COMPARISON OF DYSENTERY
BACTERIA ISOLATED AND CLASSIFIED IN
THE USSR WITH CULTURES FROM FOREIGN
COLLECTIONS CLASSIFIED IN TERMS OF
THE INTERNATIONAL NOMENCLATURE

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For a number of years our laboratory has been carrying on studies on biology and taxonomy of Shigellae recovered in the USSR and their comparison with cultures from foreign sources.

Confrontation of type cultures from the Soviet Union collection with those from English, French and Hungarian national centers has been undertaken twice in the post-war period, in 1948 and in 1957-58.

Cultures from foreign sources, with dates on which they were received as well as dates and results of their confrontation, are listed in Tables 1, 2, and 3.

Serological types of the mannitol-negative cultures "Tiakht", "Roman", "1618", "819" and "2435"*) were compared for the first time with Shigella dysenteriae 3, 4, 5, 6, 7 in 1957. Up to that time, there had been no Large-Sachs cultures in type collections of the USSR.

The serotype of "Roman" proved to be identical to type 3; that of "1618" - to type 4; "819" - to type 5 and "2435" - to type 7. Serological analysis of Q454 (type 6) could not be achieved, this culture having been received in the R-form (Novgorodskaya, 1957). In view of a close similarity in fermentative properties (Wheeler and Stuart, 1946), the culture of "Tiakht" serotype was assumed to be identical to type 6 (Table 1).

This assumption, as well as the identity of "Roman", "1618" and "819" cultures with serotypes 3, 4, 5, have recently been supported by data from Ewing et al. (1959).

*Described and classified in the USSR in 1943-46.

The first confrontation of cultures belonging to seven Boyd-Novgorodskaya serotypes*) with Shigella boydii types 1, 2, 3, 4, 5, 6 dates to 1948, when Boyd-Novgorodskaya serotype I was shown to be identical to Shigella boydii 1; III - to S. boydii 4; V - S. boydii 2; VII - to S. boydii 5. No counterparts to our serotypes II, IV, VI were to be found among the first 6 of Boyd's serological types (Novgorodskaya, 1952).

There were data in the literature (Ewing, 1946), however, suggesting such a close similarity of fermentative properties of Shigella Lavington etousae (designated later as boydii type 7) as to assume its identity to our serotype II (Novgorodskaya, 1957).

The truth of this assumption was confirmed in 1958, when additional Shigella boydii types 7, 8, 9, 10, 11 became available. The identity of Boyd-Novgorodskaya serotype IV and Shigella boydii 9 was also established (Novgorodskaya, 1958; 1959,) (See Table 2.)

This has been supported by Ewing et al. (1959), who also demonstrated the identity of one more of our serotypes—Boyd-Novgorodskaya VI with Shigella boydii, type 12, included in the International Classification schema in 1958. This serotype appears in the provisional Soviet classification since 1952 (Troitski, 1953).

In 1947-1958 we classified two additional serological types—VIII, IX—each being represented by a single culture as yet.

It may prove possible to identify counterparts of these serological types on receiving cultures of additional Shigella boydii serotypes, entered in the International Classification in 1958, that are not available yet in USSR collections.

Various serological types of Bacterium dysenteriae flexner, Flexner variant, were previously compared to the respective cultures, classified according to foreign schemata, by a number of investigators in USSR (O. O. Gartoch et al.). Such studies had to deal with a restricted series of cultures, notably: v, w, z, x, y (Andrewes and Inman).

As a result of these confrontations, out of 6 serotypes (a, b, c, d, e, f) three (c, e, f) proved to be counterparts to w, z, v respectively, while none were found for three (a, b, d) (Troitski, 1953).

*Described and classified in the USSR in 1943-46.

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In 1957-58, when a complete set of *Shigella flexneri* cultures had been obtained from English, French and Hungarian national centers, comparative investigations were undertaken in our laboratory by L.D. Grinberg. It was shown that our collection of Flexner type stock cultures of the Soviet Union included members of almost all of the serologic varieties, occurring in other countries and classified conforming to the International Nomenclature as *Shigella flexneri* serotype 1-5. (Table 3).

The place of serotype d has not been determined and is still subject to investigation.

According to data of Ewing et al. (1959), serotype d is identified as serotype 3c.

As to serologic type a, data presented by Ewing et al. (1959) suggest its identity with var. y. It should be noted, however, that the USSR collection contains adequate reference cultures of this independent serotype.

According to the USSR classification schema, Newcastle bacilli are described as a separate variety. It is warranted by their important fermentative and serologic characteristics which separate them from Flexner bacilli on one hand, and from Boyd-Novgorodskaya bacilli, on the other (gas production, consistent fermentation of dulcitol, partial group antigenic relationships with Flexner bacilli). Our collection contains 6 out of 7 fermentative variants of this bacilli. All of them are identical as to their antigenic characteristics. Confrontation with cultures of *S. flexneri* type 6 from different national centers has also shown the complete serological identity of our cultures with those from foreign sources.

The designation "Newcastle" adopted in the USSR nomenclature has an historical implication, related to the description of this bacterial variant, the Newcastle type being the first fermentative variant to be described.

None of the agents of dysentery discussed above, however, belong to those occurring frequently in our country. Sonne dysentery bacilli being by far the more widespread. These are mostly represented in our collection by three biochemical types.

Xylose-fermenting Sonne ~~cultures~~ have been occurring more and more frequently recently.

Table 1. Results of confrontation of mannitol-negative dysentery cultures isolated and classified in the USSR in 1943-46* with Shigella dysenteriae cultures 3, 4, 5, 6, 7

Culture No.	Serologic type	Counterpart International classification	Cultures received date	Confronted, date
556	"Tiakht"	<u>Shigella dysenteriae</u> type 6?	March, 1957	April, 1957
25104	"Roman"	<u>Shigella dysenteriae</u> type 3	March, 1957	April, 1957
311	"1618"	<u>Shigella dysenteriae</u> type 4	March, 1957	April, 1957
32089	"819"	<u>Shigella dysenteriae</u> type 5	March, 1957	April, 1957
2435	"2435"	<u>Shigella dysenteriae</u> type 7	March, 1957	April, 1957

*not included in provisional USSR classification in 1952.

Table 2. Results of confrontation of Boyd-Novgorodskaya type cultures I-VII with Shigella boydii cultures 1-11

Boyd-Novgorodskaya type		Counterpart, International classification	Cultures received date	Confronted, date
Culture No.	Serologic Type No.			
30	I	<u>Shigella boydii</u> type 1	October, 1947	April, 1948
4830	II	<u>Shigella boydii</u> type 7	January, 1958	April, 1958
4322	III	<u>Shigella boydii</u> type 4	October, 1947	April, 1948
10305	IV	<u>Shigella boydii</u> type 9	January, 1958	May, 1958
2012	V	<u>Shigella boydii</u> type 2	October, 1947	April, 1948
2469	VI			April, 1948 No counter- part identified
2619	VII	<u>Shigella boydii</u> type 5	October, 1947	May, 1958
		<u>Shigella boydii</u> type 3	October, 1947	April, 1948
		<u>Shigella boydii</u> type 6	October, 1947	April, 1948 No counter- part identified
		<u>Shigella boydii</u> type 8	January, 1958	April, 1948 "
		<u>Shigella boydii</u> type 10	January, 1958	April, 1958 "
		<u>Shigella boydii</u> type 11	January, 1958	May, 1958 "
				May, 1958 "

Table 3. Results of confrontation of dysentery cultures—members of Flexner serotypes a, b, c, e, f, g—with Shigella flexneri cultures 1, 2, 3, 4, 5

Culture No.	Serological type	Counterpart, International Classification	Cultures received, date	Confronted, date
18148	a ₁	None identified	October, 1957	November, 1957
7141	a ₂	4aA	October, 1957	June, 1958
2344	a ₃	4b	March, 1959	November, 1959
1966	b	2b	October, 1957	June, 1958
1966	b	2b	October, 1958	January, 1959
8913	c	2a	October, 1958	January, 1959
5316	c	3	January, 1958	November, 1958 May, 1959
18775	f ₁	1b	January, 1958	November, 1958
122	f ₂	1a	January, 1958	November, 1958
11894	g ₁	5 (x+)	October, 1957	November, 1957
583	g ₂	5 (x-)	January, 1958	May, 1958

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CONCLUSION

We find it appropriate to present the results of comparisons of dysentery bacilli isolated in USSR with cultures classified according to the International Schema. These data may help in clarifying some of the questions raised in the paper by W.H. Ewing et al. (1959), which is the first and unique contribution to the problem made by foreign investigators.

З а к л ю ч е н и е

Мы сочли целесообразным представить материалы сопоставления дизентерийных бактерий, выделяемых в СССР, с культурами, классифицированными по международной схеме. Полагаем, что эти данные могут послужить для уточнения и разъяснения некоторых положений, изложенных в статье **W.H. Ewing et al. (1959)** , первой и единственной пока работе зарубежных авторов, посвященной этому вопросу.

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