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DESTRUCTION OF CARCINOGENICITY OF TUMOR CELLS TREATED WITH EXTRACT OF GARLIC (ALLIUM SATIVUM) AND ALLICIN

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Introduction

Extract of garlic (Allium sativum) contains bactericidal agents, e.g. Allicin (4,5,6) which inactivates many -SH enzymes without altering the activity of several non-SH dependent enzymes (9).

Since the availability of -SH dependent enzymes has often been implicated in the process of cell growth and division they may play an important role in neoplastic growth of cells (8, 3).

In support of this:

a) proliferating (9) and tumor (8, 3) tissues demonstrate a higher-SH content.

b) Prior to cell division there is an increase in soluble thiols.

c) Thiol poison, e.g. alkylating agents, heavy metals inhibit cell mitosis.

In the present study the ability of crude extract of garlic and allicin to destroy carcinogenicity of Ehrlich's ascites tumor cells (EATC) is reported. In addition, the ability of treated EATC to immunize mice against further EATC transplantation is studied.

Materials and Methods

Equal volumes of freshly unwashed EATC originally recieved from Chester Beatty Research Institute England, and transplanted 30 times weekly in albino non-inbred mice was mixed with the crude garlic extract or allicin (2). Garlic extract and allicin were prepared according to the method described by Cavallito and Bailey (1, 7).

The mixture was incubated at 37° C for one hour and then centrifuged at 800 g for 5 minutes. The treated cells were washed twice with physiological saline and finally resuspended in saline solution. The suspension had a concentration of $5 \times 10^6 - 10^7$ cells per 0.1 ml groups of sixteen adult DBA mice were injected with 0.1 ml of treated EATC.

Results

The details of the experiments and results of tumor growth recorded 7 days after inoculation are summarised in Table 1.

In order to study the immunization reaction to tumor cell, similar experiments were carried out except all the mice were inoculated twice with the treated EATC at 7 days intervals and then challanged with non treated EATC, 14 days later. The results of tumor growth, recorded 7

Table 1 **Effect of garlic extract and Allicin on destruction of carcinogenicity of Ehrlich Ascites Tumor (EAT) Cells.**

Group of mice	Inoculum	Route of Inoculation	Growth of Tumor	
I	EAT cells treated	I. P.	0/8	♂
	with crude extract	S. C.	0/8	♀
	of garlic			
II	EAT cells treated	I. P.	0/8	♂
	with Allicin	S. C.	0/8	♀
III	non treated EAT	I. P.	8/8	♂
	cells	S. C.	8/8	♀

Table 2 **Results of the effect of garlic extract and Allicin on immunogenic capacity of Ehrlich Ascites Tumor (EAT) Cells.**

Group of mice	Inoculum	Route of Inoculation	Growth of Tumor 7 days after Challenge	
I	EAT cells treated	I. P.	8/8	♂
	with crude extract	S. C.	8/8	♀
	of garlic			
II	EAT cells treated	I. P.	8/8	♂
	with Allicin	S. C.	8/8	♀
III	physiological	I. P.	8/8	♂
	saline (control)	S. C.	8/8	♀

days after the last inoculation are shown in Table 2.

From the result shown in Table 1 and Table 2 we conclude, that treatment of EATC with garlic or allicin completely destroyed the carcinogenicity of the cells without rendering them to induce immunity in mice regardless to their sex.

Our finding that the destruction of carcinogenicity of EATC after treatment with extract of garlic were similar to those reported by Fujiwara and Nakata (2) but on the contrary, we were unable to induce tumor immunity in mice with EATC treated with extract of garlic or allicin. It is considered that further experiments on induction of immunity by pretreated tumor cells with garlic extract or allicin are needed to settle this controvercy.

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