

Supplementary Materials

Supplementary Table 1

Water intake (mL/d) and the contribution of water from different sources (%) of cross-sectional 1

Variable (mL/d)	Total(n=456)		<AI (n=383)		AI (n=73)		P
	P50(P25, P75)	%	P50(P25, P75)	%	P50(P25, P75)	%	
TWI	1992.85(1487.93,2537.35)	-	1840.40(1375.20,2279.70)	-	3207.60(2993.00,3904.90)	-	<0.001
TDW	1500.00 (1000.00,2000.00)	74.50	1200.00(800.00,1600.00)	73.10***	2500.00(2000.00,3000.00)	81.40	<0.001
Plain boiled water	750.00 (300.00,1200.00)	60.00	750.00(400.00,1200.00)	62.80***	1000.00 (100.00,2000.00)	45.20	0.037
Tea	200.00 (0.00,1000.00)	33.10	0.00(0.00,800.00)	30.20***	1250.00 (0.00,2200.00)	48.10	<0.001
Other drinks	0.00 (0.00,224.50)	7.00	0.00(0.00,0.00)	7.00	0.00 (0.00,0.00)	6.70	<0.001
TFW	454.05(312.45,620.05)	25.50	433.90(298.50,599.00)	26.90***	565.60(407.65,804.25)	18.60	<0.001
Rice and flour	90.95(48.60,157.13)	24.50	81.90(47.50,149.70)	24.70	121.50 (60.70,179.65)	23.90	0.005
The dishes	175.35(120.05,238.63)	43.80	171.20(118.00,227.40)	44.20	207.40(150.15,294.45)	41.50	<0.001
Fruit snacks	1.60(0.00,129.58)	11.10	1.30(0.00,128.80)	10.60	1.90 (0.00,146.35)	13.40	0.142
Porridge soup	0.00 (0.00,250.00)	20.60	0.00(0.00,250.00)	20.50	0.00(0.00,250.00)	21.20	0.135

Abbreviations: AI, adequate intake; TWI, Total water intake; TDW, Total drinking water; TFW, Total food water.

*, Comparison of differences between groups in percentage of total water intake from each source of water; ***, $P < 0.001$; **, $P < 0.01$; *, $P < 0.05$.

P, Comparison of differences in water intake from different sources between groups.

Supplementary Table 2

Subgroup analysis was performed by gender classification

Variable	<AI (n=383)			AI (n=73)		
	Female(n=217)	Male(n=166)	P	Female(n=32)	Male(n=41)	P
Weight(kg)	53.85±9.27	60.50±10.28	<0.001	55.99±8.93	64.48±11.25	<0.001
ICW (mmol/L) †	16.10(14.65,17.60)	20.1(18.25,22.48)	<0.001	17.10(15.80,18.95)	22.25(20.38,23.73)	<0.001
ECW (mmol/L) †	10.30(9.40,11.40)	12.90(11.70,14.30)	<0.001	11.00(10.00,12.28)	14.15(12.68,15.43)	<0.001
ECW/TBW†	0.39(0.39,0.40)	0.39(0.39,0.39)	0.137	0.39(0.39,0.39)	0.39(0.39,0.39)	0.539
ICW/TBW†	0.61(0.60,0.61)	0.61(0.61,0.61)	0.147	0.61(0.61,0.61)	0.61(0.61,0.61)	0.704
ECW/ICW†	0.64(0.64,0.65)	0.64(0.64,0.65)	0.108	0.64(0.64,0.65)	0.64(0.64,0.65)	0.577
TBW (kg) †	26.40(24.00,28.90)	32.95(29.95,36.90)	<0.001	28.15(25.85,31.23)	36.45(32.90,39.95)	<0.001
TBW/Weight†	0.53(0.47,0.53)	0.53(0.53,0.58)	<0.001	0.52(0.49,0.53)	0.56(0.53,0.59)	<0.001
Pro (kg) †	7.00(6.30,7.60)	8.70(7.90,9.70)	<0.001	7.40(6.80,8.23)	9.60(8.80,10.23)	<0.001
SLM (kg) †	33.40(30.35,36.50)	41.60(37.88,46.68)	<0.001	35.50(32.68,39.45)	46.05(41.70,49.58)	<0.001
Min (kg)	2.75±0.36	3.43±0.47	<0.001	2.93±0.36	3.77±0.40	<0.001
FFM (kg) †	36.10(32.75,39.50)	44.95(40.95,50.40)	<0.001	38.40(35.33,42.73)	49.80(44.93,53.68)	<0.001
BFM (kg)	17.28±6.59	14.98±6.48	0.003	16.80±5.19	13.71±7.50	0.087
SMM (kg) †	19.00(17.10,21.00)	24.20(21.85,27.35)	<0.001	20.35(18.60,22.70)	27.05(24.60,29.00)	<0.001
BMI (kg/m ²) †	24.00(21.10,26.70)	22.40(20.30,25.40)	0.002	24.10(22.15,26.25)	22.85(20.73,25.50)	0.404
PBF(%)	31.21±8.11	23.95±7.09	<0.001	29.68±6.61	20.32±8.02	<0.001
VFA (cm ²)	143.49±20.03	143.85±19.87	0.561	141.05±15.80	137.91±22.64	0.882
OD (%)	114.03±18.96	104.26±16.57	0.132	112.43±13.59	105.79±17.92	0.132
SMI (%)	6.32(5.73,6.60)	6.60(6.60,7.44)	<0.001	6.60(6.60,6.62)	7.24(6.60,8.05)	<0.001
TBW/FFM†	0.73(0.73,0.73)	0.73(0.73,0.73)	0.128	0.73(0.73,0.73)	0.73(0.73,0.73)	0.415
ICW/FFM†	0.45(0.44,0.45)	0.45(0.44,0.45)	0.086	0.45(0.44,0.45)	0.45(0.44,0.45)	0.806
ECW/FFM†	0.29(0.29,0.29)	0.29(0.28,0.29)	0.211	0.29(0.29,0.29)	0.29(0.28,0.29)	0.461

Abbreviations: AI, adequate intake; ICW, intracellular water; ECW, extracellular water; TBW, Total body water; Pro, protein; SLM, Soft Lean Mass; Min, Mineral; FFM, fat-free mass; BFM, Body Fat Mass; SMM, skeletal muscle mass; BMI, Body Mass Index; PBF, percentage of body fat; VFA, visceral fat area; OD, Obesity level; SMI, Skeletal Muscle Mass Index.

†: P50 (P25, P75)

Supplementary Table 3

Subgroup analysis was performed by age classification

Variable	<AI (n=383)				AI (n=73)			
	75~79(n=158)	80~84(n=150)	≥85(n=75)	P	75~79(n=44)	80~84(n=22)	≥85(n=7)	P
Weight(kg)	57.75±10.90	57.18±9.81	53.71±9.29	0.018	61.61±11.31	61.34±11.44	53.91±6.16	0.277
ICW (mmol/L) †	17.60(15.90,20.10)	17.70(15.55,19.95)	17.10(15.08,18.83)	0.164	21.10(17.90,23.05)	19.40(18.2,23.10)	17.25(15.15,20.70)	0.098
ECW (mmol/L) †	11.50(10.13,12.98)	11.40(10.05,12.80)	11.20(9.75,12.35)	0.529	13.40(11.25,14.65)	12.60(11.90,14.80)	11.10(9.85,12.88)	0.114
ECW/TBW†	0.39(0.39,0.39)	0.39(0.39,0.39)	0.39(0.39,0.40)	<0.001	0.39(0.39,0.40)	0.39(0.39,0.40)	0.39(0.39,0.40)	0.014
ICW/TBW†	0.61(0.61,0.61)	0.61(0.61,0.61)	0.60(0.61,0.61)	<0.001	0.61(0.61,0.61)	0.61(0.61,0.61)	0.61(0.61,0.61)	0.029
ECW/ICW†	0.63(0.63,0.65)	0.64(0.64,0.65)	0.64(0.65,0.66)	<0.001	0.64(0.63,0.64)	0.64(0.64,0.65)	0.64(0.64,0.65)	0.014
TBW (kg) †	29.05(26.03,33.10)	29.00(25.60,32.75)	28.40(24.95,31.13)	0.269	34.70(29.15,37.75)	32.00(30.00,37.90)	28.35(24.98,33.48)	0.107
TBW/Weight†	0.53(0.50,0.54)	0.53(0.49,0.55)	0.53(0.50,0.58)	0.252	0.53(0.50,0.57)	0.53(0.51,0.59)	0.53(0.50,0.58)	0.992
Pro (kg) †	7.60(6.90,8.70)	7.60(6.70,8.60)	7.40(6.53,8.18)	0.183	9.10(7.75,10.00)	8.40(7.90,10.00)	7.45(6.58,8.95)	0.096
SLM (kg) †	36.60(32.93,41.88)	36.60(32.30,41.45)	35.85(31.50,39.23)	0.246	43.80(36.85,47.70)	40.40(37.90,47.90)	35.80(31.50,42.43)	0.109
Min (kg)	3.06±0.55	3.03±0.52	2.97±0.49	0.625	3.51±0.58	3.38±0.51	2.98±0.41	0.098
FFM (kg) †	39.70(35.60,45.20)	39.60(35.00,44.75)	38.85(34.08,42.50)	0.274	47.40(39.80,51.55)	43.70(41.00,51.70)	38.70(34.08,45.73)	0.104
BFM (kg)	16.30±6.63	16.87±6.82	15.24±6.18	0.318	15.03±7.04	15.20±7.15	14.23±4.62	0.957
SMM (kg) †	21.00(18.80,24.20)	21.10(18.30,24.05)	20.35(17.70,22.60)	0.164	25.50(21.35,28.05)	23.30(21.80,28.10)	20.50(17.75,25.03)	0.099
BMI (kg/m ²)†	23.65(21.00,26.65)	23.10(20.60,26.30)	22.70(20.40,24.65)	0.345	23.30(21.05,26.05)	24.40(20.50,26.10)	22.80(21.28,23.73)	0.677
PBF(%)	27.83±8.19	28.86±8.44	27.55±9.19	0.534	23.72±9.21	24.56±8.80	26.15±6.11	0.810
VFA (cm ²)	138.53±19.45	146.00±20.13	149.30±18.30	<0.001	136.59±20.44	142.57±20.34	146.97±15.31	0.382
OD (%)	111.26±18.53	110.22±18.52	106.78±18.95	0.332	109.28±16.21	107.90±19.62	105.58±10.32	0.869
SMI (%)	6.60(6.13,6.85)	6.60(6.04,6.76)	6.60(5.88,6.60)	0.199	6.99(6.60,7.71)	6.60(6.59,7.39)	6.60(5.77,7.22)	0.363
TBW/FFM†	0.73(0.73,0.73)	0.73(0.73,0.73)	0.73(0.73,0.73)	0.864	0.73(0.73,0.73)	0.73(0.73,0.73)	0.73(0.73,0.73)	0.578
ICW/FFM†	0.45(0.44,0.45)	0.44(0.44,0.45)	0.44(0.44,0.45)	<0.001	0.45(0.44,0.45)	0.44(0.44,0.45)	0.45(0.44,0.45)	0.051
ECW/FFM†	0.29(0.28,0.29)	0.29(0.29,0.29)	0.29(0.29,0.29)	<0.001	0.29(0.28,0.29)	0.29(0.29,0.29)	0.29(0.29,0.29)	0.014

Abbreviations: AI, adequate intake; ICW, intracellular water; ECW, extracellular water; TBW, Total body water; Pro, protein; SLM, Soft Lean Mass; Min, Mineral; FFM, fat-free mass; BFM, Body Fat Mass; SMM, skeletal muscle mass; BMI, Body Mass Index; PBF, percentage of body fat; VFA, visceral fat area; OD, Obesity level; SMI, Skeletal Muscle Mass Index.
†: P50 (P25, P75)

Supplementary Table 4

Subgroup analysis was performed by BMI classification

Variable	<AI (n=383)				AI (n=73)			
	BMI<22.0kg/m ²	22.0kg/m ² ≤BMI<26.9kg/m ²	BMI≥26.9kg/m ²	<i>P</i>	BMI<22.0kg/m ²	22.0kg/m ² ≤BMI<26.9kg/m ²	BMI≥26.9kg/m ²	<i>P</i>
	(n=117)	(n=188)	(n=78)		(n=17)	(n=40)	(n=16)	
Weight(kg)	47.92±6.86	58.03±7.60	66.94±8.77	<0.001	49.70±6.46	60.72±7.12	72.66±10.65	<0.001
ICW (mmol/L) †	16.40(14.50,18.60)	17.60(15.90, 20.10)	18.70(16.50,21.90)	<0.001	19.25(16.80,21.30)	19.50(17.05,22.96)	22.70(20.33,25.78)	0.020
ECW (mmol/L) †	10.70(9.40,12.00)	11.50(10.20,12.95)	12.00(10.75,14.000)	<0.001	12.35(10.88,13.63)	12.60(10.90,14.60)	14.70(12.80,16.10)	0.029
ECW/TBW†	0.39(0.39,0.40)	0.39(0.39,0.39)	0.39(0.39,0.40)	0.582	0.39(0.39,0.39)	0.39(0.39,0.39)	0.39(0.39,0.39)	0.382
ICW/TBW†	0.61(0.60,0.61)	0.61(0.61,0.61)	0.60(0.61,0.61)	0.326	0.60(0.61,0.61)	0.61(0.61,0.61)	0.61(0.61,0.61)	0.422
ECW/ICW†	0.65(0.64,0.66)	0.65(0.64,0.65)	0.65(0.65,0.66)	0.479	0.64(0.64,0.65)	0.64(0.64,0.65)	0.63(0.64,0.64)	0.332
TBW (kg) †	27.10(23.90,30.50)	29.10(26.20,33.10)	30.60(27.30,35.95)	<0.001	31.55(28.00,34.93)	32.20(27.98,37.55)	37.40(33.13,41.93)	0.019
TBW/Weight†	0.56(0.53,0.61)	0.53(0.50,0.53)	0.48(0.44,0.53)	<0.001	0.59(0.54,0.64)	0.53(0.51,0.57)	0.52(0.47,0.53)	<0.001
Pro (kg) †	7.10(6.30,8.00)	7.60(6.90,8.70)	8.10(7.15,9.50)	<0.001	8.30(7.25,9.20)	8.45(7.35,9.98)	9.80(8.83,11.18)	0.019
SLM (kg) †	34.20(30.30,38.60)	36.80(33.10,41.85)	38.70(34.40,45.40)	<0.001	39.85(35.33,44.20)	40.60(35.30,47.53)	47.20(41.90,53.10)	0.019
Min (kg)	2.85±0.43	3.07±0.51	3.24±0.61	<0.001	3.20±0.50	3.39±0.56	3.74±0.54	0.045
FFM (kg) †	37.00(32.60,41.60)	39.80(35.75,45.25)	41.80(37.25,49.10)	<0.001	42.40(38.30,47.73)	43.95(38.15,51.33)	51.05(45.25,57.33)	0.020
BFM (kg)	10.61±4.23	17.03±4.93	23.71±5.17	<0.001	8.81±3.88	15.02±5.17	2.13±6.32	<0.001
SMM (kg) †	19.40(16.90,22.30)	21.00(18.80,24.20)	22.40(19.55,26.55)	<0.001	23.15(19.93,25.80)	23.45(20.28,27.98)	27.65(24.53,31.60)	0.020
BMI (kg/m ²)†	20.18(18.75,20.89)	24.02(23.02,25.21)	28.58(27.64,30.30)	<0.001	19.74(18.47,21.02)	24.14(22.95,25.91)	28.40(27.25,30.31)	0.020
PBF(%)	21.69±7.04	29.40±6.98	35.59±6.35	<0.001	17.38±7.64	24.66±8.15	30.35±6.21	<0.001
VFA (cm ²)	126.36±14.04	146.67±15.30	163.73±14.88	<0.001	121.66±10.85	139.30±14.73	159.43±21.98	<0.001
OD (%)	91.98±10.84	112.29±11.05	132.95±14.53	<0.001	90.64±9.29	109.60±11.28	126.60±13.35	<0.001
SMI (%)	6.34(5.77,6.60)	6.60(6.13,6.92)	6.60(6.58,7.42)	<0.001	6.60(6.11,7.13)	6.61(6.60,7.61)	7.56(6.60,8.29)	0.018
TBW/FFM†	0.73(0.73,0.73)	0.73(0.73,0.73)	0.73(0.73,0.73)	0.005	0.73(0.73,0.73)	0.73(0.73,0.73)	0.73(0.73,0.73)	0.967
ICW/FFM†	0.45(0.44,0.45)	0.45(0.44,0.45)	0.44(0.44,0.45)	0.478	0.45(0.44,0.45)	0.45(0.44,0.45)	0.45(0.44,0.45)	0.208
ECW/FFM†	0.29(0.28,0.29)	0.29(0.29,0.29)	0.29(0.29,0.29)	0.401	0.29(0.29,0.29)	0.29(0.29,0.29)	0.28(0.29,0.29)	0.368

Abbreviations: AI, adequate intake; ICW, intracellular water; ECW, extracellular water; TBW, Total body water; Pro, protein; SLM, Soft Lean Mass; Min, Mineral; FFM,

fat-free mass; BFM, Body Fat Mass; SMM, skeletal muscle mass; BMI, Body Mass Index; PBF, percentage of body fat; VFA, visceral fat area; OD, Obesity level; SMI, Skeletal Muscle Mass Index. $\dagger$: *P50 (P25, P75)*

Supplementary Table 5

Baseline characteristics of the cross-sectional 2 participants(n=31)

Variable	Total (n=31)	<AI (n=18)	AI (n=13)	P
Age	84.06±4.87	83.44±5.62	84.92±3.62	0.414
Sex,n (%)				1.000
Female	16(51.61)	9(50.00)	7(53.85)	
Male	15(48.39)	9(50.00)	6(46.15)	
Degree of education,n (%)				0.099
Illiteracy	3(9.68)	3(16.67)	0.00	
primary school	3(9.68)	3(16.67)	0.00	
junior high school	1(3.23)	1(5.56)	0.00	
High school and above	24(77.42)	11(61.11)	13(100.00)	
Marital status,n (%)				0.481
Unmarried	0(0.00)	0(0.00)	0(0.00)	
Married	14(45.16)	7(38.89)	7(53.85)	
Widow/Divorce	17(54.84)	11(61.11)	6(46.15)	
Smoking, n(%)	2(6.45)	2(11.11)	0(0.00)	0.410
Drinking, n(%)	4(12.90)	3(16.67)	1(7.69)	0.167
Suffering from several chronic diseases,n (%)				1.000
Nothing	5(16.13)	3(16.67)	2(15.38)	
One kind	8(25.81)	5(27.78)	3(23.08)	
Two types	12(38.71)	7(38.89)	5(38.46)	
Three or more types	6(19.35)	3(16.67)	3(23.08)	
Total Physical Activity (MET/Week) [†]	1039.5(462,3118.5)	981.75(462,1819.13)	1386(0,4158)	0.708

Abbreviations: AI, adequate intake;; BMI, Body mass index. TWI, Total water intake.

[†]: P50 (P25, P75)

Supplementary Table 6

Drinking water for 7 days in cross-section 2

Day	Daily drinking water			Water intake was < CNS (%)		
	Total (n=31)	<AI (n=18)	AI (n=13)	Total	<AI	AI
Day 1	1647.76±897.06	1216.94±605.53	2244.27±910.20	48.39	72.22	15.38
Day 2	1606.52±893.08	1153.47±537.35	2233.81±922.36	58.06	83.33	23.08
Day 3	1699.76±853.68	1273.06±505.37	2290.58±899.37	51.61	77.78	15.38
Day 4	1575.79±669.85	1238.75±583.02	2042.46±483.61	54.84	77.78	23.08
Day 5	1554.13±676.10	1180.00±556.15	2072.15±451.58	48.39	77.78	7.69
Day 6	1437.24±638.82	1080.42±480.40	1931.31±487.70	64.52	83.33	38.46
Day 7	1541.47±753.21	1163.19±584.18	2065.23±650.40	51.61	77.78	15.38
7-day mean	1580.38±729.00	1186.55±501.05	2125.69±646.63	54.84	77.78	23.08

Abbreviations: CNS: Chinese Nutrition Society; AI, adequate intake.

Values are expressed as mean±standard deviation; component ratios are expressed as percentage.

Supplemental Table 7
Results of the urine metabolite enrichment analysis

Metabolic pathway name	All metabolite quantities	Differential metabolite numbers	<i>P</i>	Holm adjust	FDR	Impact
Alanine, aspartate and glutamate metabolism	28	4	<0.001	0.008	0.008	0.200
Tryptophan metabolism	41	3	0.006	0.474	0.192	0.277
Arginine biosynthesis	14	2	0.007	0.563	0.192	0.228
Biosynthesis of unsaturated fatty acids	36	2	0.044	1.000	0.844	<0.001
Nitrogen metabolism	6	1	0.056	1.000	0.844	<0.001
Primary bile acid biosynthesis	46	2	0.069	1.000	0.844	0.016
Taurine and hypotaurine metabolism	8	1	0.074	1.000	0.844	0.429
D-Amino acid metabolism	15	1	0.134	1.000	1.000	<0.001
Butanoate metabolism	15	1	0.134	1.000	1.000	<0.001
Glyoxylate and dicarboxylate metabolism	32	1	0.266	1.000	1.000	<0.001
Cysteine and methionine metabolism	33	1	0.273	1.000	1.000	0.021
Fatty acid elongation	39	1	0.315	1.000	1.000	<0.001
Fatty acid degradation	39	1	0.315	1.000	1.000	<0.001
Pyrimidine metabolism	39	1	0.315	1.000	1.000	<0.001
Amino sugar and nucleotide sugar metabolism	42	1	0.335	1.000	1.000	0.102
Fatty acid biosynthesis	47	1	0.367	1.000	1.000	0.015
Purine metabolism	70	1	0.496	1.000	1.000	<0.001
Steroid hormone biosynthesis	87	1	0.575	1.000	1.000	0.043

Supplemental Table 8**Daily temperature and humidity**

Day	Indoor temperature	Outdoor temperature	Indoor humidity	Outside humidity
Day 1	26.12±0.65	25.93±2.16	52.17±15.05	50.17±19.36
Day 2	26.02±0.89	26.98±1.67	51.33±15.48	48.50±15.92
Day 3	26.78±2.63	26.97±4.29	46.83±4.67	47.00±7.51
Day 4	27.65±3.06	27.82±5.81	53.50±7.06	56.17±13.64
Day 5	27.05±3.35	26.67±4.19	57.83±7.57	60.33±13.11
Day 6	26.47±2.66	26.15±3.23	64.50±3.45	68.17±7.76
Day 7	25.92±1.56	23.73±1.18	68.83±3.31	76.67±5.99
7-day mean	26.57±1.92	26.32±2.68	56.43±3.47	58.14±4.84

Supplementary Figure 1. PCA score chart, OPLS-DA score chart, permutation test chart under positive and negative ion modes.

A, PCA score chart in positive ion mode; B, PCA score chart in negative ion mode; C, OPLS-DA score chart in positive ion mode; D, OPLS-DA score plot between two groups in negative ion mode; E, Permutation test chart in positive ion mode; F, Permutation test chart for negative ion mode.

Supplementary Figure 1-A and B show the PCA score plots in positive and negative ion modes. In both modes, the trend of separation of <AI and AI group urine samples is not significant. Supplementary Figure 1-C and D show the OPLS-DA score plots in both positive and negative ion modes, with clear distinctions between both groups and clear clustering observed within each group. Supplementary Figure 1-E and F show the validation results after 200 iterations of the replacement test for both the positive and negative ion modes. In the positive ion model, the model parameters are $R^2X = 0.452$, $R^2Y = 0.985$, and $Q^2 = 0.695$. In the negative ion model, the model parameters are $R^2X = 0.541$, $R^2Y = 0.999$, and $Q^2 = 0.664$. The model exhibits strong fitting and predictive capabilities.