

CHEMISTRY DEPARTMENT SEMINAR



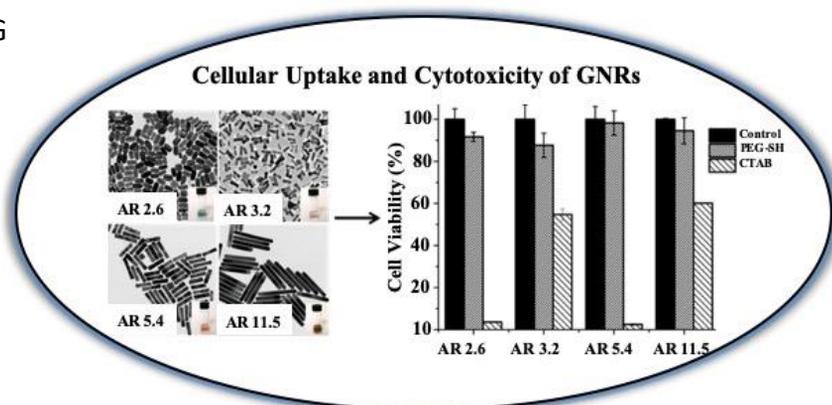
Cellular uptake and cytotoxicity of varying aspect ratios of gold nanorods in HeLa cells

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Gold nanorods (GNRs) have received broad attention due to their tunable surface plasmon modes, which make them attractive candidates for biomedical applications in drug and gene delivery, biological imaging, and cancer treatment. In this study, we highlight the interactions of four different aspect ratios (ARs), 2.6, 3.2, 5.4 and 11.5, of GNRs with HeLa cells. Specifically, we study cellular uptake and cellular viability of the particles while considering the effects of other parameters such as the surface stabilizer, supernatant, and serum proteins present in the medium. From this work, it was determined that the cell viability depended on the chemical composition of the supernatant especially the amount of excess surfactant, hexadecyltrimethylammonium bromide (CTAB), used for the synthesis of GNRs; thus, the effect of aspect ratio of GNRs on endocytosis could not be directly discerned. For example, when exposed to GNRs of aspect ratio 11.5, HeLa cells showed higher cellular uptake compared to smaller aspect ratios and also exhibited lower cytotoxicity due to the lower concentration of CTAB used in their synthesis. Gentler purification methods (sedimentation) appeared to be a factor in lowering the free CTAB concentration for experiments containing GNRs of aspect ratio 11.5. Overall, the synthesis protocols, functionalization, purification processes, and the stability of GNRs in media have an effect on cellular uptake and viability.

Our results suggest that perhaps AR plays a role in endocytosis when mPEG was used as a stabilizing ligand for the GNRs although an overall trend could not be unequivocally established. Sedimentation, contact time, and internalization kinetics need to be probed further using more biocompatible ligands and less inert ligands (mPEG) in future studies to determine the effect of AR on GNR internalization in HeLa cells.



February 24th @ 2.00 p.m. – Lopez 106

Meeting ID: 955 4454 2732 <https://zoom.us/j/95544542732>