

THE EFFECT OF QUERCETIN AND DOXORUBICIN TREATMENT ON THE PROLIFERATIVE CAPACITY OF TUMOUR CELLS

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INTRODUCTION

Quercetin is a flavonoid with antioxidant properties and significant beneficial effects on many diseases, including cancer. It is frequently studied mainly due to its potential as a chemopreventive agent, being demonstrated its ability to inhibit the initiation and development of tumour cells.

The aim of this study is to investigate the role of quercetin in cell cycle arrest of Walker 256 carcinosarcoma and to highlight its beneficial effects when it is used in tumour chemoprevention.

MATERIALS AND METHODS

The study was performed using three groups of Wistar rats with Walker 256 carcinosarcoma: a control group comprising animals with untreated tumours, the second group comprising animals with tumours treated with doxorubicin and the third group consisting of animals who received daily oral quercetin until tumour development and then followed by doxorubicin treatment. The effect of quercetin and doxorubicin treatment on the studied tumour cells was evaluated by assessing cell cycle progression using flow cytometry analysis.

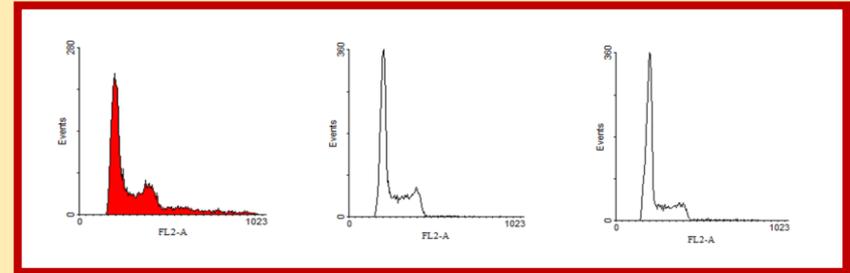


Fig 1 - Histograms of DNA distribution in cell cycle phases at 14 days from the treatment for the group 1, group 2 and group 3.

RESULTS

Propidium iodide staining of DNA measured by flow cytometry, showed the aggressive nature of Walker 256 carcinosarcoma, the tumour presenting a proliferation rate of 44.37% (at 7 days) and 48.46% (at 14 days) and increased values of the S - phase (42.60%, respectively 48.45%). Compared to control group, the results showed a decrease of the S-phase fraction (28.48% at 7 days, 25.78% at 14 days) and the arrest of the cells in the G0 / G1 phase in the quercetin experimental group. Consequently, a decrease in the proliferative index of cancer cells was observed in the same group (33.28% at 7 days, 30.82% at 14 days) (Table 1 and Figure 1).

Table 1. The results of flow cytometry analysis

Group no.	Time (days)	Cell cycle analysis			PI% (S+G2/M)
		G0/G1%	S%	G2+M%	
1	7	55,63	42,60	1,77	44,37
	14	51,54	48,45	0,01	48,46
2	7	65,44	34,18	0,37	34,55
	14	63,78	32,10	4,11	36,21
3	7	66,81	28,48	4,8	33,28
	14	69,17	25,78	5,04	30,82

CONCLUSIONS

The results of the study showed that oral administration of quercetin can inhibit the ability of tumour cells to proliferate suggesting the possibility to use as chemopreventive agent in oncology.