

Fishman 1947

LETTERS TO THE EDITORS

THE PRESENCE OF HIGH  $\beta$ -GLUCURONIDASE ACTIVITY IN CANCER TISSUE\*

Sirs:

$\beta$ -Glucuronidase is believed to function in the "metabolic conjugation" of the estrogenic hormones.<sup>1</sup> In view of the large amount of experimental

*Distribution of  $\beta$ -Glucuronidase in Adenocarcinoma of Breast with Metastases to Axillary Lymph Nodes*

Organ	Tissue	No. of specimens studied	Glucuronidase activity*
Breast	Edge of lesion	1	450
"	Center of lesion	1	890
"	Uninvolved breast	2	168, 112
"	" skin over carcinoma	1	89
"	" fat	1	57
"	" muscle	1	98
Right axilla	Involved lymph nodes	2	1960, 3520
" "	Uninvolved lymph nodes	2	816, 572
Left "	Involved lymph node	1	3700
" "	Uninvolved lymph nodes	5	633, 510, 640, 365, 645

On March 28, 1947, a radical resection of the breast and right axilla was performed on Mrs. C. The lymph nodes of the left axilla were removed on April 4. The presence or absence of carcinoma was confirmed histologically.

\* A unit of  $\beta$ -glucuronidase is defined as 1  $\gamma$  of phenolphthalein liberated per hour per gm. of wet tissue from 0.01 N phenolphthalein mono- $\beta$ -glucuronide buffered at pH 4.5, 0.1 M acetate buffer, at 37.5°.

and clinical evidence which indicates a rôle of the estrogenic hormones in the production of malignant growth, the glucuronidase activity of cancerous tissues was studied. The data in this report are regarded as evidence of the involvement of  $\beta$ -glucuronidase in processes of malignant growth.

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<sup>1</sup> Fishman, W. H., *J. Biol. Chem.*, **169**, 7 (1947).

Fresh tissue specimens removed at operation were divided; one-half was fixed in formalin for histological study and the other half was weighed, homogenized in water, and assayed for  $\beta$ -glucuronidase activity. Tissues excised from malignant neoplasms of various organs including breast, uterus, stomach, mesentery, abdominal wall, and esophagus were found to contain from 100 to 3600 per cent more glucuronidase activity than the uninvolved adjacent tissue. Metastases to lymph nodes from cancers originating in various organs including stomach, lung, breast, finger, colon, and esophagus likewise contained  $\beta$ -glucuronidase in higher concentration than the uninvolved lymph nodes. As an illustration, the table lists the enzymic activities of cancerous and non-cancerous portions of the breast and axillary lymph nodes removed at operation.

In view of the evidence<sup>1,2</sup> of a participation of  $\beta$ -glucuronidase in the metabolism of estrogens, the elevated glucuronidase in the tumor tissue may be interpreted as a metabolic response to the presence of high concentrations of estrogen or some closely related substance. Investigations now in progress are designed to test this hypothesis.

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<sup>1</sup> Fishman, W. H., and Fishman, L. W., *J. Biol. Chem.*, **152**, 487 (1944).