References

- Howard, A. J. (1977). Ampicillin resistance in *Haemophilus influenzae* (Leading article). *Journal of Antimicrobial Chemotherapy*, **3**, 535-537.
- Kjellander, J., and Myrbäck, K. E. (1964). A simple test for penicillinase-production (Abstract). *Acta Pathologica et Microbiologica Scandinavica*, **61**, 494.
- O'Callaghan, C. H., Morris, A., Kirby, S. M., and Shingler, A. H. (1972). Novel method for detection of β -lactamases by using a chromogenic cephalosporin substrate. *Antimicrobial Agents and Chemotherapy*, **1**, 283-288.
- Slack, M. P. E., Wheldon, D. B., and Turk, D. C. (1977). A rapid test for β -lactamase production by *Haemophilus influenzae*. *Lancet*, **2**, 906.
- Smith, A. L. (1976). Antibiotics and invasive *Haemophilus influenzae*. *New England Journal of Medicine*, **294**, 1329-1331.
- Thornsberry, C., Baker, C. N., Kirven, L. A., and Swenson, J. M. (1976). Susceptibility of ampicillin-resistant *Haemophilus influenzae* to seven penicillins. *Antimicrobial Agents and Chemotherapy*, **9**, 70-73.

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Letters to the Editor

Pneumococcal type 4 typing sera cross-react with type 2 pneumococcus

In 1977, a pneumococcus, which had been isolated in 1959 from a child with meningitis in Melbourne, showed a positive capsular reaction (Quellung) test with both type 2 and type 4 pneumococcal sera, Statens Seruminstitut, Copenhagen. A recently (1978) isolated strain from a New Guinean child in Port Moresby, also with meningitis, gave identical reactions. Positive results were obtained by counter-current immunoelectrophoresis with both sera. Further investigations with known type 2 pneumococci, including the reference strain NCTC 7466 (National Collection of Type Cultures, Colindale, UK), yielded similar results. Because pneumococci of types 1 to 5 inclusive have single identifiable capsular antigens, such a cross-reaction was unexpected (Mörch, 1943). Quantitative capsular tests were, therefore, done using our standard type 2 (Smith) and type 4 (Leal) strains with results as follows:

Three batches of type 4 serum were tested (comprising lot 1-78 and two earlier batches received in 1973 and 1975) with similar results. Our findings suggested that the type 4 sera contained type 2 antibody in low titre. This was confirmed by adsorption of the sera with a type 2 pneumococcus (NCTC 7466); the sera then gave negative results in the capsular reaction with the type 2 pneumococcus (but produced a positive result, as before, with the type 4 strain). The pneumococci from the children with meningitis each gave a titre of 40 with type 2 serum and failed to react with adsorbed type 4 serum; these strains could therefore be identified as type 2.

In January 1979, we received from the Statens Seruminstitut a new batch of type 4 serum (lot 2-78), which does not cross-react with type 2 pneumococcus. Many laboratories, however, may be using earlier batches of type 4 serum. Because capsular typing is usually done with neat (undiluted) sera, confusion could occur. Consequently, if an apparent cross-reaction occurs, the

test should be repeated using serial dilutions of the typing sera with suitable controls.

I thank Mr Arthur Hewstone, Royal Children's Hospital, Melbourne, and Mr Michael Gratten, Port Moresby General Hospital, for supplying pneumococci, and Miss Carol Nicholson, Mr Andrew Moore, and Mrs Sandra Duncan for technical assistance.

Dr Jørgen Henriksen, The Pneumococcus Laboratory, Statens Seruminstitut, Copenhagen, kindly verified our findings and supplied us with the new batch of type 4 pneumococcus serum.

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Reference

- Mörch, E. (1943). *Serological Studies on the Pneumococci*, p. 37. Munksgaard, Copenhagen.

Pneumococcal		Serum	Serum dilutions				
Serotype	Strain		Neat	1/5	1/10	1/20	1/40
2	Smith	type 2	+	+	+	+	+
2	Smith	type 4	+	0	0	0	0
4	Leal	type 2	0	0	0	0	0
4	Leal	type 4	+	+	+	+	0