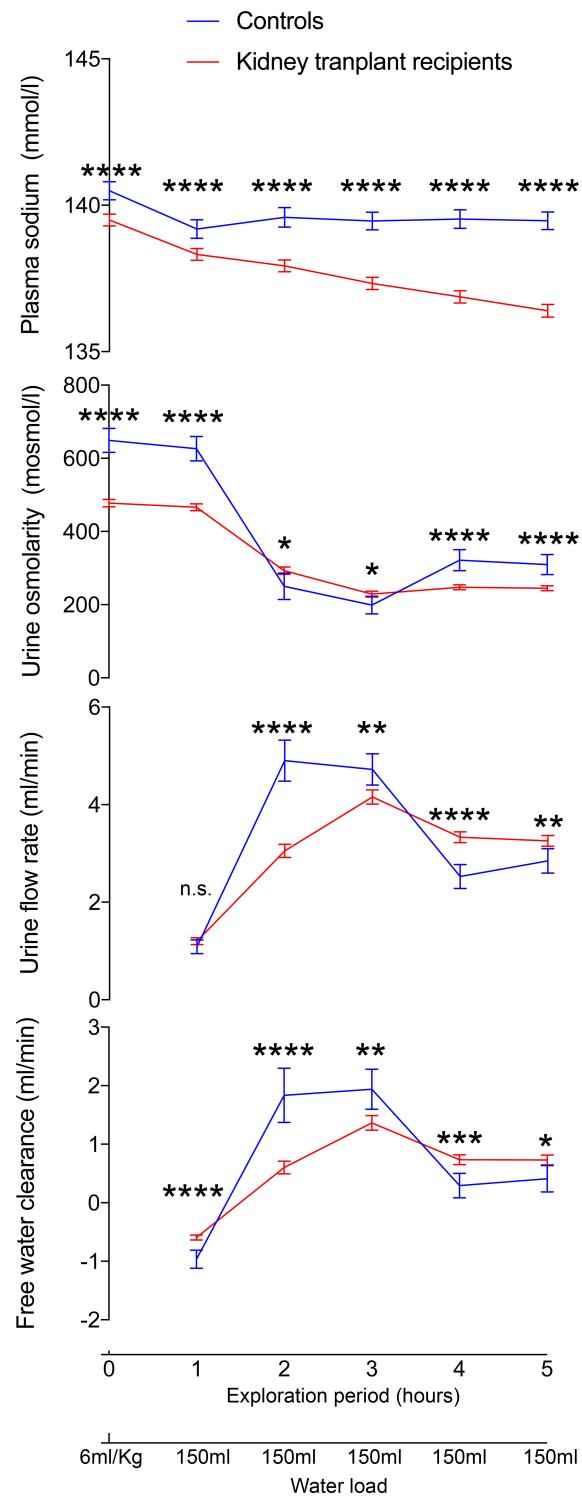


Supplementary Figure 1: distributions (density plots) of plasma sodium (P_{Na}) in kidney transplant recipients (KTR; red) and controls (blue) across water loading test periods (T0 to T6). The number (%) of KTR (red) and controls (blue) with $P_{Na} \leq 134$ mmol/l at each time point are indicated in the green area.



Supplementary Figure 2: Variation of mean plasma sodium (P_{Na}), urine flow rate, urine osmolarity and free water clearance during water loading in the 878 kidney transplant recipients without hyperglycemia (*i.e.*: maintaining blood glucose below 11mmol/l during the exploration; red) and healthy candidates to kidney donation (controls in blue). Bars indicate 95% confidence intervals. Student's t test: * $P<0.05$, ** $P<0.01$, *** $P<0.001$, **** $P<0.0001$.

Supplementary Table 1: Characteristics of the control population

Characteristic	Controls (n=164)	Kidney transplant recipients (n=1258)	P Value*
Male gender	70 (43%)	749 (59%)	<0.0001
Age, year	49±13	51±14	0.06
Body mass index, kg/m ²	25±5	24±4	0.004
Systolic blood pressure, mmHg	121±16	134±17	<0.0001
Diastolic blood pressure, mmHg	72±10	76±10	<0.0001
mGFR, ml/min/1.73 m ²	91±18	55±16	<0.0001

Categorical variables are described as numbers (%) and continuous variables as mean ± standard deviation.

*P value represents tests of significance from Student's t test or chi-squared test, as appropriate.

Supplementary Table 2: Characteristics of the kidney transplant recipients' population without uncontrolled diabetes according to P_{Na} slope tertiles.

Characteristic	All Patients (n=878)	Tertile 1 (n=292)	Tertile 2 (n=293)	Tertile 3 (n=293)	P Value*
P _{Na} slope, mmol/l/h	-0.58 (-0.83; -0.30)	-0.18 (-0.30; -0.01)	-0.58 (-0.65; -0.50)	-0.96 (-1.14; -0.83)	
Age at transplantation, years	47 ± 15	44 ± 14	48 ± 14	51 ± 15	< 0.0001
Male gender	532 (61%)	184 (63%)	183 (62%)	165 (56%)	0.18
Initial nephropathy					0.95
Cystic kidney disease	151 (17%)	46 (16%)	55 (19%)	50 (17%)	
Glomerulonephritis	141 (16%)	45 (15%)	44 (15%)	52 (18%)	
FSGS	71 (8%)	23 (8%)	25 (9%)	23 (8%)	
Diabetic nephropathy	31 (4%)	7 (2%)	13 (4%)	11 (4%)	
Vascular nephropathy	48 (5%)	14 (5%)	21 (7%)	13 (4%)	
CAKUT	41 (5%)	12 (4%)	16 (5%)	13 (4%)	
Uropathy	36 (4%)	12 (4%)	10 (3%)	14 (5%)	
Systemic lupus	26 (3%)	10 (3%)	8 (3%)	8 (3%)	
Toxic nephropathy	11 (1%)	2 (1%)	3 (1%)	6 (2%)	
Genetic glomerular diseases	22 (3%)	8 (3%)	8 (3%)	6 (2%)	
Hemolytic and uremic syndrome	14 (2%)	7 (2%)	4 (1%)	3 (1%)	
Myeloma	2 (0%)		1 (0%)	1 (0%)	
Others	91 (10%)	34 (12%)	28 (10%)	29 (10%)	
Unknown	193 (22%)	72 (25%)	57 (19%)	64 (22%)	
Preemptive transplantation	135 (16%)	52 (18%)	43 (15%)	40 (14%)	0.36
First transplantation	852 (97%)	283 (97%)	283 (97%)	286 (98%)	0.76
Active smoking	103 (12%)	36 (12%)	37 (13%)	30 (10%)	0.62
Diabetes mellitus	155 (18%)	46 (16%)	49 (17%)	60 (20%)	0.29
Living donor	230 (27%)	98 (34%)	78 (27%)	54 (19%)	0.0002
Donor age, years	52 ± 17	47 ± 16	53 ± 16	56 ± 16	0.0001
Extended donor criteria	280 (44%)	54 (29%)	94 (44%)	132 (56%)	< 0.0001
Cold ischemia duration	1008 (180-1380)	900 (150-1260)	1020 (180-1466)	1100 (725-1553)	< 0.0001
Delayed graft function	180 (21%)	50 (17%)	63 (22%)	67 (23%)	0.19
HLA mismatch A, B and DR ≥ 3	561 (66%)	178 (63%)	191 (67%)	192 (68%)	0.4
History of treated acute rejection	119 (14%)	34 (12%)	35 (12%)	50 (17%)	0.1
Body mass index, kg/m ²	24 ± 4	24 ± 4	24 ± 4	24 ± 4	0.78
Systolic blood pressure, mmHg	132 ± 16	131 ± 14	131 ± 16	134 ± 17	0.06
Diastolic blood pressure, mmHg	77 ± 10	78 ± 9	78 ± 10	75 ± 11	0.02
mGFR, ml/min per 1,73 m ²	56 ± 16	62 ± 15	54 ± 15	51 ± 16	< 0.0001
Hemoglobin, g/dl	11.9 ± 1.6	12.1 ± 1.5	12 ± 1.6	11.6 ± 1.6	0.0001
Serum magnesium, mmol/l	0.68 ± 0.10	0.68 ± 0.1	0.69 ± 0.11	0.68 ± 0.11	0.69
Serum potassium, mmol/l	4.2 ± 0.4	4.2 ± 0.4	4.2 ± 0.4	4.3 ± 0.4	0.01
Ionized calcium, mmol/l	1.26 ± 0.1	1.26 ± 0.08	1.26 ± 0.12	1.25 ± 0.1	0.16
Total calcium, mmol/l	2.40 ± 0.17	2.40 ± 0.15	2.40 ± 0.17	2.38 ± 0.19	0.28
Serum phosphate, mmol/l	0.90 ± 0.26	0.88 ± 0.23	0.91 ± 0.27	0.91 ± 0.27	0.22
25-OH-vitD, µg/l	21 (14-28)	21 (13-29)	22 (14-28)	22 (14-29)	0.99
Calcitriol, µg/l	49 (34-69)	49 (36-74)	50 (35-70)	47 (31-64)	0.11
PTH, ng/l	101 (67-162)	92 (66-145)	104 (64-161)	108 (70-184)	0.06
FGF23, RU/ml	100 (68-143)	92 (65-123)	100 (44-139)	112 (76-169)	0.0001
Immunosuppressive regimen					0.02
Tacrolimus	688 (83%)	248 (88%)	225 (81%)	215 (79%)	
mTOR inhibitor	6 (1%)	0 (0%)	1 (0%)	5 (2%)	
Cyclosporine	127 (15%)	33 (12%)	49 (18%)	45 (17%)	
Belatacept	12 (1%)	2 (1%)	4 (1%)	6 (2%)	

Categorical variables are described as numbers (%) and continuous variables as mean ± standard deviation or median (interquartile range), as appropriate.

*P represents tests of significance from ANOVA, Kruskal Wallis, or chi-squared test, as appropriate.

Supplementary Table 3: Cox uni and multivariable modelling of the association of continuous P_{Na} slope values with transplantation outcome in the 929 patients with available urinary protein to creatinine ratio measurement on the day of the exploration.

	Per 1 unit decrease of P _{Na} slope	P Value
Composite outcome of all-cause mortality and allograft loss		
All patients		
Crude hazard ratio	2.71 (1.86 - 3.93)	< 0.001
Adjusted hazard ratio ¹	1.79 (1.16 - 2.74)	0.008
Restricted to patients without uncontrolled diabetes		
Crude hazard ratio	3.30 (2.04 - 5.34)	< 0.001
Adjusted hazard ratio ²	2.63 (1.47 - 4.71)	0.001
Outcome of all-cause mortality		
All patients		
Crude hazard ratio	2.53 (1.60 - 3.98)	< 0.001
Adjusted hazard ratio ¹	1.49 (0.86 - 2.56)	0.152
Restricted to patients without uncontrolled diabetes		
Crude hazard ratio	2.89 (1.58 - 5.29)	< 0.001
Adjusted hazard ratio ³	1.91 (0.90 - 4.04)	0.091
Outcome of allograft loss with mortality as a competing risk		
All patients		
Crude hazard ratio	2.77 (1.55 - 4.96)	< 0.001
Adjusted hazard ratio ⁴	2.02 (1.05 - 3.89)	0.034
Restricted to patients without uncontrolled diabetes		
Crude hazard ratio	3.45 (1.72 - 6.92)	< 0.001
Adjusted hazard ratio ⁵	3.27 (1.46 – 7.30)	0.004

¹Adjusted for: patient age, diabetes, smoking status, donor status and age, preemptive transplantation, history of acute rejection, delayed Graft function, mGFR, BMI, systolic blood pressure, urinary protein to creatinine ratio, logFGF23 and HLA mismatch.

²Adjusted for: patient age, smoking status, donor status and age, preemptive transplantation, history of acute rejection, delayed Graft function, mGFR, BMI, systolic blood pressure, urinary protein to creatinine ratio, logFGF23 and HLA mismatch.

³Adjusted for: patient age, donor status, mGFR, systolic blood pressure, urinary protein to creatinine ratio and logFGF23

⁴Adjusted for: patient age, donor status, preemptive transplantation, history of acute rejection, delayed Graft function, mGFR, BMI, urinary protein to creatinine ratio and logFGF23.

⁵Adjusted for: patient age, donor status, history of acute rejection, mGFR, BMI and urinary protein to creatinine ratio.

Supplementary Table 4: Factors associated with 12-month mGFR. Multivariable linear regression analysis using 12-month mGFR as the dependent variable: full model.

Model variables	β coefficient	P Value
Donor age, year	-0.12 (-0.17 to -0.07)	< 0.001
3 month-mGFR, ml/min/1.73m²	0.69 (0.65 to 0.74)	< 0.001
log 25-OH-vitD, µg/ml	5.82 (3.21 to 8.43)	< 0.001
Preemptive transplantation	2.48 (0.64 to 4.31)	0.008
P_{Na} slope, mmol/l/h	1.93 (0.46 to 3.41)	0.01
Gender	-1.07 (-2.33 to 0.19)	0.096
History of treated acute rejection	-1.31 (-3.08 to 0.46)	0.148
Smoking status	-1.33 (-3.30 to 0.63)	0.185
Systolic blood pressure, mmHg	-0.02 (-0.06 to 0.02)	0.24
Body mass index, kg/m ²	0.08 (-0.07 to 0.23)	0.326
Diabetic status	0.69 (-0.71 to 2.09)	0.336
HLA mismatch ≥ 3	-0.60 (-1.92 to 0.72)	0.373
Donor Status	0.60 (-1.01 to 2.21)	0.463
Delayed graft function	-0.34 (-2.00 to 1.33)	0.693
Recipient age, year	-0.06 (-0.64 to 0.52)	0.833

Supplementary Table 5: Factors associated with 12-month mGFR. Multivariable linear regression analysis using 12-month mGFR as the dependent variable in patients with available urinary protein to creatinine ratio: full model.

Model variables	β coefficient	P Value
Donor age, year	-0.12 (-0.18 to -0.06)	< 0.001
3 month-mGFR, ml/min/1.73m²	0.67 (0.62 to 0.72)	< 0.001
log 25-OH-vitD, µg/ml	4.96 (1.96 to 7.96)	0.001
Proteinuria, mg/mmol	-0.02 (-0.03 to -0.01)	0.003
P_{Na} slope, mmol/l/h	1.88 (0.18 to 3.59)	0.031
Preemptive transplantation	1.74 (-0.30 to 3.79)	0.095
Gender	-0.97 (-2.41 to 0.47)	0.188
History of treated acute rejection	-1.34 (-3.47 to 0.79)	0.218
Systolic blood pressure, mmHg	-0.02 (-0.07 to 0.02)	0.319
Smoking status	-1.04 (-3.40 to 1.32)	0.39
HLA mismatch ≥ 3	0.61 (-0.89 to 2.11)	0.428
Delayed graft function	-0.49 (-2.41 to 1.43)	0.618
Donor Status	0.45 (-1.35 to 2.26)	0.623
Recipient age, year	0.16 (-0.51 to 0.82)	0.645
Diabetic status	0.31 (-1.28 to 1.90)	0.703
Body mass index, kg/m ²	0.01 (-0.16 to 0.19)	0.886