

**Supplementary Table 1 - Relationship Between Biomarkers and eGFR / htTKV
Adjusted for Both Age and Sex**

	eGFR	htTKV
	<i>P</i> -Value Adjusted for Age and Sex	<i>P</i> -Value Adjusted for Age and Sex
Creatinine (μM)	0.26	0.34
Osmolality (mmol/kg)	0.59	0.74
Protein/Creatinine Ratio	0.037	0.050
Protein/Osmolality Ratio	0.001	0.069
Lactate/Creatinine Ratio	0.33	0.13
Lactate/Osmolality Ratio	0.71	0.17
Pyruvate/Creatinine Ratio	0.090	0.95
Pyruvate/Osmolality Ratio	0.41	0.90
Lactate/Pyruvate Ratio	0.68	0.39
Succinate/Creatinine Ratio	0.11	0.60
Succinate/Osmolality Ratio	0.29	0.59
cAMP/Creatinine Ratio	0.002	0.37
cAMP/Osmolality Ratio	0.18	0.56
PKM2/Creatinine Ratio	0.21	0.003
PKM2/Osmolality Ratio	0.012	0.023
PDK1/Creatinine Ratio	0.15	0.25
PDK1/Osmolality Ratio	0.47	0.70
LDHA/Creatinine Ratio	0.11	0.011
LDHA/Osmolality Ratio	0.025	0.020

Supplementary Table 2

A. Relationship Between Normalized Biomarkers and htTKV in Participants with eGFR \geq 90: Overall and by Sex

	ALL PATIENTS (N=41)	MALES ONLY (N=15)	FEMALES ONLY (N=26)		
	Pearson Correlation			P-Value Adjusted for Sex [#]	P-Value Testing for Interaction ^{##}
Creatinine (μM)	0.086	0.311	-0.019	0.67	0.45
Osmolality (mmol/kg)	0.221	0.404	0.130	0.22	0.58
Protein/Creatinine Ratio	0.412**	-0.004	0.555*	0.009	0.056
Protein/Osmolality Ratio	0.144	0.299	0.115	0.36	0.60
Lactate/Creatinine Ratio	0.355*	0.342	0.436*	0.007	0.95
Lactate/Osmolality Ratio	0.208	0.325	0.241	0.10	0.98
Pyruvate/Creatinine Ratio	0.319*	-0.497	0.539**	0.036	0.005
Pyruvate/Osmolality Ratio	0.111	-0.235	0.214	0.42	0.28
Lactate/Pyruvate Ratio	0.141	0.352	0.029	0.36	0.70
Succinate/Creatinine Ratio	0.043	-0.383	0.425*	0.31	0.021
Succinate/Osmolality Ratio	0.016	-0.120	0.312	0.27	0.42
cAMP/Creatinine Ratio	0.050	-0.590	0.403*	0.62	0.004
cAMP/Osmolality Ratio	-0.177	-0.460	-0.062	0.42	0.29
PKM2/Creatinine Ratio	0.603**	0.145	0.747*	<0.001	0.33
PKM2/Osmolality Ratio	0.420**	0.442	0.475*	0.002	0.97
PDK1/Creatinine Ratio	-0.138	-0.455	-0.006	0.47	0.29
PDK1/Osmolality Ratio	-0.237	-0.340	-0.170	0.21	0.63
LDHA/Creatinine Ratio	0.101	0.235	0.125	0.40	0.69
LDHA/Osmolality Ratio	-0.029	0.545*	-0.047	0.98	0.12

[#]P-value from multivariable regression analysis testing association between each biomarker and htTKV while adjusting for sex

^{##}P-value formally testing interaction by sex: significant p-value indicates that there is evidence the strength of relationship between a biomarker and htTKV differs significantly for male vs. female patients

*Denotes Pearson correlation with P -value < 0.05 .

**Denotes Pearson correlation with P -value < 0.01 .

Data associated with significant P -values are in **bold**.

B. Relationship Between Normalized Biomarkers and htTKV in Participants with eGFR \geq 90: Overall and by Age

	ALL PATIENTS (N=41)	AGE < 43 (N=25)	AGE \geq 43 (N=16)		
	Pearson Correlation			P-Value Adjusted for Age [#]	P-Value Testing for Interaction ^{##}
Creatinine (μM)	0.086	0.063	0.163	0.59	0.61
Osmolality (mmol/kg)	0.221	0.260	0.096	0.17	0.32
Protein/Creatinine Ratio	0.412**	0.483*	0.131	0.007	0.14
Protein/Osmolality Ratio	0.144	0.107	0.344	0.35	0.093
Lactate/Creatinine Ratio	0.355*	0.322	0.518*	0.024	<0.001
Lactate/Osmolality Ratio	0.208	0.118	0.492	0.19	0.018
Pyruvate/Creatinine Ratio	0.319*	0.457*	-0.310	0.045	0.15
Pyruvate/Osmolality Ratio	0.111	0.193	-0.164	0.49	0.077
Lactate/Pyruvate Ratio	0.141	0.095	0.295	0.39	1
Succinate/Creatinine Ratio	0.043	-0.284	0.313	0.79	0.062
Succinate/Osmolality Ratio	0.016	-0.344	0.372	0.93	0.004
cAMP/Creatinine Ratio	0.050	0.257	-0.417	0.74	0.91
cAMP/Osmolality Ratio	-0.177	-0.123	-0.340	0.27	0.62
PKM2/Creatinine Ratio	0.603**	0.662**	0.252	<0.001	0.31
PKM2/Osmolality Ratio	0.420**	0.404*	0.504*	0.007	0.006
PDK1/Creatinine Ratio	-0.138	-0.146	-0.132	0.40	0.60
PDK1/Osmolality Ratio	-0.237	-0.300	-0.082	0.14	0.41
LDHA/Creatinine Ratio	0.101	0.160	-0.376	0.47	0.29
LDHA/Osmolality Ratio	-0.029	-0.025	-0.165	0.87	0.63

[#]P-value from multivariable regression analysis testing association between each biomarker and htTKV while adjusting for age

^{##}P-value formally testing interaction by age: significant p-value indicates that there is evidence the strength of relationship between a biomarker and htTKV differs significantly depending on the patient's age.

*Denotes Pearson correlation with P -value < 0.05 .

**Denotes Pearson correlation with P -value < 0.01 .

Data associated with significant P -values are in **bold**.