Outbreak of Food Poisoning Caused by Lactose-Fermenting Salmonella tuebingen

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An outbreak of food poisoning occurred in a cafeteria and involved 102 student nurses. A lactose-fermenting strain of Salmonella tuebingen was isolated. The source was traced to the chicken consumed. Production of H2S was not evident on triple sugar iron but was detected on lysine iron agar. Therefore, the present report emphasizes the importance of bismuth sulfite agar and lysine iron agar for routine use in the isolation of salmonellae from stool.

Regular surveys of food poisoning have been carried out in England and Wales, the United States, and other parts of the world. Among the organisms responsible for food poisoning, Salmonella spp. are important. In England, 80% of food poisoning cases are due to Salmonella spp.; in the United States, Salmonella spp. are responsible for 40% of food poisoning cases (9). Most serotypes isolated, however, are typical gram-negative non-lactose fermenters. Outbreaks caused by lactose-fermenting Salmonella spp. have been occasionally reported.

Out of 47,546 Salmonella isolates received at the Reference Laboratory for Enteric Pathogens, Colindale, London, England, between 1972 and 1976, lactose fermenters have been recognized in only two cultures (5). A lactose-fermenting strain of S. newington was isolated in an outbreak of diarrhea in the United States in 1967 (8). In Brazil, a lactose-fermenting S. typhi-murium strain was responsible for an epidemic of enteritis, septicemia, and meningitis in infants between 1971 and 1973 (7).

On 3 February 1982 at 9 p.m., after eating nshima (a local staple food made from maize flour) and chicken in a cafeteria, six student nurses developed diarrhea with up to two watery bowel movements every hour and with associated vomiting and abdominal cramps. They were hospitalized. A few hours later, 93 more nurses were hospitalized with severe gastroenteritis—nausea, diarrhea, fever, and abdominal cramps. A day later, four more student nurses were admitted. The incubation period varied from 8 to 24 h. In all, 102 students were admitted. All of them recovered within 1 week.

Stool specimens received at the laboratory were cultured and isolates were identified by standard techniques as described by Duguid et al. (2). Stool specimens were plated on MacConkey agar and desoxycholate citrate agar. They were also inoculated into selenite enrichment broth, from which further subcultures onto desoxycholate citrate agar were made after 18 to 24 h. All plates were incubated at 37°C and were examined after 24 and 48 h. Suspect colonies were inoculated into peptone water. After incubation for 4 to 6 h, further biochemical tests and antibiotic susceptibility tests were done. Finally, slide agglutinations with somatic and flagellar antisera were performed with reagents obtained from Wellcome Reagents Ltd., London, England. Only 10 samples were received in all—6 stool samples from the first six students involved and 4 food samples (i.e., nshima, milk, bread, and chicken). Salmonellae were isolated from four stool samples and from the chicken sample.

On primary culture, colonies on MacConkey agar and desoxycholate agar appeared not to be lactose fermenting after 24 h of incubation but appeared pink after 48 h. However, further subcultures from primary colonies produced typical lactose-fermenting colonies on MacConkey agar even after 24 h.

Triple sugar iron medium showed acid butt and acid slant with gas but without H2S production. However, H2S was produced on lysine iron agar, a medium which does not contain any lactose.

Other biochemical reactions were typical of Salmonella spp. Urea and indole were negative; citrate, mannitol, lysine, and ornithine were positive.

Since biochemical reactions other than lactose fermentation were typical of Salmonella spp., serological tests were performed. These tests indicated that the organism belonged to group D. Since specific antisera were not available, fur-
ther serotyping was done by the Public Health Laboratory Service Board, Colindale, London. The lactose-fermenting strains were found to be *S. tuebingen* 3, 15:y:1, and 2.

Institutional outbreaks of food poisoning caused by lactose-fermenting salmonellae have been reported (1). The species in this study (*S. tuebingen*) was identified despite its late lactose-fermenting property. It is believed that bismuth sulfite agar should be used routinely to sequester such lactose-fermenting salmonellae, as recommended by Edwards and Ewing (3). The occurrence of late lactose-fermenting strains of *Salmonella* spp. has been observed before by Fernandes de Toledo et al. (4). They observed that strains of *S. typhimurium* isolated in Brazil fermented lactose in 2 to 6 days on MacConkey medium.

The absence of H₂S production in the presence of lactose-containing media such as triple sugar iron medium and the importance of using media like lysine iron agar for the detection of H₂S have been noted earlier (1, 5); the present study substantiates these observations.

The acquisition of the lactose-fermenting property by *Salmonella* spp. may be plasmid mediated. Kunz and Ewing (6) report that a graduate student in their laboratory induced the ability to ferment lactose in a standard non-lactose-fermenting strain of *S. typhi* by treating cultures with an episome recovered from a lactose-positive strain of *S. typhi*. In 1974, LeMinor et al. (7) demonstrated the plasmid-mediated nature of lactose- and sucrose-positive *S. typhimurium* isolated from human disease. On the other hand, Hall et al. (5) observed that the lactose-fermenting property of *S. indiana* isolated from turkeys in England was not transmissible.

Salmonellosis is common in developing countries, particularly in Africa. Outbreaks of salmonellosis have been previously reported; these outbreaks were due to *S. isangi* (Zaire), *S. stanleyville* (Senegal), and *S. typhimurium* (Kenya) (9). To date, food poisoning caused by *S. tuebingen* has not been reported from Africa. The lactose-fermenting *S. tuebingen* strain has not been reported from anywhere.

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ERRATA

Efficacy of Enzyme-Linked Immunosorbent Assay in Serodiagnosis of Aspergillosis
SAROJ K. MISHRA, SABINE FALKENBERG, AND K. NOEL MASIHI
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Volume 17, no. 4, p. 709, column 2, lines 30 and 31: Should read "... Sepulveda et al. (8) have studied ..."

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Edwardsiella tarda Isolated in Israel Between 1961 and 1980
I. SECHTER, M. SHMILOVITZ, G. ALTMANN, R. SELIGMANN, B. KRETZER, J. BRAUNSTEIN, AND C. B. GERICHTER
National Center for Enterobacteriaceae, Central Laboratories, Ministry of Health, Jerusalem, Central Laboratory of Kupath Cholim, Haifa, Department of Microbiology, Chaim Sheba Medical Center, Tel-Hashomer, and District Public Health Laboratory, Haifa, Israel

Volume 17, no. 4, p. 669, column 2, line 37: "culture" should read "cultures."
Page 670, Table 2, column 3, line 4: "5982-71" should read "943-71."

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Volume 17, no. 4, p. 698, column 2, lines 1 and 2: "Duguid et al." should read "Mackie and McCartney."
Page 699, column 1, line 4: "3, 15:y:1, and 2" should read "3,15: y: 1,2."
Page 699, column 2, Literature Cited: Reference 2 should read as follows: