SUBCOMMITTEE ON THE TAXONOMY OF THE
STREPTOCOCCI AND PNEUMOCOCCI

Minutes of the Third Meeting

1. A meeting of the Subcommittee was held at McGill University, Montreal, Canada on August 17, 1962. The following were present:

Dr. B. Eddy	Bethesda, Maryland, USA
Prof. P.A. Hansen	College Park, Maryland, USA
Dr. R.C. Lancefield	New York, New York, USA
Dr. C.F. Niven, Jr.	Chicago, Illinois, USA
Dr. R. Pakula	Warsaw, Poland
Dr. M.T. Parker	Colindale, England
Dr. K. Raska	Prague, Czechoslovakia
Dr. K. Rosendal	Copenhagen, Denmark
Prof. M. Seelemann	Kiel, Germany
Dr. P.M.F. Shattock	Reading, England
Dr. A.W. Stableforth	Weybridge, England
Dr. E. Updyke	Atlanta, Georgia, USA
Dr. R. Wahl	Paris, France
Dr. R.E.O. Williams	London, England (<u>Chairman</u>)
Dr. A.T. Wilson	Wilmington, Del., USA (<u>Secretary</u>)

2. Dr. Williams welcomed the members and announced with regret the resignation of Dr. A. V. Allison (Belfast) from the Chairmanship.

3. Dr. Williams was elected chairman of the Subcommittee to succeed Dr. Allison, and Dr. Wilson was elected secretary to succeed Dr. Williams.

4. Several individuals were proposed as possible new members of the Subcommittee. These will be queried as to their interest in serving.

5. Standard Agglutinating Typing Sera for Group A Streptococci. Following a conference under the auspices of the WHO Regional Office for Europe, December 1960, sets of such standard antisera were prepared in a collaborative effort by the Streptococcal Reference Laboratories in Colindale and Prague. The purpose of this undertaking is to supply interested laboratories that are now making their own typing sera with standard sera of known agglutinin characteristics and also with standard strains for immunizing and

testing. A number of requests for these sera have been received by the Prague laboratory but none so far by Colindale. It was thought that many laboratories may not have heard of the availability of these materials and Drs. Raska and Parker were authorized to communicate on this subject in the name of the Subcommittee with the several laboratories known to them to be making antisera.

6. The Standardization of Antistreptolysin O. Dr. Williams reported that a standard serum employing Todd units is available from the State Serum Institute, Amager Boulevard 80, Copenhagen. A report on this subject appeared in the Bull. World Health Org., 1961, 24:271-279.

7. Neotype Culture for *S. agalactiae*. In Opinion 8 of the Judicial Commission, "The Correct Species Name of the Streptococcus of Bovine Mastitis," published in the International Code of Nomenclature of Bacteria and Viruses (Iowa State College Press, Ames, Iowa, 1958) a statement appears that "It is proposed that a type culture or standard culture of *Streptococcus agalactiae* Lehmann and Neumann be selected by a committee of experts, approved, and adequately described, and that the species be based upon this type culture rather than on the Lehmann and Neumann descriptions."

A special panel was selected to consider these matters. It recommended that the strain G19 be adopted as the neotype culture for *S. agalactiae* (NTCC No. 8181, ATCC No. 13813). A report to this effect appeared in the International Bulletin of Bacteriological Nomenclature and Taxonomy, 1961, 11:21. A description of the proposed neotype strain appears in Appendix A, and will be presented to the Judicial Commission after approval of these minutes by the Subcommittee.*

8. Comparative Tests of Identification of "Viridans" Streptococci. Since the 1958 meeting of the Subcommittee in Stockholm a special panel of six laboratories has been working on the classification and identification of the "viridans" streptococci. Forty-two strains were distributed to the six laboratories and results were returned to Dr. Williams for analysis. An interim report issued by him in August 1960, revealed marked variation in species diagnosis

* See International Bulletin 13:37, 1963. Opinion 27. The Judicial Commission approved designation of the neotype culture for *S. agalactiae* as proposed by the Subcommittee.

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and in results of testing serological and physiological characteristics of the strains. No attempt had been made to standardize the testing procedures employed. The species diagnosis of 28 strains was agreed on by three or more of the six laboratories, but there was agreement in every particular on only one strain.

There was extensive discussion at the meeting of the difficulties presented by this group of strains. It was thought that greater uniformity in procedures for testing physiological characters would be useful, and Dr. Williams offered, as a start, to circulate among the interested members the methods used in his laboratory. It was thought that the term "viridans" has been the source of much confusion and should perhaps be denied respectable taxonomic position. For practical purposes the terms "viridans" and "greening" appear to have some usefulness. The serological group of the member strains was agreed to hold precedence over other characteristics, but alone it was inadequate to show important differences. Cross reactions are troublesome.

Genetic relations revealed by transformation studies were thought by Dr. Pakula to offer promise of clarifying some of these problems in the future. Further work on all aspects of the "viridans" streptococci should be encouraged. Dr. Williams agreed to receive strains considered by the senders to be typical representatives of various species, to distribute them to interested laboratories, and to analyze results of studies. The contributed strains should be accompanied by a description of their recognized reactions in serological and physiological tests.

9. Comparative Test of Preserved Group Extracts for Testing Grouping Sera. Freeze-dried formamide extracts of representative strains of Groups A, B, C, D, G, H and O were distributed from Colindale to 18 laboratories for testing against the grouping sera in use locally. There was excellent agreement in results, except for group O. Cross reactions were minor. It is apparent, therefore, that the serologically active group antigens survive dehydration and may thus be preserved to serve as standards for testing diagnostic sera.

10. Type Identification in Group A Streptococci.

(a) Type 49 was officially recognized as a valid type at the Stockholm meeting. Antiserum is at present difficult to prepare and is in short supply. (b) Type 51 has recently

been proposed by Drs. Wilson and Wiley. Following Dr. Wilson's suggestion, consideration of this type was postponed. He felt that further studies would clarify its position. (c) Provisional types B 3264 and Imp 19, which are identified by T agglutination and appear to lack an M antigen, were retained as provisional types. (d) Dr. Wahl introduced the problem of common cross-reactions among certain types (such as 46 with 4 and 29, and 12 with 3 and 31). This question was discussed as a technical problem.

11. Type Identification in Group D Streptococci. There was extensive discussion of Group D streptococci. Dr. Niven noted that S. faecium has become recognized as a real entity and, with the exception of a few intermediates, can be readily distinguished from S. faecalis. He considered that S. durans did not deserve to be regarded a separate species, but as a variant of S. faecium. The term "enterococcus" is variously used and although it has no taxonomic standing, it is useful as an unofficial term to refer collectively to S. faecalis, S. faecium and S. durans, excluding other Group D streptococci.

Drs. Shattock and Sharpe proposed that there should be 3 divisions on the basis of physiological characteristics. These were 1) S. faecalis and its varieties zymogenes and liquefaciens, 2) S. faecium and S. durans, and 3) S. bovis and S. equinus. No formal action was taken on this proposal but a favorable attitude of the Subcommittee was registered. There is very little overlapping in serological types among the three divisions and a long discussion ensued as to the relative desirability of creating new type numbers within each division or of retaining the type numbers that now exist in published literature. It was resolved that in the opinion of the Subcommittee confusion would more likely be avoided by retaining the type numbers of Sharpe and Shattock than by adopting a new numbering system.

Dr. Lancefield noted the difficulties arising from the fact that the Group D antigen is not located in the cell wall, as it is in other groups so far studied, although its exact location is still unknown. In contrast to the other groups the cell wall polysaccharides of Group D are not group-specific but are the type-specific antigens. In encapsulated members of Group D (e.g. S. bovis), a type-specific antigen has been reported in the capsule. She felt that it is desirable to retain the glycosylglycerophosphate to define Group D sero-

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logically, and that the types within Group D should be designated on the basis of the cell wall polysaccharides as "cell-wall Type -" etc. New types in Group D should be numbered serially as they arise following those already designated by Sharpe and Shattock. In the case of capsular type-specific antigens (as in S. bovis) a separate numbering series for serological types determined by capsular antigens could be used to designate them, for example, "capsular Type -" with the appropriate serial number. This would allow for the possibility of other classes of type-specific substances, for example proteins, which might be found later, and might be differently located, in other Group D streptococci. She stressed the desirability of not making the subdivisions in the serological grouping system dependent upon physiological properties, but of keeping the serological system on a serological basis with chemically defined type-specific antigens wherever possible. The Subcommittee agreed with these suggestions.

At the suggestion of Dr. Hansen and after discussion by the members it was resolved that the Subcommittee favors official recognition being given to the epithet faecalis (in spite of prior claims of ovalis, liquefaciens and others), because the name S. faecalis is firmly established in the literature and in common usage; and that notification of this resolution be forwarded to the Judicial Commission of the International Committee on Bacteriological Nomenclature. A brief prepared by Dr. Hansen appears as Appendix B of these minutes.

12. Tetracycline Resistant S. pyogenes. Dr. Parker reported that 14% of Group A streptococci studied at Colindale since 1960 were resistant to tetracycline. Older cultures did not show this resistance. Resistance was found chiefly in strains difficult to type by M precipitin reactions. Virulence, however, did not appear from clinical evidence to be diminished. Resistant strains were known to occur in other countries, but estimates of frequency were unavailable. No group A strains resistant to penicillin or erythromycin were encountered in Dr. Parker's series.

13. Relation of Pneumococcus and Streptococcus. Written reports by Dr. Lund described 1) antisera available for identifying pneumococcal types and 2) serological cross reactions between pneumococcal capsular polysaccharides and certain nonhemolytic streptococci. Typing sera are now

being made by the Communicable Disease Center, Atlanta, Georgia, and the Michigan State Health Department as well as by the State Serum Institute, Copenhagen. Pooling systems varied in different laboratories, but this presented no great problem. It was hoped that a uniform system of classifying pneumococci could be adopted, but no recommendations were made. The members generally favored union of pneumococci and streptococci in the same genus, as in 1958.

14. Liaison with Subcommittee on Lactobacilli. Some intercommunication may be desirable between the Subcommittee on Streptococci and Pneumococci and the newly formed Subcommittee on Lactobacilli. Dr. Hansen is a member of both subcommittees and was requested to serve as liaison officer.

15. Neotype *Pediococcus cerevisiae*. Dr. Niven reported that the position of the neotype strain was in question. Work on the species is now being conducted in the USA and Japan. Dr. Niven was requested to investigate this question and to report to the Subcommittee.

R. E. O. Williams
Chairman

A. T. Wilson
Secretary

APPENDIX A

REPORT OF PANEL ON STREPTOCOCCUS AGALACTIAE

Description of strain G19 (NCTC 8181,
ATCC 13813), Streptococcus agalactiae

Gram-positive cocci in chains or pairs. Nonmotile.
Narrow zone of clear haemolysis on sheep blood agar.
Stableforth's Streptococcus agalactiae Type I.
Lancefield's group B, type II.

Acid and clot preceding reduction of litmus milk.
Acid produced from glucose, lactose, sucrose, trehalose,
salicin.
No acid produced from raffinose, arabinose, inulin, sorbitol,
or glycerol (anaerobically).

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Sodium hippurate and arginine hydrolysed.
Esculin and gelatin not hydrolysed.
Catalase not produced.
No growth at 10° or 45°, in 6.4% NaCl, or at pH 9.6.
Not soluble in bile; not tolerant of 60° for 30 min.
Nitrates not reduced.

Described by D.F. Stewart (J. Path. Bact. 45:279, 1937).
Isolated in Australia from a cow with mastitis.

APPENDIX B

PROPOSAL CONCERNING THE EPITHET "FAECALIS"

Proposal by P. Arne Hansen
August 17, 1962

The name Streptococcus faecalis Andrewes and Horder 1906, has gained wide usage in bacteriology. Var. faecalis, var. liquefaciens, and var. zymogenes are recognized by some authors, while others treat the varieties as species. However, the inclusion of S. liquefaciens and S. zymogenes in the species S. faecalis gives rise to a nomenclatural complication, since both of these names antedate faecalis. The epithet liquefaciens goes back to Sternberg 1892, and zymogenes to MacCallum and Hastings 1899, while faecalis is of more recent date—Andrewes and Horder 1906. Reference is made to Note under Rule 7 of the Bacteriological Code:

Names of species and of subspecies (varieties) from a nomenclatural point of view are coordinate (of equal value) and are subject to the same rules and recommendations.

Furthermore, the specific epithet ovalis Escherich 1886 has priority over faecalis. But it has never been used in the bacteriological literature, as far as I know. In order to avoid use of the name Streptococcus liquefaciens var. faecalis, it is recommended that the name Streptococcus faecalis be conserved.

References:

- Andrewes, F.W. and T.J. Horder. 1906. A study of the streptococci pathogenic for man. *Lancet* 2:708-713, 775-782, 852-855.
- Escherich, Th. 1886. Die Dermabakterien des Säuglings und Ihre Beziehungen zur Physiologie der Verdauung. Ferdinand Enke, Stuttgart, p.180.
- MacCallum, W.G. and Th. W. Hastings. 1899. A case of acute endocarditis caused by Micrococcus zymogenes (nov. spec.), with a description of the microorganism. *Jour. Exptl. Med.* 4:521-534.
- Sternberg, G.M. 1892. A Manual of Bacteriology. p.886. William Wood and Co., New York.

R.E.O. Williams
Chairman

A.T. Wilson
Secretary