

Multiplex genetic characterization via noble metal nanoprobos

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Cancer is a multigenic complex disease where is usually required that multiple gene loci are characterized simultaneously and/or in association (e.g. tumor suppressor gene TP53, *c-myc* oncogene, BCR-ABL fusion oncogene, among others)^[1,2]. Here, we present the use of noble metal nanoparticles with different compositions in a one-pot multi-color DNA detection strategy for multiplex cancer diagnostic. Synthesis and functionalization with thiol-ssDNA of pure gold and gold-silver alloy nanoparticles was successfully achieved, yielding different nanoprobos with tunable colors and distinct absorption peaks, characteristic of each nanoparticles' surface plasmon resonance. These nanoprobos were combined in a one-pot reaction to allow for the simultaneous differential detection of different nucleic acids sequences related to cancer, following a non-cross-linking method that has been previously developed by our group using gold nanoprobos alone^[3,4,5]. The method is based on the colorimetric comparison of solutions before and after salt-induced nanoprobe aggregation. Only the presence of a complementary target stabilizes the corresponding nanoprobe, preventing aggregation and colorimetric change after salt addition, while the absence of a complementary target leads to the aggregation of nanoprobos with a concomitant color change of solution (Figure 1)^[6].

References

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Acknowledgements

We thank FCT/MCTES for financial support: PTDC/SAU-BEB/66511/2006; PTDC/EEA-ELC/74236/2006; Nanotruck-Action NanoSciEra+ and CIGMH.

Figures

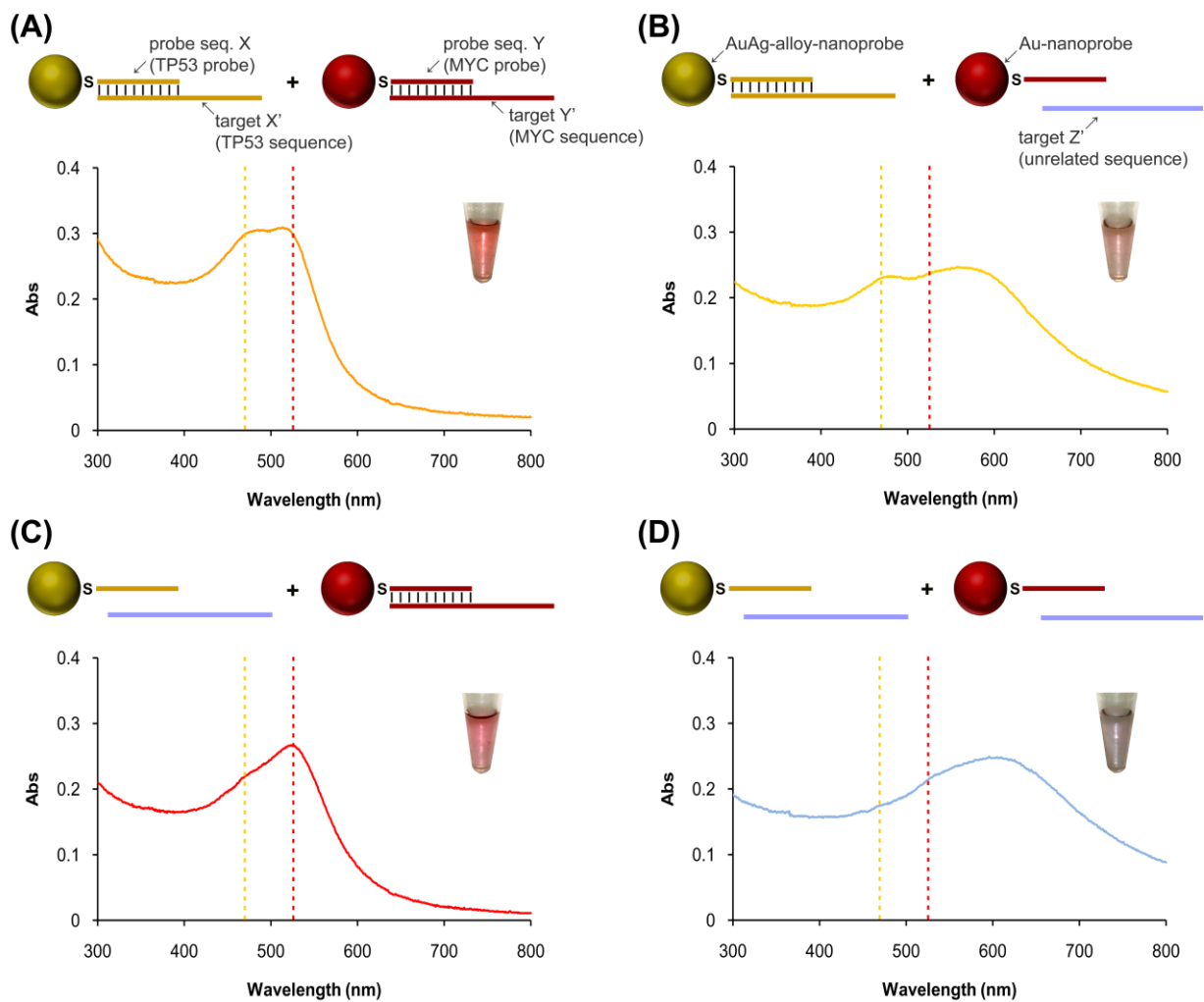


Figure 1 - One-pot colorimetric multi-target detection ^[1]. UV-visible spectrum and digital photograph of AuAg-alloy- and Au-nanoprobe mix in the presence of: (A) complementary targets to both the AuAg-alloy- and Au-nanoprobe; (B) a complementary target to the AuAg-alloy-nanoprobe; (C) a complementary target to the Au-nanoprobe; (D) a non-complementary target to both AuAg-alloy- and Au-nanoprobes. Vertical dashed lines represent the absorption peaks of AuAg-alloy-nanoprobes (orange broken line; 470 nm) and Au-nanoprobes (red broken line; 526 nm) when dispersed in solution.