A NEW SALMONELLA TYPE: SALMONELLA WAYCROSS

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The culture was isolated in the Waycross Branch Laboratory of the Department of Health, State of Georgia, and sent to us by Miss Janie Morris, Atlanta, Georgia. It was recovered from the urine of a woman with a history of pyuria due to chronic cystitis and renal calculi. The patient had fever from time to time.

Biochemical features. Gram-negative rods that promptly ferment, with gas formation, glucose, mannitol, maltose, trehalose, sorbitol, arabinose, rhamnose, and xylose. They grow on citrate agar and utilize d-tartrate on the second day. Lactose, sucrose, salicin, dulcitol, and inositol are not fermented within 3 weeks, indole is not formed, and gelatin is not liquefied (60 days). H₂S is produced.

Mouse pathogenicity. Six mice fed with the organism were alive after 28 days. Salmonella waycross was found in pellets taken on the ninth and twenty-first days. Of 3 mice injected sc. with 0.1 ml of a 24-hour broth culture, 2 died within 24 hours, 1 survived 28 days. Three mice were injected ip. with 0.1 ml of a 24-hour broth culture; 2 died within 24 hours, 1 was alive after 28 days. Thus the virulence for mice is relatively low.

Serology. Dr. Edwards, to whom we had sent the culture, informed us that its O antigen seemed to be identical with that of N.J.4, a coliform bacterium isolated from arthritic wing joints of canaries (Edwards, Cherry, and Bruner, 1943). This specific O antigen exhibited a slight relationship in the form of cross reactions to types containing the XI antigen (homologous agglutination, 1:4,000; cross reaction, 1:500). The flagellar antigen of N.J.4 was related to the g of the enteritidis group. Dr. Edwards kindly supplied a transplant of N.J.4 and thus enabled us to produce sera and antigens for comparative agglutinations and reciprocal absorption tests.

From table 1, the following conclusions may be drawn: S. waycross and N.J.4 are closely related; the main antigen shows only minor quantitative differences with unabsorbed sera. In absorption tests the two antigens do not fully exhaust the reciprocal antisera. The possible contents of XI as a partial antigen are larger in N.J.4 than in S. waycross. This is demonstrated by quantitative agglutinations as well as by the far more effective absorption of N.J.4 serum by S. rubislaw (XI).

Since the N.J.4-waycross main antigen so far has not been found in the Salmonella group, a new symbol is to be allotted to it. XLI was chosen in agreement with Edwards and Kauffmann. The addition to the formula of the partial antigen XI seems not to be warranted—because of its very limited cross reaction with our strain.

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The H antigen of *S. waycross* belongs to the z4 group. "Antigenic relationships within this group are quite complicated," to quote Edwards, West, and Bruner (1947). These antigens occur in paracolon bacilli as well as in *Salmonella* types. They have the z4 in common and differ in partial antigens, e.g., z25, z24, z26, z27. Some even more individual factors may occur with no particular diagnostic importance. Among the salmonellae the following types of this kind are known:

*S. cerro* XVIII; z4, z23, z25

*S. düsseldorf* VI.VIII; z4, z24

*S. tallahassee* VI.VIII; z4, z22

*S. stanleyville* IV.V.XII; z4, z23

*S. arizona* XXXIII; z4, z23, z26

The latter type, of which some strains ferment lactose belatedly, may be withdrawn from the *Salmonella* group and added to the paracolon bacilli—a sug-

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<tr>
<th>TABLE 1</th>
<th>Somatic relationships of <em>S. waycross</em></th>
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<td><strong>ANTIGENS</strong></td>
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<th>TABLE 2</th>
<th>Flagellar relationships of <em>S. waycross</em></th>
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<td><strong>H SERA</strong></td>
<td><strong>ANTIGENS</strong></td>
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<td>S. arizona</td>
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<td>S. cerro</td>
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gestion that is still open for discussion. We tested these 5 types in comparison
with *S. waycross*. *S. stanleyville*, an account of which has not yet been published,
was sent to us by Dr. F. Kauffmann of Copenhagen. Motile H antigens were
produced with these strains and tested with the corresponding antisera (except
for *S. stanleyville*).

Table 2 demonstrates the interrelationship of all types and the identical re-
activity of *S. cerro*, *S. stanleyville*, and *S. waycross*. *S. arizona*, *S. düsseldorf*,
and *S. tallahassee* have in addition to the $z_4$ antigen strong individual factors
which differentiate them from one another, and from the cerro-waycross-stanley-
ville group. These results were checked by a great many cross-absorption tests,
with all sera involved, and by single or double absorptions. Scores of individual
tests confirmed the conclusion that the H antigen of *S. waycross* is all but identical
with that of *S. cerro* and *S. stanleyville*. Since the designation of the *S. cerro* H
antigen has recently been simplified to $z_4$, $z_23\ldots$, this symbol is also to be given
to *S. waycross*, whose antigenic formula therefore reads: XLI: $z_4$, $z_23\ldots$

**SUMMARY**

*Salmonella waycross*, a new *Salmonella* type, was isolated from the urine of a
woman with chronic cystitis. It has a new *Salmonella* O antigen that also occurs
in the paracolon bacillus N.J.4 (Edwards); its H antigen belongs to the $z_4$ group.
The antigenic formula proposed is XLI: $z_4$, $z_23\ldots$

**REFERENCES**

Edwards, P. R., Cherry, W. B., and Bruner, D. W. 1943 Further studies on coliform
bacteria serologically related to the genus *Salmonella*. *J. Infectious Diseases*, 73,
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Edwards, P. R., West, M. G., and Bruner, D. W. 1947 *Arizona* group of paracolon