Electronic Supplementary Material (ESI) for Food & Function.

Supplementary Table 1. Information stated in the inclusion and exclusion criteria

Inclusion criteria	
1	Subjects who agree to participate in this study with a written informed consent.
2	Subjects who age is ≥30 years-old and <70 years-old.
3	Subjects who ALT level is ≥25 U/L and <100 U/L (men), ≥17 U/L and <100 U/L (women).
4	Subjects who BMI is ≥23 kg/m^2 and <30 kg/m^2.
Exclusion criteria	
1	Subjects who are under physician's advice, treatment, and/or medication for, hyperuricemia and/or dyslipidemia.
2	Subjects with hepatic diseases except NAFLD (such as NASH, hepatitis C, hepatitis B, autoimmune hepatitis, liver cirrhosis and liver cancer etc.).
3	Subjects who UA level is not less than the reference value (≥ 7.1 mg/dL).
4	Subjects who AST level is ≥100 U/L.
5	Subjects who use pacemaker or defibrillator.
6	Subjects with serious cerebrovascular, cardiac, hepatic, renal, gastrointestinal diseases, and/or affected with infectious diseases requiring reports to the authorities.
7	Subjects with major surgical history relevant to the digestive system such as gastrectomy, gastrorrhaphy, enterectomy, etc.
8	Subjects with unusually high and/or low blood pressure and/or abnormal hematological data.
9	Subjects with severe aenemia.
10	Pre- or post-menopausal women complaining of obvious physical changes.
11	Subjects who are at risk of having allergic reactions to drugs or foods, especially salmon and/or milt.
12	Subjects who regularly take medicine, functional foods, and/or supplements which would affect liver function.
13	Subjects who regularly take medicine, functional foods, and/or supplements which would affect lipid metabolism.
14	Heavy smokers, alcohol addicts or subjects with disordered lifestyle.
15	Subjects who donated either 400 mL whole blood within 16 weeks (women), 12 weeks (men), 200 mL whole blood within 4 weeks (men and women), or blood components within 2 weeks (men and women), prior to the current study.
16	Pregnant or lactating women or women who expect to be pregnant during this study.
17	Subjects who currently participate in other clinical trials, or participated within the last 4 weeks prior to the current study.
18	Any other medical and/or health reasons unfavorable to participation in the current study, as judged by the principal investigator.

Supplementary Table 2. Basic information on the test food and placebo

	Placebo	Test food	Method
Description	Beige tablet	Beige tablet	
Weight (mg/tablet)	300	300	
Dextrin (mg/tablet)	290	107	
DNA (mg/tablet)	-	133	
Raw material	Fine silicon dioxide, calcium stearate, cacao pigment, caramel	Fine silicon dioxide, calcium stearate	
Nutrition facts			
Moisture (g/tablet)	0.016	0.017	Loss-on-drying method
Protein (g/tablet)	ND	0.156	Kjeldahl method
Lipid (g/tablet)	0.003	0.004	Acid hydrolysis method
Carbohydrate (g/tablet)	0.276	0.071	Carbohydrate = tablet - moisture - protein - lipid - ash
Ash (g/tablet)	0.006	0.053	Direct ashing method
Energy (kcal/tablet)	1.128	0.942	-
Sodium (mg/tablet)	0.014	9.700	Atomic absorption spectrophotometry

Supplementary Table 3. Effect of SM DNA on primary endpoints obtained after subgroup analysis based on BMI ≥ 25 kg/m^2

	BMI ≥25kg/m^2											BMI <25kg/m^2										
	Placebo (n = 10)			SM DNA (n = 12)			*P*-value*					Placebo (n = 11)			SM DNA (n = 11)			*P*-value*				
							Group	Two-way ANOVA Period effect	Two-way ANOVA Treatment effect	Two-way ANOVA Interaction								Group	Two-way ANOVA Period effect	Two-way ANOVA Treatment effect	Two-way ANOVA Interaction	
ALT (U/L)																						
Baseline	37.20	±	14.34	39.83	±	15.36	0.684	0.307	0.631	0.488		35.73	±	11.61	32.00	±	8.75	0.405	0.014 #	0.280	0.824	
Δ4wk	5.10	±	20.57	4.50	±	22.36	0.949					0.82	±	7.65	3.45	±	7.75	0.432				
Δ8wk	4.50	±	9.65	-2.67	±	13.52	0.176					-2.36	±	8.99	0.27	±	6.78	0.447				
Δ12wk	0.60	±	8.93	-0.42	±	18.13	0.873					-3.82	±	4.87	0.27	±	8.43	0.179				
AST (U/L)																						
Baseline	26.40	±	7.35	28.25	±	7.45	0.566	0.165	0.639	0.260		27.91	±	5.59	25.00	±	3.35	0.154	0.017 #	0.066 †	0.778	
Δ4wk	0.60	±	7.59	4.33	±	11.28	0.384					-0.91	±	5.01	1.09	±	2.55	0.252				
Δ8wk	0.70	±	5.25	-1.00	±	5.53	0.471					-2.91	±	4.18	-0.09	±	2.34	0.065 †				
Δ12wk	-1.20	±	4.42	0.17	±	5.56	0.537					-3.00	±	2.57	-1.18	±	2.48	0.107				
γ-GTP (U/L)																						
Baseline	64.60	±	85.99	73.33	±	47.10	0.765	0.030 #	0.249	0.519		61.00	±	49.76	73.55	±	62.50	0.608	0.004 #	0.143	0.892	
Δ4wk	35.70	±	71.47	9.58	±	45.13	0.309					-3.18	±	12.69	8.64	±	23.08	0.152				
Δ8wk	11.50	±	27.73	-9.33	±	32.75	0.127					-10.55	±	19.78	-0.73	±	14.57	0.200				
Δ12wk	2.50	±	8.36	-6.42	±	48.15	0.571					-18.45	±	27.29	-8.91	±	13.94	0.318				
ALP (U/L)																						
Baseline	238.00	±	59.47	238.92	±	94.85	0.979	0.206	0.729	0.755		229.36	±	56.28	232.55	±	64.88	0.903	0.422	0.606	0.801	
Δ4wk	17.20	±	39.81	6.92	±	56.17	0.633					4.09	±	14.00	6.82	±	28.85	0.781				
Δ8wk	1.80	±	21.56	-1.00	±	41.80	0.850					-2.27	±	19.27	-0.91	±	25.66	0.889				
Δ12wk	0.00	±	19.64	-2.33	±	43.85	0.878					-3.82	±	24.40	3.55	±	24.70	0.490				
LDH (U/L)																						
Baseline	173.00	±	31.85	181.75	±	23.02	0.464	0.071 †	0.781	0.437		196.73	±	32.71	174.55	±	14.46	0.059 †	0.018 #	0.202	0.600	
Δ4wk	8.00	±	14.12	9.58	±	11.53	0.775					0.27	±	11.11	5.09	±	12.32	0.347				
Δ8wk	3.90	±	13.49	-2.42	±	16.11	0.337					-10.09	±	10.90	-2.36	±	6.80	0.060 †				
Δ12wk	2.10	±	7.62	3.67	±	12.38	0.731					2.45	±	16.51	4.00	±	13.74	0.814				
ChE (U/L)																						
Baseline	395.10	±	62.65	409.92	±	46.86	0.533	0.041 #	0.747	0.511		398.27	±	80.04	422.64	±	70.32	0.457	0.541	0.877	0.751	
Δ4wk	17.80	±	24.99	11.58	±	17.40	0.500					6.64	±	35.87	8.27	±	35.21	0.915				
Δ8wk	14.90	±	16.32	10.25	±	20.67	0.571					5.55	±	29.91	4.18	±	19.10	0.900				
Δ12wk	1.40	±	28.08	4.42	±	24.45	0.790					4.45	±	22.36	-0.64	±	22.93	0.604				
AST/ALT ratio																						
Baseline	0.75	±	0.20	0.78	±	0.25	0.748	0.970	0.777	0.418		0.83	±	0.19	0.81	±	0.15	0.846	0.220	0.699	0.245	
Δ4wk	-0.04	±	0.20	-0.01	±	0.22	0.777					-0.07	±	0.19	-0.05	±	0.12	0.759				
Δ8wk	-0.06	±	0.13	0.00	±	0.16	0.387					-0.05	±	0.12	0.02	±	0.11	0.206				
Δ12wk	-0.02	±	0.08	-0.04	±	0.22	0.755					0.02	±	0.07	-0.02	±	0.13	0.391				
TIBC (μg/dL)																						
Baseline	338.50	±	23.21	323.50	±	40.92	0.317	0.006 #	0.139	0.022 #		320.36	±	45.01	350.27	±	48.34	0.149	0.081 †	0.392	0.257	
Δ4wk	12.90	±	11.88	8.75	±	15.00	0.487					9.91	±	25.56	5.00	±	27.04	0.666				
Δ8wk	8.80	±	13.69	13.75	±	9.28	0.326					10.45	±	19.77	-2.64	±	14.24	0.090 †				
Δ12wk	-7.30	±	13.51	8.83	±	12.60	0.009 #					2.27	±	21.90	-1.45	±	14.40	0.642				
UIBC (μg/dL)																						
Baseline	208.50	±	50.62	205.42	±	57.20	0.896	0.376	0.993	0.702		207.00	±	63.30	226.64	±	70.92	0.501	0.835	0.993	0.264	
Δ4wk	23.50	±	75.22	19.50	±	44.28	0.878					9.18	±	28.90	18.36	±	60.08	0.653				
Δ8wk	1.70	±	60.91	11.92	±	41.30	0.645					23.82	±	39.96	9.27	±	51.64	0.469				
Δ12wk	11.00	±	37.96	5.25	±	49.65	0.767					9.55	±	39.68	14.45	±	47.63	0.796				
Ferritin (ng/mL)																						
Baseline	150.87	±	97.97	179.27	±	106.56	0.526	0.036 #	0.723	0.723		93.40	±	52.65	149.37	±	75.67	0.058 †	0.621	0.136	0.136	
Δ12wk	-17.49	±	19.40	-12.67	±	38.51	0.723					-9.15	±	20.06	4.68	±	21.64	0.136				

L/S ratio																									
Baseline	1.09	±	0.22	0.97	±	0.33	0.317		0.232		0.031	#	0.031	#	1.13	±	0.21	1.07	±	0.21	0.491		0.038	#	0.755		0.755	
Δ12wk	-0.03	±	0.12	0.11	±	0.16	0.031	#							0.04	±	0.05	0.05	±	0.11	0.755							
TP (g/dL)																									
Baseline	7.37	±	0.35	7.21	±	0.24	0.209		0.071	†	0.246		0.015	#	7.26	±	0.34	7.57	±	0.37	0.056	†	0.233		0.975		0.781	
Δ4wk	0.07	±	0.29	0.08	±	0.24	0.909								-0.07	±	0.29	-0.05	±	0.35	0.843							
Δ8wk	0.07	±	0.31	0.09	±	0.19	0.848								-0.06	±	0.28	-0.11	±	0.25	0.693							
Δ12wk	-0.16	±	0.20	0.12	±	0.21	0.005	#							0.00	±	0.24	0.01	±	0.18	0.920							
Alb (g/dL)																									
Baseline	4.50	±	0.27	4.50	±	0.20	1.000		0.117		0.630		0.003	#	4.57	±	0.26	4.61	±	0.21	0.724		0.310		0.633		0.794	
Δ4wk	0.15	±	0.19	0.03	±	0.17	0.115								0.02	±	0.19	0.07	±	0.21	0.529							
Δ8wk	0.19	±	0.25	0.10	±	0.15	0.329								0.01	±	0.23	0.02	±	0.17	0.915							
Δ12wk	0.01	±	0.17	0.13	±	0.13	0.065	†							0.05	±	0.23	0.09	±	0.16	0.604							
A/G ratio																									
Baseline	1.60	±	0.25	1.67	±	0.13	0.396		0.002	#	0.066	†	0.057	†	1.71	±	0.18	1.58	±	0.22	0.143		0.472		0.461		0.876	
Δ4wk	0.09	±	0.07	-0.03	±	0.08	0.002	#							0.07	±	0.13	0.11	±	0.10	0.416							
Δ8wk	0.13	±	0.07	0.05	±	0.14	0.131								0.05	±	0.12	0.09	±	0.09	0.405							
Δ12wk	0.09	±	0.09	0.06	±	0.11	0.488								0.05	±	0.16	0.07	±	0.09	0.693							
TNF-α (pg/mL)																									
Baseline	2.67	±	0.58	2.68	±	0.50	0.970		<0.001	#	0.307		0.307		2.23	±	0.41	2.55	±	1.01	0.349		<0.001	#	0.197		0.197	
Δ12wk	0.60	±	0.43	0.40	±	0.47	0.307								0.40	±	0.34	0.65	±	0.50	0.197							
IL-1β (pg/mL)																									
Baseline	0.47	±	0.18	0.46	±	0.18	0.930		<0.001	#	0.841		0.841		0.40	±	0.13	0.64	±	0.43	0.095	†	<0.001	#	0.624		0.624	
Δ12wk	-0.28	±	0.07	-0.27	±	0.11	0.841								-0.28	±	0.05	-0.25	±	0.17	0.624							
IL-6 (pg/mL)																									
Baseline	1.53	±	0.74	1.70	±	0.88	0.643		<0.001	#	0.581		0.581		1.48	±	0.90	2.22	±	1.21	0.123		<0.001	#	0.162		0.162	
Δ12wk	-0.47	±	0.34	-0.56	±	0.39	0.581								-0.47	±	0.52	-0.83	±	0.64	0.162							
Body weight (kg)																									
Baseline	71.85	±	7.46	73.63	±	7.86	0.594		0.124		0.157		0.256		63.95	±	8.66	65.63	±	5.30	0.591		0.001	#	0.091	†	0.028	#
Δ4wk	0.94	±	1.91	0.37	±	1.00	0.377								0.26	±	0.76	-0.02	±	0.61	0.349							
Δ8wk	0.48	±	1.45	-0.07	±	1.11	0.327								0.09	±	0.85	-0.28	±	1.05	0.373							
Δ12wk	0.88	±	1.62	-0.33	±	1.07	0.049	#							0.02	±	1.03	-1.12	±	1.05	0.019	#						
BMI (kg/m^2)																									
Baseline	26.49	±	1.21	27.29	±	1.30	0.152		0.112		0.143		0.215		23.99	±	0.90	23.84	±	0.80	0.675		0.002	#	0.094	†	0.039	#
Δ4wk	0.35	±	0.67	0.14	±	0.37	0.365								0.09	±	0.30	-0.03	±	0.22	0.306							
Δ8wk	0.19	±	0.53	-0.03	±	0.41	0.298								0.05	±	0.31	-0.09	±	0.40	0.380							
Δ12wk	0.34	±	0.65	-0.13	±	0.38	0.049	#							0.01	±	0.39	-0.40	±	0.37	0.021	#						
Body fat percentage (%)																									
Baseline	31.46	±	6.74	31.81	±	6.10	0.900		0.026	#	0.497		0.770		30.51	±	6.49	26.18	±	5.87	0.116		<0.001	#	0.564		0.206	
Δ4wk	0.42	±	0.55	0.23	±	0.98	0.598								0.89	±	1.04	0.65	±	0.72	0.542							
Δ8wk	0.60	±	0.67	0.25	±	1.20	0.422								0.40	±	1.39	0.46	±	0.83	0.897							
Δ12wk	-0.03	±	0.90	-0.18	±	0.97	0.707								0.31	±	1.26	-0.25	±	1.05	0.277							
Adiponectin (μg/mL)																									
Baseline	8.81	±	3.24	6.89	±	2.08	0.127		0.037	#	0.174		0.174		10.41	±	5.25	8.17	±	2.72	0.229		0.132		0.142		0.142	
Δ12wk	-0.59	±	0.78	-0.13	±	0.73	0.174								-0.71	±	1.23	-0.01	±	0.88	0.142							
Leptin (ng/mL)																									
Baseline	19.53	±	11.36	22.48	±	16.95	0.645		0.354		0.340		0.340		15.27	±	7.49	12.01	±	4.95	0.242		<0.001	#	0.007	#	0.007	#
Δ12wk	0.05	±	10.92	-3.26	±	3.99	0.340								-0.41	±	2.12	-2.71	±	1.24	0.007	#						

Values are presented as the mean ± SD.

*P-values were determined by independent sample t-tests; †: P <0.10, #: P <0.05.

Supplementary Table 4. Effects of SM DNA on vital signs and blood parameters

	Placebo (n = 22–25)			SM DNA (n = 24)			*P*-value*
Systolic blood pressure (mmHg)							
Baseline	129.96	±	17.08	132.13	±	18.05	0.668
Δ4wk	0.39	±	10.50	2.17	±	9.48	0.545
Δ8wk	-1.48	±	10.00	0.46	±	8.81	0.484
Δ12wk	-4.36	±	10.05	-0.83	±	9.11	0.218
Diastolic blood pressure (mmHg)							
Baseline	81.24	±	11.26	85.63	±	10.95	0.174
Δ4wk	-1.96	±	7.32	1.42	±	5.77	0.085†
Δ8wk	-3.70	±	4.92	0.17	±	6.38	0.025#
Δ12wk	-3.50	±	6.86	-0.33	±	5.08	0.080†
Pulse rate (times/min)							
Baseline	74.96	±	14.31	74.79	±	10.49	0.963
Δ4wk	-5.96	±	8.74	-2.17	±	8.58	0.141
Δ8wk	-1.35	±	9.45	-1.79	±	10.98	0.883
Δ12wk	-4.59	±	9.94	-1.63	±	8.27	0.276
WBC ($\times 10^3/\mu L$)							
Baseline	5.89	±	1.25	5.33	±	1.03	0.090†
Δ4wk	-0.31	±	0.67	-0.13	±	1.11	0.509
Δ8wk	0.32	±	0.80	-0.04	±	1.03	0.185
Δ12wk	-0.09	±	0.79	0.30	±	1.26	0.219
RBC ($\times 10^4/\mu L$)							
Baseline	488.00	±	55.65	484.33	±	39.04	0.791
Δ4wk	4.91	±	16.71	5.79	±	18.49	0.865
Δ8wk	12.35	±	18.04	11.38	±	12.57	0.832
Δ12wk	7.55	±	18.75	10.33	±	17.08	0.600
Hb (g/dL)							
Baseline	14.58	±	1.69	14.85	±	1.25	0.536
Δ4wk	0.14	±	0.43	0.10	±	0.55	0.765
Δ8wk	0.42	±	0.58	0.34	±	0.41	0.586
Δ12wk	0.19	±	0.62	0.27	±	0.47	0.600
Ht (%)							
Baseline	44.45	±	4.82	44.94	±	3.94	0.702
Δ4wk	0.93	±	1.68	0.97	±	1.81	0.931
Δ8wk	2.09	±	1.88	2.03	±	1.24	0.902
Δ12wk	0.52	±	1.83	0.78	±	1.32	0.585
Plt ($\times 10^3/\mu L$)							

	Baseline	26.47	±	5.79	24.55	±	4.88	0.218
	Δ4wk	-0.08	±	2.36	0.14	±	3.88	0.811
	Δ8wk	0.16	±	2.17	0.03	±	2.31	0.842
	Δ12wk	-0.99	±	1.98	-0.65	±	2.81	0.635
BUN (mg/dL)								
	Baseline	13.65	±	3.88	14.43	±	2.98	0.434
	Δ4wk	-0.93	±	3.13	0.10	±	2.54	0.219
	Δ8wk	-0.56	±	3.35	-0.42	±	2.77	0.877
	Δ12wk	-0.43	±	2.94	0.05	±	2.26	0.535
CRE (mg/dL)								
	Baseline	0.79	±	0.17	0.80	±	0.15	0.756
	Δ4wk	0.02	±	0.05	0.01	±	0.04	0.601
	Δ8wk	0.02	±	0.06	0.03	±	0.04	0.777
	Δ12wk	0.00	±	0.04	0.03	±	0.05	0.037#
UA (mg/dL)								
	Baseline	5.36	±	0.99	5.69	±	1.41	0.344
	Δ4wk	-0.02	±	0.59	0.08	±	0.67	0.605
	Δ8wk	0.02	±	0.62	0.02	±	0.82	0.997
	Δ12wk	-0.05	±	0.69	0.15	±	0.70	0.334
T-Cho (mg/dL)								
	Baseline	217.80	±	44.00	225.83	±	35.75	0.488
	Δ4wk	8.61	±	19.62	9.29	±	21.71	0.911
	Δ8wk	12.83	±	19.01	6.29	±	18.45	0.238
	Δ12wk	7.82	±	18.05	9.71	±	22.23	0.754
HDL-Cho (mg/dL)								
	Baseline	59.80	±	12.33	58.83	±	12.59	0.787
	Δ4wk	-0.61	±	5.37	2.00	±	7.00	0.160
	Δ8wk	-0.09	±	6.46	0.29	±	4.74	0.819
	Δ12wk	0.73	±	6.30	3.00	±	4.24	0.155
LDL-Cho (mg/dL)								
	Baseline	140.04	±	44.27	145.58	±	31.43	0.617
	Δ4wk	5.61	±	21.54	2.92	±	19.01	0.651
	Δ8wk	5.17	±	18.22	0.50	±	13.78	0.325
	Δ12wk	3.55	±	16.29	4.42	±	16.92	0.860
TG (mg/dL)								
	Baseline	117.80	±	64.86	133.33	±	66.88	0.413
	Δ4wk	9.00	±	54.93	15.63	±	83.20	0.750
	Δ8wk	-2.00	±	37.72	-6.38	±	44.33	0.718
	Δ12wk	6.45	±	54.81	0.79	±	53.30	0.724

Fasting blood glucose (mg/dL)							
	Baseline	91.92	±	10.68	97.38	± 11.57	0.093†
	Δ4wk	1.35	±	5.10	-0.63	± 5.98	0.231
	Δ8wk	1.22	±	6.01	-2.04	± 5.41	0.057†
	Δ12wk	2.27	±	3.56	-0.79	± 5.76	0.037#
HbA1c (%)							
	Baseline	5.61	±	0.36	5.61	± 0.43	0.998
	Δ4wk	-0.06	±	0.11	0.00	± 0.12	0.123
	Δ8wk	-0.05	±	0.09	-0.02	± 0.14	0.441
	Δ12wk	-0.10	±	0.10	-0.09	± 0.14	0.725
HOMA-IR							
	Baseline	1.51	±	0.59	2.01	± 0.92	0.026#
	Δ4wk	0.15	±	0.60	-0.22	± 0.89	0.103
	Δ8wk	0.03	±	0.49	-0.44	± 0.57	0.004#
	Δ12wk	0.15	±	0.68	-0.12	± 0.71	0.207

Values are presented as the mean ± SD.

*P-values are determined by independent sample t-tests; †: P <0.10, #: P <0.05.

Supplementary Table 5. Effect of SM DNA on primary endpoints obtained after subgroup analysis based on the sex of the participants

	Male			Female		
	Placebo (n = 11)	SM DNA (n = 16)	*P*-value*	Placebo (n = 10)	SM DNA (n = 7)	*P*-value*
ALT (U/L)						
Baseline	39.91 ± 14.58	38.75 ± 12.61	0.827	32.60 ± 9.45	30.00 ± 12.60	0.633
Δ4wk	5.00 ± 20.00	3.75 ± 16.01	0.858	0.50 ± 6.54	4.57 ± 19.41	0.610
Δ8wk	0.18 ± 10.86	-0.38 ± 11.67	0.901	1.70 ± 8.83	-3.29 ± 8.52	0.263
Δ12wk	-0.73 ± 8.49	-0.50 ± 16.67	0.963	-2.80 ± 5.92	0.86 ± 4.98	0.202
AST (U/L)						
Baseline	28.27 ± 6.00	27.06 ± 4.28	0.545	26.00 ± 6.86	25.86 ± 9.14	0.971
Δ4wk	1.00 ± 7.85	3.50 ± 6.30	0.368	-1.50 ± 3.84	1.14 ± 12.27	0.599
Δ8wk	-1.09 ± 5.87	0.19 ± 3.29	0.523	-1.30 ± 4.03	-2.29 ± 5.82	0.684
Δ12wk	-1.09 ± 3.91	0.13 ± 4.80	0.493	-3.30 ± 2.98	-1.86 ± 2.79	0.330
γ-GTP (U/L)						
Baseline	73.64 ± 85.05	83.25 ± 60.20	0.733	50.70 ± 42.53	51.00 ± 25.94	0.987
Δ4wk	30.18 ± 69.92	4.44 ± 28.40	0.269	-1.00 ± 12.99	19.86 ± 49.13	0.311
Δ8wk	2.91 ± 33.69	-6.25 ± 29.40	0.460	-3.30 ± 14.24	-2.86 ± 14.84	0.951
Δ12wk	-3.91 ± 21.94	-10.56 ± 41.26	0.592	-13.50 ± 23.76	-0.86 ± 15.77	0.239
ALP (U/L)						
Baseline	233.91 ± 46.84	222.13 ± 69.88	0.630	233.00 ± 68.27	267.29 ± 98.42	0.408
Δ4wk	14.09 ± 38.56	2.31 ± 31.32	0.390	6.20 ± 14.65	17.29 ± 67.36	0.682
Δ8wk	-6.73 ± 23.07	1.94 ± 39.35	0.519	6.70 ± 13.82	-7.57 ± 18.85	0.091†
Δ12wk	-4.91 ± 21.97	2.31 ± 39.99	0.592	1.20 ± 22.30	-3.71 ± 23.39	0.667
LDH (U/L)						
Baseline	186.27 ± 33.09	176.50 ± 19.34	0.342	184.50 ± 36.23	182.43 ± 20.16	0.893
Δ4wk	7.00 ± 14.99	8.94 ± 9.41	0.683	0.60 ± 9.89	4.00 ± 16.58	0.603
Δ8wk	-5.00 ± 14.86	-1.63 ± 8.76	0.464	-1.70 ± 13.28	-4.14 ± 18.86	0.757
Δ12wk	0.45 ± 6.01	4.81 ± 13.98	0.280	4.30 ± 17.67	1.57 ± 9.93	0.718
ChE (U/L)						
Baseline	414.55 ± 54.17	416.75 ± 64.54	0.927	377.20 ± 83.53	414.29 ± 44.76	0.303
Δ4wk	13.36 ± 22.59	13.69 ± 28.51	0.975	10.40 ± 39.43	1.57 ± 21.91	0.601
Δ8wk	5.64 ± 18.23	7.44 ± 20.89	0.819	14.80 ± 29.88	7.14 ± 18.32	0.557
Δ12wk	2.18 ± 21.58	-0.56 ± 25.76	0.774	3.90 ± 28.82	7.86 ± 16.76	0.750
AST/ALT ratio						
Baseline	0.76 ± 0.19	0.75 ± 0.19	0.879	0.82 ± 0.20	0.91 ± 0.21	0.414
Δ4wk	-0.03 ± 0.18	-0.01 ± 0.16	0.739	-0.08 ± 0.20	-0.08 ± 0.20	0.985
Δ8wk	-0.04 ± 0.13	-0.01 ± 0.12	0.466	-0.07 ± 0.13	0.04 ± 0.18	0.183
Δ12wk	0.00 ± 0.07	0.00 ± 0.19	0.943	0.00 ± 0.09	-0.11 ± 0.15	0.093 †

TIBC (μg/dL)																
Baseline	347.09	±	23.42	337.50	±	50.66	0.515		309.10	±	39.14	333.57	±	34.94	0.205	
Δ4wk	11.45	±	15.87	7.13	±	22.43	0.587		11.20	±	24.34	6.57	±	19.65	0.683	
Δ8wk	11.73	±	11.34	6.06	±	15.99	0.322		7.40	±	21.67	5.57	±	10.67	0.840	
Δ12wk	-5.64	±	13.63	1.69	±	14.46	0.198		1.40	±	23.10	9.00	±	13.09	0.446	
UIBC (μg/dL)																
Baseline	219.09	±	58.47	202.69	±	69.52	0.527		195.20	±	53.70	245.00	±	35.68	0.005	#
Δ4wk	19.64	±	71.08	29.38	±	52.03	0.684		12.00	±	32.51	-4.86	±	43.53	0.374	
Δ8wk	14.18	±	59.83	17.19	±	51.22	0.890		12.30	±	42.30	-4.29	±	25.39	0.371	
Δ12wk	10.82	±	38.85	21.25	±	52.43	0.580		9.60	±	38.91	-16.86	±	18.22	0.117	
Ferritin (ng/mL)																
Baseline	150.76	±	97.11	192.91	±	93.25	0.267		87.77	±	42.57	101.10	±	51.33	0.568	
Δ12wk	-11.46	±	22.86	-3.68	±	38.45	0.553		-14.95	±	16.62	-5.96	±	9.31	0.217	
L/S ratio																
Baseline	1.13	±	0.19	0.93	±	0.26	0.047	#	1.09	±	0.23	1.20	±	0.22	0.363	
Δ12wk	-0.01	±	0.11	0.11	±	0.15	0.034	#	0.01	±	0.07	0.00	±	0.05	0.680	
TP (g/dL)																
Baseline	7.46	±	0.28	7.33	±	0.34	0.295		7.15	±	0.33	7.50	±	0.39	0.065	†
Δ4wk	-0.07	±	0.25	0.02	±	0.26	0.369		0.07	±	0.33	0.03	±	0.40	0.818	
Δ8wk	-0.11	±	0.24	0.01	±	0.25	0.246		0.12	±	0.30	-0.03	±	0.23	0.293	
Δ12wk	-0.17	±	0.16	0.08	±	0.21	0.002	#	0.03	±	0.26	0.03	±	0.17	0.990	
Alb (g/dL)																
Baseline	4.70	±	0.19	4.57	±	0.22	0.125		4.36	±	0.21	4.51	±	0.20	0.148	
Δ4wk	0.02	±	0.19	0.06	±	0.18	0.541		0.15	±	0.19	0.01	±	0.21	0.186	
Δ8wk	0.02	±	0.22	0.09	±	0.16	0.353		0.18	±	0.26	0.00	±	0.14	0.120	
Δ12wk	-0.05	±	0.14	0.13	±	0.14	0.003	#	0.12	±	0.22	0.07	±	0.15	0.621	
A/G ratio																
Baseline	1.77	±	0.18	1.74	±	0.22	0.684		1.66	±	0.21	1.56	±	0.24	0.400	
Δ4wk	-0.04	±	0.12	-0.08	±	0.13	0.523		-0.08	±	0.15	-0.02	±	0.08	0.340	
Δ8wk	0.01	±	0.10	-0.02	±	0.13	0.560		0.03	±	0.09	-0.02	±	0.06	0.280	
Δ12wk	0.04	±	0.10	0.02	±	0.10	0.626		0.02	±	0.09	0.00	±	0.09	0.668	
TNF-α (pg/mL)																
Baseline	2.56	±	0.55	2.65	±	0.86	0.757		2.31	±	0.51	2.54	±	0.57	0.406	
Δ12wk	0.38	±	0.36	0.54	±	0.57	0.424		0.63	±	0.39	0.46	±	0.23	0.343	
IL-1β (pg/mL)																
Baseline	0.41	±	0.17	0.56	±	0.38	0.184		0.46	±	0.15	0.53	±	0.21	0.436	
Δ12wk	-0.28	±	0.07	-0.28	±	0.15	0.995		-0.27	±	0.04	-0.21	±	0.11	0.193	
IL-6 (pg/mL)																
Baseline	1.32	±	0.77	1.82	±	1.19	0.235		1.71	±	0.84	2.22	±	0.67	0.194	

Δ12wk	-0.37	±	0.28	-0.67	±	0.63	0.108		-0.59	±	0.54	-0.75	±	0.25	0.472	
Body weight (kg)																
Baseline	73.97	±	6.95	73.19	±	6.12	0.761		60.83	±	4.59	62.06	±	5.19	0.614	
Δ4wk	0.87	±	1.82	0.14	±	0.85	0.238		0.27	±	0.80	0.27	±	0.89	0.997	
Δ8wk	0.34	±	1.33	-0.29	±	1.17	0.210		0.21	±	1.01	0.10	±	0.77	0.811	
Δ12wk	0.34	±	1.22	-0.92	±	1.18	0.013	#	0.53	±	1.60	-0.21	±	0.79	0.276	
BMI (kg/m^2)																
Baseline	25.39	±	1.91	25.65	±	2.17	0.752		24.95	±	1.36	25.61	±	1.95	0.419	
Δ4wk	0.31	±	0.63	0.05	±	0.31	0.229		0.11	±	0.33	0.09	±	0.36	0.889	
Δ8wk	0.13	±	0.47	-0.10	±	0.42	0.203		0.10	±	0.39	0.04	±	0.34	0.759	
Δ12wk	0.12	±	0.43	-0.33	±	0.41	0.012	#	0.22	±	0.67	-0.10	±	0.32	0.260	
Body fat percentage (%)																
Baseline	25.99	±	3.99	25.35	±	3.14	0.644		36.43	±	3.40	37.73	±	2.65	0.412	
Δ4wk	0.37	±	0.56	0.25	±	0.86	0.681		0.99	±	1.03	0.86	±	0.80	0.779	
Δ8wk	0.19	±	0.75	0.13	±	1.01	0.870		0.83	±	1.32	0.86	±	0.91	0.963	
Δ12wk	-0.25	±	0.60	-0.35	±	1.07	0.791		0.59	±	1.35	0.10	±	0.76	0.402	
Adiponectin (μg/mL)																
Baseline	7.42	±	2.73	6.88	±	2.36	0.591		12.10	±	4.64	8.93	±	2.13	0.114	
Δ12wk	-0.24	±	0.73	-0.33	±	0.62	0.720		-1.11	±	1.13	0.51	±	0.87	0.006	#
Leptin (ng/mL)																
Baseline	12.07	±	6.17	12.26	±	4.53	0.930		23.05	±	9.46	29.39	±	19.58	0.386	
Δ12wk	-1.48	±	3.68	-2.93	±	2.08	0.256		1.23	±	10.25	-3.14	±	4.61	0.311	

Values are presented as the mean ± SD.

*P-values were determined by independent sample t-tests; †: P <0.10, #: P <0.05.

Supplementary Table 6. Effect of SM DNA on hepatic function markers obtained after subgroup analysis based on the lower ALT values (<51 U/L) participants

	Male					Female				
	Placebo (n = 11)		SM DNA (n = 16)		*P*-value*	Placebo (n = 10)		SM DNA (n = 7)		*P*-value*
ALT (U/L)										
Baseline	32.38 ± 7.91		35.43 ± 8.36		0.407	30.56 ± 7.32		30.00 ± 12.60		0.920
Δ4wk	7.75 ± 22.70		7.29 ± 11.51		0.958	0.00 ± 6.73		4.57 ± 19.41		0.570
Δ8wk	3.38 ± 9.16		2.14 ± 7.62		0.753	1.22 ± 9.23		-3.29 ± 8.52		0.329
Δ12wk	0.13 ± 5.41		2.79 ± 11.30		0.466	-2.67 ± 6.26		0.86 ± 4.98		0.231
AST (U/L)										
Baseline	25.63 ± 4.50		27.07 ± 4.45		0.478	24.56 ± 5.43		25.86 ± 9.14		0.746
Δ4wk	3.38 ± 7.73		3.57 ± 6.72		0.953	-2.33 ± 2.96		1.14 ± 12.27		0.489
Δ8wk	1.13 ± 5.03		0.29 ± 3.52		0.684	-1.33 ± 4.27		-2.29 ± 5.82		0.723
Δ12wk	-0.13 ± 2.70		0.57 ± 4.97		0.675	-3.22 ± 3.15		-1.86 ± 2.79		0.375
γ-GTP (U/L)										
Baseline	40.63 ± 11.16		64.14 ± 31.85		0.022 #	53.00 ± 44.44		51.00 ± 25.94		0.912
Δ4wk	23.63 ± 63.47		11.50 ± 16.69		0.611	-0.78 ± 13.75		19.86 ± 49.13		0.318
Δ8wk	10.88 ± 30.96		2.36 ± 11.46		0.475	-3.89 ± 14.97		-2.86 ± 14.84		0.893
Δ12wk	1.63 ± 8.57		0.21 ± 20.24		0.822	-14.78 ± 24.83		-0.86 ± 15.77		0.195
ALP (U/L)										
Baseline	220.25 ± 44.88		202.07 ± 45.58		0.378	226.78 ± 69.34		267.29 ± 98.42		0.376
Δ4wk	11.88 ± 25.65		8.50 ± 19.24		0.752	4.67 ± 14.66		17.29 ± 67.36		0.643
Δ8wk	1.75 ± 18.06		9.21 ± 24.88		0.428	7.00 ± 14.62		-7.57 ± 18.85		0.119
Δ12wk	-0.25 ± 20.82		9.36 ± 23.50		0.335	-1.67 ± 21.62		-3.71 ± 23.39		0.860
LDH (U/L)										
Baseline	181.75 ± 30.20		178.07 ± 20.25		0.765	180.89 ± 36.47		182.43 ± 20.16		0.916
Δ4wk	10.50 ± 15.41		8.86 ± 10.08		0.792	-0.11 ± 10.22		4.00 ± 16.58		0.578
Δ8wk	-1.75 ± 15.96		-1.86 ± 8.98		0.986	-1.89 ± 14.08		-4.14 ± 18.86		0.797
Δ12wk	1.13 ± 5.17		7.21 ± 13.05		0.139	4.56 ± 18.72		1.57 ± 9.93		0.689
ChE (U/L)										
Baseline	416.38 ± 62.29		415.50 ± 66.56		0.976	376.11 ± 88.52		414.29 ± 44.76		0.283
Δ4wk	9.38 ± 25.31		12.64 ± 30.27		0.790	9.00 ± 41.55		1.57 ± 21.91		0.653
Δ8wk	4.25 ± 21.46		7.79 ± 21.28		0.715	11.78 ± 30.03		7.14 ± 18.32		0.709
Δ12wk	0.50 ± 24.85		-0.29 ± 26.79		0.946	0.56 ± 28.43		7.86 ± 16.76		0.533
AST/ALT ratio										
Baseline	0.82 ± 0.18		0.79 ± 0.16		0.667	0.83 ± 0.21		0.91 ± 0.21		0.476
Δ4wk	-0.02 ± 0.22		-0.05 ± 0.11		0.710	-0.09 ± 0.21		-0.08 ± 0.20		0.887

Δ8wk	-0.05	±	0.14	-0.03	±	0.09	0.735	-0.06	±	0.14	0.04	±	0.18	0.243
Δ12wk	0.01	±	0.07	-0.03	±	0.14	0.312	0.00	±	0.09	-0.11	±	0.15	0.137
L/S ratio														
Baseline	1.12	±	0.21	0.92	±	0.27	0.071	1.13	±	0.21	1.20	±	0.22	0.559
Δ12wk	-0.02	±	0.12	0.11	±	0.16	0.044 #	0.00	±	0.07	0.00	±	0.05	0.856

Values are presented as the mean ± SD.

*P-values were determined by independent sample t-tests; †: P <0.10, #: P <0.05.