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Ultrafast Spectroscopy of Single-Stranded Adenine Oligomers CHARLENE SU, The Ohio State University, CHRIS MIDDLETON, University of Wisconsin-Madison, BERN KOHLER, The Ohio State University — The excited-state dynamics of single-stranded homo-oligomers containing a variable number of adenine bases have been studied by femtosecond transient absorption technique within the ground state absorption band. The bleach recovery signals show that all the adenine oligomers decay with a long-lived component of a hundred picosecond in addition to a short-lived component, which is also observed in the adenine mononucleotide, 2'-deoxyadenosine 5'-monophophate. The latter component is attributed to vibrationally cooling to the electronic ground state and the former one is associated with intrastrand excimer formation between stacking bases. It is found that the amplitude of long-lived component increases with the elongation the of adenine oligomers in comparison to the short-lived one. Excimer yields estimated on the basis of relative amplitude show that adenine oligomers have higher excimer formation in longer strands, indicating a greater degree of base stacking.

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