ANTIGENIC SIMPLIFICATION OF HUMAN STOMACH TISSUES IN CARCINOMA

G. I. Avdeev and I. S. Bashkaev

Virological Laboratory (Head, Professor V. V. Gorodilova), P. A. Gertsen State Oncological Institute (Director, Professor A. N. Novikov), Moscow
(Presented by Active Member AMN SSSR N. N. Zhukov-Verezhnikov)
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Opinions differ on the character of the antigens lost during malignant transformation of the tissues. Weiler [5] adduced evidence suggesting that these antigens are organ-specific. V. I. Gel'shtein [2] carried out experiments giving results apparently contradictory to those of Weiler. By means of the reaction of anaphylaxis with desensitization, she found organ-specific liver antigens in a mouse hepatoma and came to the conclusion that antigenic simplification takes place at the expense of other antigens. L. A. Zil'ber [3] explained this contradiction by postulating that although antigenic simplification of a tumor takes place at the expense of organ-specific antigens, some of these antigens survive and can be detected if sufficiently sensitive methods are used.

We have attempted to discover the extent to which the pattern demonstrable in the case of experimental hepatoma is applicable to human gastric tumors. In a previous paper [1] we showed that gastric tumors had lost organ-specific antigens, but could not determine the extent of this loss, or decide whether malignant growths of the stomach preserve, albeit partially, their gastric specificity. This was because we used antistomach sera exhausted with antigens from carcinoma of the stomach. These sera naturally would not react with antigens from carcinoma of the stomach even if they contained organ-specific antigens.

We were also interested in the possibility that the tissues of a gastric carcinoma could lose antigens not possessing organ specificity. It has been reported [4] that certain tumors of animals lose antigens not possessing organ-specificity.

The material and method used in the present investigation were identical with those described elsewhere [1].

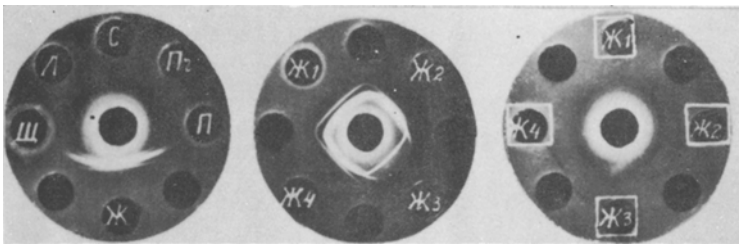
The three concentrated rabbit sera against normal human gastric mucosa which we had available were exhausted with antigens from other organs. These sera acquired organ-specificity. They gave up to 4 clear lines in the precipitation reaction in agar with saline extracts from gastric mucosal tissue, but did not react with extracts of other organs taken from the same cadaver (Fig. 1, a).

Of the 29 normal gastric mucosae tested by the precipitation reaction in agar, only 3 did not react with these sera (Fig. 1, b). As a rule malignant gastric tissues did not react with these sera (Fig. 1, c).

Of 33 gastric carcinomas, only 4 gave weak reactions. These reactions were presumably due to the fact that we were not always sufficiently careful in purifying the tumors from contamination by cells of the normal gastric mucosa. In cases when we were sure that no normal gastric mucosal cells were present, no reaction was given. Not one of the seven metastases of gastric carcinoma which were studied gave a reaction with organ-specific antigastric sera.

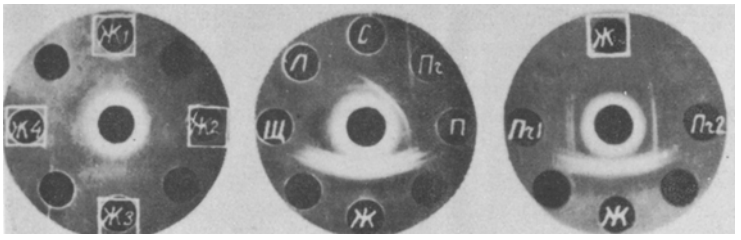
Hence, we were unable to detect organ-specific gastric antigens in saline extracts of malignant gastric tissues in amounts demonstrable by the precipitation reaction in agar.

In further experiments we studied an antigastric serum neutralized with antigens from gastric carcinoma tissue. This serum did not react with antigens from tissues from gastric carcinoma (Fig. 2, a), but gave a strong reaction with antigens from normal gastric mucosa and also a weaker, yet clear reaction with antigens from certain other normal organs (Fig. 2, b, and c).



a b c

Fig. 1. Reaction with antiserum to gastric mucosa, exhausted with antigens from the human spleen, kidney, and serum. Central well contains immune serum, peripheral wells contain antigens. Sp) spleen; K) kidney; Li) liver; St) stomach; T) thyroid; Lu) lung; [St] carcinoma of the stomach.



a b c

Fig. 2. Reactions with antiserum to gastric mucosa exhausted with antigens from gastric carcinoma and human serum. Sp) spleen; K) kidney; Li) liver; St) stomach; T) thyroid; Lu) lung; [St] carcinoma of the stomach.

Fig. 2, b clearly shows a line against the wells with splenic antigens. Hence, a serum obtained by immunizing rabbits with extract from the gastric mucosa contained antibodies against antigens also present in other organs (especially in the kidney). The extract from carcinoma of the stomach did not neutralize these antibodies, and consequently it did not contain the corresponding antigens.

Hence, when the normal gastric mucosa undergoes malignant change, it loses not only its organ-specific antigens, but also certain tissue antigens not possessing organ specificity.

SUMMARY

An immunological study was carried out of cancerous and normal tissues of human stomach. Antistomach sera exhausted by antigens from other organs reacted in the precipitation in agar reaction only with antigens from the gastric mucosa. These sera did not react, as a rule, with antigens from gastric cancers, pointing to a complete (within the range of the reaction used) loss by them of the gastric organ specificity. Antistomach serum completely exhausted by antigens from stomach cancer continued to react with antigens from the gastric mucosa, as well as with antigens from some other organs (kidney). This points to the fact, along with organ-specific antigens, that gastric mucosa loses some tissue antigens which possess no organ specificity.

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