

TYPHOID FEVER CAUSED BY A NEGATIVE LYSINE DECARBOXYLASE *SALMONELLA* TYPHI STRAIN IN TWO PATIENTS FROM DISTRITO FEDERAL, BRAZIL

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The decarboxylation test for certain amino acids introduced by V. Møller (1954, *Acta Path. Microbiol. Scand.*, 35: 259-277; 1955, *loc. cit.*, 36: 158-172), is extremely valuable for the phenotypic differentiation of several genera belonging to the family *Enterobacteriaceae*. In particular, lysine decarboxylase (LDC) plays an outstanding role in the primary characterization of *Salmonella* since only the serovar *Salmonella* Paratyphi A (representation according to L. Le Minor & M. Y. Popoff, 1987, *Int. J. Syst. Bacteriol.*, 37: 465-468) does not have the ability to act on this substrate. Some serovars also occur (Abortusequi, Sendai and Typhisuis) which normally show discrete enzymatic activity on lysine (H. H. Wuthe, 1971, *Arch. Hyg.*, 154: 537-539).

An interesting point about the test is that, despite its extensive routine application, there are relatively few reports of lysine decarboxylase-negative *Salmonella* biotypes, which are limited to serovars Enteritidis (M. Catsaras & R. Buttiaux, 1963, *Ann. Inst. Pasteur Lille*, 14: 111; K. M. Holl & H. W. Franz, 1966, *Zbl. Bakt. I Abt. Orig.*, 199: 192); Typhimurium (P. R. Edwards et al. 1956, *Am. J. Med. Technol.*, 22: 28; W. Stellmacher, 1959, *Mh. Vet.*, 14: 378; D. Fritsche, 1964, *Zbl. Bakt. I Abt. Orig.*, 194: 188; G. Van der Wall, 1967, *Arch. Lebensmitt. Hyg.*, 18: 128; G. V. A. Pessôa et al., 1978, *Rev. Inst. Adolfo Lutz*, 38: 33-35; M. R. N. R. Esper et al., 1980, *Rev. Inst. Adolfo Lutz*, 40: 77-82); Panama (M. Catsaras & L. Le Minor, 1969, *Ann. Inst. Pasteur Lille*, 20: 159-162), and finally Typhi (J. Takács, 1964, Thesis, Budapest; H. H. Wuthe, 1971, *Arch. Hyg.*, 154: 537-539). Indeed, the last author similarly reported LDC negative strains in

serovars Paratyphi B and Typhimurium. In view of this unusual aspect, especially in Brazil, the present note reports on the identification of two strains of *Salmonella* Typhi with the inability to perform L-lysine decarboxylation in Møller medium.

The strains were obtained in 1987 from blood cultures of two patients with suspected typhoid fever, both of them residing in the satellite city of Planaltina, Distrito Federal. Only one patient was seen at his place of origin (blood culture 804), while the other, after 25 days of disease with no regression of symptoms or a conclusive diagnosis, was admitted to "Hospital Regional da Asa Norte", Brasília (blood culture 3534). Some general data were obtained about this patient. He was a 13-year old boy residing in an area with very precarious sanitary conditions. As an example, drinking water was obtained from a well near the house and dejecta were discharged into a stream on the side of the house, where clothes were also washed and where children played. In terms of laboratory tests, a final diagnosis was made only after two months of disease by blood culture, since the clinical suspicion was more of malaria associated with another infection. However, no hematozoa or *Schistosoma mansoni* eggs were detected in any of the tests made. The last aspect is emphasized in view of the fact that the hematological alterations observed, such as hypochromic anemia, discrete leucocytosis and elevated red cell sedimentation, may also have suggested the presence of prolonged septicemic salmonellosis. Another point suggesting such a correlation was the absence of anti-O and anti-H serum titers in the Widal test, which was first performed after one month of disease. Curiously, the Widal reaction performed one month after the isolation of *Salmonella* showed extremely significant TO and TH titers (1/640).

Next identification of the etiology, the patient was treated with ampicillin, with satisfactory clinical evolution and discharge from the hospital within 15 days. It should be pointed out that during the period preceding the specific treatment, high doses of penicillin (Benzetacil) were used.

From a bacteriological viewpoint indicating the presence of *Salmonella* Typhi, it should be pointed out that the two strains belonged to biotype I (xylose + and arabibose -), contained tetrathionate reductase (TTR +) and did not produce colicin in the presence of an indicator culture (*Escherichia coli* K 12-RCW-22R80). Antigen analysis revealed that both strains were motile, with strain no. 804 being in phase VW, indicating the beginning of Ag Vi degradation, and strain no. 3534 in phase V, demonstrating the integrity of this antigen. Vi phage typing (E. Hofer, 1984, *Mem. Inst. Oswaldo Cruz*, 79: 125-137), the strains were characterized as lysotype 46.

Both strains showed an elevated degree of *in vitro* susceptibility to antimicrobial agents, and in particular to those used for the treatment of typhoid fever (chloramphenicol, ampicillin and sulfamethoxazole-trimetoprim).

On an experimental basis, five colonies of each culture were successively replated five times at 48-hour intervals after incubation at 37 °C in Moller medium with 1% L-lysine. In the last step, the inoculated tubes were incubated at 37 °C for 10 days in order to provoke a possible induction of decarboxylase by the continuous contact of the bacteria with the substrate at acid pH. However, the result demonstrated the irreversibility of the phenomenon. A parallel test for the direct detection of cadaverine in the two samples by alkalinization and by reaction with ninhydrin (P. R. Carlquist, 1956, *J. Bacteriol.*, 71: 339-341) was also negative.