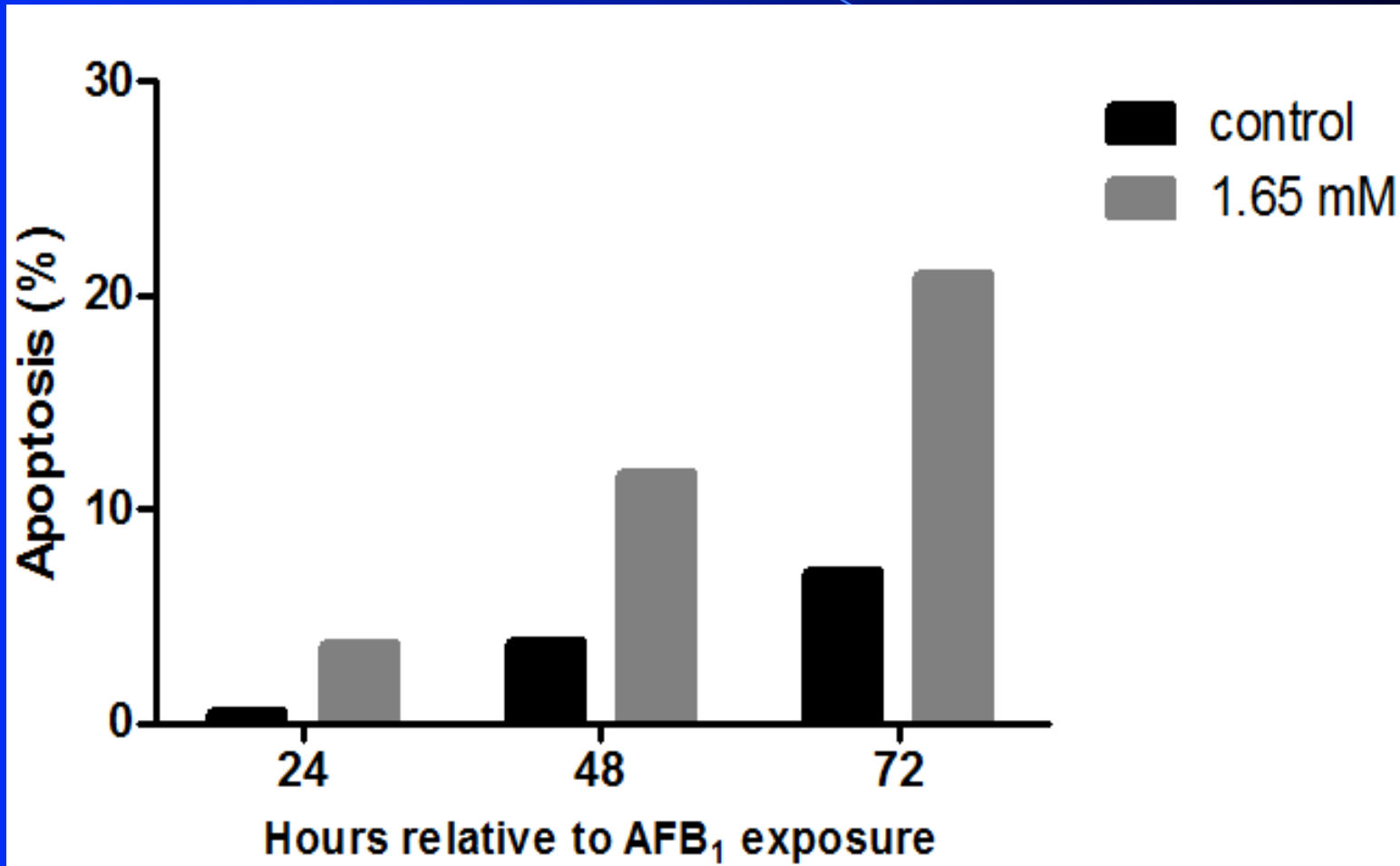
AFB<sub>1</sub>-treated



PI

Annexin V

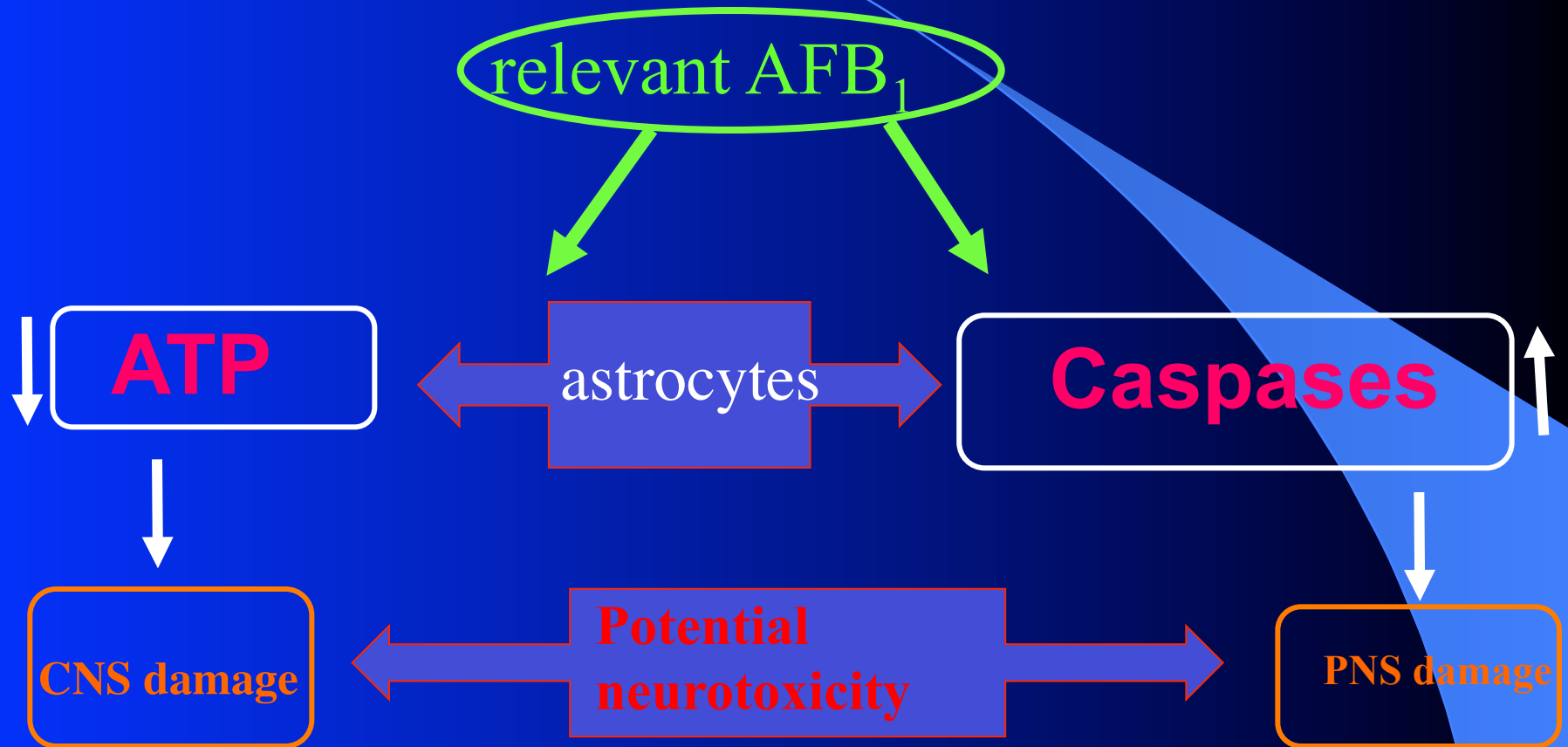
# AFB<sub>1</sub> and apoptosis/necrosis in astrocytes (in FACS assay)



A wide-angle landscape photograph showing a mountain valley. In the foreground, a small, thin tree stands on a rocky outcrop. The middle ground features a village with numerous small, white-roofed buildings scattered across a green, terraced hillside. The background is dominated by large, rugged mountains with patches of snow and partially obscured by white clouds. The sky is filled with soft, grey clouds.

# Conclusions

# Potential neurotoxicity of AFB<sub>1</sub> on CNS/ PNS via astrocytes



**this *in vitro* could potentially translate to *in vivo*... more work**



MSc student, Parisa Vahidi Ferdowsi  
Prof. Dr Saman Hosseinkhani

From Tarbiat Modares University, Tehran.



Thanks for your attention



Location: Alborz mountain ranges, Southern part of Caspian Sea, Iran  
>3500 m.above sea level