

Poster 64

Gold nanoparticles for forensic application

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Abstract

Background: Nanotechnology has grown exponentially over the years, considering the versatility of applications [1]. Metallic nanoparticles present various advantages, highlighting their versatility, low toxicity, high biocompatibility, biodegradability, stability, and low production cost [2–4]. Metallic nanoparticles, such as gold nanoparticles (NP Au), can be used for incorporation in systems due to the colorimetric properties that allow identification through color change [1]. There are methodologies for detecting latent fingerprints under development, using NP Au for forensic application [2–4]. On the other hand, NP Au are used for illicit drug testing methods [2–4]. One of the barriers to the application of metallic nanoparticles is their synthesis through manual methodologies, making this process time-consuming and complex. The growing interest in nanoparticles and biomaterials opens the opportunity to design and develop novel and optimized prototype for biomaterials and nanoparticles synthesis. **Objective:** Demonstrate the potential of applying a versatile prototype for the synthesis of nanoparticles and biomaterials for biomedical and forensic applications. **Methods:** Herein, a versatile prototype for the synthesis of biomaterials and nanoparticles, namely NP Au is presented [5]. The main aim is to synthesize gold nanoparticles under controlled conditions, as temperature, pH, conductivity, among others. The as-produced nanoparticles will be used to identify diverse diseases, applied to biomedical or forensic applications. **Results:** A versatile prototype for biomaterials synthesis is presented. Gold nanoparticles will be synthesized, and chemical, physical, thermal properties will be evaluated. A proper biological condition will be addressed to characterize the gold nanoparticles. NP Au will be tested for the detection of traces, drugs or diseases, to be for example applied to several forensic areas. **Conclusions:** Development of the BioRobotBeads system demonstrates an emergent evolution of nanotechnology, especially for biomedical and forensic applications.

Keywords: prototype; nanoparticles; forensic applications

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References

1. Mohamed, A.A. Gold is going forensic. *Gold Bull* **2011**, 44, 71–77.
2. Kłębowski, B.; Depciuch, J.; Parlińska-Wojtan, M.; Baran, J. Applications of noble metal-based nanoparticles in medicine. *Int J Mol Sci* **2018**, 19, 4031.
3. Salata, O. Applications of nanoparticles in biology and medicine. *J Nanobiotechnology* **2004**, 2, 3.
4. Alaribe, F.N.; Manoto, S.L.; Motaung, S.C.K.M. Scaffolds from biomaterials: advantages and limitations in bone and tissue engineering. *Biologia (Bratisl)* **2016**, 71, 353-366.
5. Comune, M.; Rai, A.; Palma, P.; TondaTuro, C.; Ferreira, L. Antimicrobial and pro-angiogenic properties of soluble and nanoparticle-immobilized LL37. *Biomater Sci* **2021**, 9, 8153-8159.



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