■ SUPPLEMENT ■

Complete Model Equations and Parameters

for

Sex-Specific Computational Models for Blood Pressure Regulation in the Rat

Cardiovascular Function

$$P_{mf} = (\frac{1}{SF_V} \times 7.436 \times V_b - 30.18) \times \epsilon_{aum} \quad * \tag{S1}$$

$$P_{ra} = \max \left\{ 0.2787 e^{SF_R \times 0.2281\Phi_{co}} - 0.9119, 0 \right\}$$
 (S2)

$$P_{ma} = \Phi_{co} \times R_{tp} \quad ^* \tag{S3}$$

$$\Phi_{vr} = \frac{P_{mf} - P_{ra}}{R_{vr}} \quad * \tag{S4}$$

$$\Phi_{co} = \Phi_{vr} \stackrel{\circ}{*} \tag{S5}$$

$$\frac{dvas}{dt} = vas_f - vas_d \quad * \tag{S6}$$

$$vas_f = \frac{11.312 \times e^{-\Phi_{co} \times (SF_R \times 0.4714)}}{100000} \quad * \tag{S7}$$

$$vas_d = vas \times K_{vd} \quad * \tag{S8}$$

$$R_a = R_{ba} \times \epsilon_{aum} \quad ^* \tag{S9}$$

$$R_{ba} = K_{bar}/vas * (S10)$$

$$R_{vr} = (8R_{bv} + R_a)/31 \quad * \tag{S11}$$

$$R_{tp} = R_a + R_{bv} \quad ^* \tag{S12}$$

$$\varepsilon_{aum} = \frac{4}{5} (a_{chemo} + a_{baro}) \quad * \tag{S13}$$

$$a_{chemo} = \frac{1}{4} a_{auto} \quad * \tag{S14}$$

$$\frac{da_{baro}}{dt} = \frac{3}{4} \left\{ \frac{da_{auto}}{dt} - 0.0000667(a_{baro} - 1) \right\}$$
 (S15)

$$a_{auto} = 3.0042e^{-0.0107P_{ma}} \quad * \tag{S16}$$

Renal Hemodynamics

$$\Phi_{rb} = \frac{P_{ma}}{R_r} \quad * \tag{S17}$$

$$\Phi_{gfilt} = P_f \times C_{gcf} \quad * \tag{S18}$$

$$P_f = P_{gh} - (P_B + P_{go}) \quad * \tag{S19}$$

$$P_{ah} = P_{ma} - \Phi_{rb} \times R_{AA} \quad * \tag{S20}$$

$$R_r = R_{AA} + R_{EA} \quad * \tag{S21}$$

$$R_{AA} = R_{aa-ss} \times \beta_{rsna} \times \Sigma_{tgf} \times \Sigma_{myo} \times \Psi_{AT1R-AA} \times \Psi_{AT2R-AA} \quad ^{*\star\dagger}$$
 (S22)

$$R_{EA} = R_{ea-ss} \times \Psi_{AT1R-EA} \times \Psi_{AT2R-EA} \quad ^{**\dagger} \tag{S23}$$

$$\beta_{rsna} = \frac{2}{1 + e^{-3.16(rsna-1)}} *^{\ddagger}$$
 (S24)

$$\Sigma_{tgf} = \begin{cases} 0.3408 + \frac{3.449}{3.88 + e^{(\Phi_{md-sod} - SF_S \times 3.891)/(SF_S \times -0.9617)}} & \text{in males} \\ 0.3408 + \frac{3.449}{3.88 + e^{(\Phi_{md-sod} - SF_S \times 6.591)/(SF_S \times -0.9617)}} & \text{in females} \end{cases}$$
(S25)

$$\Sigma_{myo} = 0.75 + \frac{1.2}{1 + 3.8e^{-0.6(P_{gh} - 63.8)}}$$
 (S26)

$$\Psi_{AT1R-AA} = 0.8 + 0.2092 \times \frac{[AT1R]}{[AT1R]_{eq}} - 0.0092 \div \frac{[AT1R]}{[AT1R]_{eq}}$$

$$\Psi_{AT1R-EA} = 0.925 + 0.0835 \frac{[AT1R]}{[AT1R]_{eq}} - 0.0085 \div \frac{[AT1R]}{[AT1R]_{eq}}$$

$$(S27)$$

$$\Psi_{AT1R-EA} = 0.925 + 0.0835 \frac{[AT1R]}{[AT1R]_{eq}} - 0.0085 \div \frac{[AT1R]}{[AT1R]_{eq}}$$
[†]
(S28)

$$\Psi_{AT2R-AA} = \begin{cases} 0.9 + 0.1e^{-\frac{[AT2R]}{[AT2R]eq} - 1} & \text{in females} \\ 1 & \text{in males} \end{cases}$$

$$(S29)$$

$$\Psi_{AT2R-EA} = \begin{cases} 0.9 + 0.1e^{-\frac{[AT2R]}{[AT2R]_{eq}} - 1} & \text{in females} \\ 1 & \text{in males} \end{cases}$$
 (S30)

Renal Function

$$\Phi_{filsod} = \Phi_{afilt} \times C_{sod} \quad * \tag{S31}$$

$$\Phi_{pt-sodreab} = \Phi_{filsod} \times \eta_{pt-sodreab} \quad * \tag{S32}$$

$$\Phi_{md-sod} = \Phi_{filsod} - \Phi_{pt-sodreab} \quad * \tag{S33}$$

$$\Phi_{dt-sodreab} = \Phi_{md-sod} \times \eta_{dt-sodreab} \quad * \tag{S34}$$

$$\Phi_{dt-sod} = \Phi_{md-sod} - \Phi_{dt-sodreab} \quad * \tag{S35}$$

$$\Phi_{cd-sodreab} = \Phi_{dt-sod} \times \eta_{cd-sodreab}$$
 * (S36)

$$\Phi_{u-sod} = \Phi_{dt-sod} - \Phi_{cd-sodreab} \quad * \tag{S37}$$

$$\eta_{pt-sodreab} = \eta_{pt-sodreab}^{eq} \times \gamma_{filsod} \times \gamma_{AT1R} \times \gamma_{rsna} \quad * \tag{S38}$$

$$\eta_{dt-sodreab} = \eta_{dt-sodreab}^{eq} \times \psi_{al} \quad ^* \tag{S39}$$

$$\eta_{cd-sodreab} = \eta_{cd-sodreab}^{eq} \times \lambda_{dt} \times \lambda_{anp} \times \lambda_{al} \quad ^{*\dagger}$$
 (S40)

$$\gamma_{filsod} = \begin{cases} 0.8 + \frac{0.3}{1 + e^{[(\Phi_{filsod} - SF_S \times 113.7)/(SF_S \times 138)]}} & \text{in males} \\ 0.8 + \frac{0.3}{1 + e^{[(\Phi_{filsod} - SF_S \times 108.3)/(SF_S \times 138)]}} & \text{in females} \end{cases}$$
(S41)

$$\gamma_{AT1R} = 0.92 + \frac{0.136}{1 + e^{-1.7983(\frac{[AT1R]}{[AT1R]eq} - 0.8017)}} *$$
(S42)

$$\gamma_{rsna} = 0.72 + \frac{0.56}{1 + e^{(1 - rsna)/2.18}} * \tag{S43}$$

$$\psi_{al} = \frac{11.55}{1 + 0.1e^{-0.007937C_{al}}} - 10.5 \quad ^{\ddagger} \tag{S44}$$

$$\lambda_{dt} = \begin{cases} 0.8 + \frac{0.275}{1 + e^{\frac{1}{SF_S} \times 2.31(\Phi_{dt-sod} - SF_S \times 2.224)}} & \text{in males} \\ 0.8 + \frac{0.2417}{1 + e^{\frac{1}{SF_S} \times 2.86(\Phi_{dt-sod} - SF_S \times 3.699)}} & \text{in females} \end{cases}$$
(S45)

$$\lambda_{anp} = -0.1 \times \hat{C}_{anp} + 1.1 \quad * \tag{S46}$$

$$\lambda_{al} = \frac{1}{C_{al}^{eq0.06}} C_{al}^{0.06} \quad ^{\dagger} \tag{S47}$$

$$\Phi_{pt-wreab} = \Phi_{gfilt} \times \eta_{pt-wreab} \quad ^{\ddagger} \tag{S48}$$

$$\Phi_{md-u} = \Phi_{gfilt} - \Phi_{pt-wreab} \quad ^{\ddagger} \tag{S49}$$

$$\Phi_{dt-wreab} = \Phi_{md-u} \times \eta_{dt-wreab} \quad ^{\ddagger} \tag{S50}$$

$$\Phi_{dt-u} = \Phi_{md-u} - \Phi_{dt-wreab} \quad ^{\ddagger} \tag{S51}$$

$$\Phi_{cd-wreab} = \Phi_{dt-u} \times \eta_{cd-wreab} \quad ^{\ddagger} \tag{S52}$$

$$\Phi_u = \Phi_{dt-u} - \Phi_{cd-wreab} \quad ^{\ddagger} \tag{S53}$$

$$\eta_{pt-wreab} = \eta_{pt-wreab}^{eq} \times \mu_{pt-sodreab}$$
 [†] (S54)

$$\eta_{dt-wreab} = \eta_{dt-wreab}^{eq} \times \mu_{dt-sodreab} \quad ^{\ddagger} \tag{S55}$$

$$\eta_{cd-wreab} = \eta_{cd-wreab}^{eq} \times \mu_{cd-sodreab} \times \mu_{adh}$$
[†]
(S56)

$$\mu_{pt-sodreab} = 0.12 \tanh \left(10 \left(\frac{\eta_{pt-sodreab}}{\eta_{pt-sodreab}^{eq}} - 1 \right) \right) + 1^{-\frac{1}{2}}$$
(S57)

$$\mu_{dt-sodreab} = 0.12 \tanh \left(10 \left(\frac{\eta_{dt-sodreab}}{\eta_{dt-sodreab}^{eq}} - 1 \right) \right) + 1^{-\frac{1}{4}}$$
(S58)

$$\mu_{cd-sodreab} = 0.12 \tanh \left(10 \left(\frac{\eta_{cd-sodreab}}{\eta_{cd-sodreab}^{eq}} - 1 \right) \right) + 1^{-\frac{1}{2}}$$
(S59)

$$\mu_{adh} = 1.0328 - 0.1938e^{-0.4441C_{adh}} \quad * \tag{S60}$$

Renin-Angiotensin-Aldosterone System

$$R_{sec} = N_{rs} \times \nu_{md-sod} \times \nu_{rsna} \times \nu_{AT1R} \quad * \tag{S61}$$

$$\frac{d[PRC]}{dt} = R_{sec} - \frac{\ln(2)}{h_{renin}} [PRC]^{-\dagger} \tag{S62}$$

$$PRA = [PRC] \times X_{PRC-PRA} \quad ^{\dagger} \tag{S63}$$

$$\frac{d[AGT]}{dt} = k_{AGT} - PRA - \frac{\ln(2)}{h_{AGT}}[AGT]^{-\dagger}$$
(S64)

$$\frac{d[AngI]}{dt} = PRA - (c_{ACE} + c_{Chym} + c_{NEP})[AngI] - \frac{\ln(2)}{h_{AngI}}[AngI]$$
[†]
(S65)

$$\frac{d[AngII]}{dt} = (c_{ACE} + c_{Chym})[AngI] - (c_{ACE2} + c_{AII=AIV} + c_{AT1R} + c_{AT2R})[AngII] - \frac{\ln(2)}{h_{AngII}}[AngII]^{\dagger}$$
(S66)

$$\frac{d[Ang(1-7)]}{dt} = c_{NEP}[AngI] + c_{ACE2}[AngII] - \frac{\ln(2)}{h_{Ang(1-7)}}[Ang(1-7)]^{-\dagger}$$
(S67)

$$\frac{d[AngIV]}{dt} = c_{AII=AIV}[AngII] - \frac{\ln(2)}{h_{AngIV}}[AngIV]^{-\dagger}$$
(S68)

$$\frac{d[AT1R]}{dt} = c_{AT1R}[AngII] - \frac{\ln(2)}{h_{AT1R}}[AT1R]^{-\dagger}$$
(S69)

$$\frac{d[AT2R]}{dt} = c_{AT2R}[AngII] - \frac{\ln(2)}{h_{AT2R}}[AT2R]^{-\dagger}$$
(S70)

$$\nu_{md-sod} = \begin{cases} 0.2262 + \frac{28.04}{11.56 + e^{(\Phi_{md-sod} - SF_S \times 1.659)/(SF_S \times 0.6056)}} & \text{in males} \\ 0.2262 + \frac{28.04}{11.56 + e^{(\Phi_{md-sod} - SF_S \times 4.359)/(SF_S \times 0.6056)}} & \text{in females} \end{cases}$$
(S71)

$$\nu_{rsna} = 1.822 - \frac{2.056}{1.358 + e^{(rsna - 0.8662)}}$$
 * (S72)

$$\nu_{AT1R} = \left(\frac{[AT1R]}{[AT1R]_{eq}}\right)^{-0.95}$$
 † (S73)

$$N_{als} = N_{als}^{eq} \times \xi_{k/sod} \times \xi_{map} \times \xi_{AT1R} \quad * \tag{S74}$$

$$\frac{dN_{al}}{dt} = \frac{1}{T_{al}}(N_{als} - N_{al}) \quad * \tag{S75}$$

$$C_{al} = 387N_{al} \quad * \tag{S76}$$

$$\xi_{k/sod} = \frac{5}{1 + e^{0.265(C_k/C_{sod} - 23.7)}}$$
 (S77)

$$\xi_{map} = \begin{cases}
70.1054e^{-(0.0425) \times P_{ma}} & \text{if } P_{ma} \le 100 \\
1 & \text{if } P_{ma} > 100
\end{cases} \\
\xi_{AT1R} = 0.1 + \frac{2.9}{1 + e^{-2\left(\frac{[AT1R]}{[AT1R]_{eq}} - 1.399\right)}} *$$
(S78)

$$\xi_{AT1R} = 0.1 + \frac{2.9}{1 + e^{-2\left(\frac{[AT1R]}{[AT1R]_{eq}} - 1.399\right)}}$$
 (S79)

Miscellaneous

$$rsna = \begin{cases} rsna_0^{\frac{1}{rsna_0}} & \text{in females} & \star \\ rsna_0 & \text{in males} \end{cases}$$
 (S80)

$$\alpha_{map} = 0.5 + \frac{1}{1 + e^{(P_{ma} - 103)/15}} \quad * \tag{S81}$$

$$\alpha_{rap} = 1 - 0.008 P_{ra}$$
 * (S82)

$$\Phi_{win} = \frac{SF_U \times 0.002313}{1 + e^{-0.8(C_{adh} - 4.3404)}}$$
 (S83)

$$\frac{dV_{ecf}}{dt} = \Phi_{win} - \Phi_u \quad * \tag{S84}$$

$$V_b = SF_V \times 4.5479 + \frac{SF_V \times 2.4312}{1 + e^{-(V_{ecf} - SF_V \times 18.1128) \times (\frac{1}{SF_V} \times 0.4744)}}$$
 (S85)

$$N_{adhs} = \begin{cases} \left[\max\{(C_{sod} - 140), 0\} + \max\{(\epsilon_{aum} - 1), 0\} - \delta_{ra} \right] / 3 & \text{in males} \end{cases} * (S86)$$

$$\left[\max\{(C_{sod} - 143), 0\} + \max\{(\epsilon_{aum} - 1), 0\} - \delta_{ra} \right] / 3 & \text{in females} \end{cases}$$

$$\frac{dN_{adh}}{dt} = \frac{1}{T_{adh}} (N_{adhs} - N_{adh}) \quad * \tag{S87}$$

$$C_{adh} = 4N_{adh} \quad ^* \tag{S88}$$

$$\frac{d\delta_{ra}}{dt} = 0.2 \frac{dP_{ra}}{dt} - 0.0007\delta_{ra} \quad * \tag{S89}$$

$$\frac{dM_{sod}}{dt} = \Phi_{sodin} - \Phi_{u-sod} \quad * \tag{S90}$$

$$C_{sod} = \frac{M_{sod}}{V_{ecf}} \quad * \tag{S91}$$

$$\hat{C}_{anp} = 7.4052 - \frac{6.554}{1 + e^{(P_{ra} - 3.762)/(1)}}$$
(S92)

 $\underline{\text{Other}}$

$$V_b = 0.06 \times W_b + 0.77 \quad ^{\circ} \tag{S93}$$

Rat Value = Human Value
$$\times$$
 SF_{α} , ‡ (S94)

 $\alpha=$ urine sodium flow, urine flow, volume, resistance

Equation Reference Legend

- * Ref. [1]

 * Ref. [2]

 ° Ref. [3]

 † Ref. [4]

 † This work

Table S1: Baseline values of all model variables and parameters for male (M) and female (F). ADH, antidiuretic hormone; ALD, aldosterone; ANP, atrial natriuretic peptide; CD, collecting duct; DT, distal tubule; MAP, mean arterial pressure; PT, proximal tubule; RSNA, renal sympathetic nerve activity.

Symbol	Description	Units	Baseline M Value	Baseline F Value	Ref.
	Cardiovascular Function		ivi varae	1 Value	
P_{mf}	Mean filling pressure	mmHg	7.28	7.26	[1]
P_{ra}	Right atrial pressure	mmHg		0	[1]
P_{ma}	Mean arterial pressure	mmHg		103	[1]
Φ_{vr}	Venous return	ml	15.0	9.57	[1, 5]
Φ_{co}	Cardiac output	$\frac{min}{ml}$	27.3	17.4	[1, 5]
vas	Vascularity	- min $-$	1	1	[1]
vas_f	Vascularity formation rate	_	1×10^{-5}	1×10^{-5}	[1]
vas_d	Vascularity destruction rate	_	1×10^{-5}	1×10^{-5}	[1]
K_{vd}	Vascularity destruction coefficient	_	1×10^{-5}	1×10^{-5}	[1]
K_{bar}	Coefficient relating basic arterial resistance to vascularity	$\frac{mmHg}{ml/min}$	3.14	4.91	[1, 5]
R_a	Arterial resistance	$rac{mmHg}{ml/min}$	3.14	4.91	[1, 5]
R_{ba}	Basic arterial resistance	mmHg	3.14	4.91	[1, 5]
R_{vr}	Resistance to venous return	$\frac{ml/min}{mmHg}$	0.267	0.418	[1, 5]
R_{bv}	Basic venous resistance	$\frac{ml/min}{mmHg}$	0.642	1.01	[1, 5]
		$ml/min \ mmHg$			
R_{tp}	Total peripheral resistance	$\overline{ml/min}$	3.78	5.91	[1, 5]
ε_{aum}	Autonomic multiplier effect	_	$\frac{1}{0.25}$	1	[1]
a_{chemo}	Chemoreceptor activity	_		0.25	[1]
a_{baro}	Baroreceptor activity	_	1 1	1 1	[1] [1]
a_{auto}	Autonomous system activity		1	1	[1]
-	Renal Hemodynamics	ml			[= 1
Φ_{rb}	Renal blood flow	$\frac{min}{min}$	6.55	4.17	[5]
Φ_{gfilt}	Glomerular filtration rate	$rac{min}{ml/min}$	1.22	0.833	[5]
C_{gcf}	Glomerular capillary filtration coefficient	mmHg	0.068	0.047	[1, 5]
P_f	Net filtration pressure	mmHg		17.7	[1]
P_{gh}	Glomerular hydrostatic pressure	mmHg	63.9	63.7	[1]
P_B	Bowman hydrostatic pressure	U	18	18	[1]
P_{go}	Glomerular osmotic pressure	$\substack{mmHg \ \underline{mmHg}}$	28	28	[1]
R_r	Renal vascular resistance	$\frac{\overline{ml/min}}{mmHg}$	15.7	24.6	[1, 5]
R_{AA}	Afferent arteriolar resistance	ml/min	5.98	9.36	[1, 5]
R_{EA}	Efferent arteriolar resistance	$rac{mmHg}{ml/min}$	9.76	15.2	[1, 5]
β_{rsna}	Effect of RSNA on afferent arteriolar resistance	_	1	1	[1]
\sum_{tgf}	Tubuloglomerular feedback signal	_	1	1	[1]
Σ_{myo}	Myogenic response	_	1	1	[6]
	Effect of AT1R-bound Ang II on afferent resistance	_	1	1	[7]
	Effect of AT1R-bound Ang II on efferent resistance	_	1	1	[7]
	Effect of AT2R-bound Ang II on afferent resistance	_	1	1	[8]
$\Psi_{AT2R-EA}$	Effect of AT2R-bound Ang II on efferent resistance	_	1	1	[8]
	Renal Function				
Φ_{filsod}	Filtered Na ⁺ load	$rac{\mu e q}{min} \ \mu e q$	174	122	[1, 5]
$\Phi_{pt-sodreab}$	Proximal tubule Na ⁺ reabsorption rate	$rac{\mu e q}{min} \ \mu e q$	140	61.1	[1]
Φ_{md-sod}	Macula densa Na ⁺ flow	$rac{\mu e q}{min} \ \mu e q$	34.9	61.1	[1]
	Distal tubule Na ⁺ reabsorption rate	$min \atop \mu eq$	17.4	30.5	[1]
Φ_{dt-sod}	Distal tubule Na ⁺ flow	$\min_{\substack{\mu eq \ \mu eq}}$	17.4	30.5	[1]
$\Phi_{cd-sodreab}$	•	$\min_{\substack{\mu eq \ \mu eq}}$	16.2	29.3	[1]
Φ_{u-sod}	Urine Na ⁺ flow Fractional proximal tubule Na ⁺ reabsorption	$\frac{\mu \circ q}{min}$	1.22	1.22	[1, 5]
$\eta_{pt-sodreab}$	Fractional proximal tubule Na reabsorption Fractional distal tubule Na reabsorption	_	0.80	0.50	[1]
$\eta_{dt-sodreab}$	Fractional collecting duct Na ⁺ reabsorption	_	$0.50 \\ 0.93$	$0.50 \\ 0.96$	[1]
$\eta_{cd-sodreab}$	Fractional conecting duct iva readsorption	_	0.95	0.90	[1]

v_{at} Effect of SRNA on fractional PT Na ⁺ reabsorption - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 1 2	γ_{filsod}	Effect of the filtered Na ⁺ load on fractional PT Na ⁺ reabsorption	_	1	1	[1]
V_{ab} Effect of DY Na [†] reabsorption − 1 1 0 $λ_{ab}$ Effect of DY Na [†] outflow on fractional CD Na [†] reabsorption − 1 1 1 $λ_{ab}$ Effect of AD on fractional CD Na [†] reabsorption − 1 1 1 $Φ_{pd-wroab}$ Proximal tubule water reabsorption rate math 0.15 0.417 6 $Φ_{et-wroab}$ Distal tubule water reabsorption rate math 0.172 0.250 6 $Φ_{et-wroab}$ Distal tubule water reabsorption rate math 0.0582 0.152 6 $Φ_{et-wroab}$ Practional proximal tubule water reabsorption — 0.0682 0.168 6 $Φ_{et-wroab}$ Practional distal tubule water reabsorption — 0.060 0.050 19 $P_{et-wroab}$ Practional distal tubule water reabsorption — 0.060 0.060 19 $Φ_{et-wroab}$ Practional distal tubule water reabsorption — 0.15 1 1 $Φ_{et-wroab}$ Practional distal tubule water reabsorption — <td>γ_{AT1R}</td> <td>Effect of AT2R-bound Ang II on fractional PT Na⁺ reabsorption</td> <td>_</td> <td>1</td> <td>1</td> <td>[1]</td>	γ_{AT1R}	Effect of AT2R-bound Ang II on fractional PT Na ⁺ reabsorption	_	1	1	[1]
$λ_{anp}$ Effect of DT Na* outflow on fractional CD Na* reabsorption − 1 1 1 $λ_{a1}$ Effect of AD on fractional CD Na* reabsorption − 1 1 1 $Φ_{a1}$ Effect of AD on fractional CD Na* reabsorption − 1 1 1 $Φ_{a1}$ To revisinal tubule water reabsorption rate $\frac{m^2}{100}$ 0.177 0.417 6 $Φ_{a1}$ To revisinal tubule water reabsorption rate $\frac{m^2}{100}$ 0.0682 0.168 6 $Φ_{a1}$ Urine flow $\frac{m^2}{100}$ 0.0882 0.168 6 $Φ_{a1}$ Urine flow $\frac{m^2}{100}$ 0.0382 0.152 6 $Φ_{a1}$ Urine flow $\frac{m^2}{100}$ 0.0682 0.168 6 $Φ_{a1}$ Tractional distal tubule water reabsorption $-$ 0.06 0.09 9 P_{a1} Tractional distal tubule water reabsorption $-$ 0.78 0.91 9 P_{a2} Defect of Smotic gradient in DT Tractional distal tubule water reabsorption $-$	γ_{rsna}	Effect of RSNA on fractional PT Na ⁺ reabsorption	_	1	1	[1]
λορη Effect of ANP on fractional CD Na* reabsorption - 1 1 1 1 4 Φρα-στολο Proximal tubule water reabsorption rate and. 1.05 0.1417 6 Φα-σ-στολο Distal tubule water reabsorption rate and. 1.05 0.1417 6 Φα-σ-στολο Occolecting duct water reabsorption rate ang. 1.00 0.0052 0.152 16 Φα-στονετολο Collecting duct water reabsorption - 0.0052 0.150 1.5 Phyt-wroth Particonal proximal tubule water reabsorption - 0.060 0.00 0.0 9 Part-ordered Particonal distal tubule water reabsorption - 0.060 0.00 9 Phyt-sordered Effect of Gambine gradient in DT - 1 1 6 Phyt-sordered Effect of Gambine gradient in DT - 1 1 6 Phyt-sordered Effect of Sambine gradient in CD - 1 1 1 Phyt-sordered Effect of Sambine gradient in CD - 1 1 1 1 Phyt-sordered Effect of Sambine gradient	ψ_{al}		_	1	1	[6]
λ_{tt} Effect of ALD on fractional CD Na* reabsorption − 1 1 4 4 Φ_{tt} $(t_t)^{t_t}$ 0.15 0.17 6 $(t_t)^{t_t}$ 0.17 0.17 0.17 0.17 6 $(t_t)^{t_t}$ 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 </td <td>λ_{dt}</td> <td></td> <td>_</td> <td>1</td> <td>1</td> <td>[1]</td>	λ_{dt}		_	1	1	[1]
λ_{tt} Effect of ALD on fractional CD Na* reabsorption − 1 1 4 4 Φ_{tt} $(t_t)^{t_t}$ 0.15 0.17 6 $(t_t)^{t_t}$ 0.17 0.17 0.17 0.17 6 $(t_t)^{t_t}$ 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 </td <td>λ_{anp}</td> <td>Effect of ANP on fractional CD Na⁺ reabsorption</td> <td>_</td> <td>1</td> <td>1</td> <td>[1]</td>	λ_{anp}	Effect of ANP on fractional CD Na ⁺ reabsorption	_	1	1	[1]
Φρ+σ-call Proximal tubule water reabsorption rate $\frac{1}{cc}$ 0.171 0.417 [6] Φ _{dt-wreal} Method Distal tubule water reabsorption rate $\frac{1}{cc}$ 0.172 0.417 [6] Φ _{dt-wreal} Occleating duct water reabsorption rate $\frac{1}{cc}$ 0.0682 0.168 [6] Φ _{ct-wreab} Occleating duct water reabsorption rate $\frac{1}{cc}$ 0.0532 0.152 [6] Φ _{ct-wreab} Occleating duct water reabsorption		Effect of ALD on fractional CD Na ⁺ reabsorption	_	1	1	[4]
Φ _{th} —symble Macula densa ultrafiltrate flow Inc. 0.171 0.417 6 Φ _{th} —sumable Distal tubule ultrafiltrate flow mile 0.022 0.250 6 Φ _{th} —sumable Distal tubule ultrafiltrate flow mile 0.0682 0.168 6 Φ _{th} —sumable Virine flow mile 0.0532 0.152 6 Φ _{th} —sumable Fractional proximal tubule water reabsorption — 0.66 0.50 9 Plat—sumble Fractional collecting duct water reabsorption — 0.78 0.91 9 Plat—sumble Effect of osmotic gradient in DT — 1 1 6 Beta—sumble Effect of somotic gradient in DT — 1 1 6 Beta—sumble Effect of SADH on CD Tractional water reabsorption — 1 1 1 Beta—sumble Effect of ADH on CD Tractional water reabsorption — 1 1 1 Beta—sumble Effect of ADH on CD Tractional water reabsorption — 1 1 1 Beta—sumble Effect of ADH on CD Tractional water reabsorption — 1 <td>$\Phi_{pt-wreab}$</td> <td>Proximal tubule water reabsorption rate</td> <td></td> <td>1.05</td> <td>0.417</td> <td></td>	$\Phi_{pt-wreab}$	Proximal tubule water reabsorption rate		1.05	0.417	
$q_{cl} = v_{cl} v_$		Macula densa ultrafiltrate flow		0.171	0.417	
$φ_{cd-u-real}$ Distal tubule ultrafiltrate flow $\frac{inf}{m_c}$ 0.0682 0.168 6 $φ_{u}$ Urine flow $\frac{inf}{m_c}$ 0.0520 0.152 1,5 $η_{td-u-real}$ Fractional proximal tubule water reabsorption 0.66 0.50 9 $η_{td-u-real}$ Fractional distal tubule water reabsorption 0.60 0.00 0.00 $H_{td-sorteral}$ Fractional distal tubule water reabsorption 0.60 0.00 0.00 $H_{td-sorteral}$ $H_{td-sorteral}$ Effect of osmotic gradient in DT 1 1 6 $H_{td-sorteral}$ Effect of ADH on CD fractional water reabsorption 1 1 1 $H_{td-sorteral}$ Effect of ADH on CD fractional water reabsorption 1 1 1 PRA Plasma renin concentration $\frac{m_{td}}{T_{td}}$ <	$\Phi_{dt-wreab}$	Distal tubule water reabsorption rate	$m\iota$	0.102	0.250	
ϕ_{ac} Collecting duct water reabsorption rate $\frac{inpl}{min}$ 0.0532 0.152 [6] ϕ_{ac} Usine flow Fractional proximal tubule water reabsorption - 0.86 0.50 [9] $\eta_{Bc-wreab}$ Fractional distal tubule water reabsorption - 0.60 0.60 [9] $\eta_{Bc-wreab}$ Fractional collecting duct water reabsorption - 0.78 0.91 [9] $\eta_{Bc-wreab}$ Fractional collecting duct water reabsorption - 0.78 0.91 [9] $\eta_{Bc-wreab}$ Effect of osmotic gradient in DT - 1 1 [6] μ_{adb} Effect of osmotic gradient in CD - 1 1 [6] [7] μ_{adb} Effect of Samotic gradient in CD - 1 1 [6] [7] [8] μ_{adb} Effect of Samotic gradient in CD - 1 1 [6] [7] μ_{adb} On Samotic gradient in CD - 1 1 [7] 1 1 1 1 <th< td=""><td>Φ_{dt-u}</td><td>Distal tubule ultrafiltrate flow</td><td>ml</td><td>0.0682</td><td>0.168</td><td></td></th<>	Φ_{dt-u}	Distal tubule ultrafiltrate flow	ml	0.0682	0.168	
$Φ_{p_1 - wreeb}$ Urine flow Institution of the presentation of the	$\Phi_{cd-wreab}$	Collecting duct water reabsorption rate		0.0532	0.152	
$p_{p+-ureab}$ Fractional proximal tubule water reabsorption	Φ_u		\underline{ml}	0.0150	0.0150	
	$\eta_{nt-wread}$	Fractional proximal tubule water reabsorption	_	0.86	0.50	
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Facili					
PRC Plasma renin concentration $\frac{Fmol}{QR}$ 17.3 17.3 [8] PRA Plasma renin activity $\frac{Fmol}{QR}$ 136 114 [8] $[AngI]$ Angiotensinogen concentration $\frac{Fmol}{Imol}$ 5.76×10 ⁵ 5.76×10 ⁵ [8] $[AngII]$ Angiotensin I concentration $\frac{Imol}{Imol}$ 90 75 [8] $[AngIII]$ Angiotensin II concentration $\frac{Imol}{Imol}$ 6.0 6.0 8 $[AngIII]$ Angiotensin IV concentration $\frac{Imol}{Imol}$ 1.29 1.29 [8] $[ATTR]$ AT1R-bound Angiotensin II concentration $\frac{Imol}{Imol}$ 1.29 1.29 [8] $[ATTR]$ AT2R-bound Angiotensin II concentration $\frac{Imol}{Imol}$ 6.8 6.8 [8] $[ATTR]$ AT1R-bound Angiotensin II concentration $\frac{Imol}{Imol}$ 6.8 6.8 [8] $[ATTR]$ AT2R-bound Angiotensin II concentration $\frac{Imol}{Imol}$ 7.83 6.60 [8] $[ATTR]$ ACT R 6.1 7.83				-		[a1
PRA Plasma remin activity I_{mol} 136 114 [8] [AGT] Angiotensinogen concentration I_{mol}						
Angiotensin Concentration Indicates			$\frac{fmot}{ml}$,			
			$\frac{jmot}{ml \cdot min}$			
Angil Angiotensin II concentration Image Im	[AGT]		$\frac{fmol}{ml}$	5.76×10^{5}	5.76×10^{5}	
	[AngI]	Angiotensin I concentration	ml	90	75	[8]
	[Ang II]	Angiotensin II concentration	\underline{fmol}	6.0	6.0	[8]
	[Ang(1-7)]	Angiotensin (1-7) concentration	\underline{fmot}	50	25	[8]
	[AngIV]	Angiotensin IV concentration	fmol	1.29	1.29	
	[AT1R]	AT1R-bound Angiotensin II concentration	fmol	20	20	
$X_{PRC-PRA}$ Ratio of PRA to [PRC] $\frac{1}{m_{pln}}$ 7.83 6.60 [8] k_{AGT} AGT production rate $\frac{m_{pln}}{m_{pln}}$ 801 780 [8] C_{CChym} Reaction rate of chymase $\frac{m_{pln}}{m_{pln}}$ 0.0968 0.116 [2] C_{NFP} Reaction rate of neutral endopeptidase $\frac{m_{pln}}{m_{pln}}$ 0.0127 0.00767 [8] C_{ACE2} Reaction rate of Ang converting enzyme 2 $\frac{m_{pln}}{m_{pln}}$ 0.0127 0.00767 [8] C_{ATEA} Reaction rate of conversion of Ang II to Ang IV $\frac{m_{pln}}{m_{pln}}$ 0.0298 0.298 [8] C_{ATIR} Reaction rate of binding of Ang II to AT1R $\frac{m_{pln}}{m_{pln}}$ 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 0.197 <td></td> <td></td> <td>fmol</td> <td>6.8</td> <td>6.8</td> <td></td>			fmol	6.8	6.8	
k_{AGT} AGT production rate of Ang converting enzyme $\frac{T_{mol}}{m_l^{l-min}}$ 801 780 [8] c_{ACE} Reaction rate of Ang converting enzyme $\frac{T_{mol}}{m_l^{l}n}$ 0.0968 0.116 [2] c_{NEP} Reaction rate of chymase $\frac{m_l}{m_l^{l}n}$ 0.0108 0.0128 [8] c_{AEE} Reaction rate of neutral endopeptidase $\frac{m_l}{m_l^{l}n}$ 0.0127 0.00767 [8] c_{AEE} Reaction rate of Ang converting enzyme 2 $\frac{m_l}{m_l^{l}n}$ 0.0127 0.00767 [8] $c_{AII=AIV}$ Reaction rate of binding of Ang II to Ang IV $\frac{m_l}{m_l^{l}n}$ 0.197 0.197 [8] c_{AT2R} Reaction rate of binding of Ang II to AT2R $\frac{m_l}{m_l^{l}n}$ 0.197 0.197 [8] h_{AngI} Half life of AGT $\frac{m_l}{m_l^{l}n}$ 0.197 0.197 [8] h_{AngI} Half life of Ang II $\frac{m_l}{m_l^{l}n}$ 0.197 0.197 [8] h_{AngI} Half life of Ang II $\frac{m_l}{m_l^{l}n}$ 0.197 0.0657 0.0657 0.0657						
c_{ACE} Reaction rate of Ang converting enzyme $\frac{1}{m_{min}}$ 0.0968 0.116 [2] c_{Chym} Reaction rate of chymase $\frac{1}{m_{in}}$ 0.0108 0.0128 [8] c_{NEP} Reaction rate of neutral endopeptidase $\frac{m_{in}}{m_{in}}$ 0.0127 0.00767 [8] c_{ACE2} Reaction rate of Ang converting enzyme 2 $\frac{m_{in}}{m_{in}}$ 0.0127 0.00767 [8] $c_{AII=AIV}$ Reaction rate of conversion of Ang II to Ang IV $\frac{m_{in}}{m_{in}}$ 0.0298 0.298 [8] c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{m_{in}}{m_{in}}$ 0.197 0.197 [8] c_{AT2R} Reaction rate of binding of Ang II to AT2R $\frac{m_{in}}{m_{in}}$ 0.0657 0.0657 [8] h_{AGT} Half life of AGT min 0.0667 0.0657 [8] h_{AngII} Half life of Ang II min 0.5 0.5 [8] h_{AngII} Half life of Ang (1-7) min 0.66 0.66 [8] h_{AT1R} Half life of AT1R			$\frac{min}{fmol}$			
c_{Chym} Reaction rate of chymase $\frac{1}{m_{min}^{in}}$ 0.0108 0.0128 [8] c_{NEP} Reaction rate of neutral endopeptidase $\frac{m_{in}^{in}}{m_{in}}$ 0.0127 0.00767 [8] c_{ACE2} Reaction rate of Ang converting enzyme 2 $\frac{m_{in}^{in}}{m_{in}}$ 0.0267 4.33×10 ⁻⁴ [8] c_{AIIB} Reaction rate of binding of Ang II to AT1R $\frac{1}{m_{in}^{in}}$ 0.197 0.197 [8] c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{1}{m_{in}^{in}}$ 0.098 0.298 [8] c_{AT1R} Reaction rate of binding of Ang II to AT2R $\frac{1}{m_{in}^{in}}$ 0.0957 0.0657 [8] h_{renin} Half life of AGT min 0.0657 0.0657 [8] h_{AGT} Half life of AGT min 0.00 600 [8] h_{AngI} Half life of Ang II min 0.5 0.5 [8] h_{AngI} Half life of Ang IV min 0.66 0.66 [8] h_{AT2R} Half life of AT2R-bound Ang II <			$\frac{ml \cdot min}{1}$			[2]
c_{NEP} Reaction rate of neutral endopeptidase $\frac{r_{min}}{m_{in}}$ 0.0127 0.00767 [8] c_{ACE2} Reaction rate of Ang converting enzyme 2 $\frac{r_{min}}{m_{in}}$ 0.0127 4.33×10^{-4} [8] c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{r_{min}}{m_{in}}$ 0.298 0.298 [8] c_{AT2R} Reaction rate of binding of Ang II to AT1R $\frac{r_{min}}{m_{in}}$ 0.197 0.197 [8] h_{catter} Half life of renin $\frac{r_{min}}{m_{in}}$ 0.0657 0.0657 [8] h_{AGT} Half life of AGT $\frac{r_{min}}{m_{in}}$ 0.0657 0.0657 [8] h_{AngI} Half life of Ang I $\frac{r_{min}}{m_{in}}$ 0.0657 0.0657 [8] h_{AngI} Half life of Ang I $\frac{r_{min}}{m_{in}}$ 0.5 0.5 [8] h_{AngI} Half life of Ang II $\frac{r_{min}}{m_{in}}$ 0.5 0.5 [8] h_{AngI} Half life of Ang IV $\frac{r_{min}}{m_{in}}$ 0.5 0.5 [8] h_{AT2R} Half life of AT2R-b			$\frac{min}{1}$			[8]
c_{ACE2} Reaction rate of Ang converting enzyme 2 $\frac{r_1}{min}$ 2.67×10^{-3} 4.33×10^{-4} [8] $c_{AII=AIV}$ Reaction rate of conversion of Ang II to Ang IV $\frac{r_1}{min}$ 0.298 0.298 [8] c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{r_1}{min}$ 0.197 0.197 [8] c_{AT2R} Reaction rate of binding of Ang II to AT2R $\frac{r_1}{min}$ 0.0657 0.0657 [8] h_{renin} Half life of AGT min 0.0657 0.0657 [8] h_{AGT} Half life of AGT min 0.0657 0.0657 [8] h_{AngI} Half life of Ang I min 0.5 0.5 [8] h_{AngI} Half life of Ang II min 0.5 0.5 [8] h_{AngII} Half life of Ang IV min 0.5 0.5 [8] h_{AT1R} Half life of AT2R-bound Ang II min 0.5 0.5 [8] h_{AT2R} Half life of AS1R-bound Ang II on renin secretion rate <th< td=""><td>-</td><td></td><td>$\frac{min}{1}$</td><td></td><td></td><td></td></th<>	-		$\frac{min}{1}$			
$c_{AII=AIV}$ Reaction rate of conversion of Ang II to Ang IV $\frac{n_{ii}}{min}$ min 0.2980.298[8] c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{1}{min}$ min 0.1970.197[8] c_{AT2R} Reaction rate of binding of Ang II to AT2R $\frac{1}{min}$ min 0.06570.0657[8] h_{renin} Half life of renin min 1212[8] h_{AGT} Half life of AGT min 600600[8] h_{AngI} Half life of Ang I min 0.50.5[8] h_{AngII} Half life of Ang II min 0.660.66[8] h_{AngIV} Half life of Ang IV min 0.50.5[8] h_{AT1R} Half life of AT1R-bound Ang II min 1212[8] h_{AT2R} Half life of AT2R-bound Ang II min 1212[8] ν_{md-sod} Effect of macula densa Na+ flow on renin secretion rate $-$ 11[1] ν_{rsna} Effect of AT1R-bound Ang II on renin secretion rate $-$ 11[1] ν_{AI1R} Effect of AT1R-bound Ang II on renin secretion rate $-$ 11[1] N_{als} Normalized ALD secretion rate $-$ 11[1] N_{al} Normalized ALD concentration $-$ 11[1] T_{al} Time constant for ALD hormone secretion $-$ 11[1] T_{al} Effect of K to Na+ concentration ratio on ALD secretion r						
c_{AT1R} Reaction rate of binding of Ang II to AT1R $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ $\frac{1}{m_{in}}$ \frac			1			
c_{AT2R} Reaction rate of binding of Ang II to AT2R $\frac{m_1}{min}$ min 0.0657 min 0.060 min 0.060 min 0.060 min 0.05 min 0.05 min 0.05 min 0.066 min 0.066 min min 0.066 min 0.066 min 0.066 min 0.066 min 0.066 min 0.066 min 0.066 min min 0.05 min <			$\frac{min}{1}$			
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h_{AT2R} Half life of AT2R-bound Ang II min 1212[8] ν_{md-sod} Effect of macula densa Na+ flow on renin secretion rate-11[1] ν_{rsna} Effect of RSNA on renin secretion rate-11[1] ν_{AT1R} Effect of AT1R-bound Ang II on renin secretion rate-11[4] N_{als} Normalized ALD secretion rate-11[1] N_{al} Normalized ALD concentration-11[1] C_{al} Aldosterone concentration $\frac{ng}{l}$ 387387[10] T_{al} Time constant for ALD hormone secretion min 6060[1] $\xi_{k/sod}$ Effect of K to Na+ concentration ratio on ALD secretion rate-11[1]						[8]
$ u_{md-sod} $ Effect of macula densa Na ⁺ flow on renin secretion rate $-$ 1 1 [1] $ u_{rsna} $ Effect of RSNA on renin secretion rate $-$ 1 1 [1] $ u_{AT1R} $ Effect of AT1R-bound Ang II on renin secretion rate $-$ 1 1 [4] $ N_{als} $ Normalized ALD secretion rate $-$ 1 1 [1] $ N_{al} $ Normalized ALD concentration $-$ 1 1 [1] $ C_{al} $ Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] $ T_{al} $ Time constant for ALD hormone secretion min 60 60 [1] $ \xi_{k/sod} $ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						[8]
$ u_{rsna} $ Effect of RSNA on renin secretion rate $-$ 1 1 [1] $ u_{AT1R} $ Effect of AT1R-bound Ang II on renin secretion rate $-$ 1 1 [4] $ u_{AT1R} $ Normalized ALD secretion rate $-$ 1 1 [1] $ u_{AIs} $ Normalized ALD concentration $-$ 1 1 [1] $ u_{Al} $ Normalized ALD concentration $-$ 1 1 [1] $ u_{Al} $ Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] $ u_{Al} $ Time constant for ALD hormone secretion $ u_{Al} $ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
$ u_{AT1R} $ Effect of AT1R-bound Ang II on renin secretion rate $-$ 1 1 [4] $ N_{als} $ Normalized ALD secretion rate $-$ 1 1 [1] $ N_{al} $ Normalized ALD concentration $-$ 1 1 [1] $ C_{al} $ Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] $ T_{al} $ Time constant for ALD hormone secretion min 60 60 [1] $ \xi_{k/sod} $ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
N_{als} Normalized ALD secretion rate $-$ 1 1 [1] N_{al} Normalized ALD concentration $-$ 1 1 [1] C_{al} Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] T_{al} Time constant for ALD hormone secretion min 60 60 [1] $\xi_{k/sod}$ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
N_{al} Normalized ALD concentration $-$ 1 1 [1] C_{al} Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] T_{al} Time constant for ALD hormone secretion min 60 60 [1] $\xi_{k/sod}$ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
C_{al} Aldosterone concentration $\frac{ng}{l}$ 387 387 [10] T_{al} Time constant for ALD hormone secretion min 60 60 [1] $\xi_{k/sod}$ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
T_{al} Time constant for ALD hormone secretion min 60 60 [1] $\xi_{k/sod}$ Effect of K to Na ⁺ concentration ratio on ALD secretion rate $-$ 1 1 [1]						
$\xi_{k/sod}$ Effect of K to Na ⁺ concentration ratio on ALD secretion rate – 1 1 [1]						
γmap Effect of WAF off ALD secretion rate – 1 1 [1]						
	ζmap	Effect of MAT of ALD secretion rate	_	1	1	[1]

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	ξ_{AT1R}	Effect of AT1R-bound Ang II on ALD secretion rate	_	1	1	[1]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Miscellaneous							
α_{rap} Effect of right atrial pressure on RSNA $-$ 1 1 [1] Φ_{win} Water intake $\frac{ml}{min}$ 0.0150 0.0150 [1, 5] Φ_{sodin} Na ⁺ intake $\frac{\mu e}{min}$ 1.22 1.22 1.22 [1, 5] W_b Body weight g 238 194 [5] V_{ecf} Extracellular fluid volume ml 46 38 [1] V_b Blood volume ml 15 12 [3, 5] I_{adh} Time constant for ADH secretion min 6 6 [1] N_{adh} Normalized ADH secretion rate $-$ 1 1 [1] N_{adh} Normalized ADH concentration $-$ 1 1 [1] N_{adh} Antidiuretic hormone concentration $-$ 1 1 [1] N_{adh} Antidiuretic hormone concentration $-$ 0 0 [1] N_{adh} Ontal amount of Na ⁺ μ μ	rsna	Renal sympathetic nerve activity	_	1	1	[1]		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	α_{map}	Effect of MAP on RSNA	_	1	1	[1]		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	α_{rap}	Effect of right atrial pressure on RSNA	_	1	1	[1]		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Φ_{win}	Water intake	$\frac{ml}{min}$	0.0150	0.0150	[1, 5]		
W_b Body weight g 238194[5] V_{ecf} Extracellular fluid volume ml 4638[1] V_b Blood volume ml 1512[3, 5] T_{adh} Time constant for ADH secretion min 66[1] N_{adh} Normalized ADH secretion rate $-$ 11[1] N_{adh} Normalized ADH concentration $-$ 11[1] C_{adh} Antidiuretic hormone concentration $\frac{\mu units}{ml}$ 44[1] δ_{ra} Effect of right atrial pressure on ADH secretion rate $-$ 00[1] M_{sod} Total amount of Na $^+$ μeq 65605527[1, 5] C_{sod} Plasma Na $^+$ concentration $\frac{\mu eq}{ml}$ 143147[1] \hat{C}_{anp} Normalized atrial natriuretic peptide concentration $-$ 11[1] C_K Plasma K concentration $-$ 11[1] SF_S Human to rat urine sodium flow scaling factor $\frac{\mu eq}{mq}$ 9.699.69[1, 5] SF_U Human to rat urine flow scaling factor $\frac{ml}{l}$ 1515[1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.012.48[1, 5]	Φ_{sodin}	Na ⁺ intake	$\frac{\mu eq}{min}$	1.22	1.22	[1, 5]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		Body weight		238	194	[5]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	V_{ecf}	Extracellular fluid volume	ml	46	38	[1]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	V_b	Blood volume	ml	15	12	[3, 5]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T_{adh}	Time constant for ADH secretion	min	6	6	[1]		
C_{adh} Antidiuretic hormone concentration $\frac{\mu units}{ml}$ 44[1] δ_{ra} Effect of right atrial pressure on ADH secretion rate $-$ 00[1] M_{sod} Total amount of Na+ μeq 65605527[1, 5] C_{sod} Plasma Na+ concentration $\frac{\mu eq}{ml}$ 143147[1] \hat{C}_{anp} Normalized atrial natriuretic peptide concentration $-$ 11[1] C_K Plasma K concentration $-$ 11[1] S_{caling} Factors S_{caling} $ -$ 1 $ S_{caling}$ $ S_{caling}$ Factors S_{caling} $ -$ <t< td=""><td>N_{adhs}</td><td>Normalized ADH secretion rate</td><td>_</td><td>1</td><td>1</td><td>[1]</td></t<>	N_{adhs}	Normalized ADH secretion rate	_	1	1	[1]		
δ_{ra} Effect of right atrial pressure on ADH secretion rate $-$ 0 0 0 [1] M_{sod} Total amount of Na ⁺ μeq 6560 5527 [1, 5] C_{sod} Plasma Na ⁺ concentration μeq 6560 5527 [1, 5] \hat{C}_{anp} Normalized atrial natriuretic peptide concentration $-$ 1 1 1 [1] C_K Plasma K concentration μeq 5 5 5 [1] SE_{sod} Human to rat urine sodium flow scaling factor μeq 9.69 9.69 [1, 5] SF_{sod} Human to rat urine flow scaling factor μeq 9.69 9.69 [1, 5] SF_{sod} Human to rat volume scaling factor μeq 9.69 9.69 [1, 5]	N_{adh}	Normalized ADH concentration	_	1	1	[1]		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	C_{adh}	Antidiuretic hormone concentration	$\frac{\mu units}{ml}$	4	4	[1]		
C_{sod} Plasma Na ⁺ concentration $\frac{\mu eq}{ml}$ 143 147 [1] \hat{C}_{anp} Normalized atrial natriuretic peptide concentration -1 1 1 [1] C_K Plasma K concentration $\frac{\mu eq}{ml}$ 5 5 [1] Scaling Factors SF _S Human to rat urine sodium flow scaling factor $\frac{\mu eq}{meq}$ 9.69 9.69 [1, 5] SF_U Human to rat urine flow scaling factor $\frac{\mu eq}{ml}$ 15 15 [1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.01 2.48 [1, 5]	δ_{ra}	Effect of right atrial pressure on ADH secretion rate		0	0	[1]		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	M_{sod}	Total amount of Na ⁺	μeq	6560	5527	[1, 5]		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	C_{sod}	Plasma Na ⁺ concentration	$\frac{\mu eq}{ml}$	143	147	[1]		
C_K Plasma K concentration $\frac{\mu eq}{ml}$ 55[1]Scaling Factors SF_S Human to rat urine sodium flow scaling factor $\frac{\mu eq}{meq}$ 9.699.69[1, 5] SF_U Human to rat urine flow scaling factor $\frac{ml}{l}$ 1515[1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.012.48[1, 5]	\hat{C}_{anp}	Normalized atrial natriuretic peptide concentration	_	1	1	[1]		
SF_S Human to rat urine sodium flow scaling factor $\frac{\mu eq}{meq}$ 9.699.69[1, 5] SF_U Human to rat urine flow scaling factor $\frac{ml}{l}$ 1515[1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.012.48[1, 5]	C_K	Plasma K concentration	$rac{\mu e q}{m l}$	5	5			
SF_U Human to rat urine flow scaling factor $\frac{ml}{l}$ 15 15 [1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.01 2.48 [1, 5]		Scaling Factors						
SF_U Human to rat urine flow scaling factor $\frac{ml}{l}$ 15 15 [1, 5] SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.01 2.48 [1, 5]	SF_S	Human to rat urine sodium flow scaling factor	μeq mea	9.69	9.69	[1, 5]		
SF_V Human to rat volume scaling factor $\frac{ml}{l}$ 3.01 2.48 [1, 5]	SF_U	Human to rat urine flow scaling factor	$\frac{ml}{l}$	15	15	[1, 5]		
	SF_V	Human to rat volume scaling factor		3.01	2.48	[1, 5]		
	SF_R	Human to rat resistance scaling factor	$\frac{l}{ml}$	0.189	0.296			

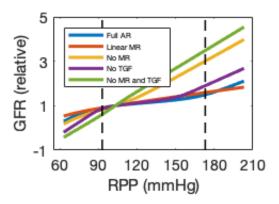


Figure S1: Renal autoregulation. Following the same experimental protocol as in Ref. [7], renal perfusion pressure is perturbed from its baseline value of 103 mmHg within a wide range. Male GFR is plotted as relative change from baseline value for full autoregulation, no myogenic response, no TGF, and no myogenic response and TGF. Dashed vertical lines are at the end points of the autoregulatory range of 90-170 mmHg. Female GFR curves are the same.

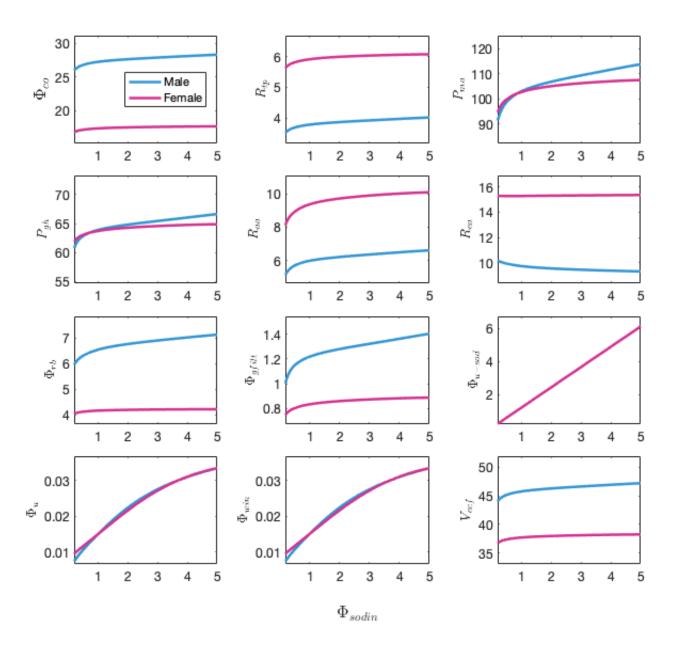


Figure S2: Response of several cardiovascular and renal variables to varying sodium intake.

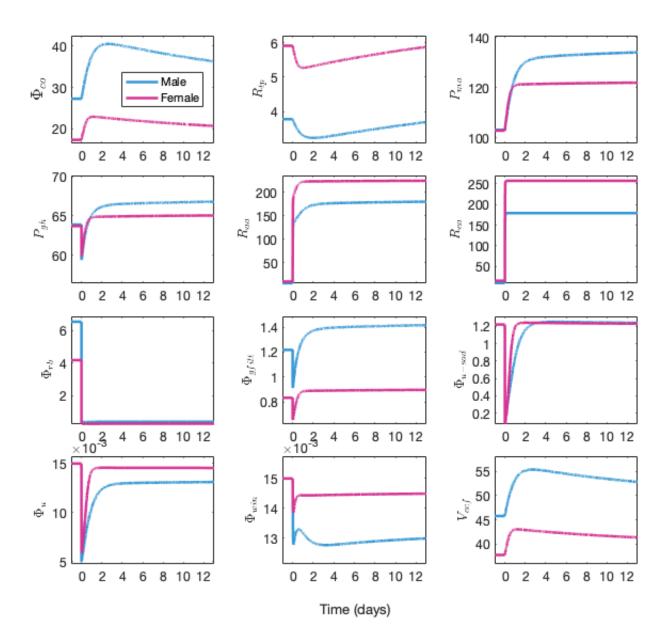


Figure S3: Response of several cardiovascular and renal variables to Ang II infusion.

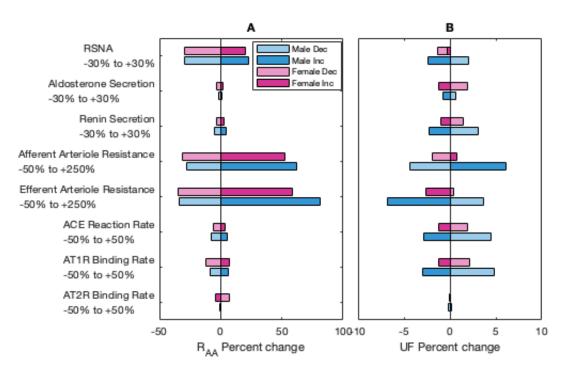


Figure S4: Sensitivity analysis. Percent change in afferent arteriolar resistance and urine flow due to various perturbations.

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