Natural proteins display critical structural and bioactive properties that have evolved in nature for millions of years. However, depending on the specific protein, there may be useful functions, such as mechanical toughness, while other critical features may be more limiting, such as cell compatibility or a broader range of mechanical properties. We aim to achieve deep understanding of distinctive properties of fiber-forming protein constructs from atomic to macromolecular levels and molecular pathways from pathological entities to diverse functions to enable expand the concept from soluble proteins to insoluble amyloids, from inhibition to functionalization, and from drugs to new materials.