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Dynamic ^{129}Xe NMR Spectroscopy in an Experimental Model of Pneumonitis in Rat Lung Induced by Exposure to *Stachybotrys Chartarum* Spores*, **Nishard Abdeen**¹, Albert Cross², Tom Rand³ and Giles Santyr¹, ¹ Carleton University, ² University of Lethbridge and ³ St. Mary's University — Hyperpolarized Xenon(H-Xe) NMR spectroscopy demonstrates the dynamics of gas exchange in rat lung *in vivo*, aided by the large chemical shift between gas phase and xenon dissolved in red blood cells and lung parenchyma. By repeating a pulse sequence consisting of selective saturation of the dissolved phase peaks followed by a readout pulse at variable time delay intervals, the time dependence of the exchange between gas phase xenon and xenon dissolved in the lung and red blood cells can be determined within a single lung inflation. This dependence is characterized by a gas transfer time constant which depends on diffusion across the alveoli, lung parenchyma, and blood and is therefore sensitive to changes in gas exchange and compartment effects. In this study, the time constant is measured in a rat model of chronic alveolar inflammation induced by intra tracheal instillation of fungal (*Stachybotrys chartarum*) spores. A significant difference is demonstrated between experimental animals (recovery time 25.1+/- 4.7 ms) and control animals (17.2+/-1.6 ms). These results show promise for detection of subtle alterations in gas exchange in lung disease. The applicability of this technique to other models of lung disease in animal and humans is discussed.

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