INFECTION AND IMMUNITY, Jan. 1972, p. 143-144

Vol. 5, No. 1
Printed in U.S.A.

NOTES

Comparison of Capsular Types of *Staphylococcus aureus* Strains

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Received for publication 27 September 1971

Staphylococcal capsular types 1 to 4 as determined by the "specific capsular reaction" belonged to type A capsule as determined by the serum-soft agar technique.

Previously, Yoshida (6) demonstrated the serologically different capsular types of *Staphylococcus aureus* by the serum-soft agar (SSA) technique and designated them as types A, B, and C. Question remained concerning the relation between these capsular types and Maverakis and Wiley's (2) types 1 to 4 as determined by the "specific capsular reaction." This paper reports on a recent comparison of these capsular types as determined by the SSA technique.

Three different capsular types of *S. aureus* strains, wound, 36T, and 43R, were obtained from B. B. Wiley, Department of Microbiology, University of Utah, Salt Lake City. The Smith diffuse strain, which is Maverakis and Wiley's type 2 and Yoshida's type A, and strains NS58D and NS41D, the representative strains of types B and C, respectively, were used. Capsule typing by the SSA technique, the absorption procedure for converting activity, the conversion of diffuse- to compact-type growth in SSA containing antisera, and the preparation of antisera were performed by methods reported elsewhere (6).

The three strains, wound, 36T, and 43R, represented compact colonial morphology in SSA containing anti-Smith rabbit sera but showed diffuse-type growth in the same media containing anti-NS58D or anti-NS41D strain (Table 1). The converting activity of the anti-Smith rabbit sera was absorbed with strains wound, 36T, or 43R; however, the converting activities of anti-NS58D and anti-NS41D strains were not absorbed with those organisms (Table 2). Concerning the specific capsular reaction determined by the method of Wiley and Maverakis (5), no reaction was observed with strains NS58D and NS41D in this experiment; therefore, the relation of capsular types determined by the specific capsular reaction could not be elucidated.

From these results, it is clear that strains wound, 36T, and 43R belong to Smith-type organisms designated as type A capsule by Yoshida (6). Regarding the capsule swelling phenomenon, Koenig and Melly (1) and Morse (3) were not able to observe this reaction with the Smith strain of *S. aureus*; however, Mudd (4) demonstrated a capsule swelling phenomenon with the wound strain and designated it an "extracellular peripheral precipitin reaction." He postulated that this reaction is not a true capsule swelling and relates to the teichoic acid of the cell. Immunochemically, different types of teichoic acid among strains of *S. aureus* have not yet been reported. Also, the biochemical substance related to the converting activity in the SSA technique has not yet been determined,

TABLE 1. *Growth types of the Smith diffuse strain and strains wound, 36T, 43R, NS58D, and NS41D in serum-soft agar containing homologous and heterologous antisera*[a]

Sera	Strain					
	Wound	36T	43R	Smith	NS58D	NS41D
Anti-Smith diffuse	C	C	C	C	D	D
Anti-NS58D	D	D	D	D	C	D
Anti-NS41D	D	D	D	D	D	C
Normal rabbit sera	D	D	D	D	D	D

[a] D and C mean diffuse- and compact-type growth.

TABLE 2. *Growth types of the Smith diffuse strain and strains NS58D and NS41D in serum-soft agar containing homologous antisera absorbed with homologous and heterologous organisms*[a]

Strain	Normal rabbit sera	Homologous immune rabbit sera absorbed with						
		Untreated	Smith diffuse	Wound	36T	43R	NS58D	NS41D
Smith diffuse	D	C	D	D	D	D	C	C
NS58D	D	C	C	C	C	C	D	C
NS41D	D	C	C	C	C	C	C	D

[a] D and C mean diffuse- and compact-type growth.

although it is possible that the Smith-type strains were subtyped by the specific capsular reaction. Recently, Maverakis and Wiley (2) isolated encapsulated *S. aureus* strains other than Smith-type organisms determined by the specific capsular reaction at a ratio as high as 61% in mice. However, previous papers (6, 7) noted that the majority of encapsulated *S. aureus* strains from human sources are the Smith type. This discrepancy is understandable since types 1 to 4 of Maverakis and Wiley belong to Smith-type organisms differentiated by the SSA technique. This problem would be elucidated if Smith-type organisms can be successfully classified by the specific capsular reaction, although the procedure itself would involve technical problems.

We thank B. B. Wiley, Department of Microbiology, University of Utah, for providing the strains.

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