P33

Gold nanoparticles decorated with polyamidoamines for the delivery of anticancer drugs: synthesis and biological characterization

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Despite remarkable successes in the treatment of breast cancer, some challenges remain. Gold nanoparticles may prove valuable in addressing these problems owing to their unique characteristics that make them elective agents for the conjugation with drugs and for photothermal therapy [1]. The potential toxicity of AuNPs remains a major hurdle that impedes their use in clinical settings. In this study, stable and biocompatible colloidal AuNPs (4-10 nm) were obtained by their functionalization with biocompatible stabilizing polymers (polyamidoamines, PAA). Sequentially, coated-AuNPs were used as platform for the conjugation of anticancer drugs (Fig. 1). AuNPs were conjugated with *Herceptin*, a chemotherapic agent used to treat breast cancer and their efficacy was evaluated *in vitro.* Two breast cancer cell lines were used (SKBR-3 and MCF-7) and compared with fibroblast-like cell line (NIH-3T3). Preliminary biological investigation showed that polymer coated-AuNPs functionalized with Herceptin led to increased efficacy and specificity for target cells in comparison with free drug and uncoated AuNPs, consistent with the endocytosis capability of the nanoparticles in the target cancer cells.

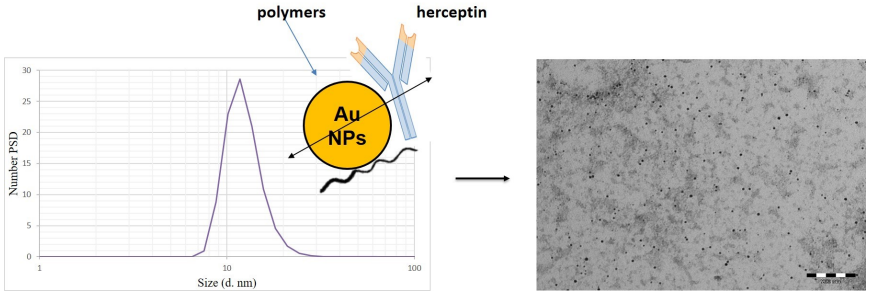

Figure 1. Dynamic light scattering (DLS) analysis and transmission electron microscopy (TEM).

References

1. J. Lee, D.K. Chatterjee, M.H. Lee, S. Krishnan, *Cancer Lett.,* **2014***, 347,* 46.

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