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Bio-distribution and urinary excretion of Gold nanoparticles (GNPs) following systemic administration: A long term *in-vivo* study

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Gold nanoparticles (GNPs) have shown a great potential for use as vehicle for drug delivery and other systemic use. However, long term toxicity remains a major concern. Very few long term *in-vivo* study pertaining to organ specific biodistribution, sequestration and excretion of GNPs are available. We investigated the long term (90 days) biodistribution, sequestration kinetics, and excretion of ultrafine gold nanoparticles after a single intravenous administration in mice. The sequestration pattern of three different sizes of GNPs 2±0.5 nm, 5±1 nm, and 10±2 nm, at a high dose of 1250 µg/Kg was determined by inductively coupled plasma atomic emission spectrometry (ICP-AES) in various organs such as lungs, liver, spleen, heart, kidney, brain, as well as in blood and urine. GNPs of all three sizes showed highest accumulation in spleen (µg/gm of the tissues) around 15 days after injection and reached near basal level at 90 days. Low concentration of GNPs was detected in brain after 1 day without any residual of GNPs after 30 days. Ultrastructural study also showed few GNPs in brain tissue in lysosome. Renal sequestration was also low indicating reduced nephrotoxic potential. GNPs could be detected in urine till 30 days indicating near total excretion of GNPs following single injection in 1 month. No significant toxicity was documented by normal hemogram, serum biochemistry, and tissue histology. No abnormality was detected in survival, behaviour, skin and hair colour, weight and food intake. Therefore, we concluded that the ultrafine GNPs are mostly excreted out through urine without any systemic toxicity following high dose intravenous administration and it may be safe for systemic use.

Biography

Farhat Naz has completed her PhD in 2014 from All India Institute of Medical Sciences, Delhi in cancer nanomedicine and doing Postdoctoral research in same institute. She is Research Associate in the Dept of Pathology, AIIMS. She has published 3 papers in international journals of repute.

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