X-ray Fiber Diffraction Reveals Ultrastructural Location and Interactions of the Immunoglobulin Receptor Binding Sequence within Fibrillar Type I Collagen, with Implications for Fibrosis and Autoimmune Conditions

Joseph Orgel[1]

[1]N/A

ORGEL@IIT.EDU

Collagen type I is a major constituent of animal bodies and is abundant in tendon, bone, skin, cartilage, blood vessels, bronchi, and the lung interstitium. It is over-produced and accumulates in large amounts in response to certain inflammations such as lung fibrosis which may have relevance to autoimmune conditions and COVID-19 and long COVID considerations. In X-ray diffraction (XRD) and Atomic Force Microscopy (AFM) based research designed to study how antibodies interact with the structure of collagen and the extracellular matrix, we recently discovered a key immunoreceptor domain that we believe is also the major histocompatibility complex (MHC) recognition region within collagen. The MHC helps the body protect itself from invading pathogens, viruses, and cancer. In type I collagen, this immune recognition sequence is on the most clearly presented and highly available part of collagen's hierarchical structure which is in clear alignment with the recognition role of the MHC domain. In diseases affecting the lungs, viruses have been shown to cause too much collagen to be made and deposited, causing lung/pulmonary fibrosis, and/or autoimmunity against collagen. The findings reported for this research are likely to have relevance to understanding and combating these underlying mechanisms.