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Distinguished Women in Science: A Lecture Series

**A Tale of a Triple Helix: What Crystallography Tells Us About Collagen Structure
and Assembly**

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Collagen has an ubiquitous distribution in the human body and it is important in maintaining the tensile strength of structures as varied as skin, tendon, blood vessels, cartilage, and the basement membrane. If we want to understand how this protein functions, we must first look at its molecular structure, how it assembles, and how it interacts with its environment. An analysis of collagen's crystal structure in terms of the molecule's molecular conformation, crystal packing, and hydration shows that water molecules are an integral part of the collagen molecule and may play a role in the assembly of collagen in fibrils. This analysis also demonstrates the interrelationships between the hydration structure and hydroxyproline. A comparison of the hydration structure of collagen with that of DNA also highlights the key role that structural water plays in biological systems.