

Functionalized Gold-based Nanostructures for Uveal Melanoma Treatment ^[1]

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Uveal melanoma is a rare disease accounting for 5% of all melanomas and 0.1% of all cancer deaths. It is the most common primary intraocular malignant tumor in adults resulting in liver metastasis in 85% of the cases, half of which end up in death. This overwhelming scene has raised up a considerable interest in the development of novel approaches for the treatment of such disease.

One of the biggest problems regarding cancer therapeutics is the lack of specificity of the chemotherapeutic approaches. Functionalized gold-based nanostructures may offer a strategy to overcome such complications taking into account the low toxicity and the high cellular penetration capacity of gold nanoparticles, which make them an excellent choice for biomedical applications ^[2].

We have tested functionalized gold nanoparticles (AuNPs, Figure 1.A) and albumin-stabilized gold nanoclusters (BSA-AuNCs, Figure 1.B) as delivery systems for two chemotherapeutic agents (AZD8055 and Selumetinib, Figure 1.C) in several uveal melanoma cell lines. These two drugs interfere with the MAPK and the PI3K pathways, respectively, which are involved in the development of uveal melanoma promoting cellular growth, proliferation, invasion and cell survival.

Our results show that Selumetinib and AZD8055 gold-based nanostructures are suitable for delivery systems in several uveal melanoma cell lines, reducing cellular viability in a similar way to the free drugs. Due to the versatility of these nanomaterials, we are assessing different approaches to improve their selectivity and efficacy as drug carriers.

References

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- [2] Latorre, A., Posch, C., Garcimartín, Y., Celli, A., Sanlorenzo, M., Vujic, I., MA, J., Zekhtser, M., Rappersberger, K., Ortiz-Urda, S., Somoza, A. (2014). DNA and aptamer stabilized gold nanoparticles for targeted delivery of anticancer therapeutics. *Nanoscale*, 6, 7436–42. <http://doi.org/10.1039/c4nr00019f>

Figures

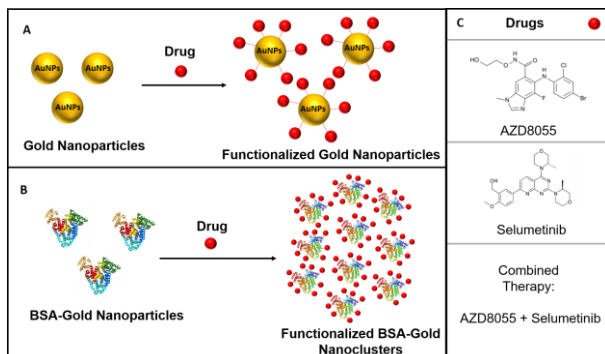


Figure 1: Functionalization of gold-based nanostructures for drug delivery. A. Drug functionalization of gold nanoparticles. B. Drug functionalization of BSA-Gold nanoclusters. C. Drugs tested for uveal melanoma treatment: AZD8055, Selumetinib and combined therapy.