

## **A deep dive into the material world of the human body**

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Our bodies are built up of cells and tissues with unique physical properties. Cells and tissues are living materials that combine high mechanical stability with active reshaping. This paradoxical mechanical behavior is governed by fibrous protein scaffolds known as the cytoskeleton and the extracellular matrix. Fibrous networks have many advantageous mechanical properties: fibers can form space-filling elastic networks at low volume fractions and they reversibly stress-stiffen, which provides protection from damage. However, it is still poorly understood how biopolymer networks can combine these features with the ability to dynamically adapt their structure and mechanics. I will summarize recent insights in this question obtained via quantitative measurements on cells and tissues and on simplified reconstituted model systems. Along the way I will mention connections to applications in bottom-up synthetic biology and in tissue (re)generation.