Iranian J. Publ. Hlth,
Autumn 1974, Vol. 3, No. 3.

HUMORAL IMMUNITY TO HUMAN NEOPLASMS[1]

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ABSTRACT

Using complement fixation technique, serial serum samples from 15 patients undergoing surgical removal of malignant tumours were assayed for the presence of tumour antibodies against the cellular fractions of both normal and carcinomatous tissue. Antibody responses against tumour-associated antigens were detected in four cases. In all cases, antibody activity was directed only against the supernatant of the carcinomatous tissue from the same individual.

INTRODUCTION

Recent studies(1–5) have shown that only a few cancer patients have antibody responses to tumour-associated antigens. The low frequency of tumour antibody detection could be due to a slow but constant release of tumour antigens and their combination with antibody *in vivo*. To test this possibility, serial serum samples from patients undergoing surgical removal of malignant tumours were assayed for the presence of antibodies against tumour- associated antigens.

MATERIALS AND METHODS

Tumour and corresponding normal tissue from the same individual were obtained from surgical specimens. Cellular fractions (nuclear, mitochon-

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1- This study was supported in part by funds of the School of Public Health and Institute of Public Health Research, University of Teheran, and partly by the Public Health Research Project of the Ministry of Health and Plan Organization.

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dria, microsomal and supernatant) of both normal and tumour tissue were prepared according to the method of Schneider.[5]

Blood samples were obtained from each patient providing tissue on the day before surgery and on days 3 to 6, 10 to 13, and 22 to 53 after surgery. Each serum sample was tested three times by the microtiter complement fixation technique[7] against the autologous cellular fractions of both normal and carcinomatous tissue.

RESULTS AND DISCUSSION

Antibody responses against tumour-associated antigens were detected in four of the 15 cancer patients studied, (Table 1). In all four positive cases, antibody activity was directed against the supernatant of the carcinomatous tissue. None of the sera gave positive test against any of the antologous normal tissue fractions. Similarly, none of the sera giving autologous-positive reaction cross-reacted with the cellular fractions of patients with the same type of neoplasm or patients with other neoplasms. One factor common to all four cases was that antibody activity was directed against the supernatant of the carcinomatous tissue.

By assaying serum samples obtained both before and after the surgical removal of tumour, the incidence of antibody detection was found to have increased from 2 out of 34 cases examined[3] to 4 out of 15 reported here. Two of the four positive cases showed a four-fold rise in antibody titer, as indicated by the units of complement fixed, after removal of their tumours. Serum from a patient with carcinoma of — the breast had undetectable (titer of less than $\frac{1}{2}$) and serum from a patient with medullary carcinoma of the thyroid had very weak (titer of $\frac{1}{2}$) circulating antibody, while their tumours were *in situ* (Table 2). The apparent appearance of antibody in the circulation after tumour re-

TABLE 1

Incidence of Tumour Antibodies in Cancer Patients

Tumour Type	Number Studied	Number Positive*
Carcinoma of breast	4	1
" " oesophagus	5	1
" " stomach 7h	2	1
" " rectum	2	0
Medullary carcinoma of thyroid	2	1
Total	15	4

* Positive = antibody titer more than $^1/_2$.

moval suggests that tumour antibody responses could be more common than is realized, but may be missed because of their timing.

ACKNOWLEDGEMENT

The writers are grateful to Dr. H. Hashemian, Professor of Surgery, Pahlavi Medical Center, who kindly provided the specimens.

TABLE 2

Relationship of Tumour Antibody Detection to Surgical Removal of Tumour

Tumour Type	Pre - operative Serum 1	Post - operative Samples		
		Serum 2	Serum 3	Serum 4
Carcinoma of breast	1/2	1/8	1/16	1/16
Carcinoma of oesophagus	1/16	1/32	1/2	1/2
Carcinoma of stomach	1/4	1/8	1/8	NA*
Medullary carcinoma of thyroid	1/2	1/8	1/32	NA*

* NA = Serum sample was not available for assay.

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