**Table S1. Allometrically scaled effective surface area in humans.**

| Species | Rat (Body weight: 250 g)[a] | | Human (Body weight: 70 kg) | |
|---|---|---|---|---|
| **Tissue** | **Tissue weight (g)** | **$S_{eff}$ ($m^2$/g tissue)** | **Tissue weight (kg)** | **$S_{eff}$ ($m^2$/g tissue)** |
| **Adipose [b]** | 16.6 | 3.02 | 15.0 | 3.60 |
| **Bone [b]** | 18.3 | 2.34 | 10.0 | 3.26 |
| **Brain [b]** | 1.43 | 1.67 | 1.4 | 1.94 |
| **Gut [b]** | 6.75 | 16.1 | 1.20 | 31.9 |
| **Heart [b]** | 0.825 | 18.1 | 0.329 | 27.8 |
| **Kidney [b]** | 1.83 | 37.4 | 0.308 | 75.3 |
| **Liver** | 9.15 | 14.8 | 1.80 | 28.4 |
| **Lung [b]** | 1.25 | 14.4 | 0.532 | 21.7 |
| **Muscle [b]** | 101 | 5.71 | 28.0 | 9.84 |
| **Skin [b]** | 47.6 | 0.843 | 2.60 | 2.41 |
| **Spleen [b]** | 0.500 | 4.56 | 0.182 | 7.22 |

a. The effective surface areas for rats were obtained from the Model 1 of Jeong et al [1].

b. Estimated surface area for the tissues except liver were not used for the PBPK modeling in this study

The exponent between area and weight was obtained from the correlation between body surface (BSA) area and weight (BW) as 0.687 among 10 populations [i.e., $\log(\mathrm{BSA}) = 0.687 \cdot \log(\mathrm{BW}) - 0.989$]. The BSA and BW was obtained from the literature [2].

**Table S2. Compartment volumes of the mechanistic kidney model [3].**

| Compartment | Compartment volume (mL) |
|---|---|
| Proximal tubule blood 1 | 2.56 |
| Proximal tubule blood 2 | 2.56 |
| Proximal tubule blood 3 | 2.56 |
| Loop of Henle blood | 11.78 |
| Distal tubule blood | 1.63 |
| Collecting duct blood 1 | 6.55 |
| Collecting duct blood 2 | 14.07 |
| Proximal tubule cells 1 | 18.49 |
| Proximal tubule cells 2 | 18.49 |
| Proximal tubule cells 3 | 14.27 |
| Loop of Henle cells | 26.8 |
| Distal tubule cells | 8.3 |
| Collecting duct cells 1 | 22.6 |
| Collecting duct cells 2 | 29.16 |
| Proximal tubule lumen 1 | 12.38 |
| Proximal tubule lumen 2 | 12.38 |
| Proximal tubule lumen 3 | 16.6 |
| Loop of Henle lumen | 14.2 |
| Distal tubule lumen | 11.35 |
| Collecting duct lumen 1 | 3.51 |
| Collecting duct lumen 2 | 18.57 |
| Glomerular blood | 7.64 |
| Glomerular space | 3.57 |
| Bladder | 350 |

**Table S3. Flow rates entering each compartment of the mechanistic kidney model [4, 5].**

| Compartment | Flow rate (mL/h) |
|---|---|
| Glomerular filtration rate (GFR) | 7200 |
| Proximal tubule lumen | GFR |
| Loop of Henle lumen | 0.36×GFR |
| Distal Tubule lumen | 0.2×GFR |
| Collecting duct lumen | 0.1×GFR |
| Urine | GFR/120 |

**References**


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