UV/UV FEMTOSECOND TRANSIENT ABSORPTION SPECTROSCOPY OF SINGLE-STRANDED ADENINE MULTIMERS

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The UV-induced photodynamics of single-stranded tracts containing a variable number of adenine bases were investigated using femtosecond transient absorption spectroscopy by probing within the ground state absorption band. The results show all adenine multimers have a long-lived component in addition to a short-lived one caused by vibrational cooling to the electronic ground state. The longer component has been assigned to the decay of excimer states. The amplitude of the signal arising from excimers increases with the number of adenine bases in a tract, while the lifetime remains constant. Excimer yields were estimated by comparing signals from the adenine mononucleotide, adenine 5´-monophosphate, with those recorded for adenine multimers. Higher excimer yields are observed in DNA than in RNA forms, and this is attributed to the higher degree of base stacking in the DNA tracts.