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# Surface modification of layered double hydroxide nanoparticles with albumin to improve colloidal stability, redispersity and cellular uptake

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One of the major challenges for nanoparticles to be used as a drug/gene delivery platform is their tendency to aggregate in electrolyte solution (physiological environment). We introduced 2 surface modification strategies that effectively prevented inorganic layered double hydroxide (LDH) nanoparticles with different sizes and interlayer anions from aggregation in phosphate buffer saline and cell culture medium solutions. We found that LDH nanoparticles with the size of 110 nm were well stabilised at the albumin/LDH mass ratio of 5:2 when LDH suspension was added into albumin solution dropwise with vigorous stirring. The key factors influencing the colloidal stability of albumin-coated LDHs included the sequence and speed of reagent addition during the pre-coating process, the albumin/LDH mass ratio, the LDH particle size, and anions intercalated in the LDH. In the second strategy, albumin-coated LDH nanoparticles were crosslinked with crosslinking agent glutaraldehyde (GTA). The amount of GTA was optimised to achieve minimal aggregation and ready redispersion. The GTA-crosslinked albumin-coated nanoparticles showed excellent redispersity compared to the non-crosslinked nanoparticles. These 2 albumin coating strategies therefore provide an effective method for the prevention of LDH nanoparticle aggregation and improved LDH nanoparticle redispersion for use in a wide variety of bio-applications *in vitro* and *in vivo*.

## Biography

Zi Gu received her PhD in Biomedical Engineering from the University of Queensland in 2011. She is currently honoured with a National Health and Medical Research Council (NHMRC) Early Career Fellowship at Australian Institute for Bioengineering and Nanotechnology, The University of Queensland. Her current research interests include novel nanostructured materials and their applications in drug/gene delivery and bio-imaging.

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