Soluble elastin: isolation from ligamentum nuchae and its application to drug release devices

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Elastin is the insoluble core protein of the elastic fibers which furnish the resilience for the elastic tissues such as arterial walls, ligaments, lungs, skin, etc. Soluble elastin, a fragmentation product of insoluble elastin, undergoes self-assembly called coacervation, in which coacervate droplets are formed. These coacervate droplets are easily converted to nanoparticles by cross-linking with cobalt-60 γ-irradiation. In this study, we examined first the isolation of highly purified soluble elastin from bovine and horse ligamentum nuchae by successive treatments of salt-extractions, alkali-extractions and acid-degradations. Next, on raising the temperature, soluble elastin in water self-assembled and became turbid by a phase transition. The coacervate droplets formed in turbid solution were cross-linked by cobalt-60 γ-irradiation to yield stable nanoparticles. The sizes of nanoparticles obtained were measured by transmission electron microscope and the stability in the treatment of elastase was studied. Furthermore, the release of anticancer drug from nanoparticles was examined in vitro and its release profile appeared to be diffusible. These results suggest that nanoparticles prepared from coacervate droplets of soluble elastin may be a useful drug release device.