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Structural changes in type-I collagen from non-enzymatic glycation revealed by isomorphous X-ray diffraction

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The process of non-enzymatic glycosylation, i.e., glycation, is rather slow resulting in the formation of sugar-mediated crosslinks, also known as Advanced Glycation Endproducts (AGEs), within the native structure of type-I collagen. This process occurs in all animals but is accelerated in diabetics. However, the exact locations or regions of high propensity for the formation of these crosslinks within the packing structure of collagen are largely unknown, despite our knowledge of the underlying chemistry. The results obtained showed the location of possible crosslinks and correlate the effects of crosslinks to the structural and functional sites present on the D-periodic arrangement of collagen into fibrils. Prolonged treatment with iodine, as a wound disinfectant, is detrimental to the structure of collagen underlying the wound site. Diabetic patients are more prone to injuries to limb extremities. Wounded extremities are commonly amputated to prevent the spread of infection to the rest of the body followed by low dose iodine application to the wound site. We will present results to demonstrate specific disintegration of collagen fibrils in rat tail tendons from a short iodine treatment.

Biography

Rama S Madhurapantula is a Senior Postdoctoral Research Associate at Dr. Joseph Orgel's research group at the Illinois Institute of Technology, USA. He is currently involved with work on the changes in molecular packing in myelin and cytoskeleton caused by traumatic brain injury and understanding stress-strain relations in the muscle tendon junction using X-ray diffraction. He also specializes in HPLC method development and has collaborated with various research groups from Chicago to develop new methods for measuring analytes in various samples.

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