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Effects of Particle Size, Helium Gas Pressure and Microparticle Dose on the Plasma Concentration of Indomethacin after Bombardment of Indomethacin-Loaded Poly-L-Lactic Acid Microspheres Using a Helios™ Gun System

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We investigated the effects of the particle size of indomethacin-loaded poly-L-lactic acid microspheres (IDM-loaded PLA MS), the helium pressure used to accelerate the particles, and the bombardment dose of PLA MS on the plasmaconcentration of IDM after bombarding with IDM-loaded PLA MS of different particle size ranges, 20-38, 44-53 and 75-100 μm, the abdomen of hairless rats using the Helios™ gene gun system (Helios™ gun system). Using larger particles and a higher helium pressure, produced an increase in the plasma IDM concentration and the area under the plasma concentration-time curve (*AUC*) and resultant *F* (relative bioavailability with respect to intracutaneous injection) of IDM increased by an amount depending on the particle size and helium pressure. Although a reduction in the bombardment dose led to a decrease in C_{max} and *AUC*, *F* increased on decreasing the bombardment dose. In addition, a more efficient *F* was obtained after bombarding with IDM-loaded PLA MS of 75-100 μm in diameter at each low dose in different sites of the abdomen compared with that after bolus bombardment with a high dose (dose equivalent). These results suggest that the bombardment injection of drug-loaded microspheres by the Helios™ gun system is a very useful tool for delivering a variety of drugs in powder form into the skin and systemic circulation.