WHEN CONNECTIVE TISSUE STRETCHES

Various types of connective tissue join organ and muscle groups throughout the body. Our research showed that when connective tissue is stretched for at least 30 minutes, either by physical extension 1 or by mechanical stimulation with an acupuncture needle 2, the fibroblast cells that help produce and maintain the connective-tissue matrix become enlarged and flattened. A current cellular model that could explain this change in shape predicts that focal-adhesion complexes on the surface of the fibroblasts detect the stretching, and initiate a signaling pathway mediated by the protein Rho 3. In response, the cell releases ATP into extracellular space. ATP participates in the change in cell shape, and also may be converted into breakdown products with analgesic effects 4. In addition, the Rho pathway instigates remodeling of the cell’s focal adhesions 5, which mediate where and how the cell attaches to the extracellular matrix. Together these changes cause relaxation of connective tissue.