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Appendix Figure

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ative		Ĭ [°] │ ╎╿ ╹ <mark>╷</mark> ┆ ║╷╹.・	Ingredient (g) Control 25%BCAA
	-1-1		L-Arginine 10 10
30			L-Histidine-HCI-H2O 6 6
			L-isoleucine 8 2
	2		_ L-Leucine 12 2
			L-Lysine-HCI 14 14
		li in in in a stati in in	L-Methionine 6 6
	lan bys bys bys bys bys bys bys bys bys bys	ser aural arrag	L-Phenylalanine 8 8
	g ole ole a a	cy cy is pail lut lut ty ty bis	L-Threonine 8 8
	eny try tis	g g a	L-Typtophan 2 2
	bh Dh		L-Valine 8 2
	- in the second		L-Alanine 10 10
	<u> </u>	Control 25% Low BCAA	L-Asparagine-H2O 5 5
			L-Aspartate 10 10
			L-Cystine 4 4
			L-Glutamic Acid 30 30
С			L-Glutamine 5 5
			Glycine 10 10
	Ingredient (g)	Control 50% BCAA 25%BCAA	L-Proline 5 5
		454 454 454	L-Serine 5 5
	Amino acid mixture without BCAA	151 151 151	L-Tyrosine 4 4
	BCAA mixture	28 14 7	Corn Starch 550.5 572.5
	Corn starch	417 431 437	
	Dextrin and sucrose	250 250 250 50 50 50	Corp Oil 50 50
		50 50 50 50 50 50	Mineral Mix \$10001 35 25
	Mineral mixture	JU JU JU JU	Sodium Bicarbonate 75 75
	Vitamin mixture	10 10 10	Vitamin Mix V10001 10 10
	Choline chloride	2 2 2	Choline Bitrartrate 2 2
	TBHQ antioxidant		FD&C Blue Dve #1 0.05 0.05
	Total	1000 1000 1000	Total 1000.05 1000.05

Appendix FigureS1. Low BCAA diet on young female mice.

A. The relative abundance of amino acid composition of the low BCAA diet. N=3; **B.** The energy in the diet. N=5; and **C.** The recipe of the diet from Trophic Animal Feed Hightech; **D.** The recipe of the diet from Research Diet, Inc. Error bars stand for SEM of biological repeats. The p value was calculated by two-tailed t-test with 2-way ANOVA correction.



Appendix FigureS2. Metabolic features of young female mice fed a low BCAA diet.

A and B. The body weight of short (1.5 months; Control, N=5; Low BCAA, N=4) and long (3 months, N=10) term low BCAA diet; **C.** The relative abundance of BCAAs in serum. N=6; **D.** The relative energy expenditure measured by Comprehensive Lab Animal Monitoring System (CLAMS). N=3; **E.** The relative abundance of 3-hydroxybutyrate (3-HOB) and carnitine in serum. N=6; **F.** The mRNA level of Fgf21 in liver. N=6; **G.** The concentration of FGF21 in serum. N=4. Error bars stand for SEM of biological repeats. The p value was calculated by two-tailed t-test with 2-way ANOVA correction.



Appendix FigureS3. BCAA insufficiencies induce POI.

A. The serum concentration of FSH. Control, N=5; Low BCAA, N=4; and **B.** The changes of follicles in the mice on 50% low BCAA diet. Control, N=4; Low BCAA, N=3; **C.** Serum concentration of FSH. Control, N=4; Low BCAA, N=7; and **D.** The changes of follicles in 7-month-old mice on 25% low BCAA diet. N=5. S1, Primordial; S2, Primary; S3, Secondary; S4, Antral; S5, Atretic. Error bars stand for SEM of biological repeats. The p value was calculated by two-tailed t-test with 2-way ANOVA correction.



Appendix FigureS4. Relative abundance of metabolites in the serum of patients on a low carbohydrate high protein diet.

A. Serum concentration of isoleucine. N=7; B. Serum concentration of leucine. N=7; C. Serum concentration of valine. N=7; D. Serum concentration of cer (d18:1/16:0)_DH. N=7;
E. Serum concentration of cer (d18:1/16:0). N=7. Error bars stand for SEM of biological repeats. The p value was calculated by two-tailed t-test with 2-way ANOVA correction.



Appendix FigureS5. The changes of adiponectin in POI patients and mice on a low BCAA diet.

A. Serum concentration of adiponectin in POI patients and healthy donors. N=18; **B.** Serum concentration of adiponectin in mice fed by low BCAA diet (LB) or control diet. N=6. Error bars stand for SEM of biological repeats.