**Poly(N-isopropylacrylamide) and globular as well as disordered proteins temperature dependent interactions examination by NMR spectroscopy**

Poly(N-isopropylacrylamide) (PNIPAAm) applied in medical science and protein interaction have not been studied extensively yet. We studied the interaction of PNIPAAm with two proteins of different structure. The model selection was based on proteins that are studied earlier and are sufficiently small so that potential atomic-level interaction studies could be conducted. The first selected molecule (44-residue-long tβ4) is a completely disordered small protein belongs to the IUP. The second model is a well-structured miniprotein, a double point mutant variant of Tc5b, D9Q and S20Q (termed Tc5bQQ having 20 residues).

UV-visible spectroscopy studies showed that the critical solution temperature of PNIPAAm does not change by adding tß4 but the reversibility is incomplete over multiple thermal cycles. The NMR studies confirmed the interactions of PNIPAAm with both tβ4 and Tc5bQQ proteins. In the case of IUP model, this was reflected in the change of signal intensity, while for the structural model, significant chemical shift changes were detected depending on the relative molecular ratio.