**Self-Assembling Antimicrobial Peptides with Intrinsic UV-Visible Spectral Fluorescence upon Single Amino Acid Substitution from Arginine to Citrulline**

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Self-assembling antimicrobial peptides with aromatic amino acid residues, such as phenylalanine, often display intrinsic fluorescence due to delocalization of electron densities in dense hydrogen bonding networks and dipolar coupling of aromatic residues. These self-assembling peptides are a promising platform to develop fluorescent nanomaterials for various biomedical and optical engineering applications. Our research explores the effect of lipophilicity and net charge on the self-assembly behavior and intrinsic fluorescence properties of mini chicken Angiogenin 4 (mCA-4). mCA-4 is a synthetic, ten-residue antimicrobial peptide derived from chicken Angiogenin-4, an avian antimicrobial protein, and forms β-sheets which further self-assemble to form spherical nanostructures. Changing lipophilicity by substituting valine with isoleucine residues has no notable effects on the self-assembly and intrinsic fluorescence properties of mCA4 nanostructures. However, the replacement of a single arginine residue with citrulline was observed to impart intrinsic fluorescence. Reducing cationic charge from substituting arginine with citrulline also results in morphological changes in self-assembled structures from nanospheres to larger nanorods and fibers. In this study, simple and systematic substitutions of short peptide sequences are shown to be a potential avenue to develop new classes of intrinsically fluorescent self-assembled nanomaterials.