

Chemistry of Contrast Media

Basic Considerations about Suitable Modalities and Probes

Strengths and weaknesses of imaging modalities and probes

Ferdia A. Gallagher

Radiology, University of Cambridge, Cambridge, United Kingdom (2007612)

Learning Objectives:

- Learn the relative strengths and weaknesses of different imaging probes.
- Understand the sensitivity and specificity of imaging probes with an emphasis on MRI methods.
- Learn about the quantification of probe accumulation in vivo.

This talk will discuss the general strengths and weaknesses of a range of imaging modalities including MRI, CT, PET, ultrasound and optical techniques. Different probes for each modality will also be introduced with a particular emphasis on the sensitivity and specificity of probes in use with MRI e.g. gadolinium-based probes, USPIOs, CEST and hyperpolarized techniques. Quantification will be discussed as well as the particular challenges faced in quantifying MRI signal intensity. Finally, hybrid imaging modalities will be presented with an emphasis on those techniques incorporating MRI.

Relevant Publications:

1. Molecular Imaging: Principles and Practice. Edited by Ralph Weissleder, Brian D Ross, Alnawaz Rehemtulla, Sanjiv S. Gambhir. 2010. PMPH, USA.
2. An introduction to functional and molecular imaging with MRI. Gallagher FA. Clin Radiol. 2010 Jul;65(7):557-66.