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Refoldable Peptide Barrel – Carbon Nanotube Junctions
ALEXEY TITOV, BOYANG WANG, PETR KRAL, University of Illinois at Chicago, PROF. KRAL'S RESEARCH GROUP TEAM — We design hybrid bio-nano-junctions formed by cylindrical peptide structures covalently attached to carbon nanotubes. The cylinders are composed of 5 pairs of antiparallel peptide strands that are "one-to-one" matched and covalently bonded through ester and amide bonds to the terminal C atoms in two (20,0) carbon nanotubes. The remaining terminal carbons in the CNTs are replaced by nitrogens, forming embedded quinoline-like structures. The used peptide strands are composed of charged amino acids that form cylindrical patterns with preferred stable configurations. By applying a torque to the nanotubes, we can reversibly fold and control the overall structure of the peptide barrels. The junctions might allow the collection and delivery of drugs and activation of biological molecules attached to them.

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