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Effect of Nanoparticle Surface Design on Blood Retention and Elimination Dynamics in Vivo

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Abstract: *A variety of biocompatible materials, including poly dextran and polyvinylpyrrolidone have been used to modify the magnetic nanoparticles with a core diameter of 10 nm that are stabilized by sodium oleate and bovine serum albumin in phosphate buffer. Scanning electron microscopy and the dynamic light scattering technique were used to analyze prepared biocompatible magnetic fluids and determine the particle size distribution. Biocompatible substances were injected into the mice's bloodstreams to investigate the removal of various modified magnetic nanoparticles from the bloodstream. Additional blood samples were collected at certain intervals. The SQUID magnetometer was used to measure the magnetic moment of the lyophilized blood samples. The time-dependent magnetic moment of magnetic nanoparticles and those modified by DEX, PEG, and PVP normalized to Fe3O4 demonstrated that the time it takes for magnetic nanoparticles to circulate in the bloodstream is dependent on the modification material. While magnetic nanoparticles modified by DEX, PEG, and PVP circulated in the circulation for up to three hours, the unmodified magnetic nanoparticles were retained by the reticuloendothelial system after one hour.*

Keywords: The in vivo elimination of magnetic nanoparticles the bloodstream modifications, biodistribution, circulation

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