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Microcalorimetry of the intestinal mucus: Hydrogen bonding and self-assembly of mucin.

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Abstract

The effect of mucin hydrogen bonding on the structure of intestinal mucus has been studied with micro-differential scanning microcalorimetry (μ -DSC), supported by spectroscopy. The experiments were performed in water–dimethyl sulfoxide (DMSO) solutions, using either water–DMSO mixtures of an appropriate DMSO content or water as blanks, as to isolate the effects of the solvent to hydrogen bonding. When using matched water–DMSO blanks, thermal events at low temperatures are linked to the negation of mucin–DMSO interactions, while events at higher temperatures are linked to the break-up of hydrogen bonds connecting the sugars of the individual macromolecules. When using a matched solvent as blank, alterations in C_p , such as increases at 10% and 15% DMSO, have been linked to the break-up and creation of quaternary structures. In the case of water as blank, a monotonic but not linear decrease in enthalpy, hence extent of hydrogen bonding, is observed. The

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