

Magnetic resonance spectroscopy (MRS) provides a means of obtaining *in vivo* biochemical information in a completely non-invasive fashion. Proton MRS has been used extensively in the brain and, more recently, in prostate for improved differential diagnosis and monitoring of treatment response. Breast, musculoskeletal, and liver proton MRS applications have also been reported. In addition, MRS studies using non-zero spin nuclei other than protons have been performed, but are limited by low sensitivity.

This presentation will provide a review of the physical basis of MRS as well as the acquisition strategies currently used to obtain *in vivo* MRS data. General requirements, including magnetic field homogeneity and, for proton MRS, water suppression, will be discussed. Localization techniques and pulse sequence options will also be reviewed, and the dependence of the resulting spectral information on key acquisition parameters, *e.g.*, echo time, will be discussed. Finally, approaches to quantitative interpretation of the resulting spectral data will be discussed. While the focus will be primarily on proton MRS, due to its prevalence in clinical and research applications, information on non-proton MRS will also be provided, including more recent strategies for improving the sensitivity of such applications using hyperpolarization.

At the conclusion of this session, attendees should:

- 1) Understand the physical basis of *in vivo* MRS applications
- 2) Appreciate the requirements necessary to obtain high quality *in vivo* MRS data
- 3) Understand the spatial location strategies commonly used for *in vivo* MRS studies
- 4) Understand common approaches to quantitative interpretation of the measured data
- 5) Understand the dependence of measured parameters on key acquisition parameters