This effect will obviously be observed essentially in still actively dividing tissues, which will thus be expected to be particularly sensitive to the action of mustard gas. In accordance with this expectation, it has been found[5] that in the adult *Drosophila*, in which the only organ with actively dividing cells is the gonad, mustard gas produces a selective action on gametogenesis, while in developmental stages of the same flies, doses of mustard gas which affect the germ cells are usually harmful or definitely lethal to the animal as a whole, presumably because cells in many other tissues are also actively dividing.

In adult mammals the bone marrow is one of the few tissues in which cell division is actively proceeding. It is, therefore, not surprising that it is also highly sensitive to the action of mustard gas, even though it only contains comparatively small amounts of it.

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## Specific Serological Characters of the Mucoids of Hog Gastric Mucin

THE demonstration that purified and apparently homogeneous specimens of 'A-substance' prepared from commercial hog gastric mucin possess both A and O blood-group specificity, whereas A-substance isolated from the fluid contents of human pseudomucinous ovarian cysts[1] shows no significant O activity, suggested that a closer and more detailed examination of the hog mucin 'A-substance' for homogeneity should be undertaken. The best specimens of A-substance of animal origin examined so far have been obtained from commercial preparations of hog gastric mucin or pepsin[2], each batch of which contains material from the stomachs of many hogs. In view of the differences known to exist in the serological specificity of the gastric secretions of man[3], it seems not improbable that similar serological differences exist in the mucin preparations derived from individual hog's stomachs, and an examination of the serological properties of the mucoids isolated from single stomachs was therefore undertaken.

The individual stomach linings were finely chopped and were allowed to autolyse at *p*H 3–4 and at 37° for several days in the presence of toluene. The tissue undigested after this time was removed by centrifugation, the resulting opalescent supernatant fluid was treated with three times its volume of ethanol, and the precipitate, which contained the serologically active material, was dissolved in water, dialysed and reprecipitated with alcohol. Mucoid material was obtained in this way from twenty-four stomachs, and a serological examination of the preparations revealed that fourteen possessed A specificity only, whereas those remaining showed O specific character alone. It is noteworthy that in the series examined, no preparation of mucoid possessed both A and O specificity, as did the mucoid material obtained from hog gastric mucin of commercial origin, and no specimen was without either A or O character. The occurrence in hog gastric mucin of a mucoid material which possesses a single serological character that is very similar to, if not identical with, the human blood group O factor is thus demonstrated. The mucoid possessing O-specificity alone is presumably the material recently described as inactive mucoid by Bendich, Kabat and Bezer[4] as a result of their careful studies on the A-specific component of mucoid preparations obtained from individual hog stomachs.

Up to the present time, no technique for the isolation of the blood-group substances has been described that involves more than a few simple chemical and physical methods, and it is not surprising, therefore, that the application of these techniques fails to separate the blood-group substances one from the other in a mixture of A and O mucoids such as arises when a purified 'A-substance' is obtained from commercial hog mucin. The very similar chemical and physical properties and behaviour of the specific blood-group factors, and of the closely related but inactive mucoids which undoubtedly occur in native tissue fluids and secretions, forced one to rely on serological techniques for their differentiation, and it has been found that the success or failure of special techniques elaborated to separate the mucoids in mixtures of this kind can be readily followed by determining, by means of quantitative inhibition tests, the ratio of the activity of the appropriate specific characters, in this instance the A and O activity, of the separate fractions obtained. Inactive mucoids, that is, those not possessing A, B or O specificity, can be detected in the presence of material showing these specific blood-group characters by means of this type of agglutination test.

The behaviour of electrophoretically homogeneous hog mucin 'A-substance' after fractionation from solution in water, formamide, ethylene and diethyleneglycol, 90 per cent acetic acid–ammonium acetate mixture (a method investigated in this Institute by Dr. H. Laurell) and 90 and 95 per cent phenol, has revealed that at least a partial separation of the A and O components can be achieved by the use of some of these simple procedures.

Full details of this work and the application of the techniques to artificial and natural mixtures of biologically important mucoid substances will be given elsewhere.

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