

Contemporary and ancient tissues give modern insights into biomedical engineering

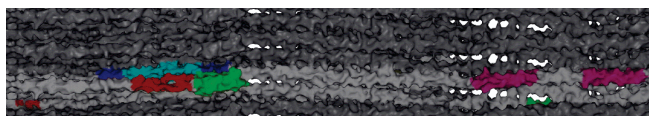
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Abstract

One of the most serious impediments to the study of traumatic injury is the lack of meaningful primary mechanical damage criteria at the molecular level.

This study addresses this, through the use of novel imaging technologies such as a newly developed X-ray Diffraction (XRD) scanning methodology, applied to systemically loaded animal models of both brain and connective tissue injury and accompanied by conventional microscopy for cross-correlation of observations. Interestingly, this same technique reveals the state and status of soft tissue preserved in T-rex fossilized bone.

Molecular representation of connective tissue structure



Selected Publications

1. Joseph P.R.O. Orgel, Thomas. C. Irving, Andrew Miller, Tim J. Wess. "The micro-fibrillar structure of collagen in situ" PNAS, 103, 9001-5. (2006).
2. JD San Antonio, MH Schweitzer, ST Jensen, R Kalluri, M Buckley, Joseph Orgel. Dinosaur peptides suggest mechanisms of protein survival. PLoS One 6 (6), e20381 (2011)
3. Joseph Orgel, Anton Perskov, Olga Antipova. "Variations in collagen's helical structure". PLoS ONE 9(2): e89519. doi:10.1371/journal.pone.0089519 (2014)
4. R. A. Barrea, O. Antipova, D. Gore, R. Heurich, M. Vukonich, N. G. Kujala, T. C. Irving and J. P. R. O. Orgel. "X-ray micro-diffraction studies on biological samples at the BioCAT Beamline 18-ID at the Advanced Photon Source". J. Synchrotron Rad. 21 (5) (2014).
5. S Varma, M Botlani, JR Hammond, HL Scott, JPRO Orgel, JD Schieber. "Effect of intrinsic and extrinsic factors on the simulated D-band length of type I collagen". Proteins: Structure, Function, and Bioinformatics 83 (10), 1800-1812 (2015).