Problems of *Escherichiae* Systematics and the Classification of Atypical Dysentery Bacilli

WOLFGANG STENZEL

Bakteriologisches Untersuchungsamt des Kreises Wesel in Moers, D-4130 Moers, Germany

Due to the close systematic relationships within the tribe *Escherichieae*, definition of the taxon *Shigella* should be based primarily on the potential enteropathogenicity of the dysentery types. Immobile and anaerogenic dysentery bacilli possessing biochemical activities exceeding the established *Shigella* norm could be included in *Shigella* subgroup D, to which should be given the name *S. metadysenteriae* to avoid misunderstandings resulting from lipopolysaccharide phase designations I and II of *S. sonnei*. *S. sonnei*, serotype 792 and serotype 147, and *S. guanabara* are proposed to be listed as serotypes 1 to 4 of *S. metadysenteriae*. Regularly aerogenic and/or motile dysentery types of the tribe *Escherichieae*—*E. coli* O124, O136, O143, O144, and O152—could be placed for the present into a provisional taxon *Escherichia dysenteriae*.

Some years ago, Manolov, Trifonova, and Stenzel (7-10, 14, 15) suggested a definition of the genus *Shigella* based on the potential pathogenicity of freshly isolated *Shigella* strains for the conjunctivae and urinary bladder of guinea pigs. The authors made this proposal because they felt that there are no other peculiarities suitable for discriminating between *Escherichia* and *Shigella* (cf. 9). In 1962, however, the *Enterobacteriaceae* Subcommittee (5) decided that such pathogenicity tests should not be accepted as a criterion for the inclusion of an organism in the *Shigella* group.

In the meantime our presumption as to the systematic relationships between *Escherichia* and *Shigella* has been widely confirmed by further findings (cf. 12), especially by fairly precise analysis of polynucleotide relatedness between strains of these taxonomic groups (1-4) and by the discovery of an overlapping protein antigen typical for all dysentery bacilli (11, 16). On the other hand, it became apparent that *Shigella*-like pathogenicity for mucous membranes is not limited to the *Shigella* group but can also be found in certain motile and aerogenic *Escherichieae*. Although we have been able to judge the enteropathogenicity of almost any *Escherichieae* bioserotype, we, nevertheless, did not find until now a stable marker connected with pathogenicity and so have been unable to demonstrate this property in every individual case.

As matters stand, the question arises whether the taxonomy of the tribe *Escherichieae* Bergey et al. 1938 emend. Ewing 1963 should reflect a part of history of bacteriological nomenclature, or whether it should be based on facts or should take its bearings from the needs of medical mi-

crobiologists. It is our opinion that there is no doubt that *Escherichieae* taxonomy will one day be set up by the necessity of separating dysentery bacilli from apathogenic or only toxinogenic *Escherichieae*. Current thinking in classifying unusual dysentery types does not lead to an acceptable situation. One can, for example, denominate serotype 147 strains as *E. coli* O25 on the grounds of serological relationships, but when the entire background is taken into consideration, i.e., pathogenicity, biochemical behavior, presence of certain protein antigens (17), and differences in the chemical composition of the O-lipopolysaccharides concerned (13), one realizes that such nomenclature is of little value both for practical and theoretical purposes.

It may seem premature to set up a new classification of the tribe *Escherichieae* Ewing 1963 before having in hand the chemical substances responsible for pathogenicity of the dysentery types. One must consider, however, that pathogenicity for mucous membranes is a property of little genetic stability which may lose its traceability by chemical methods together with its demonstrability in animal tests. It is true, that, for lack of stability, pathogenicity for mucous membranes cannot serve as a taxonomic criterion without reservation, and therefore it might be wise not to cite animal tests when setting up formal definitions concerning the tribe *Escherichieae*. However, positive results of pathogenicity tests on a certain *Escherichieae* strain should be considered in any case when judging the taxonomic position and nomenclature of the bioserotype represented by the culture in question.

As already stated (9, 10, 12) *Shigella* subgroup

D should be open for inclusion of any immobile and anaerogenic dysentery type that possesses a biochemical activity exceeding the *Shigella* norm, for example those that split lactose, salicin, acetate, mucate, or citrate, as long as such strains are not biotypes of *Shigella* types already accepted. The specific epithet of *S. sonnei*, however, should be dropped to avoid misunderstandings resulting from lipopolysaccharide phase designations I and II of *S. sonnei* (9). Instead of the latter name we suggest the name *S. metadysenteriae* Stenzel 1962 (9) for *Shigella* subgroup D, and that *S. sonnei* be listed as *S. metadysenteriae* 1, serotype 792 be listed as *S. metadysenteriae* 2, serotype 147 be listed as *S. metadysenteriae* 3, and *S. guanabara* ("*E. coli* O112 a, c") be listed as *S. metadysenteriae* 4.

The second, more *Escherichia*-like group of atypical dysentery bacilli could remain within the genus *Escherichia* but then should be placed into a provisional species *E. dysenteriae* which would comprise at the present time *E. coli* serotypes O124, O136, O143, O144, and O152 (cf. 12). A formal definition of a taxon *E. dysenteriae* could hardly exceed the statement that *E. dysenteriae* should contain any *Escherichiae* type that causes dysentery but is regularly aerogenic and/or motile. Such a separation of a species *E. dysenteriae* might not be easily accepted but is the necessary compromise for the protection of the *Shigella* biotype concept.

REPRINT REQUESTS

Address reprint requests to: Dr. Wolfgang Stenzel, Bakteriologisches Untersuchungsamt des Kreises Wesel in Moers, Goethestr. 1, D-4130 Moers 1, Germany.

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