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pH-dependent and pH-independent self-assembling behavior of surfactant-like peptides LEONID GUREVICH, PETER FOJAN, Aalborg University, BIOPHYSICS GROUP TEAM — Self-assembly of amphiphilic peptides designed during the last years by several research groups leads to a large variety of 3D-structures that already found applications in stabilization of large protein complexes, cell culturing systems etc. In this report, we present synthesis and characterization of two novel families of amphiphilic peptides KA_n and KA_nW ($n=6,5,4$) that exhibits clear charge separation controllable by pH of the environment. As the pH changes from acidic to basic, the charge on the ends of the peptide molecule varies eventually leading to reorganization of KA_n micelles and even micellar inversion. On contrary, the bulky geometry of the tryptophan residue in KA_nW limits the variation of the surfactant parameter and hence largely prevents assembly into spherical or cylindrical micelles while favouring flatter geometries. The studied short peptide families demonstrate formation of ordered aggregates with well-defined secondary structure from short unstructured peptides and provide a simple system where factors responsible for self-assembly can be singled out and studied one by one. The ability to control the shape and structure of peptide aggregates can provide basis for novel designer pH sensitive materials including drug delivery and controlled release systems.

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