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Brief Communication

GROUPING OF ANIMAL STREPTOCOCCI BY LATEX AGGLUTINATION AND STAPHYLOCOCCAL CO-AGGLUTINATION TESTS

Identification by both physiological and serological procedures offers the most definite approach to differentiation of streptococcal species. The standard serological technique of Lancefield, however, is laborious and time-consuming. Therefore, routine differentiation of animal streptococci has usually been carried out only by physiological tests.

As various modifications of agglutination test have been introduced and proved feasible in grouping of streptococci of human origin in recent years (*Christensen et al.* 1973, *Lue et al.* 1978), the question of applicability also to the veterinary field has become more topical. The present paper is a report on grouping trials with two commercial agglutination tests of streptococci of animal origin.

The Phadebact Streptococcus Test (PST) (Pharmacia Diagnostics AB) and Streptex Test (ST) (Wellcome) were studied. Both techniques have yielded results that correlate closely with those by the Lancefield technique using streptococci of human origin. The staphylococcal co-agglutination technique has yielded identical results with those by the Lancefield technique also using animal streptococci (*Holmberg* 1975, *Saxegaard* 1977). However, there are no reports of the latex agglutination test applied to animal streptococci.

Fifty of the 80 streptococci strains examined originated from cases of bovine mastitis and the other 30 from various pathological conditions of different animal species (Table 1). Thirty-seven of the strains were beta-hemolytic, 20 alpha-hemolytic and 23 non-hemolytic.

The agglutination tests were carried out according to the manufacturers' direction. The ST was performed by preparing antigen extracts from pure cultures grown on blood agar. In the PST, overnight cultures of Todd-Hewitt broth (BBL) were used as antigen and if co-agglutination of equal degree occurred with two or more streptococcal reagents, the broth was centrifuged

and the strain was retested with the supernatant as the antigen. The acid extraction method of Lancefield with antisera for groups A—H, K, L, N and O (Difco Laboratories) was used as the standard technique. All the streptococcal strains were also examined by the following biochemical tests: the CAMP test, hydrolysis of esculin and hippurate and fermentation of raffinose, inulin and sorbitol. Str. uberis strains and some of the Str. dysgalactiae strains (group C) from mastitis milk were examined only by biochemical and agglutination tests.

The results, excluding the 16 Str. uberis strains isolated from mastitis milk, are presented in Table 1 which demonstrates good agreement between the two agglutination methods and the Lancefield technique. Sixty-one out of 64 strains were positively grouped by the Lancefield technique, 53 by the ST and 47 by the PST. Discrepancies existed only in two cases. Two alpha-hemolytic strains were grouped as D by the ST and Lancefield technique but reacted in the PST with C-reagent. Otherwise correct grouping of alpha-hemolytic and non-hemolytic strains, too, is worth noting. One of the biochemically identified 16 Str. uberis strains reacted in the ST with F-reagent. The strain was grouped as F also by the Lancefield technique. All the other Str. uberis strains were non-groupable in the two agglutination tests used.

Table 1. Comparative grouping of 64 strains of streptococci of animal origin by the Lancefield technique and two agglutination methods.

Origin of strain	Technique	Number of strains in Lancefield groups								Ungrouped	Total
		A	B	C	D	E	F	G	other[4]		
Bovine mastitis	L[1]	0	8	16	6	0	0	3	0	1	34
	ST[2]	0	8	16	6	—[6]	0	3	—	1	34
	PST[3]	0	8	17	—	—	—	3	—	6	34
Other animal sources[5]	L	0	1	10	2	3	0	7	5	2	30
	ST	0	1	10	2	—	0	7	—	10	30
	PST	0	1	11	—	—	—	7	—	11	30

[1] Lancefield technique, [2] The Streptex Test, [3] The Phadebact Streptococcus Test.

[4] Included groups E, H, K, L, N and O tested by the Lancefield technique.

[5] Included 13 strains from pig, five from horse, five from dog, three from mink and one each from calf, polecat, raccoon and fox.

[6] —, Not tested by the technique.

When bacterial cells were used as antigen in the PST, non-specific agglutination of roughly 60 % of the strains occurred as judged by the Lancefield technique. Specific agglutination always appeared faster than non-specific except when non-specific agglutination occurred with all four antisera. Specific agglutination was also always stronger than non-specific. The non-specific agglutination disappeared or decreased when the supernatant antigen was used.

It was possible by performing the PST in both ways and after gaining experience of the interpretation of agglutination to achieve correct results. The ST was not disturbed by non-specific agglutination and posed no difficulties of interpretation.

The close correlation of the present results with the two agglutination tests with those of the standard serological method of Lancefield supports the practical applicability of these methods because of their simplicity and rapidity as complementary techniques in differentiation of animal streptococci.

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