

**Table S1.** Serum concentrations of non-discriminant amino acids and derivatives in frail/pre-frail participants with type 2 diabetes mellitus (F-T2DM) and controls.

Analytes	F-T2DM (n = 66)	Controls (n = 30)
$\alpha$ -amino butyric acid	29.5 $\pm$ 12.9	22.3 $\pm$ 5.7
$\beta$ -alanine	8.5 $\pm$ 3.3	6.5 $\pm$ 2.6
$\beta$ -aminobutyric acid	2.9 $\pm$ 1.5	1.7 $\pm$ 1.1
1-methylhistidine	10.6 $\pm$ 10.1	9.2 $\pm$ 16.7
3-methylhistidine	7.8 $\pm$ 4.2	5.2 $\pm$ 2.5
4-hydroxyproline	17.6 $\pm$ 8.8	17.2 $\pm$ 7.9
Alanine	542.3 $\pm$ 165.8	384.2 $\pm$ 98.3
Amino adipic acid	2.7 $\pm$ 1.7	1.3 $\pm$ 0.8
Arginine	168.3 $\pm$ 91.2	103.7 $\pm$ 31.2
Asparagine	78.8 $\pm$ 20.0	77.8 $\pm$ 13.4
Aspartic acid	22.0 $\pm$ 8.2	17.0 $\pm$ 4.0
Citrulline	36.5 $\pm$ 14.8	36.8 $\pm$ 11.5
Cystine	5.2 $\pm$ 4.7	32.4 $\pm$ 11.3
Ethanolamine	11.5 $\pm$ 3.4	9.0 $\pm$ 2.2
Glycine	253.0 $\pm$ 73.0	260.9 $\pm$ 65.6
Glutamic acid	130.0 $\pm$ 66.7	54.3 $\pm$ 21.3
Histidine	95.3 $\pm$ 24.0	82.2 $\pm$ 11.4
Isoleucine	91.9 $\pm$ 31.8	63.2 $\pm$ 18.3
Leucine	170.2 $\pm$ 55.4	121.9 $\pm$ 27.0
Lysine	251.8 $\pm$ 85.9	196.8 $\pm$ 41.6
Methionine	28.2 $\pm$ 9.8	23.4 $\pm$ 5.8
Ornithine	103.2 $\pm$ 37.6	109.4 $\pm$ 25.0
Phenylalanine	85.7 $\pm$ 28.6	66.1 $\pm$ 11.0
Proline	268.2 $\pm$ 100.4	199.9 $\pm$ 44.4
Sarcosine	2.5 $\pm$ 0.9	1.5 $\pm$ 0.5
Serine	140.1 $\pm$ 41.1	118.7 $\pm$ 16.9
Taurine	100.4 $\pm$ 49.0	189.5 $\pm$ 47.2
Threonine	137.9 $\pm$ 51.5	125.1 $\pm$ 22.3
Tryptophan	66.2 $\pm$ 23.4	62.0 $\pm$ 13.1
Tyrosine	78.2 $\pm$ 25.3	65.7 $\pm$ 14.6
Valine	302.7 $\pm$ 90.3	221.2 $\pm$ 42.9

Data are shown as mean  $\pm$  standard deviation. Concentrations are expressed in  $\mu\text{mol/L}$ .

Concentrations of  $\gamma$ -aminobutyric acid, anserine, carnosine, cystathionine, phosphoethanolamine, and phosphoserine were below the detection limit.