

## *In Vivo Flow Measurements of Murine Renal Arteries and Veins with High Frequency Ultrasound*

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The number of glomeruli in the kidneys has been shown to have an effect on the decline in renal function over time (Brenner, Garcia, Anderson 1988). Furthermore, flow in the renal arteries and veins may depend on the number of glomeruli in the kidney. Consistent *in vivo* measurements of volumetric flow in the renal arteries and veins are difficult to obtain. Thus, the purpose of this study was to develop non-invasive imaging techniques capable of estimating arterial and venous flow to kidneys. A high-frequency small animal ultrasound system was chosen based upon its excellent spatial and temporal resolution when imaging mice (Vevo 2100, VisualSonics, Inc.). Velocity profiles of the renal arteries and veins in *C57BL/6* male mice (n=4) were measured. Motion, color Doppler, and pulsed wave Doppler data were acquired and used to determine renal diameter, maximum velocity, mean velocity, and volumetric flow for both kidneys. For the renal artery the average volumetric flow was  $33.31 \pm 7.16 \text{ mm}^3/\text{s}$  and for the renal vein it was  $30.23 \pm 4.58 \text{ mm}^3/\text{s}$ . The next step will be imaging the same animals multiple times to ensure that these measurements are consistent over prolonged periods of time. Then data will be collected from different breeds of mice to conclude whether or not differences in glomeruli number affect renal flow. Measurement of volumetric flow in the renal arteries and veins can lead to important insights into how the glomeruli density in kidneys relates to renal flow and function.