

**Effect of S-β-aminoethylisothiuronium Bromide Hydrobromide on X-ray Damage to Guinea Pig Skin**

MANY chemical substances have been investigated for their ability to protect animals against the lethal effects of total-body radiation<sup>1</sup>. Of these, S-β-aminoethylisothiuronium bromide hydrobromide is one of the most effective if administered before exposure. It produces a remarkable degree of protection to total-body radiation in mice<sup>2</sup>. Similar protection is afforded to the monkey if given 150–250 mgm./kgm. prior to administration of 650 r. whole-body X-radiation<sup>3</sup>. The following experiments were carried out to test whether S-β-aminoethylisothiuronium bromide was capable of protecting tissues against local irradiation.

17 male albino guinea pigs of average weight 693 gm. (range 530–920 gm.) were given 5,000 r. to a 1-in. circular area of skin under 'Nembutal' anaesthesia. This dosage was one which caused deep ulceration in all normal guinea pigs and the details of administration have been previously reported (see ref. 4 and Mellett, P. G., Walter, J. B., and Houghton, L. E., unpublished work).

Seven animals were kept as control, the remaining ten being treated with S-β-aminoethylisothiuronium bromide. 100 mgm./kgm. were given the day before and 150 mgm./kgm. 10 min. before exposure. The experiment was repeated using nine control animals and ten treated. Their average weight was 472 gm. (range 420–500 gm.).

There was no significant difference between control and animals treated with S-β-aminoethylisothiuronium bromide, either in the development of the initial superficial ulceration or the later deep lesion. The results obtained in the second experiment are shown graphically in Fig. 1. Although 5,000 r. is a heavy dose of X-rays, smaller doses are insufficient to cause ulceration in 100 per cent of animals. Any substance of useful protective value should therefore be capable of detection using this dosage.

Much of the work on chemical protection against the effects of X-radiation has been done using lethal total-body exposure. It is evident that results obtained by this method are not necessarily applicable to those obtained using local heavy irradiation such as are used in clinical radiotherapy.

In another series of experiments, locally applied X-rays in doses up to 1,500 r. have delayed the

contraction of circular excised wounds in rats. This effect can be antagonized by S-β-aminoethylisothiuronium bromide given before the irradiation; thus this substance administered parenterally is capable of reversing this particular X-ray effect. However, it does not produce significant protection against ulceration caused by larger doses. It may be that the mechanism involved in the skin necrosis caused by irradiation is not entirely identical with the mechanism involved in either the action of X-rays on wound contraction or in the lethal effect of total-body irradiation in animals.

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<sup>1</sup> Bacq, Z. M., and Alexander, P., "Fundamentals of Radiobiology" 290 (Butterworth, London, 1955).

<sup>2</sup> Doherty, D. G., and Burnett, jun., W. T., *Proc. Soc. Exp. Biol. Med.*, **89**, 312 (1955). Doherty, D. G., Burnett, jun., W. T., and Shapira, R., *Radiation Res.*, **7**, 13 (1957). Shapira, R., Doherty, D. G., and Burnett, jun., W. T., *ibid.*, **7**, 22 (1957).

<sup>3</sup> Crouch, B. G., and Overman, R. R., *Science*, **125**, 1092 (1957).

<sup>4</sup> Houghton, L. E., Walter, J. B., and Jones, D. E. A., *Brit. Med. J.*, **ii**, 1313 (1954).

**BIOLOGY**

**Influence of Environment on the Distribution and Form of Sponges**

DURING a taxonomic study of sponges in the Madras harbour and the adjoining Royapuram beach<sup>1</sup>, certain differences in distribution, size, texture and the extent of animal associations between the sponges occurring in these two areas were observed.

The Madras harbour is a protected area with placid waters. Owing to the effluents from the ships and docks the water there is somewhat polluted. The side walls of the harbour and some boats docked there for long periods are the substrata on which the sponges occur. In addition, the dead bivalve shells on the side walls of the harbour also provide a good substratum for certain sponges. The Royapuram beach, on the other hand, is an open, sand and boulder beach, subject to heavy wave action.

Of the ten species studied, five (*Reniera delicatula*, *Mycale mytilorium*, *M. madraspatana*, *M. aegagropila* var. *militaris*, and *Callyspongia diffusa*) occur only in the harbour, while three (*Prostylissa arcotti*, *Tedania nigrescens* and *Pachychalina multi-formis* var. *manaarensis*) were found only on the boulders of the Royapuram beach. Two forms (*Oceanapia arenosa* and *Lissodendoryx similis*) occur in both the localities. The harbour contains an abundantly larger sponge fauna than the Royapuram beach does.

A characteristic feature of the harbour sponges is their association with several groups of

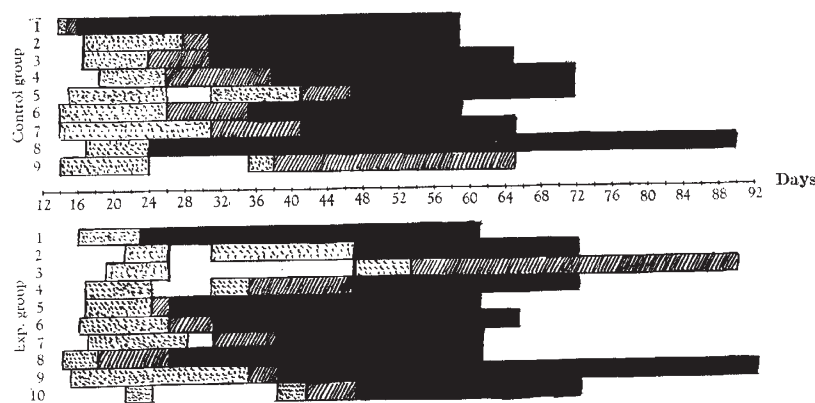


Fig. 1. Solid, large deep ulcer; hatched, small deep ulcer; stippled, superficial ulceration