

Chemistry of Contrast Media

Small Molecules

Hyperpolarized MR probes

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Learning Objectives:

- What is hyperpolarization and what can we do with it for molecular imaging?
- Pros and cons of MR spectroscopy and MR imaging methods for acquisition
- Hyperpolarization of non-common nuclei, advanced probe design
- The generation of long-lived states and how to lengthen T1 relaxation rates

This educational lecture is the third in a series of talks on hyperpolarized magnetic resonance (MR) probes. The purpose of this lecture is to re-introduce hyperpolarization at a high level for molecular imaging and then delve into more advanced topics concerning the application of hyperpolarized MR. These include the use of spectroscopy versus imaging type pulse sequences for the acquisition of data and non-common nuclei for hyperpolarization (e.g. non-¹³C) as well as methods to generate hyperpolarized states which have very long lifetimes.

Relevant Publications:

1. Kurhanewicz J et al. (2011) Analysis of cancer metabolism by imaging hyperpolarized nuclei: prospects for translation to clinical research. *Neoplasia* 13:81–97.
2. Keshari KR, Wilson DM (2014) Chemistry and biochemistry of ¹³C hyperpolarized magnetic resonance using dynamic nuclear polarization. *Chem Soc Rev* 43:1627–1659.