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Rees D A. Structure, conformation, and mechanism in the formation of polysaccharide gels and networks. *Advan. Carbohyd. Chem.* **24**:267-332, 1969.
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A general theory is proposed for the molecular basis of gel formation by polysaccharides, in terms of cooperative conformational interactions. Based on reinterpretation of literature evidence and recent results from the author's laboratory, likely stereochemical features and detailed models are put forward for individual polysaccharides of industrial and biological interest. [The *SCI*® indicates that this paper has been cited in over 285 publications.]

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This article was written when, in youth and naivety, I was eager to attempt to define structure-function relationships for carbohydrate chains. I was a lecturer in organic chemistry and a junior member of the school of carbohydrate chemistry in Edinburgh established by Sir Edmund Hirst. My first publications concerned primary structure and biosynthesis, but, prompted by the great progress with nucleic acids and proteins that had thrilled the biological world in the preceding decade and a half, my interests began to shift. One formative influence was the series of annual Christmas meetings of the new British Biophysical Society—in those days always at Queen Elizabeth College in Kensington. Many visitors came from Europe and the US to combine scientific discussion with the Christmas lights and shopping in London, and there was an excellent mix of participants from disciplines from biology through chemistry to physics.

I reasoned that the physical properties of gelling polysaccharides pointed to specific conformational effects, and with Struther Arnott (then at the MRC Unit, King's College, London) and with our research students, Norman Anderson and David Dover, began X-ray fibre diffraction experiments. These eventually led to the carrageenan double helix,[1] which I think still represents the paradigm for polysaccharide gelation mechanisms. I next studied all the literature evidence I could find on the mechanisms of gelation of this and other polysaccharides and wrote a sequel that is now apparently a *Citation Classic*, which proposed a general junction zone model, including detailed stereochemical and other considerations where possible. This gave significance to the character of many gelling polysaccharides as imperfect block copolymers and to the existence of late biosynthetic modifications to determine block structure, perhaps under controls relating to tissue function. This all fell together neatly, and most of the rationalisations still stand today. I am, however, surprised that the paper has become a *Citation Classic*—I had thought that most of its notions had become assimilated into general knowledge. Perhaps it is cited as a compendium of distillations from older literature, some of it in obscure journals.

I imagine that the insights and experimental work were the main reason why I was awarded the Carbohydrate Chemistry Award of the Chemical Society in 1970 and the Colworth Medal of the Biochemical Society (also in 1970) and contributed substantially to my election as a Fellow of the Royal Society in 1981. This publication also determined the path of my future career since the industrial implications led to an invitation, which I accepted, to move to Unilever Research. One reason for accepting was that I had now started a direction of work that was difficult to continue within the disciplinary confines of a university department of organic chemistry. In industry for 12 years, I acquired substantial management and other responsibilities and experience that in turn prepared me for my present position as director of this institute.

1. **Anderson N S, Campbell J W, Harding M M, Rees D A & Samuel J W B.** X-ray diffraction studies of polysaccharide sulphates: double helix models for κ- and ι-carrageenans. *J. Mol. Biol.* **45**:85-99, 1969. (Cited 120 times.)