

Subject of this thesis is the regulatory DNA segment, the so-called Serum Response Element (SRE), which possesses highly specific structural characteristics and its structural flexibility plays probably a key role in its physiological activity. Structural properties of 16-mer SRE segments capable to form hairpin structures were studied by means of accurate measurements of temperature dependent Raman spectra. Due to the close connection of oligonucleotide chain structural stability with the stacking interaction, temperature dependent Raman and UV absorption spectra were measured on dinucleotides serving as a simple model system for the stacking investigation. The measurements results processed by factor analysis provided characteristic spectral patterns and confirmed that stacking interaction depends on the base order. By fitting the thermodynamic equilibrium equations to the factor analysis outputs, the thermodynamic characteristics of the thermally induces structural changes in hairpinforming complexes were estimated and difference spectra characterizing opened and closed hairpins, which enable the further specification of the geometry of these complexes, were obtained.