TABLE I

RELATIVE SPECIFIC ACTIVITY VALUES OF THE ATP SPOTS UNDER THE VARIOUS CONDITIONS OF INCUBATION

Date of experiment	*A* "Blank"	*B* Insulin	*B–A* Difference	*C* Pyruvate Citrate	*D* Pyruvate Citrate Insulin	*D–C* Difference
3–29	12.70	12.24	—0.46	11.26	12.94	+ 1.68
4–1	11.70	9.34	—2.36	8.18	11.05	+ 2.87
4–5	12.14	11.60	—0.54	10.32	12.46	+ 2.14
4–12	11.60	11.14	—0.46	10.50	12.40	+ 1.90
4–20	12.62	11.50	—1.12	11.00	13.50	+ 2.50
6–7	13.40	9.20	—4.20	9.15	12.30	+ 3.15
6–9	11.90	12.25	+ 0.35	12.00	13.60	+ 1.60
Mean value	12.16	11.06	—1.10	10.34	12.60	+ 2.26
%			—9.0			+ 21.8
"P" value			< 0.1			< 0.001

IVAN BOSZORMENYI-NAGY
JACQUELINE KUEBER

Department of Psychiatry, College of Medicine, University of Illinois, Chicago, Ill. (U.S.A.)

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Received July 12th, 1955

On the *in vitro* anticatalase activity of tumor extracts

An interesting point of biology of neoplastic growth is the ability of tumors and of their extracts to reduce the liver catalase activity *in vivo*[1]. An *in vitro* inhibitor also was demonstrated by HARGREAVES AND DEUTSCH[2].

The purpose of our work was to ascertain, as a basic question, the specificity of the latter phenomenon.

Two experimental tumors, Sarcoma 180 and a spontaneous mammary carcinoma of mouse, a number of organs of normal rats and mice, several different human tumors, especially gastric carcinomas and their corresponding mucosa, and gastric mucosa of patients with gastric or duodenal ulcer, were studied. Crystalline beef liver catalase was used and the inhibiting activity was tested by the method of VON EULER AND JOSEPHSON[3], for catalase determination.

Extracts were preparated according to HARGREAVES AND DEUTSCH, but the simple "Kochsaft" was used only for the purpose of comparison and the procedure usually employed was that including the alcoholic purification of the extracts.

Not only tumors but also normal organs showed a marked inhibition; this was often stronger than that of tumors (Table I). Individual variations were very large; the activation observed by alcoholic treatment was often very important, especially with normal organs. This could possibly explain the low activity found in normal tissues by HARGREAVES AND DEUTSCH, who apparently used only the simple "Kochsaft".

The inhibition curves given by increasing amounts of extracts showed a rather characteristic and constant behaviour for tumor extracts (Fig. 1).

TABLE I

Percent inhibition of the catalase activity induced by extracts, purified through alcohol precipitation, of several rat organs, two mouse experimental tumors, gastric carcinoma, mucosa adjacent to the tumor, and gastric mucosa of ulcer patients. Mean values from five groups of determinations, except for the mammary adenocarcinoma whose figures represent the mean of two determinations.

Organs	*ml Extract*	*% Inhibition*	*Range*	*ml Extract*	*% Inhibition*	*Range*
Rat liver	0.2	53 ± 9.2	42–65	0.4	62 ± 7.3	56–74
Rat spleen	0.2	50 ± 10.2	40–64	0.4	56 ± 12.4	40–72
Rat kidney	0.2	46 ± 8.0	37–58	0.4	54 ± 12.2	40–71
Rat lung	0.2	43 ± 13.2	31–58	0.4	55 ± 15.8	32–72
Rat brain	0.2	41 ± 17.5	15–58	0.4	45 ± 14.8	20–57
Rat pancreas	0.2	46 ± 14.2	33–63	0.4	59 ± 14.7	38–75
Rat salivary glands	0.2	40 ± 17.2	32–62	0.4	46 ± 14.7	48–62
Rat gastric mucosa	0.2	67 ± 16.0	48–81	0.4	72 ± 12.8	56–83
Rat skeletal muscle	0.2	52 ± 14.2	41–70	0.4	59 ± 18.1	36–83
Rat serum	0.2	17 ± 6.2	9–26	0.4	39 ± 17.7	18–63
Gastric carcinoma	0.2	45 ± 19.9	32–80	0.4	44 ± 11.4	35–57
Adjacent gastric mucosa	0.2	55 ± 17.5	37–72	0.4	62 ± 10.7	51–73
Gastric mucosa of ulcer patients	0.2	53 ± 15.8	43–73	0.4	80 ± 4.0	77–85
Sarcoma 180	0.2	62 ± 7.7	51–69	0.4	62 ± 4.9	60–67
Spontaneous mammary adenocarcinoma	0.2	63	— —	0.4	60	— —

In fact, in this case, the inhibition curve, after a sharp rise for small amounts of extracts, usually decreases a little and then starts rising again very slowly. This decrease was very seldom observed in non-neoplastic tissues, which, on the contrary, showed a continuous increase. The reason for this different appearance of the two kinds of curves, is not easy to find. It could possibly depend on an equilibrium between an inhibiting and an enhancing factor, which may be present in different proportion in the various extracts. Preliminary attempts to investigate this point by paper electrophoresis showed the presence of both the factors.

In conclusion, no specificity can be ascribed to the inhibiting factor of tumor boiled extracts. Also, DEUTSCH has recently reported the presence of considerable amounts of inhibitor in beef liver autolysate.

However, some interesting facts seem to emerge from the study of the anticatalase action of tissue extracts which deserve further consideration.

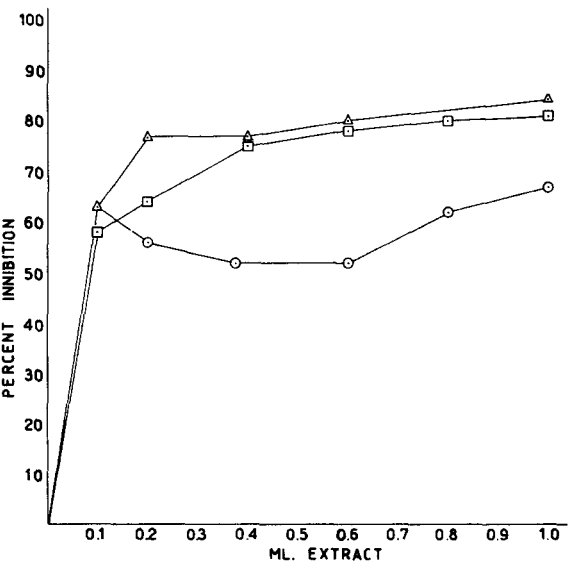

Fig. 1. Inhibition curves given by increasing amounts of different thyroid extracts.
○ Ca of thyroid □ goiter △ normal calf thyroid

A complete account of our work will appear elsewhere[4].

GIOVANNI CERIOTTI
LUIGI SPANDRIO

Centro Tumori di Busto Arsizio (Italy)

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Received July 11th, 1955