

## Safety science for nanomaterials in cosmetics using skin-related cells

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Amorphous silica nanoparticles (nSPs), widely used in cosmetics, medicines, and foods, are thought to pose risks induced by changes in the biologic reactivity and kinetics of bulk materials due to the reduction of the particle size. In a previous study, we demonstrated that silica particles with a diameter of 70 nm penetrated the stratum corneum (SC) of mouse skin and were taken up by living cells such as keratinocytes and Langerhans cells. Here, to reveal the relationship among particle size, distribution, and cellular response, we evaluated size-dependent intercellular localization and cytotoxicity of silica particles in a mouse epidermal Langerhans cell line (XS52). Treatment with silica particles of various diameters (70, 300, or 1000 nm) increased both the amount of silica particles taken up into the cells and cytotoxicity in accordance with the reduction of particle size. These findings suggest that smaller-sized silica particles induce greater cytotoxicity against Langerhans cells in association with a greater quantity of silica particles taken up by the cells.