

Synthesis and characterization of bio reducible heparin-polyethyleneimine nanogels: Application as imaging-guided photosensitizer delivery vehicle in Photodynamic Therapy (PDT)

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Herein, we synthesized and characterized novel bio reducible Heparin Polyethyleneimine (HPC) nanogels consisted of heparin, branched polyethyleneimine (PEI) and L-cysteine. ¹H-NMR and FTIR analysis confirmed the formation of HPC nanogels while TEM and dynamic light scattering revealed uniform spherical nanoparticles with average diameter of <200 nm. Zinc phthalocyanine (ZnPC) was encapsulated via the dialysis method and the drug is released in vitro from disulfide-containing HPC nanogels in a redox-sensitive manner. Additionally, HPC nanogels possess bright blue fluorescence which eliminates the use of additional probing agent in image-guided drug delivery. Moreover, singlet oxygen detection revealed that nanogels prevented ZnPC aggregation thus enhancing ¹O₂ generation and Photodynamic Therapy (PDT) efficacy. These results showed that disulfide crosslinked HPC nanogels are promising vehicles for stimulated photosensitizer delivery in advanced PDT.

Biography

Tilahun Ayane Debele received his BSc degree in Applied Chemistry at Ambo University and his MSc degree in Medical Biochemistry from Addis Ababa University, School of medicine, Ethiopia. He is currently a PhD student in Graduate studies of Applied Science and Technology at National Taiwan University of Science and Technology, concentrating on using nanoparticles as photosensitizer delivery in photodynamic therapy of cancer under supervision of Professor Hsieh-Chih Tsai. He has published five papers in reputed journals.

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