

P013 A self-assembling peptide-based scaffold to support cell growth

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Self-assembling peptide-based fibrous systems lend themselves to tissue engineering (TE). An abundant protein-assembly motif is the α -helical coiled coil; many proteins of the extracellular matrix have coiled coils (laminins, fibrinogen/fibrin). Sequence-to-structure “rules” for the folding of coiled coils are available, permitting the design of coiled-coil based structures. One design is the SAF (Self-Assembling Fibril) system, which comprises two complementary peptides that combine to form “sticky ended” building blocks for fibre assembly. The resulting structures are tens of nanometres thick and tens of microns in length. One obstacle to using SAFs in TE is stability. The work herein describes the rational redesign of the SAFs to give assembly under physiological conditions of pH, temperature and salt. We use a combination of microscopy and spectroscopic methods to assay the folding and assembly of several iterations of SAF design engineered for increasing stability. The current design both folds into α -helices and assembles into supramolecular fibres in physiological media. We are currently testing these fibres in cell culture. The SAF system presents a viable candidate for peptide-based scaffolds. Systems like this are becoming real alternatives to synthetic polymers and *ex vivo* scaffolds.