

Home works of Nanobiomedicine 2

Under supervision of Dr Abolfazl akbarzadeh

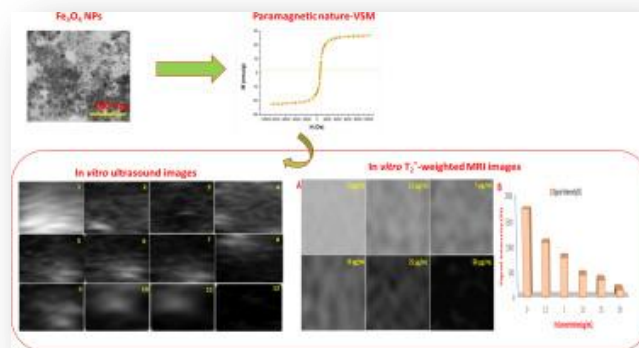
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**The use of Fe superparamagnetic nanoparticles in
diagnosis and treatment**

Faculty of Advanced Medical Science

Fe_3O_4 super paramagnetic nanoparticles for ultra sound examination and magnetic resonance imaging for cancer treatment

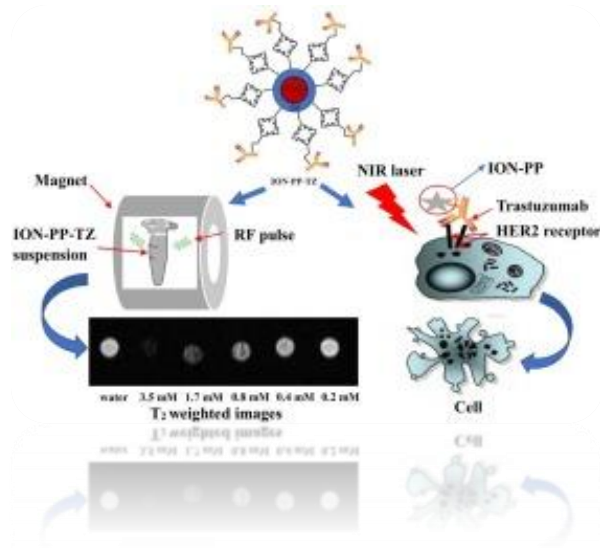
- In the present work, Fe_3O_4 nanoparticles with superparamagnetic properties were prepared and capped by using Chitosan.
- Fe_3O_4 NPs as contrast agents in efficient Ultra sound/Magnetic resonance (US/MR) imaging
- The Chitosan coated SPION have reported significant contrast-enhanced imaging potential for dual-mode US/MR imaging. Hence, the prepared Chitosan coated SPION composites administration serve as potential guide in the diagnosis and treatment of cancers.



superparamagnetic iron oxide nanoparticle: A potential PTT-MRI bimodal agent for herceptin positive breast cancer

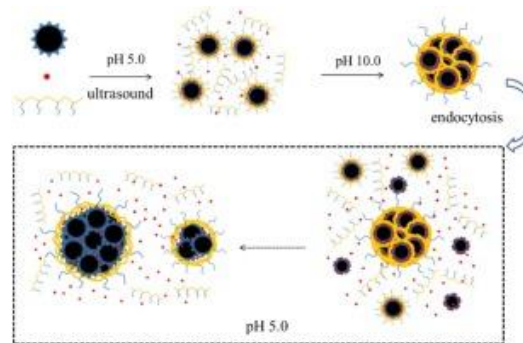
- Trastuzumab Conjugated Porphyrin-Superparamagnetic Iron Oxide Nanoparticle (ION-PP-TZ) successfully synthesized. TZ and SPION were designated as the targeting ligand and specific T2 MRI contrast agent, respectively, and the MRI and photothermal properties of the IONs were investigated
- The theranostic agents effectively decreased the number of MCF 7 cells. In addition, the in vitro photothermal ablation of ION-PP-TZ revealed a 74% MCF 7 cell reduction after 10 min of at the highest Fe concentration (1.00 mg Fe/mL).

- The in vitro MR images confirm the potential of the theranostic agent as T2-weighted MRI contrast agent.
- We suggest IONs-PP-TZ is a promising specific bimodal agent for the diagnosis and treatment of HER2 positive breast cancer cells using MRI and photothermal therapy.



Superparamagnetic nanoparticles enabling tumor-specific disassembly for on-demand drug delivery and enhanced MR imaging

- The hybrid cluster bombs of PEGylated chitosan encapsulated doxorubicin (DOX)-loaded superparamagnetic nanoparticles as tumor-specific theranostics for targeted DOX delivery and magnetic resonance(MR) imaging, by simply co-precipitation of poly(ethylene glycol) modified chitosan (CS-PEG), oleylamine modified Fe_3O_4 (OA- Fe_3O_4) nanoparticles and DOX
- Fe_3O_4 nanoparticle clusters with higher Ms for MR imaging-guided diagnosis, owing to the tumor-specific DOX release and dissolution of CS-PEG.



References

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- Trastuzumab conjugated porphyrin-superparamagnetic iron oxide nanoparticle: A potential PTT-MRI bimodal agent for herceptin positive breast cancer, P. Khaniabadi, D. Gahrouei, A. AbdulAziz, A. Dheyab, B. Khaniabadi, B. Mehrdel, M. Jameel, 2020
- Stimuli-responsive hybrid cluster bombs of PEGylated chitosan encapsulated DOX-loaded superparamagnetic nanoparticles enabling tumor-specific disassembly for on-demand drug delivery and enhanced MR imaging, P. Xie, P. Du, J. Li, P. Liu, 2019