

Hyperpolarized [1-¹³C]-acetate Renal Metabolic Clearance Rate Mapping

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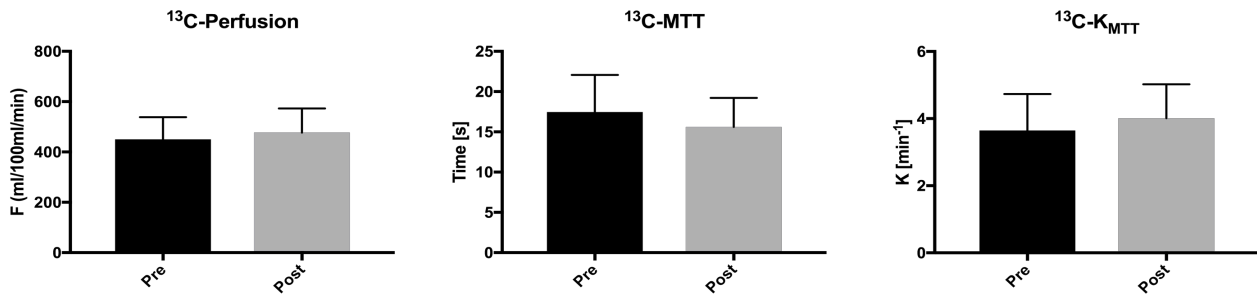
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Short running title: Hyperpolarized ¹³C-acetate MRI

SUPPLEMENTAL FIGURES.

Supplemental figure 1.

In order to verify the existence of a metabolic component in the mean transit time, 4 female rats receiving a similar furosemide treatment was processed with the proposed method. A global T_1 relaxation time of 24 sec, was used to correct the ^{13}C -urea perfusion data.



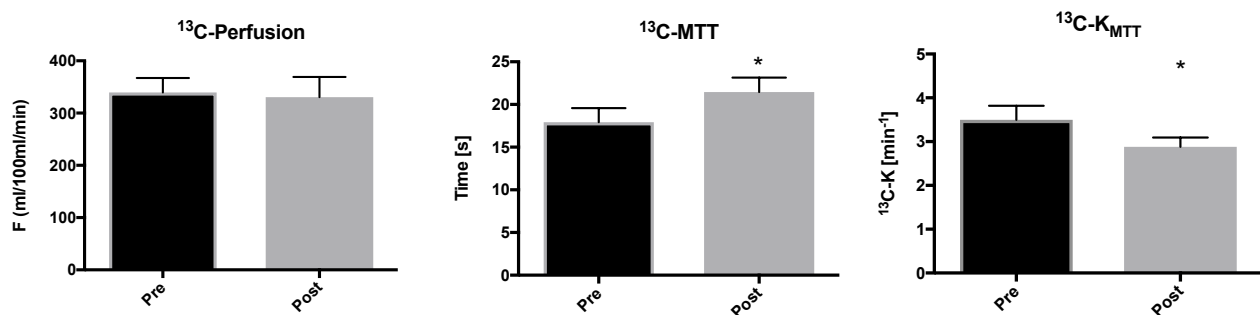
SUPPLEMENTAL FIGURE 1. The ^{13}C -urea RBF did not differ statistically between pre (450 ± 88 ml/100 ml/min) and post administration of furosemide (477 ± 96 (\pm SD) ml/100 ml/min; paired t -test: $P = 0.7$). Furthermore, no difference in the ^{13}C -urea MTT of 18 ± 5 (\pm SD) sec at baseline compared with 16 ± 4 (\pm SD) sec post furosemide administration (paired t -test: $P = 0.6$) was found.

Supplemental figure 2.

Whole blood was extracted from two healthy rats into sodium heparin vacuum tubes. The blood was stored at 5°C . Prior to the experiment the blood was heated and maintained at 37°C . A volume of 4.5 ml blood was mixed with hyperpolarized ^{13}C -acetate (0.5 ml) prior to placement in the scanner. The MR experiment was acquired over 120 s (120 acquisitions), with a constant flip angle of 10° . The single exponential decay was fitted in MATLAB and corrected for RF depletion.

$$\frac{1}{T_1} = \frac{1}{T_{1\text{eff}}} - \frac{\ln \cos \theta}{TR} \quad (\text{supplement eq. 1})$$

Where θ is the RF flip angle and TR is the repetition time. Using the *ex vivo* $T_{1\text{eff}}$ for correction, results in an underestimated absolute perfusion, lower MTT and thus larger K_{MTT} .



SUPPLEMENTAL FIGURE 2. ^{13}C -acetate *in vivo* hemodynamic parameters (using whole blood T_1 correction). Acetate perfusion (min/100 ml/mL), mean transit time (MTT) (sec), and acetate mean transit time metabolic clearance rate K_{MTT} (min^{-1}) before and after administration of furosemide. The mean is plotted with standard errors.