

COLLAGEN MATRIX POSSESSING LOCALLY CONTROLLABLE INTERNAL AND SURFACE MINERAL CONTENT

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Background: Tissue engineered scaffold repair materials are currently modified with surface mineralization with simulated body fluids (SBF) of collagen provide a lower stiffness than desired in biosynthetic entheses and fail to replicate the naturally graded structure of the human connective tissue in regards to cell type, tissue composition, and mechanical properties. This often leads to repair-site failures and future pain post-surgery for patients.

Technology Description: Researchers at Washington University have produced a fetuin-regulated mineralization which improves strength, stiffness, and toughness of mineralized collagen samples. Bulk mineralization (fetuin treatment) serves to decrease the possibility of deleterious stress concentrations and disruption of the collagen microstructure which occur with surface mineralized collagen.

This Platform Technology:

- Provides spatial control of mineralization allowing for a custom intrafibrillar gradient and independent graded mineralization at the surface.
- Controls the strength of collagen repair construct at the bone/tissue interface.
- Shows that bulk mineralized collagen tensile modulus (4.63 ± 1.05 MPa) was 43% and 22% higher than surface mineralized and unmineralized collagen, respectively.