The Art of Falling Apart: Exploiting Nanomaterial Disassembly for Health Sciences

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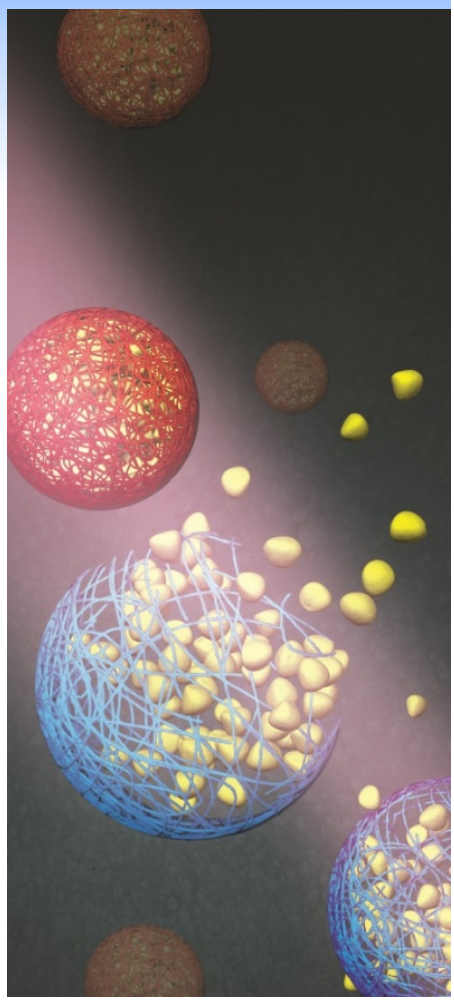

The Almutairi lab's work is tied together by an interest in amplifying chemical and physical stimuli through creative molecular architectures. This theme has led them to pursue a variety of biomedical challenges, from detecting vulnerable atherosclerotic plaque to enabling noninvasive light-mediated control of signaling in vivo. Surprisingly, these can be addressed by a single strategy: encapsulation of molecules within nanoparticles composed of polymers that degrade on demand. This unique approach has led to several breakthroughs, including a nanoparticle that releases cargo in response to disease-relevant concentrations of H_2O_2 and a means of activating MRI signal with unprecedented differences between on and off states. The lab is now translating these designs into clinically relevant imaging agents and drug carriers and designing new materials sensitive to distinct stimuli, such as enzymes overexpressed in disease conditions or wavelengths of light that effectively penetrate tissues.

Adah Almutairi is an associate professor at UC San Diego and is co-director of the Center of Excellence in Nanomedicine and Engineering. Prof. Almutairi has eight issued or pending patents, several of which have been licensed and one of which is being developed by the company she founded, eLux Medical. Her lab's research has been recognized by *Chemical & Engineering News* and *Materials Today*, among other scientific media outlets, and her innovation has been acknowledged through Young Investigator Awards from ACS's Division of Polymeric Materials (PMSE, 2014) and from the World Biomaterials Congress (2012). She completed her PhD in Materials Chemistry at UC Riverside and came to UC San Diego in 2008 from UC Berkeley, where she worked with Professor Jean Fréchet to develop several nanoprobes for in vivo imaging.