

**COLLAGEN FIBRILLAR CONSTRUCTS: NEW IDEAS ON THEIR FORMATION AND ULTRASTRUCTURE VIA A PARALLEL AFM, TEM, ESI AND NMR APPROACH**

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With a plethora of techniques that have been used to investigate their structure, collagen fibrillar constructs have been one of the most investigated protein systems by biologists, physicists, and chemists over the past 50 years. However, although several models have been proposed, answers to the most basic of questions concerning their mechanism of formation and details on their ultrastructure have remained elusive. This lack in understanding is largely due to both the complex nature of the system in question and to problems related to the non-consensus of information obtained from the different techniques. We have recently been able to clarify the relationship between atomic force microscope (AFM) and transmission electron microscope (TEM) images of collagen fibrils, questioning the validity of existing models of collagen fibrils. By using a combined, parallel approach of AFM, TEM, electron spectroscopy imaging (ESI), and nuclear magnetic resonance (NMR), we would like to suggest new information on the structure of several different types of collagen fibrillar constructs, and comment on what implications these findings will have on existing ideas of collagen fibril formation and ultrastructure.