

36-67 Removal of DNA from a protein solution with cross-linked poly(ethyleneimine) spherical particles
 (橋かけポリエチレンイミン粒子によるタンパク質水溶液からのDNAの除去)

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To remove nucleic acids from a solution of a cell product used as a drug, water-insoluble poly(ethyleneimine) (PEI) spherical particles were prepared by suspension cross-linking with PEI and chloromethyloxirane. The PEI content of the particles was easily adjusted by changing the PEI ratio and the CMO ratio in the cross-linking. The cross-linked PEI particles, which had diameters of 44 to 105 μm and PEI contents of 50 to 90 unit-mol%, were used as adsorbents. The adsorption of DNA and cell products to the adsorbents were determined using a batchwise method. The larger the PEI content of the adsorbent, the larger the DNA-adsorbing activity of the adsorbent. The apparent dissociation constant between the DNA (purified DNA from salmon spermary) and the adsorbent decreased from 8.5×10^{-8} to 9.5×10^{-10} M with an increase in PEI ratio from 50 to 90 unit-mol% under physiological conditions (ionic strength of $\mu = 0.17$, pH 7.2). On the other hand, the adsorbing activity of bovine serum albumin also increased with increasing PEI ratio of the adsorbent from 70 unit-mol% or higher, but sharply decreased with increasing ionic strength of the buffer. The adsorbing activity of γ -globulin increased with decreasing PEI ratio to 70 unit-mol% or lower. As a result, when the cross-linked PEI particles, having a PEI ratio of 80 unit-mol%, were used as the adsorbent, they only selectively removed DNA from various protein solutions at an ionic strength of $\mu = 0.17$ and a pH of 7.2. The particles decreased the concentration of DNA in each protein solution to less than 10 ng ml^{-1} , and the recovery rate of protein was more 97% in all cases.

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