INFRARED SPECTROSCOPY OF SINGLE-TURN AND DOUBLE-TURN TETHERED ALPHA-HELICES IN THE GAS PHASE: DON'T LET YOUR LEFT HAND KNOW WHAT YOUR RIGHT HAND IS DOING.

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This talk will describe single-conformation IR and UV spectroscopy of a series of single-turn and double-turn alpha helices as cryo-cooled, gas phase ions. Synthesized samples of tethered pentapeptides are known to form single-turn alpha helices in aqueous solution. When L-amino acids are used, a right-handed single-turn helix is formed while D-amino acids produce a left-handed helix. Due to the tether, these structures are remarkably stable in aqueous solution over a wide range of temperatures, pH, and denaturant. They can be concatenated, making LL, DD, LD, and DL double-turn forms. When a methylated arginine is placed at the C-terminal end of the tethered peptide, single-turn helices are the most stable structure, and are observed exclusively. The spectra in the NH stretch and amide I regions show distinct effects that depend on position along the helix, and the presence or absence of a kink due to concatenation of two opposite-handed helices. We will discuss these spectra and the prospects they offer as scaffolds for studying a wide range of interesting structural and dynamical problems.

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