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Poster: nanotoxicology / nanobiotechnology

## Nanotechnology and contact allergy

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Nanotechnology is an emerging technique used in the cosmetic and pharmaceutical industry. The benefits of using nanotechnology in skin products include increased delivery of active ingredients to skin, protecting product from degradation, and giving improved cosmetic performance.

However, when active ingredients are formulated in nanoparticles, such as polycaprolactone, this could theoretically increase the sensitization and elicitation potential. Different tests have been developed for investigating the risk of sensitization, and some of these are based on the use of laboratory animals. When using laboratory animals, it is our obligation to use the least straining test for the animal. Traditionally the Guinea Pig Maximization (GMT) test and Buehler test have been used for testing sensitization. The Local Lymph Node Assay (LLNA) has the potential of detecting sensitization with a significant lower strain for the animals, since no injections with adjuvants, as in the GMT, or restraint, as in the Buehler test, are required. Therefore this test was chosen as the panel to test sensitization for nanoparticles, beside the patch test in human volunteers.

Two different types of nanoparticles, used in cosmetics (liposomes and polycaprolactone), were selected for experimental studies in mice (LLNA) and human volunteers (patch test). The nanoparticles were manufactured and loaded with three different contact allergens, being potassium dichromate (hydrophilic), isoeugenol (slightly hydrophilic) and oxazolone (lipophilic).

The liposomes were produced by extrusion through a 50 or 100nm filter. The allergen was placed in the lipophilic or hydrophilic compartment. Extraliposomal allergen was removed by ultrafiltration. Size and stability was measured by light scattering and encapsulation efficiency of the allergen was performed by HPLC. Polycaprolactone was produced by the solvent displacement method. Incorporation of allergen was achieved by dissolving the allergen in either the organic or the water phase. Hereafter, water was evaporated to the desired end-volume. Stability, size and encapsulation efficiency was analysed as for liposomes. Sensitization animal experiments are ongoing and methods and data will be presented.

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