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## The power of theory in developing the design of targeted nanoparticles

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In nano-medicine, designing therapeutic nanoparticles has undergone an enormous development in the last few decades. These therapeutic designs focus on developing several features to illuminate inflammations, protect the drug, and enhance the targeted delivery. While the choice of materials affects the efficiency of the design, pondering the intermolecular interactions in a system that is composed of a nanoparticle and cell at a biological environment is vital to stabilize the design and improve targeting. Such a system is usually subject to steric, Van der Waals, and electrostatic interaction, and in the case of magnetic nanoparticles, to electromagnetic interactions. Thus, developing a theory that can predict and/or interpret the nanoparticle behavior at altered biological and design parameters is sufficient. The biological parameters include temperature, salt concentration, pH, and an external electromagnetic field, while the choice of polymers, their functional groups, and density are considered as design parameters. The theory defines the molecular reorganization that can form microgel or micelle, prevent drug leakage, extend mono or dual-ligands toward the targeted cell. Using the theory to stimulate the system and predict the molecular reorganization and correspondingly the nanoparticles behavior should illuminate material and time loss. Then, combining the theory with several experimental data can lead to a new machine learning technique to post the arena of designing smart therapeutic nanoparticles.

## **Biography**

Ebtisam Aldaais is one of the first Saudi women that have a PhD in Biomedical Engineering. She earned her PhD degree in 2016 from the University of South Carolina. In 2012, she got her Master's degree in Physics. She has more than 18 years of experience in teaching, developing material courses, research, performing quality assurance for LINAC machines, and modeling polymeric biomaterials and drug delivery systems. She works as an assistant professor at the biomedical engineering department at Imam Abdulrahman Bin Faisal University, as well as a visiting assistant professor at the department of physics & astronomy at University of South Carolina.

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