

Bio-Imaging of Cancer Cells Using Polymer-Stabilized Platinum Nanoclusters as Fluorescent Probes

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In the past decades, fluorescent bio-imaging has become an indispensable tool in cancer research, gene therapy and drug delivery. Noble metal nanoclusters (M NCs) consisting a few to several tens of atoms exhibit the molecule-like behaviors such as discrete energy level and size-dependent fluorescence, which ensure them as a new and promising fluorescent biological probe. Recently, fluorescent gold and silver nanoclusters (Au and Ag NCs) have been already produced and utilized for labeling of the living cells as probes. Platinum as another noble metal has extensively applied to antineoplastic and catalytic fields, however, their fluorescence properties were rarely investigated.

In our previous works, aqueous blue and green fluorescent platinum nanoclusters (Pt NCs)^[1-2] were synthesized by using hydroxyl-terminated four-generation poly(amidoamine) dendrimers (PAMAM G4-OH) as a template and already bio-imaged the cancer cells. Besides, yellow fluorescent hyper-branched polyethylenimine (PEI) stabilized Pt NCs (Pt NCs@PEI)^[3] were prepared by a facile and environmental-friendly protocol. In this presentation, we report that these yellow fluorescent Pt NCs were successfully applied for bio-imaging of chemokine receptors that are expressed on the membrane of cancer HeLa cells, through conjugating to anti-chemokine receptor antibodies anti-CXCR4-Ab (**Fig. 1**). Moreover, these fluorescent PEI-capping Pt NCs exhibited lower cell cytotoxicity and more excellent biocompatibility in contrast to carboxyl-functionalized CdTe quantum dots (QDots@COOH), even at long-term incubation times and high concentrations. Compared to common fluorophores like organic dyes or QDots, Pt NCs have plenty of advantages, such as water solubility, ultrafine size and low cytotoxicity, demonstrating the enormous potential in the fields of tracking, imaging, and sensing as an alternative fluorescent probe.

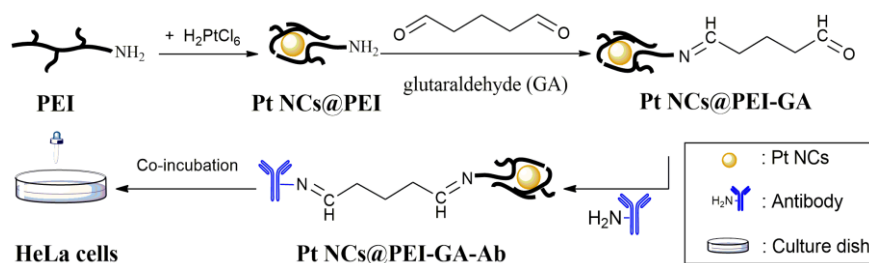


Fig. 1 Schematic reaction of the preparation of Pt NCs and bio-conjugation of Pt NCs to antibodies towards the bio-imaging of cancer HeLa cells.

References:

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