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Enhancing mineralized collagen scaffolds for CMF defect repair

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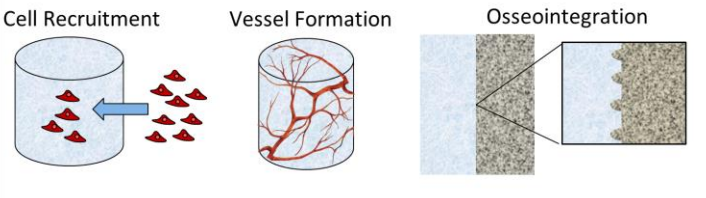
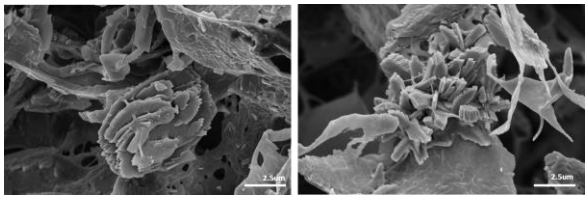
ABSTRACT:

Challenges associated with large craniomaxillofacial (CMF) defects present opportunities to improve bone regeneration by regulating early responses, such as mesenchymal stem cell (MSC) recruitment and host inflammatory response, as well as delayed responses, such as MSC osteogenesis and angiogenesis. To this end, our group has developed mineralized collagen-glycosaminoglycan (GAG) scaffolds for bone regeneration and has tested these in vitro and in vivo. My project aims to enhance our current mineralized collagen-GAG scaffolds to elicit specific cellular responses to improve bone regeneration in large scale bone defects. I intend to achieve this via addition of biological factors and alterations in the mineral composition within our mineralized collagen-GAG scaffolds. These modifications will allow combinatorial control over desired cellular responses during bone healing (i.e. cell recruitment, vessel formation, osseointegration).





AWARDS/PUBLICATIONS:

- Summer Pre-Doctoral Institute Fellow
- Alfred P. Sloan Scholar
- NSF Graduate Research Fellow
- GEM University Fellow
- Graduate College Academic Excellence Award
- W.K. Grier*, **A.S. Tiffany*,** M.D. Ramsey, B.A.C. Harley, 'Incorporating β-cyclodextrin into collagen scaffolds to sequester growth factors and modulate MSC activity,' *Acta Biomater.*, 2018. * co-first authors.