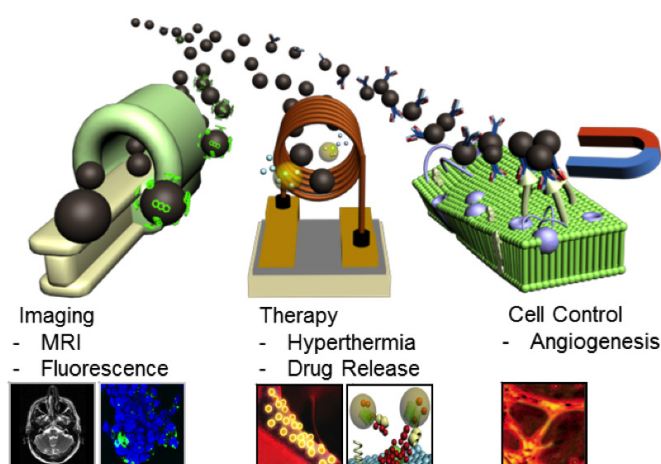


Design of Magnetic Nanoparticles for Imaging and Therapeutics

Jinwoo Cheon*

Center for Evolutionary Nanoparticles and Department of Chemistry, Yonsei University, Korea
jcheon@yonsei.ac.kr

One of the important trends of next-generation nanomedicine is theranostics that is defined by the combination of therapeutics and diagnostics on a single platform. Magnetic nanoparticles are among one of the most essential platforms for targeted imaging, therapy, and simultaneous monitoring of therapeutic efficacy. In this talk, I will discuss magnetic nanoparticles as a core platform material for theranostics and add a variety of functionalities such as drug, targeting moiety, and gene to enhance their performance. Their unique utilization in highly accurate dual-modal MR imaging¹, therapeutic hyperthermia of cancer cells², controlled drug release³, gene delivery⁴, and molecular level cell signaling and cell fate control⁵ will be discussed.



References

- [1] Yoo, D.; Cheon, J. et. al. Theranostic Magnetic Nanoparticles, *Acc. Chem. Res.* **2011**, 44, 863.
- [2] Lee, J-H.; Park, K. I.; Cheon, J. et. al. Exchange-coupled Magnetic Nanoparticles for Efficient Heat Induction. *Nat. Nanotech.* **2011**, 6, 418-422.
- [3] Choi, J.-s.; Cheon, J. et. al. Self-Confirming “AND” Logic Nanoparticles for Fault-Free MRI, *J. Am. Chem. Soc.* **2010**, 132, 11015–11017.
- [4] Thomas, C. R.; Lee, J.-H.; Cheon, J.; Zink, J. I. et. al. Noninvasive Remote-Controlled Release of Drug Molecules in Vitro Using Magnetic Actuation of Mechanized Nanoparticles, *J. Am. Chem. Soc.* **2010**, 132, 10623–10625.
- [5] Lee, J.-H.; Cheon, J. et. al. Artificial Control of Cell Signaling and Growth by Magnetic Nanoparticles. *Angew. Chem., Int. Ed.* **2010**, 49, 5698–5702.