

Abstract Submitted  
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**Hyperpolarization: Amplification of MRI Signals by >10,000-fold for Ultrasensitive Detection and Assessment of Cancer** LLOYD LUMATA, University of Texas at Dallas — As cancer cells proliferate rapidly, there is an immediate need for new raw materials and nutrients to sustain the hyperdrive metabolic machinery of tumors. Metabolic rewiring, mainly characterized by the voracious appetite of cancer and thus stark deviation from the normal biochemical behavior, is one prominent hallmark of this disease. Thus, in vivo detection of these biochemical changes and behavior could reveal important diagnostic information for early detection and metabolic assessment of this pathology. In this study, the principles and associated instrumentation of physics-based magnetic resonance imaging (MRI) signal-enhancing technology called hyperpolarization will be discussed. Furthermore, examples of biomedical applications in which the MRI signal-enhancing power of hyperpolarization is harnessed especially in molecular imaging of cancer will be discussed as well. This study is supported by the Welch Foundation grant AT-1877-20180324, DOD grants W18XWH-17-1-0303 and W81XWH-19-1-0741, Cancer Prevention and Research Institute of Texas (CPRIT) grant RP180716, and the UTD Collaborative Biomedical Research Award (CoBRA).

Lloyd Lumata  
University of Texas at Dallas

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