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A NEW SALMONELLA SEROTYPE, SALMONELLA COOK (39:z_{48}:1,5), CONTAINING AN UNDESCRIBED FLAGELLAR ANTIGEN

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SUMMARY. Salmonella cook was isolated from animal feed meal and is represented by the antigenic formula 39:z_{48}:1,5. The z_{48} antigen of phase 1 bears no demonstrable relationship to previously described H antigens of Enterobacteriaceae.

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The serotype to be described, Salmonella cook (364-61), was isolated by Dr. C.F. Niven, Jr. from a sample of animal feed meal and was forwarded to the writers by the Division of Laboratories of the Illinois State Department of Health. The organism was a typical motile member of subgenus I of the genus Salmonella as defined by Kauffmann (1960). It failed to produce indol, was methyl-red positive and Voges-Proskauer negative, grew readily on Simmons' citrate agar, produced hydrogen sulfide, did not produce urease or phenylalanine deaminase and failed to liquefy gelatin or to grow in Moeller's KCN medium. D-tartrate, L-tartrate, citrate, and mucate were utilized promptly but I-tartrate and malonate were not attacked. Lysine and ornithine decarboxylase and arginine dihydrolase were produced. Acid and gas were formed promptly from glucose, arabinose, rhamnose, xylose, maltose, trehalose, dulcitol, inositol, mannitol, sorbitol, and glycerol. Cellobiose was fermented after 14 days incubation. Lactose, sucrose, adonitol and salicin were not attacked.

When examined with sera for the various O antigens of the Salmonella group, S. cook was agglutinated only by serum for O antigen 39 derived from Salmonella champaign. In absorption tests the culture removed all agglutinins from the serum. When examined with sera for the various H antigens of the known Salmonella types the organism was

agglutinated by none of them although it was actively motile. After repeated passage through semisolid medium to enhance motility it still failed to react with available Salmonella H sera. Further, it was not agglutinated by sera for the known H antigens of the Arizona, Citrobacter, Escherichia coli, Serratia, or Providence groups. A serum then was prepared from a formalinized broth culture of S. cook. This serum agglutinated the homologous culture in a dilution of 1 to 6400 but did not agglutinate the recognized H antigens of salmonellae in a dilution of 1 to 50. Later, a culture of Salmonella infantis was encountered which possessed complex H phases and these phases contained an antigen (z_{49}) which was slightly related to the antigens of 364-61. The undescribed antigen of S. cook was assigned the symbol z_{48} *.

The organism then was inoculated into semisolid medium to which had been added homologous serum in sufficient amount to immobilize the z_{48} phase. It did not migrate rapidly through the medium but eventually produced small bulbs which spread throughout the tube. From this spreading growth was isolated a form which was agglutinated to the titre of Salmonella thompson, phase 2 (1, 5) serum and by single factor 5 serum. No agglutination occurred in sera for H factors 2, 6 or 7. In absorption tests the 1, 5 phase of 364-61 reduced the titre of S. thompson, phase 2 serum from 12, 800 to 100. All agglutinins for phase 2 of S. champaign (39:k:1, 5) were removed from the serum.

From the results cited above it was obvious that the antigenic formula of S. cook was 39:z_{48}:1, 5. As pointed out by Dr. Kauffmann, the organism possessed biochemical reactions, O antigens, and phase 2 H antigens identical with those of S. champaign. In his opinion the z_{48} antigen was an "R phase" in the sense of Kauffmann (1961). In an effort to establish a relationship between the k antigen of S. champaign and the z_{48} antigen of S. cook, each was transferred repeatedly in semisolid medium to which had been added serum for the homologous phase as well as Salmonella H serum 1, 5 to prevent migration of phase 2 of the organisms. S. champaign was carried through 13 such transfers over a period of 14 weeks and S. cook through 15 transfers over a

* The writers are indebted to Dr. F. Kauffmann and Dr. Joan Taylor for confirmation of the results reported and to Dr. Kauffmann for assigning the antigenic symbol z_{48}.

period of 19 weeks. During this process no antigenic changes were noted in either organism and no evidence was obtained that z_{48} was derived from H antigen k. The results indicated that S. cook was a valid serotype. It seems quite possible that antigen z_{48} eventually will be found in other antigenic combinations and recognized as a valid H antigen of the Salmonella group.

REFERENCES

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