

**Supplemental Table 1.** Eligibility Criteria

Inclusion	Exclusion
Type 1 diabetes or healthy controls	Type 2 diabetes or Maturity-onset diabetes of the young (MODY)
12-21 years of age	Resting blood pressure $\geq 140/90$ mm Hg
Diabetes duration 1-10 years	Hemoglobin $< 9$ mg/dL
	Albumin-to-creatinine [UACR] $\geq 300$ mg/g
	eGFR $< 60$ ml/min/1.73m <sup>2</sup>
	HbA1c $> 11\%$ (97 mmol/mol),
	Smoking
	Oral contraceptives
	Plans to alter exercise or diet during the study
	Pregnant or nursing
	Use of medications affecting insulin sensitivity (oral or inhaled steroids, metformin, thiazolidinediones, or atypical antipsychotics)
	Medications affecting renal function and energetics (renin-angiotensin aldosterone system inhibitors, diuretics, calcium channel blockers, and mineralocorticoids).

Although not formal exclusion criteria we confirmed that no participants were prescribed sodium-glucose transport protein 2 (SGLT2) inhibitors or glucagon-like peptide-1 (GLP-1) receptor agonists. None of the participants had pre-existing kidney disease.

**Supplemental Table 2** BOLD MRI Parameters

Parameters	Value
Field-of-VIEW (FOV) Read	400 mm
FOV Phase	100%
Slice thickness	5 mm
Repetition time (TR)	61 ms
Echo time (TE)	4.92, 9.84, ...39.36 ms
Average	1
Flip angle	30°
Fat suppression	On
Measurements	1
Resolution	192 x 192
Number of Slices	5
Bandwidth	280 Hz / pixel

**Supplemental Table 3** RO<sub>2</sub>:GFR (normalized by BSA) Stratified by T1D Status

	<b>T1D (n=50)</b>	<b>Controls (n=20)</b>	<b><i>p</i>-value</b>	<b><i>Adjusted p</i>-value*</b>
<i>RO<sub>2</sub>:GFR by whole-kidney, cortex and medulla</i>				
Whole-Kidney RO <sub>2</sub> :GFR (ml/min/1.73m <sup>2</sup> )	0.25 ± 0.04	0.31 ± 0.03	<0.0001	0.0005
Cortex RO <sub>2</sub> :GFR (ml/min/1.73m <sup>2</sup> )	0.27 ± 0.05	0.34 ± 0.03	<0.0001	0.008
Medullary RO <sub>2</sub> :GFR (ml/min/1.73m <sup>2</sup> )	0.21 ± 0.04	0.26 ± 0.03	<0.0001	0.005

Data are presented as mean ± SD. \* Data are adjusted for sex and HbA1c for RO<sub>2</sub>:GFR