CLASSIFICATION OF DYSENTERY BACTERIA

(Decisions of the Committee on the Nomenclature
of the Pathogenic Bacteria and Viruses
of the Ministry of Health of the USSR)

SUMMARY: The decisions of the Soviet Committee on Nomenclature report the steps taken to integrate the provisional Soviet classification scheme of the dysentery bacteria with the proposals of the International Subcommittee on the Enterobacteriaceae. The relationships of the species of the genus Shigella in the two schemata are analyzed. A scheme of Shigella classification to be used in the USSR is presented.

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In furtherance of the decision of the Committee on Nomenclature of Pathogenic Microorganisms of February 15, 1960 with regard to substitution of the provisional Soviet classification scheme of dysentery bacteria by the international one, the Committee during its sessions of February 15 and 16, 1962, considered concrete proposals to this effect.

The authors representing three institutions* reported on the study of more than 700 cultures carried out expressly for collating the antigenic structures of type cultures of Flexner's bacilli along the lines of two classifications. A report was presented** which included the draft of a new classification which touched on the main concepts reflecting the state of modern knowledge of the nomenclature and of the genetic ties between bacteria.

In addition to the committee members, representatives of some Moscow Institutes and the Central Sanitary-Epidemiological Station also took part in the discussion of the Draft Soviet Nomenclature of the genus Shigella. The institutions represented were the following:

* The Tarasevich State Institute for the Control of Vaccines and Sera (E. D. Ravich-Birger; E. A. Elchinova, L. D. Peremestina); the Moscow Institute of Epidemiology and Microbiology (R. V. Epstein-Litvak, I. L. Gofman); and the Laboratory of the Moscow Sanitary-Epidemiological Station (Ju. I. Litinsky).

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INTERNATIONAL BULLETIN

The Moscow Institutes -

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The Pasteur Institute of Leningrad -

(Prof. E.M. Novgorodskaya, L.D. Grinberg);

The Kiev Institute of Experimental Medicine -

(M.A. Elshina); and

The Tashkent Medical Institute -

(M.N. Yanishevskaya).

In fulfilment of the decisions of the Committee on Nomenclature of Pathogenic Bacteria and Viruses of February 15, 1960 and January 15, 1962, the provisional Soviet classification of dysentery bacteria must be satisfactorily interpreted with the international nomenclature for more convenient use in literature and in routine laboratory activities.

The principal difference between the two schemes lies in the nomenclature of subdivisions under which falls the genus Shigella. In the international classification the term "species" is not used, there are four subgroups within which the included types are listed under numbers. In the Soviet nomenclature the genus is subdivided into the species and subspecies which include types listed under letters or Roman figures. Apart from that the Flexner bacilli classification schema in the provisional Soviet nomenclature is based on the registration of one type antigen, while the international system also provides group antigens. Consequently, apart from serotypes the international classification also shows subtypes characterized by variants among group antigens.

With regard to the mannitol-negative strains it should be pointed out that the Soviet provisional scheme of classification lacks the entire group of large Sachs cultures since they are isolated quite rarely and thus were not included. At the same time it is quite possible that they failed to be isolated because the necessary sera were not available for routine laboratory activities. The same is true of the Boyd strains which are given a much smaller place in the Soviet nomenclature compared to the international.

After discussing the reports presented at the session, the Committee decided to accept the name Shigella as standard for designating dysentery bacteria, on the analogy with the use of the name Salmonella.

BACTERIOLOGICAL NOMENCLATURE
AND TAXONOMY

It was also decided to replace the provisional Soviet scheme of classification by a different one based on the international classification with all necessary and adequate amendments made in it. These amendments first and foremost bear on the classification terminology. Taking into account the level of modern scientific knowledge there are no grounds whatsoever for excluding the subdivision "species" from the nomenclature. Therefore, in the new classification terminology the term "species" is preserved, while the term "subgroup" is omitted.

Subgroup "A" of the international scheme under which are classed the microorganisms "which do not split mannitol" consists of three species according to the new Soviet classification. These three species are divided into three types based on their serological (antigenic) independence.

Changes have also been introduced into subgroups "B" and "C" of the international nomenclature. According to the new classification scheme these include the mannitol-splitting microorganisms classed under Flexner species (S. flexneri). Likewise, the Flexner species is subdivided into three subspecies: The Flexner proper, Newcastle, and Boyd. The latter in turn are subdivided into types and subtypes.

The Newcastle microorganisms which, according to the international classification belong to Type 6 of subgroup "B" should be designated as a subspecies on the basis of their serological individuality and because of the existence of fermentative types.*

In accordance with the scheme, diagnostic sera must be produced that would embrace the type and group antigens. The method of determining the antigenic structure of Shigella does not differ from that used for the study of Salmonella. This peculiarity was used for collating the types with regard to the provisional and international nomenclatures. A study of cultures, both from the museum and freshly isolated, demonstrated that quite often the strains which had a common type antigen revealed variations in group antigens which made it possible to refer them to the respective subtypes. Table 2 shows antigenic structures of the most frequent variants of cultures.

* Up to 7 fermentative types have been described, although three are the best known ones. They are: a) Newcastle, b) Manchester, and c) Boyd 88.

Table 1. Classification of the genus Shigella to be used in the USSR.

		Species	Subspecies	Type antigen	Subtype
Not splitting mannitol		<u>S. grigoriewa-shiga</u>	-	1	-
		<u>S. stutzeri-schmitzii</u>	-	2	-
		<u>S. large-sachsi</u>	-	3	-
			-	4	-
			-	5	-
			-	6	-
			-	7	-
		Provisional*	-	8	-
			-	9	-
			-	10	-
Mannitol-splitting		<u>S. flexneri</u>	<u>S. flexneri</u>	1	1a 1b
			"	2	2a 2b
			"	3	3a 3b 3c
			"	4	4a 4b
				5**	var. x var. y ***
		<u>S. flexneri</u>	<u>S. newcastle</u>	6	-
		<u>S. flexneri</u>	<u>S. boydii</u>	1	-
				2	-
				3	-
				4	-
				5	-
				6	-
				7	-
				8	-
				9	-
				10	-
				11	-
				12	-
				13	-
				14	-
				15	-

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Table 1 (cont.)

	Species	Subspecies	Type antigen	Subtype
Bacilli which split lactose slowly	<u>S. sonnei</u>	-	-	-

* Not clear to what type these should be referred.

** There are subtypes.

*** Devoid of type antigens, are differentiated by the group ones.

Table 2. Serotype designations of Shigella flexneri to be used in the USSR.

Species	Subspecies	Type	Subtype	Type antigen	Group antigens
<u>S. flexneri</u>	<u>flexneri</u>	1	1a 1b	1	3, 4:(7, 8) 3, 4:6
		2	2a 2b	2	3, 4:7, 8 7:8
		3	3a 3b 3c	3	3, 4:6:7, 8 6:7, 8 3, 4:6
		4	4a 4b 5(x+) 5(x-) var. x var. y	4 4 5 5 - -	3, 4 (3, 4):6 7, 8 (3, 4) (3, 4):6;7, 8 (3, 4):6

The collection of the type cultures showed that:

Type 1 corresponds to type - f
 " 2 " - b and c
 " 3 " - e and d
 " 4 " - a (Boyd 103)
 " 5 " - g (Boyd 119)

The decisions taken by the Committee on Nomenclature have been reported to the Ministry of Health of the USSR for taking the necessary practical steps for their implementation.

The newly adopted scheme for the classification of Shigella should find wide application in routine diagnostic laboratory work. It must find reflection in the nomenclature of diagnostic drugs as well as in medical statistics. Last, but not least, it must be also reflected in the terminology used in scientific literature.

The decisions taken by the Committee on Nomenclature also envisage that the Shigella Classification Scheme should be submitted for discussion to international nomenclatural bodies.

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