

## LETTER TO THE EDITOR

### Staphylococcal Infection in Histamine and 5-Hydroxytryptamine Depleted Rats

SIR,—It is well known that in the rat much histamine and 5-hydroxytryptamine(5-HT) is contained in the skin<sup>1</sup>. The preponderance of these substances in regions which meet the outside world, suggests that they may be concerned in resistance of the animal to infection<sup>2</sup>.

We have studied the effect of preferential depletion<sup>3</sup> of histamine or 5-HT on the resistance of the rat to infection by coagulase positive *Staphylococcus aureus*, isolated from a human source. When normal control rats were given intra-peritoneal injection of doses of *Staphylococcus aureus* (18 hours broth culture) and killed 72 hours after, viable organisms could not be recovered from the blood. In these animals no abscesses, macroscopic or microscopic could be detected. The mast cells from subcutaneous tissues, however, showed considerable degranulation and rupture in areas distant from the site of injection. When such injections of *Staphylococcus aureus* were given in rats previously depleted of histamine by repeated injections of polymixin B or depleted of 5-HT by injection of reserpine<sup>3</sup>, the results obtained were different. In both these groups of animals, viable organisms were recovered from the blood. There were multiple pyaemic abscesses in the lung, liver and kidney. Organisms could be recovered from these abscesses as well. The mast cell damage produced by injections of polymixin B or reserpine were similar to those described by Parratt and West<sup>3</sup>. Injection of *Staphylococcus aureus* was without any effect on these damaged cells.

The total and differential count of leucocytes were done in control animals and in animals depleted of histamine or 5-HT, before and 24 hours after the injection of *Staphylococcus aureus* and also at autopsy. There was no appreciable alteration produced in either count by injections of polymixin or reserpine and the counts remained essentially the same in all the three groups after injection of the organisms.

The resistance of rats to infection by *Staphylococcus aureus*, and the presence of histamine and 5-HT in the tissues may be related. The injection of these organisms causes rupture of mast cells with release of histamine and other metabolites which may possibly aid in the defence of the body. Histamine or 5-HT, however, did not inhibit the growth of *Staphylococcus aureus in vitro*, when included in the culture media. The breakdown of the resistance, of the histamine or 5-HT-depleted rats to this organism cannot be accounted for by alteration of the leucocyte response. The mechanism by which the presence of histamine or 5-HT in tissues in rats confers immunity to infection by this organism is obscure. It was of interest therefore to note that 5-HT increased the phagocytic power of monkey leucocytes *in vitro* (Buttle and Northover, personal communication) and injections of histamine caused increased phagocytosis of BCG in rats<sup>4</sup>. Further work is in progress to elucidate this mechanism.

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