Development of a novel method for the identification of mouse gastric stem cells Using Raman Spectroscopy

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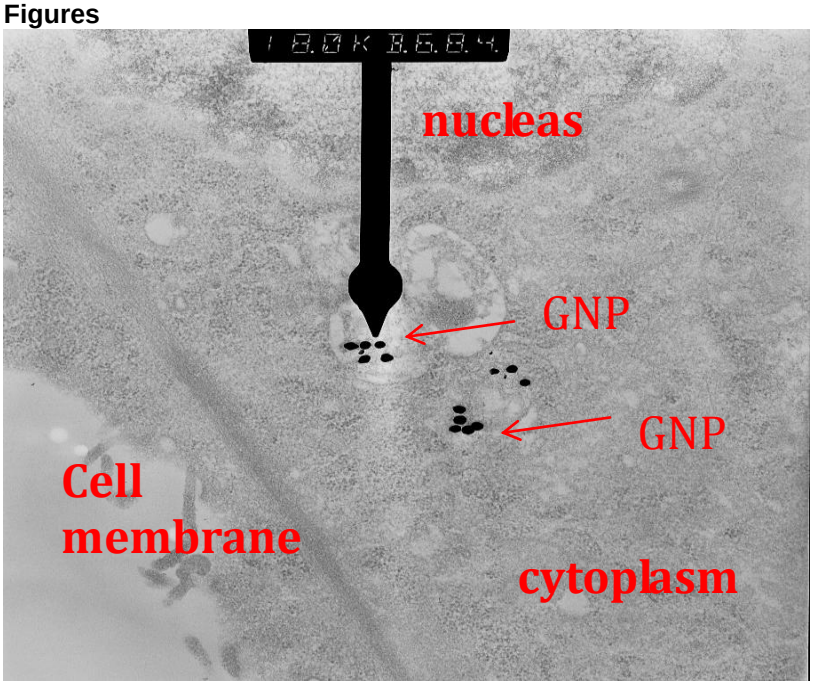
Abstract The stomach is lined by different types of epithelial cells which are generated continuously by gastric stem (GS) cells. These cells are rare and difficult to identify. Previous reports demonstrated the use of gold nanoparticle-based surface-enhanced Raman scattering (SERS) for probing the differentiation of embryonic stem cells (1). As a first step to use SERS as a tool to identify and characterize GS cells we tested the effect of gold nanoparticles (GNP) on growth and viability of GS cells. Trypsinized mouse GS cells were incubated with GNP either directly or after forming embryoid bodies using the hanging drop method. Transmission electron microscopy (TEM) was used to localize GNP inside cells, whereas PicoGreen assay were used to measure cell proliferation. Neutral red uptake (NRU) assay was used to test GNP cytotoxicity. TEM confirmed the intracellular localization of GNP. PicoGreen assay showed that the number of GS cells treated with GNP increased by 32.8% within 3 days in comparison to untreated cells. Additionally, NRU assay showed that GNPs have no toxic effect on GS cells. We are currently employing SERS to identify and characterize GS cells.

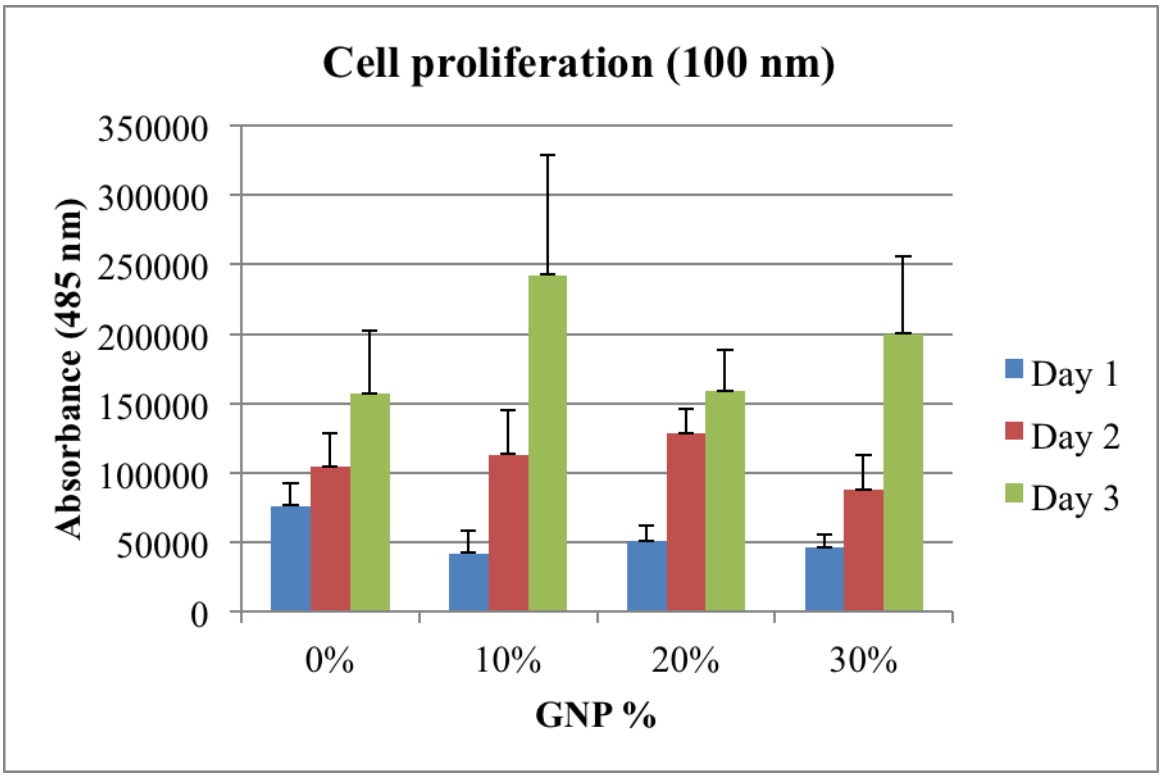
References

[1] Sathuluri RR, Yoshikawa H, Shimizu E, Saito M, Tamiya E (2011) PLoS ONE 6(8): e22802.

Figures



60nm 20%, GNP inside cytoplasm, GNP tend to aggregate inside cell in vesicles



Picogreen cell proliferation assay (Concentration)

Conclusion: This part of the study shows the GNP are delivered into mGS cells. GNP do not affect the viability and cell proliferation. Embryoid bodies cultured in differentiation media show slight morphological differences, which is yet to be determined by Raman.