

Supplementary information

Micellar refolding of coiled-coil honeybee silk proteins

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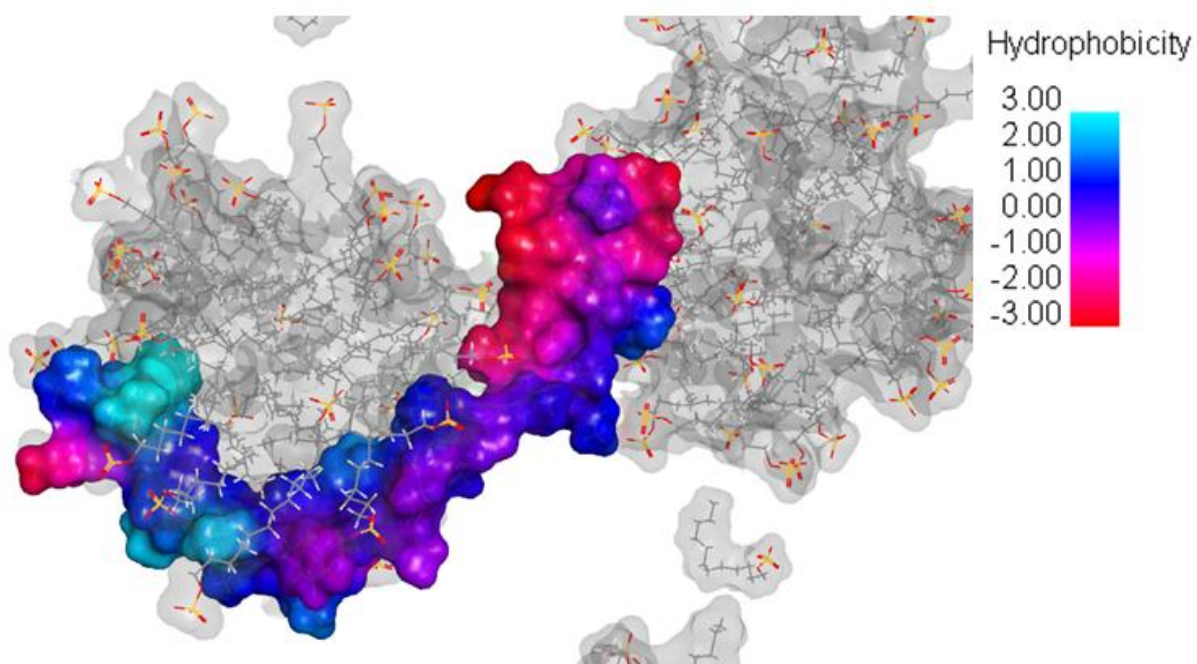


FIGURE S1. A silk protein helix after 8 ns simulation, associated with two SDS micelles. The more hydrophobic residues (blue) are buried in within the micelle while the more hydrophilic residues (red) forming a solvent-accessible surface (probe radius 1.4 Å).

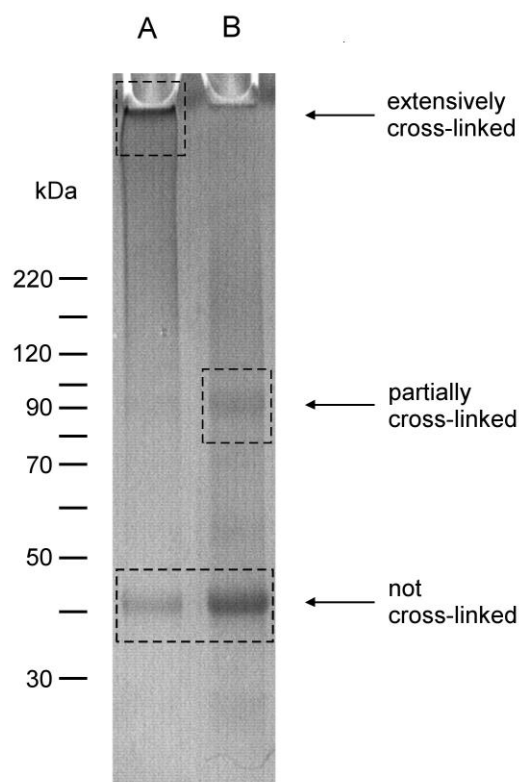


FIGURE S2. SDS-PAGE gel showing migration of 4.1 g/L recombinant honeybee protein solutions after glutaraldehyde cross-linking at low SDS concentrations. Lane A: cross-linked in the presence of 14.1 g/L (241.3 mM) NaCl; Lane B: cross-linked in the presence of 0.1 g/L (1.7 mM) NaCl. Dashed boxes indicate the location of protein monomers, dimers, and extensively cross-linked aggregates. Molecular weight markers are shown on the left. The cross-linking reagent glutaraldehyde (5 μ l of 1% solution), was added to 45 μ l of two 4.1 g/L honeybee silk protein solutions and incubated for 5 min at room temperature. Cross-linked samples were then analyzed by SDS-polyacrylamide gel electrophoresis (PAGE) on a NuPage Bis-Tris (4-12%) polyacrylamide gel (Invitrogen) using MES buffer. After electrophoresis the gels were stained with Commassie Blue protein staining dye and imaged.

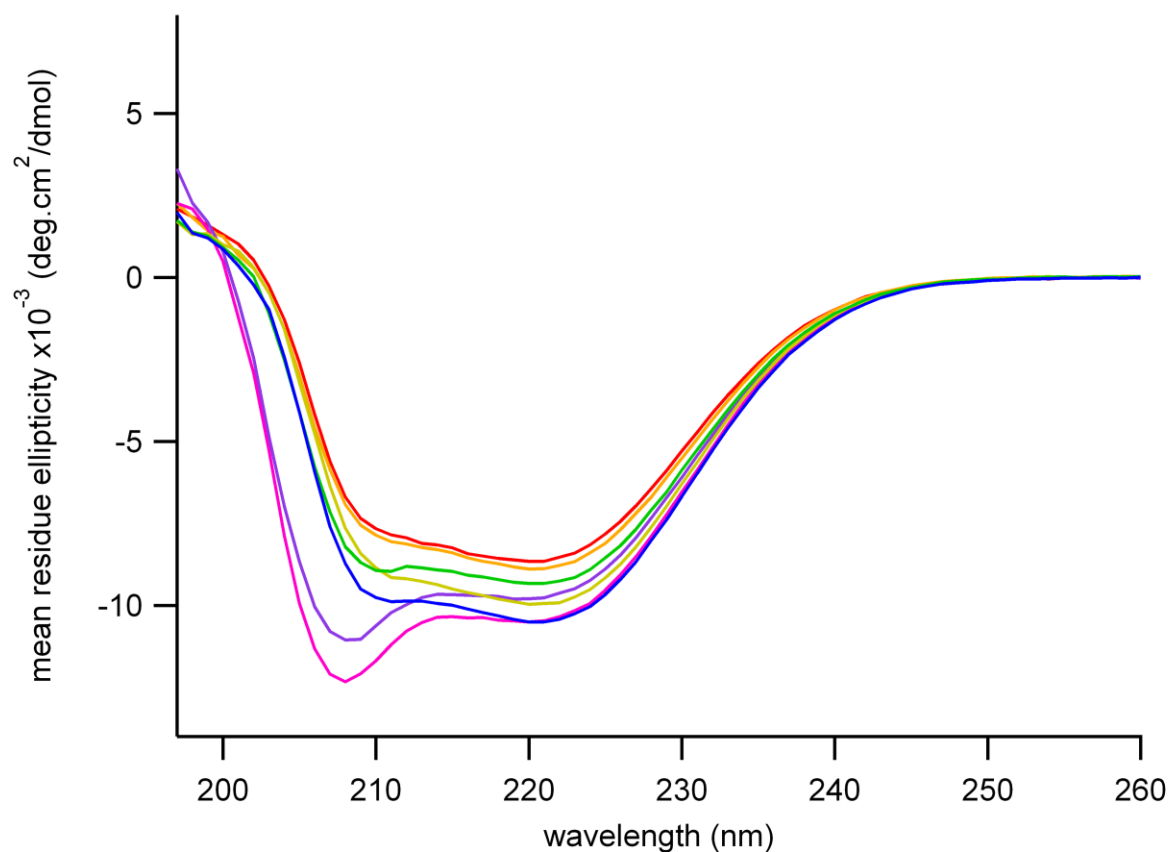


FIGURE S3. Circular dichroism spectra of 4.1 g/L recombinant honeybee protein solutions containing 0.1 g/L (1.7 mM) NaCl and a range of SDS concentrations. Red, 0.3 g/L (1.0 mM) SDS; orange 0.6 g/L (2.1 mM) SDS, yellow, 0.9 g/L (3.1 mM) SDS; green, 1.2 g/L (4.2 mM) SDS; blue, 1.6 g/L (5.5 mM) SDS; purple, 1.9 g/L (6.6 mM) SDS; pink, 10.3 g/L (35.7 mM) SDS.

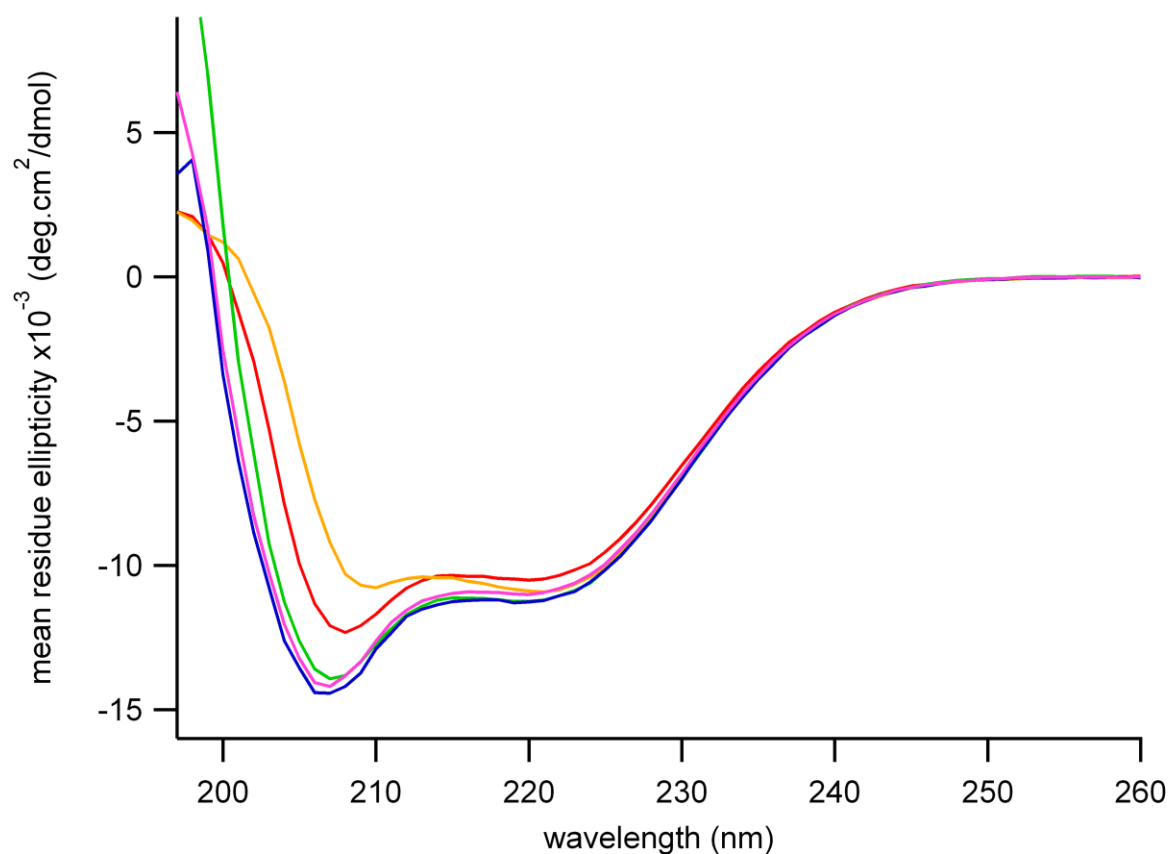


FIGURE S4. CD spectra of 4.1 g/L recombinant honeybee protein solutions containing 10.3 g/L (35.7 mM) SDS and a range of NaCl concentrations. Red, 0.1 (1.7 mM) g/L NaCl; orange, 3.6 g/L (61.6 mM) NaCl; green, 7.1 g/L (121.5 mM) NaCl; blue, 10.6 g/L (181.4 mM) NaCl; pink, 14.1 g/L (241.3 mM) NaCl.