**S. NEWBRUNSWICK FROM A FOOD POISONING OUT-
BREAK AND FROM A HEALTHY CARRIER***

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Since Edwards¹⁾ reported *Salmonella newbrunswick* for the first time, many papers have been published about food poisoning cases due to this particular organism in the areas in Europe and America, while there has been no report about this organism in Japan. This paper is reporting an outbreak of food poisoning, from which *S. newbrunswick* was isolated, and a healthy carrier of this organism.

**1. AN OUTBREAK OF FOOD POISONING IN THE
NATIONAL YOKOHAMA HOSPITAL****

There was an outbreak of food poisoning among the workers and the patients in the National Yokohama Hospital from the night of August 24, 1949 to the afternoon of the next day, who showed the typical symptoms of acute gastroenteritis due to food poisoning, namely vomiting, diarrhea, abdominal pain, headache, fever etc. The causative food was supposed to be raw tunny meat, which had been eaten by them in the evening meal of August 24, and among 478 workers and patients, who took this meal, 82 became sick due to food poisoning. The morbidity rate is supposed to be more than 17 % at least, though unable to present an exact rate because of the unsatisfactory results of the survey, which did not show the number of the people who took the food supposed to be causative. Most of the patients recovered in one or two days, but in a few cases of them, it took about a week to become well again.

The tunny meat used for the food, which was supposed to be causative for the sickness, was purchased on the day before and kept at room temperature though it was in summer season, for a long time, before and

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after it was cooked. It was also reported that the remaining tunny meat was not fit for consumption in its freshness according to the examination.

A strain (SH. I. strain) of salmonella from the tunny meat used for food and three strains (SH. II, III, and IV. strains) of salmonella each from the stools of three patients were isolated. The results of antigenic analyses and the biochemical examinations of these strains are shown in Table 1. The strain SH. I is *S. senftenberg*, and the strains SH. II, III, and IV are *S. Newbrunswick*. It is hard to understand, that different types of salmonella were found from the presumable causative food on one hand and from the patients on the other hand. Nevertheless, the following possibilities may be considered.

(1) The food poisoning outbreak may have been of a mixed infection of the two salmonella types and the one alone was isolated from the food, while the other alone was isolated from the patients.

(2) The real causative organism may have been *Salmonella newbrunswick*, which was unfortunately not isolated from the food. In this case, *S. Senftenberg* may have been accidentally found in the food.

(3) The causative organism may have been *Salmonella senftenberg*, which became *Salmonella newbrunswick* after variation by passage through human bodies.

The possibility of (3) is pretty difficult to consider, but it seems not always impossible in view of the fact that the antigenic variations of salmonella O and H can be artificially induced even in vitro. Bruner and Edwards²⁹ reported that they succeeded to induce *S. newington* (IV, XV: e, h-1,6.....) from *S. anatum* (III, X, XXXVI: e, h, -1,6.....). Following their method, the experiment was attempted to induce *S. newbrunswick* in vitro from *S. senftenberg* using the strain SH. I, namely, strain SH. I was transplanted in one end of the U-tube containing semisolid media, to which anti-XIX, I, II, XII O-serum, anti-g, s, t, H-serum and heat-killed bacterial suspension of *S. newbrunswick* were added, and the organisms reaching the other end of the tube was examined of their antigenic structure. But the variation to *S. newbrunswick* from *S. senftenberg* was not recognized.

The same kind of induction experiment was carried out in vivo, using three guinea pigs. They were immunized with *S. senftenberg* SH. I and when the agglutination titer (OH) of the animals reached about 1:1,000, live organisms of the same strain was given per os. There was found no

Table 1. The result of the antigenic and biochemical examination of the organisms isolated

Strain	SH. I	SH. II	SH. III	SH. IV	470
Antigenic structure	I, III, XIX: g, s, t—	III, XV: l, v—1, 7 ..	III, XV: l, v—1, 7...	III, XV: l, v—1, 7...	III, XV: l, v—1, 7...
Glucose	⊕	⊕	⊕	⊕	⊕
Mannitol	+	+	+	+	+
Dulcitol	—	+	+	+	+
Sorbitol	—	+	+	+	+
Inositol	—	+	+	+	+
Maltose	+	+	+	+	+
Arabinose	+	+	+	+	+
Rhamnose	+	+	+	+	+
Xylose	+	+	+	+	+
Trehalose	+	+	+	+	+
Adonitol	—	—	—	—	—
Salicin	—	—	—	—	—
Sucrose	—	—	—	—	—
Lactose	—	—	—	—	—
Motility	+	+	+	+	+
Indole	—	—	—	—	—
M.R.	+	+	+	+	+
V.P.	—	—	—	—	—
Citrate	+	+	+	+	+
Gelatin	—	—	—	—	—
H ₂ S	+	+	+	+	+
Milk	—	—	—	—	—
Urea	—	—	—	—	—

variant organism, namely *S. newbrunswick*, in the stools of the animals other than *S. senftenberg*.

From the experimental results mentioned above, the possibility of (1) or (2) was rather more rational than that of (3).

2. A HEALTHY CARRIER OF *S. NEWBRUNSWICK*

A strain of salmonella (strain 470) was isolated from a healthy food handler in the city of Sanjo, Niigata Prefecture, and forwarded to us from the Prefectural Public Health Laboratory for identification. The organism was identified as *Salmonella newbrunswick* antigenically and

biochemically, as shown in Table 1. The food handler showed no clinical symptom suggestive of salmonellosis or the like and looked very healthy, therefore was considered to be a healthy carrier.

SUMMARY

(1) *S. newbrunswick* was isolated from the stools of patients in a food poisoning outbreak and, at the same time, *S. Senftenberg* was isolated from its presumable causative food. Some possibilities were considered about the relationship between these two organisms and the outbreak of this food poisoning.

(2) This is considered to be the first report on the isolation of *S. newbrunswick* either from a food poisoning case or from a healthy carrier in Japan.

REFERENCE

- 1) Edwards, P. R.: A new *Salmonella* type possessing a hitherto undescribed non-specific antigen. *J. Hyg.*, 37, 384-387, 1937.
- 2) Bruner, D. W., and Edwards, P. R.: Changes induced in the O antigens of *Salmonella*. *J. Bact.*, 55, 449-450, 1948.