Hyperpolarized 13C Urea Relaxation Mechanism Reveals Renal Changes in Diabetic Nephropathy

*Purpose:* Our aim was to assess a novel 13C radial fast spin echo golden ratio single shot method for interrogating early renal changes in the diabetic kidney, using hyperpolarized (HP) [13C,15N2]urea as a T2 relaxation based contrast bio-probe.

*Methods:* A novel HP 13C MR contrast experiment was conducted in a group of streptozotocin type-1 diabetic rat model and age matched controls.

*Results:* A significantly different relaxation time (P=0.004) was found in the diabetic kidney (0.49±0.03 s) compared with the controls (0.64±0.02 s) and secondly, a strong correlation between the blood oxygen saturation level and the relaxation times were observed in the healthy controls.

*Conclusion:* HP [13C,15N2]urea apparent T2 mapping may be a useful for interrogating local renal pO2 status and renal tissue alterations.