

Chemistry of Contrast Media

Particles and Polymers

Novel polymeric contrast materials

David P. Cormode

Radiology, University of Pennsylvania, Philadelphia, PA, USA

Learning Objectives:

- To know how contrast agents can be formed from polymeric materials.
- To be able to explain the advantages of using polymeric contrast agents.
- To be familiar with specific examples, such as albumin-based agents.

This is the second lecture in the curriculum on the Chemistry of Contrast Media: Particles and Polymers. The focus of this lecture is polymeric contrast agents. This lecture will cover different approaches to the formation of polymer-based contrast agents, such as covalent synthesis, the use of proteins or other biopolymers, and supramolecular assembly. Agents based on dendrimers, albumin, chitosan, PLGA, PCL and PEG will be featured. Methods to integrate a range of contrast generating materials will be discussed, such as iron oxides, gadolinium chelates, gold nanoparticles, iodine and quantum dots. The use of polymers to create agents for MRI, fluorescence, CT and other imaging modalities will be covered. The advantages and drawbacks of such approaches will be described, such as the increase in relaxivity of gadolinium chelates when attached to a large polymer. The clinical utility of these agents will be discussed. For example, Gadofosveset is a gadolinium chelate that binds to albumin in the bloodstream, extending its blood circulation half-life compared to Gd-DTPA, and facilitating MRI angiography.

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