

Chemistry of Contrast Media

Particles and Polymers

Advances in Particles and Polymers

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Learning Objectives:

- Relative advantages of fluorescence, Raman optical imaging, and photoacoustic imaging
- Novel nanoparticles for optical and photoacoustic imaging
- Learn about applications of fluorescence, Raman, and photoacoustic imaging

The development of optical fluorescence, optical Raman, and photoacoustic imaging are allowing for rapid advances in the field of molecular imaging. Driving these changes are improvements in instrumentation, novel molecular imaging agents and new small animal as well as clinical applications. This talk will review all of these strategies including the use of novel nanomaterials for enhancing the signal from low copy number of target biomarker molecules. Understanding the physical principles of each of these imaging modalities to guide molecular imaging agent development will be stressed. The effect of imaging agent geometry on the desired signal will be detailed. The use of multiplexing to derive information from multiple biomarkers will be highlighted especially with the Raman based technique which may allow up to 10-20 simultaneous signals. Combining several of these modalities in order to take advantage of their relative strengths (e.g., depth penetration, multiplexing) will also be stressed. Several new clinical applications under exploration including for imaging of the gastro-intestinal tract and for intraoperative imaging will be discussed. Finally, future challenges for the field and areas in need of active exploration will also be highlighted.