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# Testing the Viability of Coiled Coils as Biomaterials for Future Use in Regenerative Medicine Applications

Stephen A. Godfrey, Manish Nepal, and Jean Chmielewski
Department of Chemistry, Purdue University

## ABSTRACT

Regenerative medicine and some drug delivery today uses natural biomaterials such as collagen and fibrin as platforms on which to attach cells, growth factors, and other biological chemicals, but these can have immunological effects on the body. Developing other biomaterials that can perform the same tasks without the immunological effects would be beneficial to the field as a whole[1]. This study aimed to recreate known behaviors of collagen fibers using novel trimeric coiled coils by coordinating the coiled coils with metal ions to form higher order assemblies. These assemblies could have future use as a drug delivery platform or transport material without the unwanted aspects associated with collagen. The peptides used to form the coiled coils were produced using standard solid phase peptide synthesis methods. Two designs were utilized—a radial design in which three bipyridine molecules were added to each peptide, resulting in nine bipyridines on each coiled coil, and a linear design, in which an NTA molecule was added to one end of each peptide and a histidine tail to the other. Once purified by reverse phase HPLC, metal ions will be added to the coiled coils in an aqueous environment and induced to form structures by stirring and other methods. Shape data will be collected using scanning electron microscopy (SEM) and atomic force microscopy (AFM), while size will be determined using dynamic light scattering (DLS). Preliminary results are expected to show that small hollow spheres were formed for the radial design, while the linear design forms small spheres, indicating that coiled coils may become a significant part of drug delivery and aspects of regenerative medicine. Further research is needed to determine the full capabilities of coiled coils to transport biomaterials and/or to form scaffolds or other materials related to regenerative medicine.

## KEYWORDS

Coiled coil, regenerative medicine, drug delivery, biomaterial

## REFERENCES

Hernandez-Gordillo, V.; Chmielewski, J. "Mimicking the extracellular matrix with functionalized metal-assembled collagen peptide scaffolds" *Biomaterials* **2014**, *35*, 7363-7373.