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标题: Fundamental differences in model cell-surface polysaccharides revealed by complementary optical and spectroscopic techniques
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摘要: The propensity of two classes of polysaccharides, charged heparins and uncharged dextrans serving as models of those found in the extracellular matrix, to form ordered arrangements in solids and in solution, were explored employing polarising optical microscopy and reflection anisotropy spectroscopy. The fundamental modes of molecular vibration in the solid state, which relate to the occupancy of conformational states at ambient temperatures, were also investigated using terahertz (1-15 THz) spectroscopy on purpose built beam lines at SRS, Daresbury and ANKA, Karlsruhe. In the solid state, evidence for the anisotropic arrangement of ion centres was observed for the Na, Ca and Mg ion forms of heparin by RAS but, this was absent in aqueous solution at 100 mg ml(-1) and the absence of molecular ordering in solution was confirmed by polarised optical microscopy. The ion charged heparin specimens showed very strong absorption of THz radiation indicating the accessibility of unoccupied higher energy conformational states in these materials whereas the uncharged dextrans showed only weak THz absorption, implying that the majority of conformational states are occupied and there are few unoccupied higher energy states in these materials. This suggests the two classes of material will have very different conformational properties, particularly in response to temperature changes in the extracellular matrix.
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