Optimization of the GSH-mediated formation of mesoporous silica-coated gold nanoclusters for application in photothermal therapy

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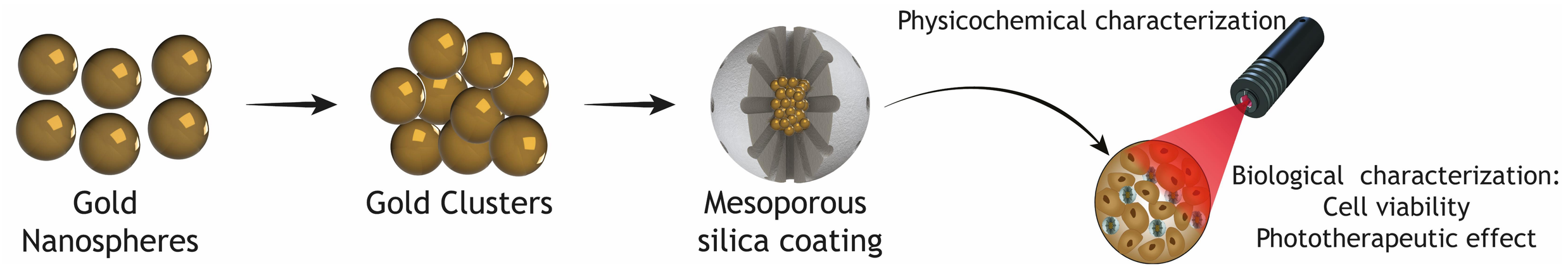
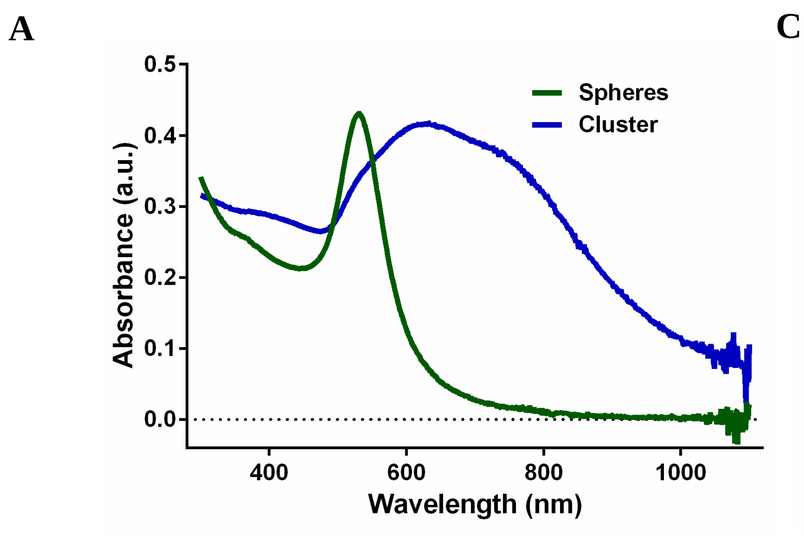
Introduction

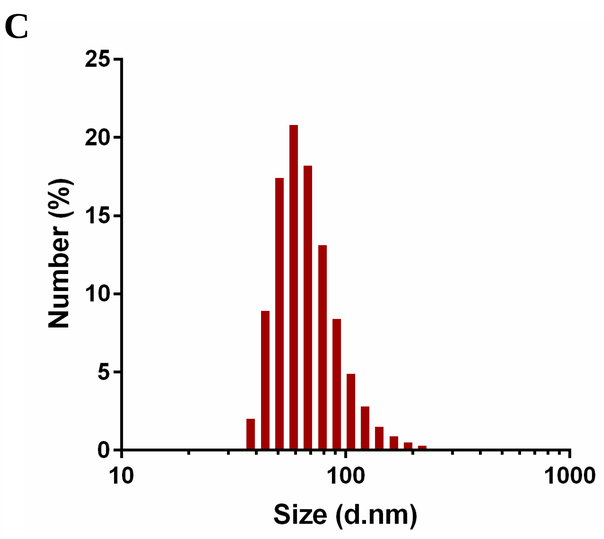
- Gold-based nanoparticles have been widely studied due to their localized surface plasmon resonance that can mediate a strong light absorption and heat generation [1]. However, gold nanospheres present a typical absorption band in the 500-550 nm limiting its application in cancer photothermal therapy [2].
- In this work, a novel and straightforward methodology was developed to produce gold nanoclusters coated with mesoporous silica (AuMSS), using glutathione (GSH) to mediate the formation of the gold clusters, in order to improve its photothermal capacity [3].

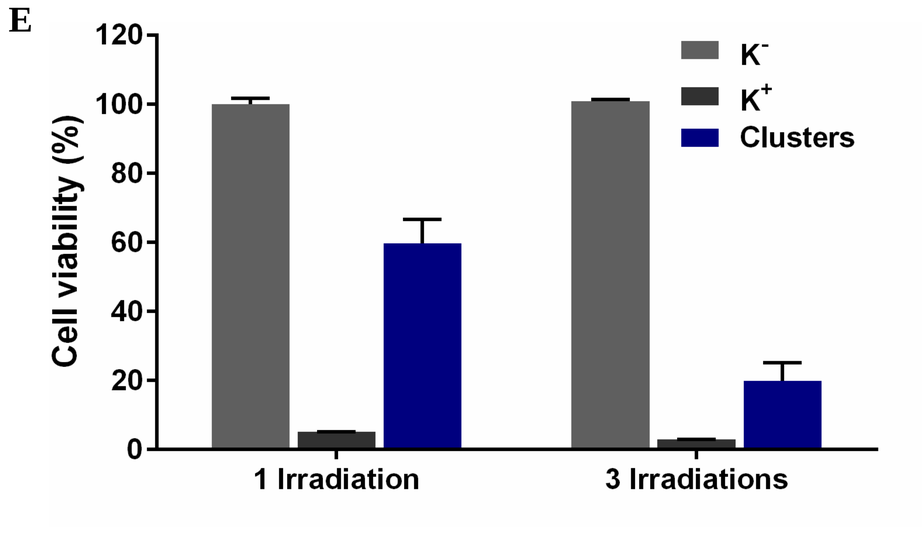
Materials and Methods

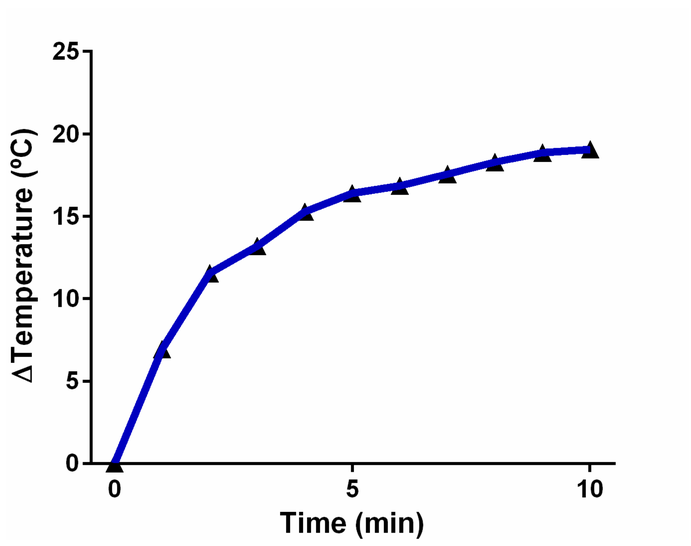


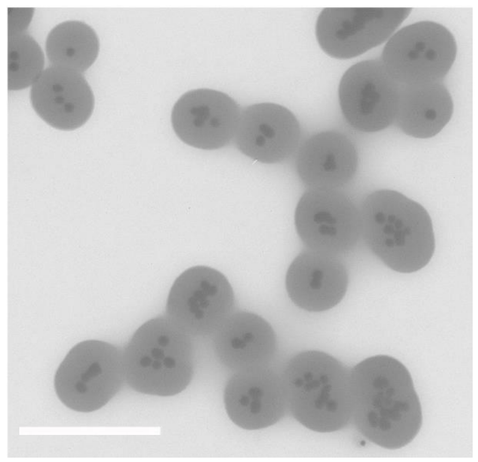
Results











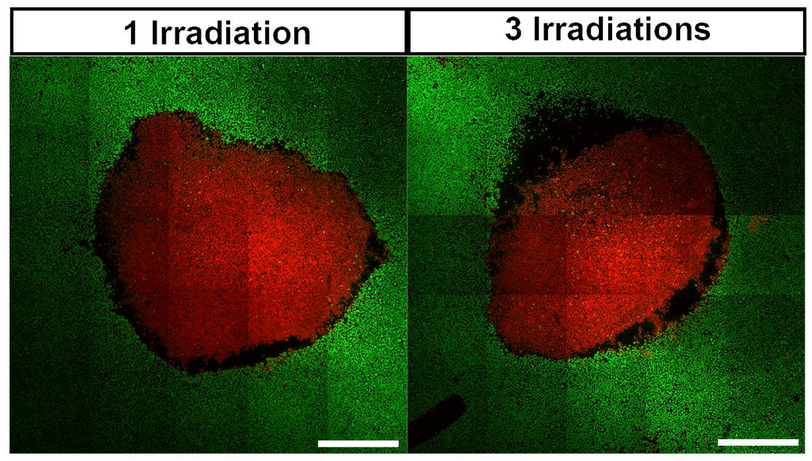


Figure 1. Characterization of AuMSS nanoclusters' physicochemical and biological properties. UV-vis spectra of AuMSS nanocluster **(A),** Temperature variation curve (NIR laser (808 nm, 1.7 W/cm^2, 10 min)) **(B),** Size distribution of AuMSS nanoclusters **(C),** TEM image of AuMSS nanoclusters **(D),** Analysis of the AuMSS nanoclusters cytotoxic activity after 1 or 3 NIR laser irradiations (808 nm, 1.7 W/cm^2, 5 min) **(E),** Live/Dead CLSM images of the cytotoxic activity of AuMSS nanoclusters after 1 and 3 NIR laser irradiations (808 nm, 1.7 W/cm^2, 5 min) **(F)**.

Conclusion

- AuMSS nanoclusters are promising agents for cancer photothermal therapy and can be further explored to develop a multifunctional nanomedicine with an enhanced anticancer capacity.

References

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Acknowledgements

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