Hyperpolarized 13C Urea Relaxation Mechanism Reveals Renal Changes in Diabetic Nephropathy - DTU Orbit (17/03/2019)

**Hyperpolarized $^{13}$C 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 ($0.49\pm0.03$ s) compared with the controls ($0.64\pm0.02$ 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.

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