Two New *Salmonella* Serotypes (Serotype *malakal* and Serotype *khartoum*) Isolated from Dogs

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Two new *Salmonella* serotypes, *Salmonella* sp. serotype *malakal* and *Salmonella* sp. serotype *khartoum*, have been isolated from mesenteric lymph nodes of apparently healthy dogs in the Sudan, and they belong to *Salmonella* subgenus I. The antigenic formulae of these serotypes are: *S. malakal* = 16: e,h: 1,2; *S. khartoum* = (3),(15), 34 : a : 1,7.

During an investigation in the Sudan into *Salmonella* infections in dogs, two previously unreported *Salmonella* serotypes were isolated from the mesenteric lymph nodes of dogs. The lymph nodes, emulsified in normal sterile saline, were inoculated into selenite medium and, after 48 hr of incubation at 37 C were plated on MacConkey's medium and deoxycholate-citrate-agar. From these plates, six non-lactose-fermenting colonies were recovered and were biochemically and serologically tested. The new serotypes, here named *Salmonella* sp. serotype *malakal* and *Salmonella* sp. serotype *khartoum*, are described below.

Biochemical characteristics. Serotype *malakal* and serotype *khartoum* were biochemically almost identical: both produced acid and gas from glucose and mannitol; they also fermented maltose, xylose, arabinose, dulcitol, inositol, rhamnose, sorbitol, and trehalose, but they did not ferment lactose, sucrose, salicine or adonitol. They were: H₂S positive, Stern's glycerol fuchsin broth positive, indole negative, urea negative, KCN negative, and gelatin liquefaction negative.

Of the organic acids, they fermented *d*-tartrate, sodium citrate, and mucate, but not malonate. L-Tartrate and *i*-tartrate were fermented by serotype *malakal* but not by serotype *khartoum*.

Thus, both strains belong to *Salmonella* subgenus I.

Antigenic structure. When tested with differ-

ent single-factor sera, the organisms gave the following results.

(i) Serotype *malakal*. The culture agglutinated with serum containing O:16 antibodies and belongs, therefore, to group I of the Kauffmann-White schema. The H: phase 1 antigen of this strain agglutinated to the titer in an e,h-antiserum prepared from serotype *reading*. The H: phase 2 antigen was similar to that of serotype *newport*, i.e., it showed 1,2,3 factors. Since antigen 3 of this phase has been excluded from the Kauffmann-White schema, the complete antigenic structure of *S. malakal* is recorded as 16 : e,h : 1,2.

(ii) Serotype *khartoum*. Agglutination tests showed that this serotype belongs to group E₃ and that its O: antigens are (3),(15),34.

This is a diphasic organism, and its H: antigens are a:1,7. Its complete antigenic structure, therefore, reads: (3),(15),34 : a : 1,7.

Both organisms were confirmed by F. Kauffmann as new serotypes, and they have been included in the Kauffmann-White schema (1, 2).

LITERATURE CITED

1. Kauffmann F. 1964. Supplement zum K. W. Schema. VII. Acta Pathol. Microbiol. Scand. 62:68
2. Kauffmann F. 1965. Supplement zum K. W. Schema VIII. Acta Pathol. Microbiol. Scand. 64:367