Joseph Orgel, Struct Chem Crystallogr Commun, 3:2
DOI: 10.21767/2470-9905-C1-001

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X-ray diffraction reveals the mechanical load tolerance of mammalian nerve, muscle and tendon in traumatically induced injury and the vertebrate identity of fossilized T-rex bone

Those living with traumatically induced injuries, including but not limited to, Traumatic Brain Injury (TBI), face an elevated risk for developing chronic health issues including Alzheimer's disease (AD) or AD-like dementia and depression. 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.

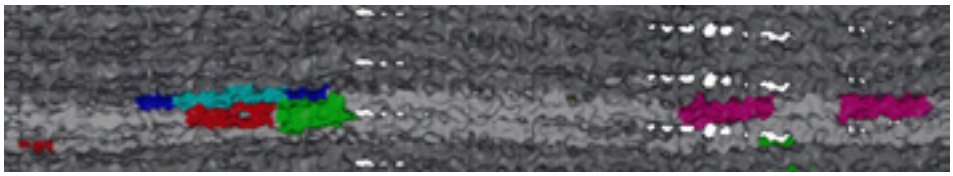

Figure-1: Molecular representation of connective tissue structure

Biography

Joseph Orgel is a British American Scientist based at the Illinois Institute of Technology with past and present appointments in Biology, Physics and Biomedical Engineering and Applied Health Sciences at UIC as Visiting Faculty. His research interests are concerned with fundamental structural biochemistry problems that have direct links to the understanding and treatment of disease. He leads investigations of brain pathological diseases such as Alzheimer's and Traumatic Brain Injury in collaboration with the US Army and connective tissue conditions including heart disease and arthritis at the National Institutes of Health Biotechnology Research Resource, BioCAT, as Associate Director. He is an awardee of the United States National Science Foundation's CAREER Award. He has been Biochemistry Section Editor of the Public Library of Science Journal, PloS ONE since 2008 and joined the board of Directors of the National Museum of Health and Medicine (Chicago) in December of 2012.

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