Table S3. Physiological parameters, membrane potential, blood flow, and urinary flow in the kidney model

Flow rate in the kidney model	
Parameter (unit)	value
Q_r (L/h)	74.4[1)]
Q_{vein} (L/h)	74.3[a]
Q_{GFR} (L/h)	7.50[1)]
Q_{urine} (L/h)	0.06[1)]

Surface area and membrane potential of each function in the kidney model				
segment	Surface area (m^2)[2)]		Membrane potential[b] (mV)	
	Vessel	Lumen	Vessel	Lumen
Proximal tubule	0.81	6.1	-70[3)]	-60[3)]
Distal tubule	0.21	0.21	-60[4)]	-50[4)]
Collecting duct	0.045	0.045	-70[5)]	-30[5)]

Length, diameter, and volume of each function in the kidney model						
segment	Length[c] (*10^3 m)	Diameter[6)] (*10^{-5} m)	Volume[d] (L)			
	Lumen	Lumen	total	vessel	cell	lumen
Proximal tubule	18	6	0.050	0.015	0.012	0.023
Distal tubule	5.5	5	0.0110	0.0033	0.0026	0.0051

Collecting duct	2	20	0.0063	0.019	0.015	0.029

pHs of different segments in the kidney model

	Lumen[8)]	Cell[9)]	Vessel[9)]
Proximal tubule	7.0	7.2	7.4
Distal tubule	6.7	7.2	7.4
Collecting duct	6.4	7.2	7.4

Q_r, blood flow rate into the kidney; Q_{vein}, blood flow rate out of the kidney; Q_{GFR}, glomerular filtration rate; Q_{urine}, urine flow rate.

a. *Q_{vein} was calculated from $Q_r + (Q_{GFR}-Q_{urine})$*
b. *The membrane potential is inside negative*
c. *The length of the proximal and distal tubules were calculated from the length/nephron[6)] and 10^6 nephrons/kidney[7)]. The length of the collecting duct was calculated from the average length of the collecting duct[6)], 11 nephrons/collecting duct[10)] and 10^6 nephrons/kidney[7)].*
d. *The volumes of each lumen were calculated from the diameter and the length. Blood vessel volumes were calculated from the total volume of each section and the fraction of tissue vasculature[11)]. Cell volumes were calculated by subtracting the lumen and vessel volumes from the total volume of the individual segments.*

Reference for Table S3

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