3083

## Soy sauce as a stimulative agent in the development of beriberi in pigeons.

A. A. HORVATH. (Introduced by F. R. Dieuaide).

[*From the Chemical Laboratory, Department of Medicine, Peking Union Medical College, Peking, China.*]

Miyadera and Tsuji found that on a diet deficient in vitamin B there is a diminished gastric and intestinal secretion, but the secretory function is not lost and can be restored at once to a normal level if a suitable stimulus is present in the food. Abel and Kubota found that histamine is one of its constituents which accounts for the stimulating action of the soy sauce on the intestinal plain muscle, and that it also plays an important role in digestion as a dilating agent for the capillaries of the gastric and intestinal mucosa. Recently Kubota found that *in vitro* peptic and tryptic digestion of foods is stimulated from 4 to 8 times by soy sauce. Soy sauce possesses also a strong amylolytic function.

Funk reports that spontaneous cures of beri beri in rice-pigeons occur if nothing but water is given. It seems, therefore, probable, that beri beri in pigeons may be produced by some toxin absorbed from the intestinal tract. Soy sauce, in stimulating intestinal digestion and absorption, may also stimulate the production and absorption of this toxic substance.

In order to investigate this question, seven pigeons were fed on polished rice and water, the latter containing five per cent of the Pekingese soy sauce. Five control pigeons were fed on polished rice and pure water. Within one month five out of the experimental pigeons developed beri beri, and of the controls none. The pigeons fed on polished rice and soy sauce and water frequently showed attempts to disgorge the rice out of their crops. One of them, while under observation, died on the 6th day in a few minutes with the symptoms of an acute intoxication, with unsuccessful attempts to disgorge the food from his crop (the latter being only half filled). In one pigeon a typical spastic form of beri beri was observed on the 20th day. In three other pigeons a paralytic form of beri beri developed on the 14th, 27th and 29th day. In one of them this form changed in a few hours into a spastic-paralytic form, although yeast feedings had been started in the

meanwhile. In one of these three pigeons bloody feces were observed.

These data show that soy sauce in some way stimulates the development of beri beri in pigeons, because none of the controls developed beri beri within the same period, although one month is usually sufficiently long for the occurrence of the disease. The case in which beri beri appeared strikingly early (in 6 days) is of particular interest.

## 3084

### The relation of virulence to the pneumococcidal activity of normal rabbit serum-leucocyte mixtures.

SHUTAI T. WOO. (Introduced by O. H. Robertson).

[*From the Department of Medicine, Peking Union Medical College, Peking, China.*]

Previous work by Robertson and Sia[1] has shown that the blood (serum and leucocytes) of certain pneumococcus-resistant animals possessed destructive properties for pneumococci not found in the blood of susceptible animals. This suggests that the natural immunity of pneumococcus infection depends chiefly, if not entirely, on the pneumococcidal activity of the blood. In their studies pneumococci of high virulence only were employed, and the animals tested represented well marked examples of natural immunity and susceptibility, the dog and cat on one hand, and the rabbit and guinea pig on the other. It is a commonly observed fact that within a single species of any of the usual laboratory animals there occur wide variations in susceptibility toward different strains of disease-producing pneumococci, and that among the so-called susceptible animals such variations may be extreme.

Experiments were undertaken with the purpose of determining whether the immunity shown by a relatively susceptible animal, as the rabbit, against certain strains of pneumococci was asso-

[1] Robertson, O. H., and Sia, R. H. P., *J. Exp. Med.*, 1924, xxxix, 219.