In vivo pharmacokinetics and biodistribution of gold nanoparticles

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The outstanding physicochemical properties, well-established synthetic procedures, and easy surface modifications make gold nanoparticles (AuNPs) an emerging platform for a wide range of pharmaceutical and biomedical applications. Despite the obvious advantages of gold nanoparticles for biomedical applications, controversial and incomplete toxicological data hamper their widespread use.
Here, we present the results from an *in vivo* toxicity study using gold nanoparticles coated with polyethylene glycol (PEG-AuNPs). The pharmacokinetics and biodistribution of PEG-AuNPs were examined in the rat's liver, lung, spleen, and kidney after a single i.v. injection at different time intervals. PEG-AuNPs had a relatively long blood circulation time and accumulated primarily in the liver and spleen, where they remained for up to 28 days after administration. We identified significant changes in lipid metabolism, altered levels of liver injury markers, and elevated monocyte count 24 h and 7 days after PEG-AuNPs exposure, suggesting the immunomodulatory effects of PEG-AuNPs. In blood cells, no DNA damage was present in any of the studied time intervals.
Our results indicate that the tissue accumulation of PEG-AuNPs might result in late toxic effects.

Funding: This study is based upon work from COST Action CA 17140 "Cancer Nanomedicine from the Bench to the Bedside" supported by COST, project HISENTS No. 685817, project VISION (Strategies to strengthen scientific excellence and innovation capacity for early diagnosis of gastrointestinal cancers) No. 857381, VEGA grants 2/0055/20, 2/0121/21.