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Review article

Review of potential health risks associated with nanoscopic calcium phosphate

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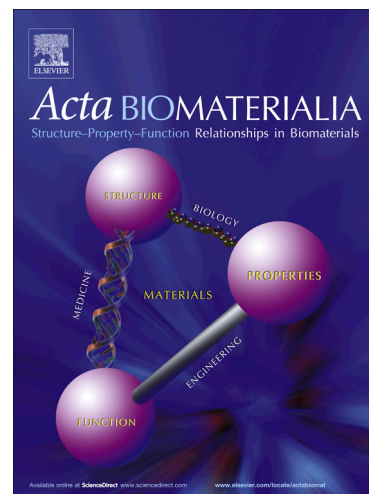
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**Review of potential health risks associated with nanoscopic calcium
phosphate**

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Abstract

Calcium phosphate is applied in many products in biomedicine, but also in toothpastes and cosmetics. In some cases, it is present in nanoparticulate form, either on purpose or after degradation or mechanical abrasion. Possible concerns are related to the biological effect of such nanoparticles. A thorough literature review shows that calcium phosphate nanoparticles as such have no inherent toxicity but can lead to an increase of the intracellular calcium concentration after endosomal uptake and lysosomal degradation. However, cells are able to clear the calcium from the cytoplasm within a few hours, unless very high doses of calcium phosphate are applied. The observed cytotoxicity in some cell culture studies, mainly for unfunctionalized particles, is probably due to particle agglomeration and subsequent sedimentation onto the cell layer, leading to a very high local particle concentration, a high particle uptake, and subsequent cell death. There is no risk from an oral uptake of calcium phosphate nanoparticles due to their rapid dissolution in the stomach. The risk from dermal or mucosal uptake is very low. Calcium phosphate nanoparticles can enter the bloodstream by inhalation, but no adverse effects have been observed,

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