



Investigation of the antiproliferative effect of essential oil of the plant *Lavandula angustifolia* against colon cancer cells

Mouzakis Antonios¹, Aindelis Georgios¹, Spyridopoulou Katerina¹, Kyriakou Sotiris², Panayiotidis Michalis², Chlichlia Katerina¹

1 Department of Molecular Biology and Genetics, Democritus University of Thrace, University Campus-Dragana, 68100 Alexandroupolis

2 Department of Cancer Genetics, Therapeutics and Ultra Structural Pathology, The Cyprus Institute of Neurology and Genetics, Ayios Dometios, Nicosia 2371, Cyprus

Introduction

Colorectal cancer: Use of the **Lavender Essential Oil (LEO)** as a potential anticancer agent.

Purpose: Investigation of the *in vitro* antiproliferative effect of Lavender Essential Oil on colon cancer cell lines.



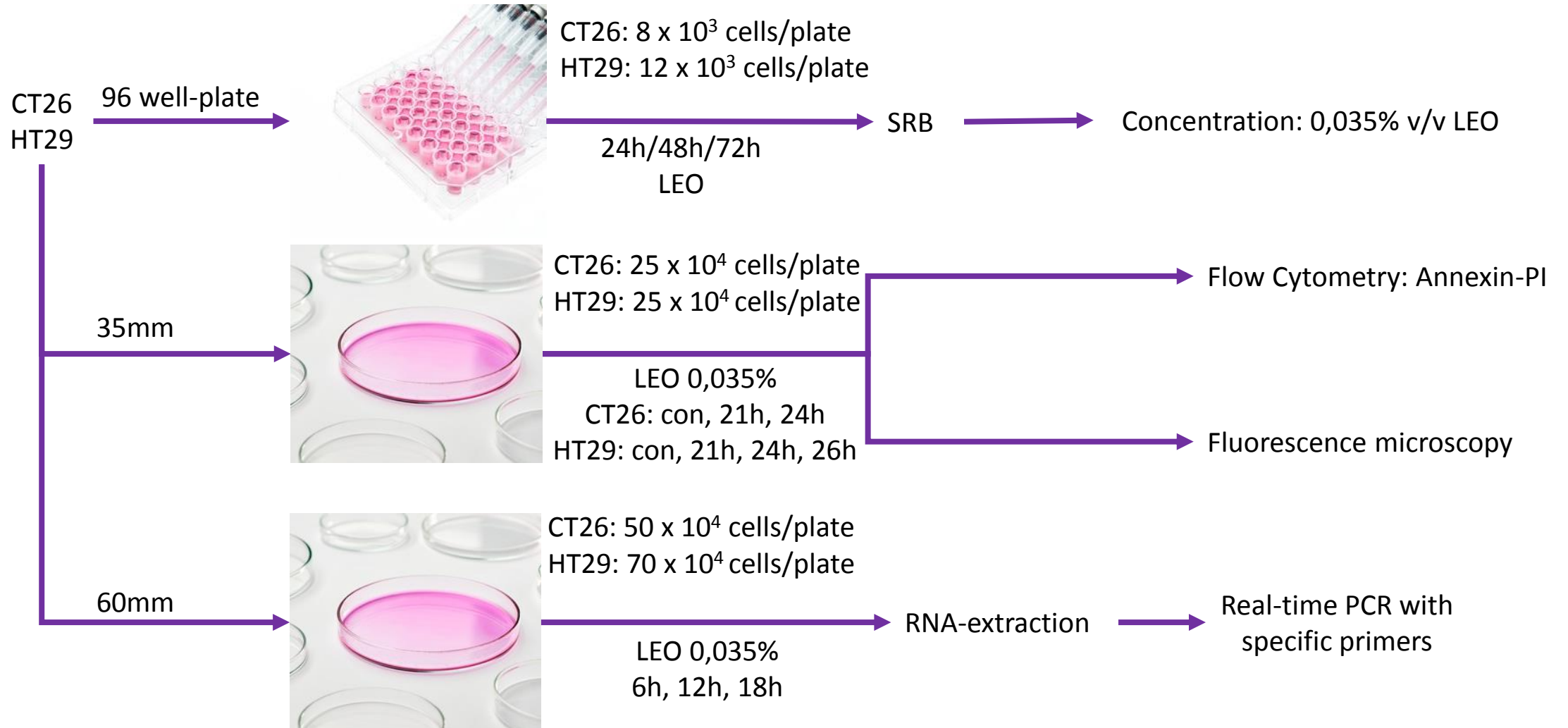
The research project was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the “1st Call for H.F.R.I. Research Projects to support Faculty members and Researchers and the procurement of high-cost research equipment” (Project Number: HFRI-FM17C3-2007).



Materials and Methods



Chemical characterization with UPLC tandem mass spectrometry (MS/MS)



Results

Table 1: Chemical characterization of the Lavender Essential Oil (LEO)

Contents of LEO	Concentration
Total Phenolic Content (μg of gallic acid eq / g of dry extract)	194.90\pm3.69
Total Flavonoid Content (μg of catechin eq / g of dry extract)	165.10\pm6.32
Total Soluble Protein Content (mg of BSA eq / g of dry extract)	n.d.
Total Soluble Sugar Content (nM/ of mannose eq / g of dry extract)	194.18\pm9.81
Chlorophyll-a (μg of chlorophyll-a / g of dry extract)	0.07\pm0.001
Chlorophyll-b (μg of chlorophyll-b / g of dry extract)	3.13\pm0.10
Lycopene (μg of lycopene / g of dry extract)	0.01\pm0.001
β -carotene (μg of β -carotene / g of dry extract)	n.d.

LEO inhibits cell proliferation:

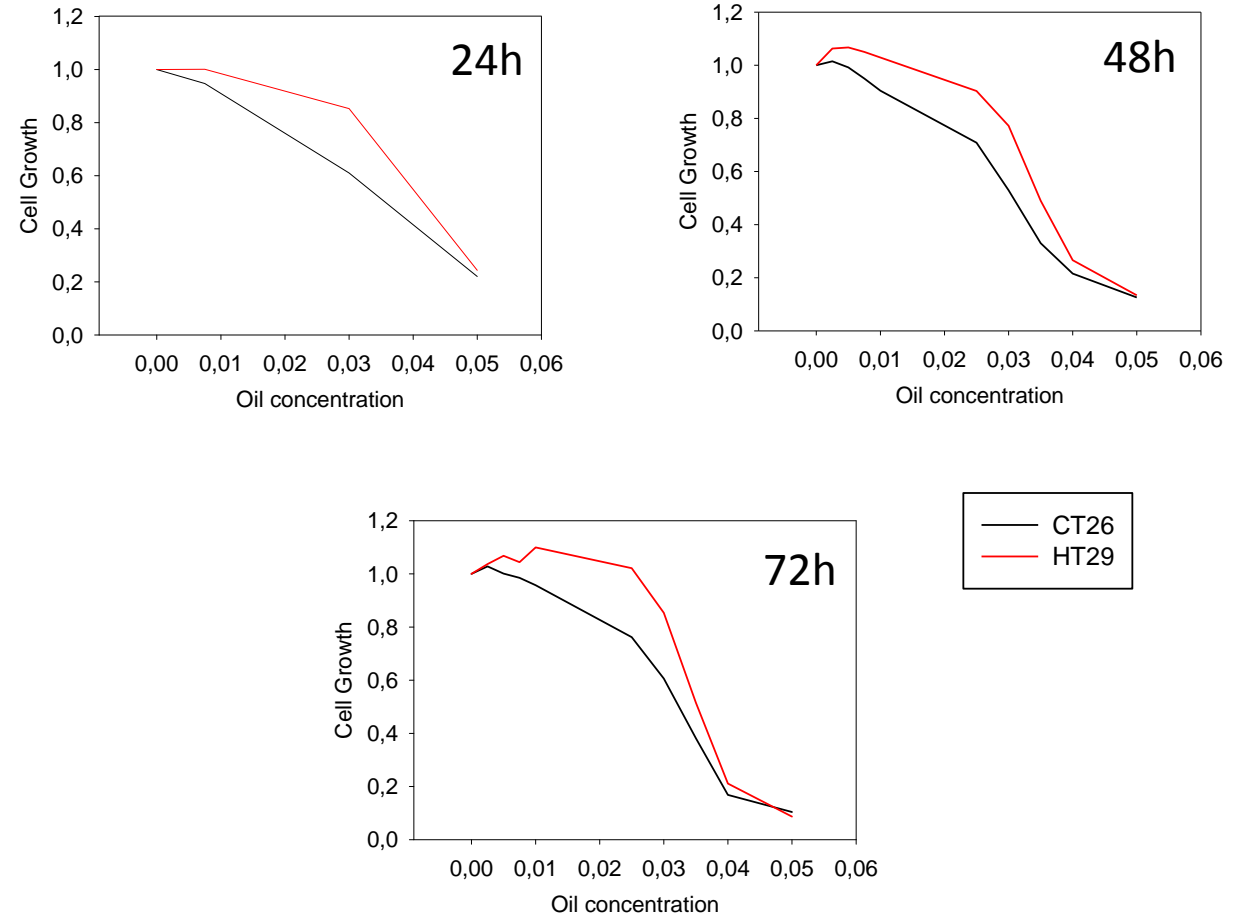


Figure 1: *In vitro* concentration-dependent growth-inhibitory activity of LEO on colon cancer cell lines

Lavender Essential Oil induces apoptotic events:

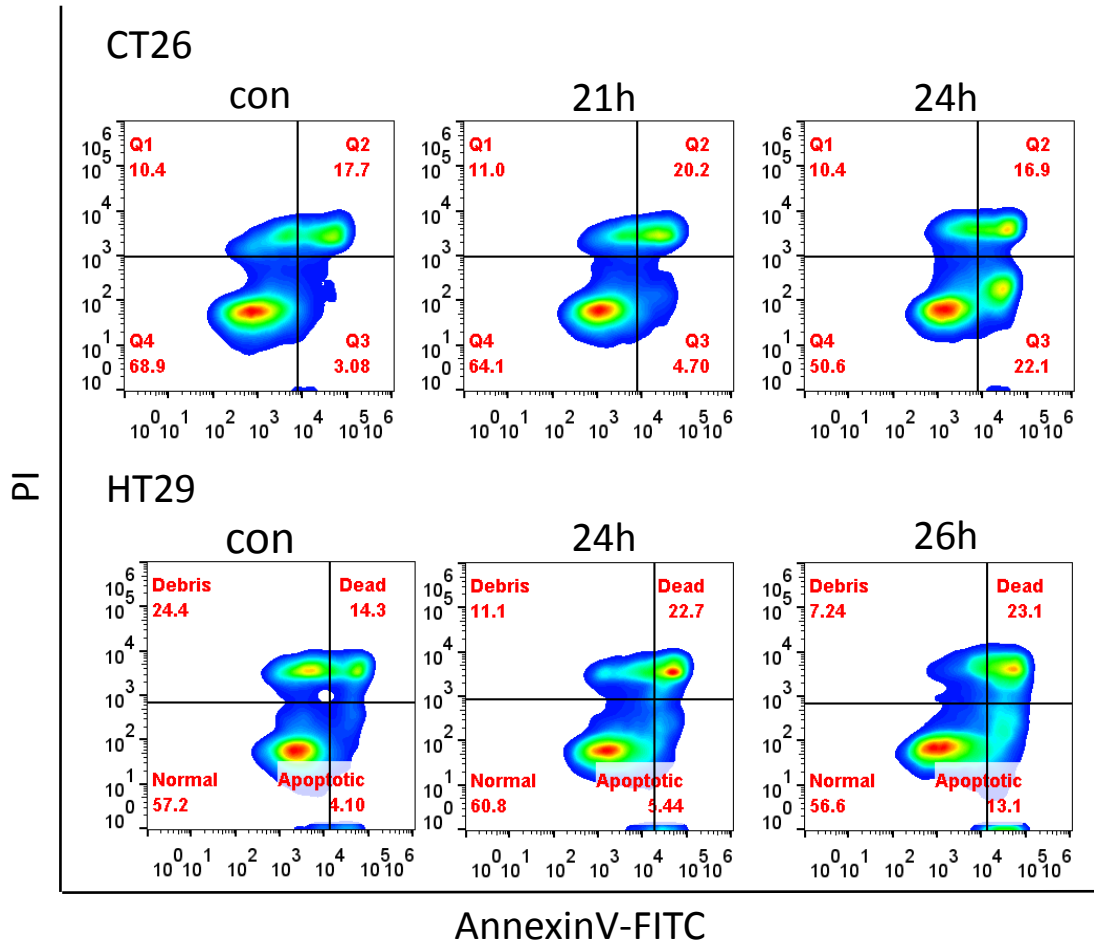


Figure 2: Analysis of apoptotic cell death by flow cytometry following incubation of colon cancer cells with LEO.

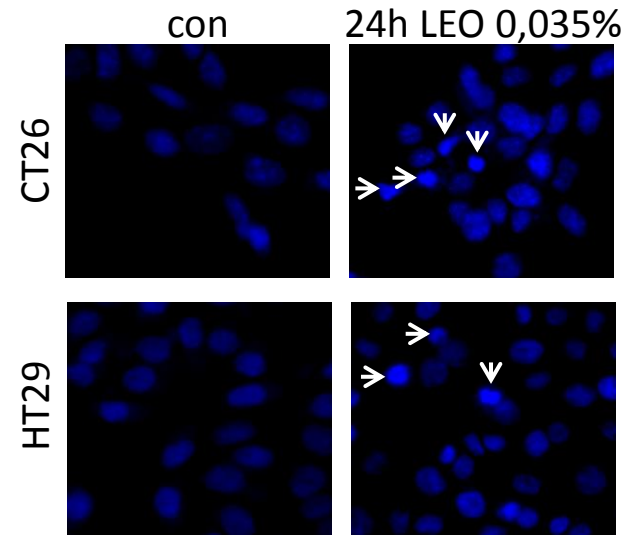


Figure 3: Observation of apoptotic nuclei by fluorescence microscopy following incubation of colon cancer cells with LEO.

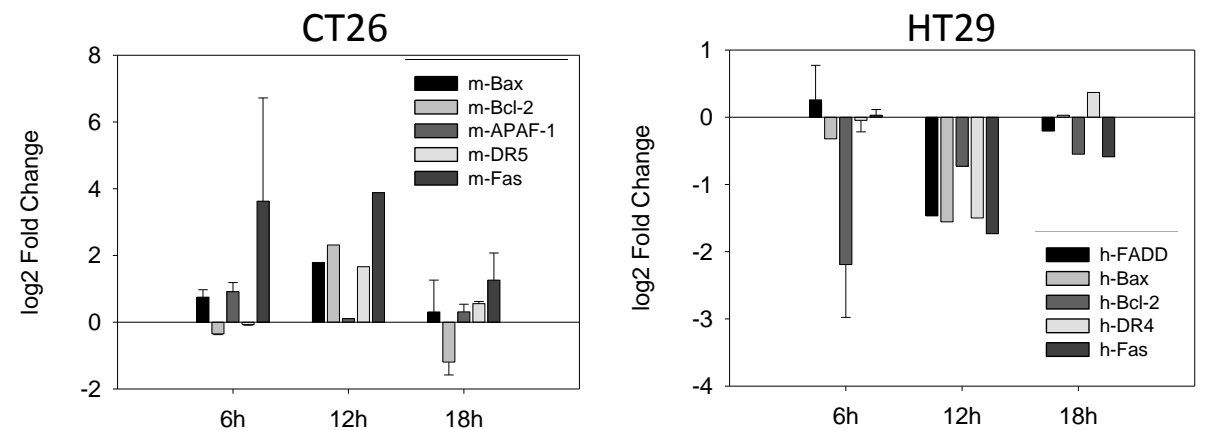


Figure 4: Study of the gene expression of apoptotic genes through RT-PCR following incubation of colon cancer cells with LEO.

Conclusions-Discussion

Lavender Essential Oil:

- shows *in vitro* concentration-dependent antiproliferative activity against colon cancer lines CT26 and HT29.
- has the ability to induce apoptotic cell death in colon cancer cell lines.

Future Work:

- investigation of further biological activities of Lavender Essential Oil (e.g. anti-inflammatory, anti-migratory, etc.).
- investigation of Damage-Associated Molecular Patterns (DAMPs) release from tumor cells treated with Lavender Essential Oil and induction of immunogenic cell death.