

Preliminary communication

Structural studies on the polysaccharide from *Streptococcus pneumoniae* type 20

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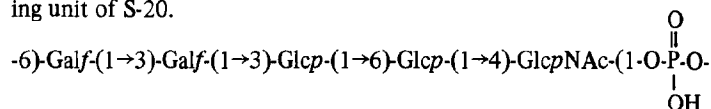
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It was of interest to study the pneumococcal polysaccharides containing D-galactofuranosyl residues, because, in most cases, such residues have been found to be immuno-determinant¹. By trial experiments, it was found that the polysaccharide from *Streptococcus pneumoniae* type 20 (S-20) contains D-galactofuranosyl units.

The polysaccharide S-20, having $[\alpha]_D^{25} +3.5^\circ$, contained 2.5% of phosphorus, 16.8% of 2-amino-2-deoxy-D-glucose, and 10% of acetyl. On acid hydrolysis, the antigen gave D-galactose, D-glucose, and 2-amino-2-deoxy-D-glucose in the molar ratios of ~2:2:1. Partial hydrolysis of S-20 with 45% formic acid for 45 min gave an oligosaccharide, galactose, and a trace of glucose, indicating that the two D-galactofuranosyl residues are linked together. Methylation analysis of S-20 afforded 2,3,5,6-tetra-*O*-methylgalactose, 2,4,6-tri-*O*-methylglucose, 2,5,6-tri-*O*-methylgalactose, 2,3,4-tri-*O*-methylglucose, and 2-de-2-deoxy-3,6-di-*O*-methyl-2-(methylamino)glucose in approximately equimolar amounts. The absence of any di-*O*-methylhexose or mono-*O*-methylhexosamine in the mixture was significant. It was probable that a phosphate group was present in the main chain, and that it connected O-6 of one of the D-galactofuranosyl residues to the 2-acetamido-2-deoxy-D-glucosyl residue. During the Hakomori methylation², the phosphate group was eliminated, leaving a galactofuranosyl unit as the nonreducing end-group, which appeared as 2,3,5,6-tetra-*O*-methylgalactose in the methylation analysis.

The *O*-deacetylated S-20 consumed 0.75 mol of periodate per hexosyl unit. Smith degradation³ of S-20 gave glycerol, arabinose, glucose, and 2-amino-2-deoxyglucose in the ratios of ~1:1:1:1. Methylation analysis of the periodate-oxidized product gave 2,3,5-tri-*O*-methylarabinose, 2,4,6-tri-*O*-methylglucose, and 2-deoxy-3,4,6-tri-*O*-methyl-2-(methylamino)glucose.

All these results indicated the following possibility for the structure of the repeating unit of S-20.



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