

Supporting Information

Discovery of JND003 as a New Selective Estrogen-Related Receptor α (ERR α) Agonist Alleviating Nonalcoholic Fatty Liver Disease and Insulin Resistance

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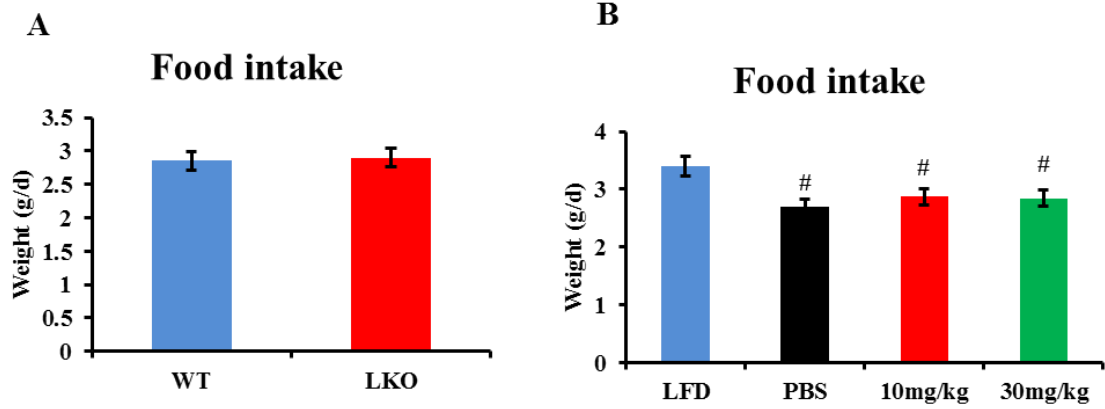


FIG. S1. Food intake of mice. (A) Food intake of wild-type and LKO mice; (B) Food intake between PBS and JND003 treated mice. [#] $p < 0.05$, compared with control mice, $n=5$.

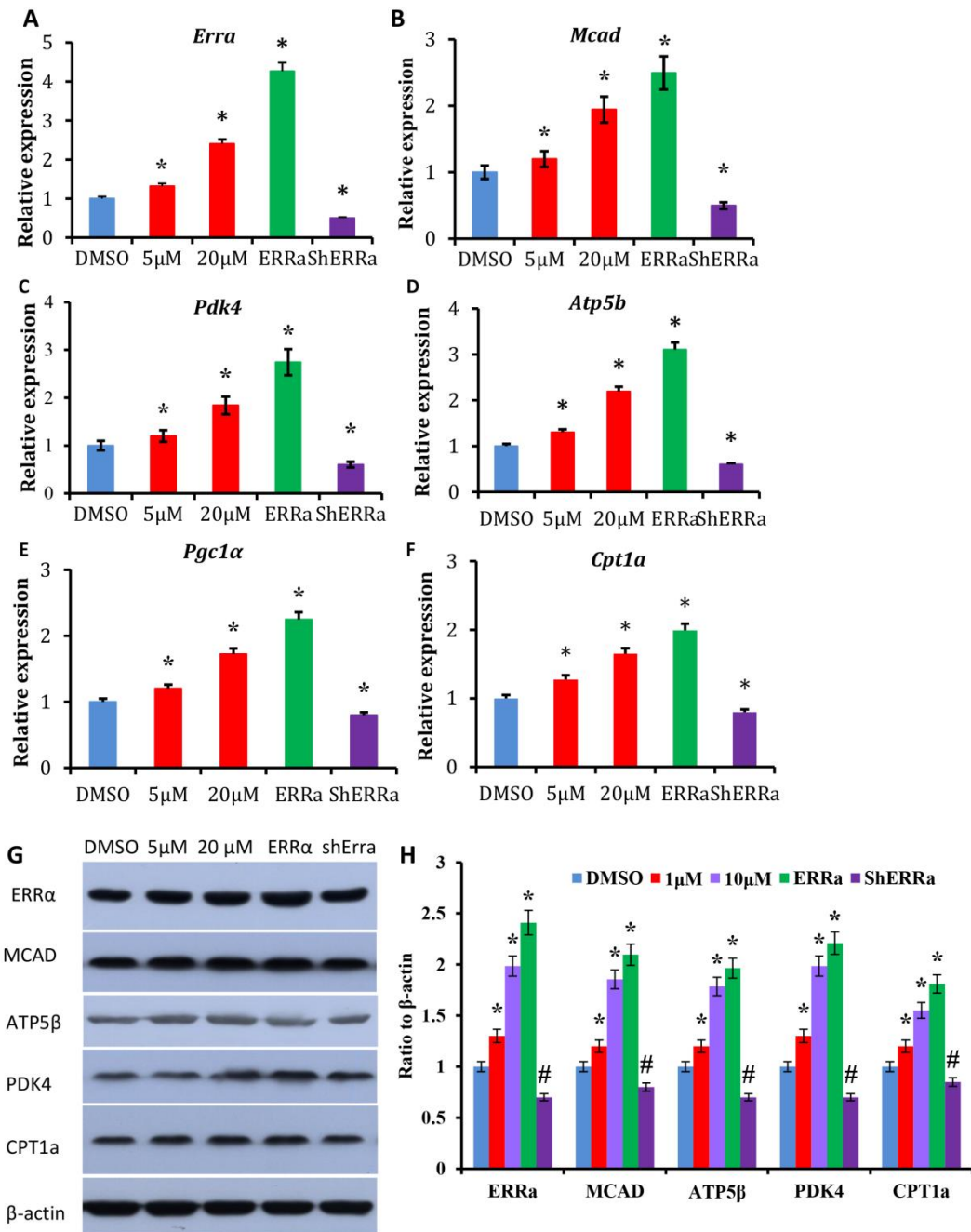


FIG. S2. JND003 (Compound 7) enhances the expression of ERRα and related genes in HepG2-IR cells. Relative RNA expression of (A) *Erra*, (B) *Mcad*, (C) *Pdk4*, (D) *Atp5β*, (E) *Pgc1α* and (F) *Cpt1a* with HepG2-IR cells treated by JND003 or DMSO; (G-H) western blot results with HepG2-IR cells treated by JND003 or DMSO. * $p < 0.05$ vs. DMSO.

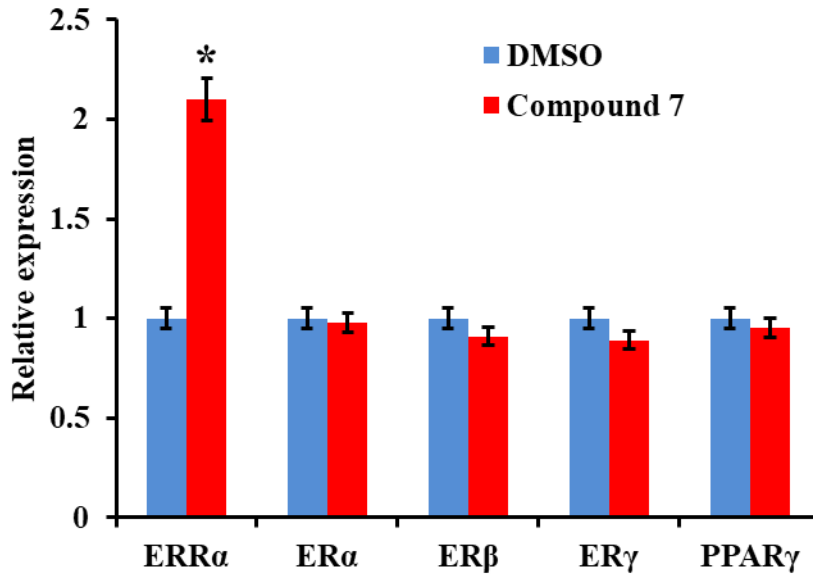


FIG. S3. Compound 7 (JND003) selectively elevates the activity of ERRα. * $p < 0.05$ vs. DMSO.

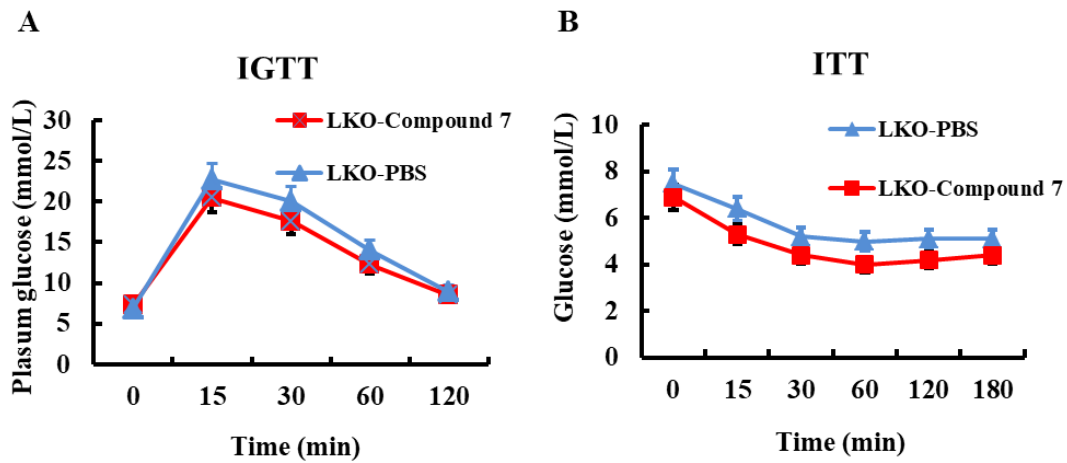
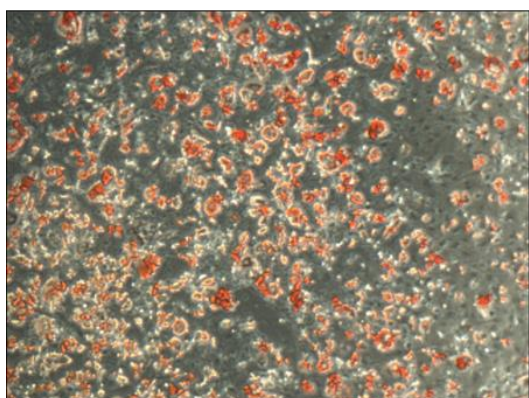


FIG. S4. IGTT and ITT in ERRα-LKO mice. (A) IGTT and (B) ITT have no obvious difference between JND003 and control group in ERRα-LKO mice on HFD.

Control



Compound 7

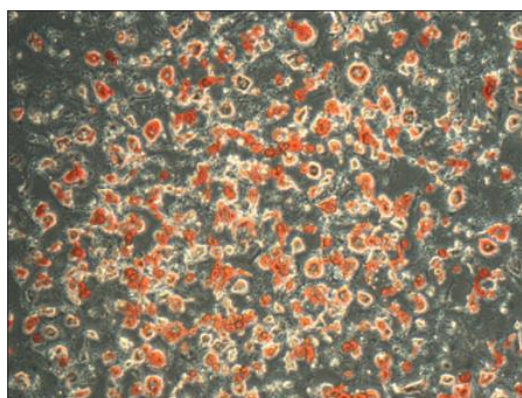
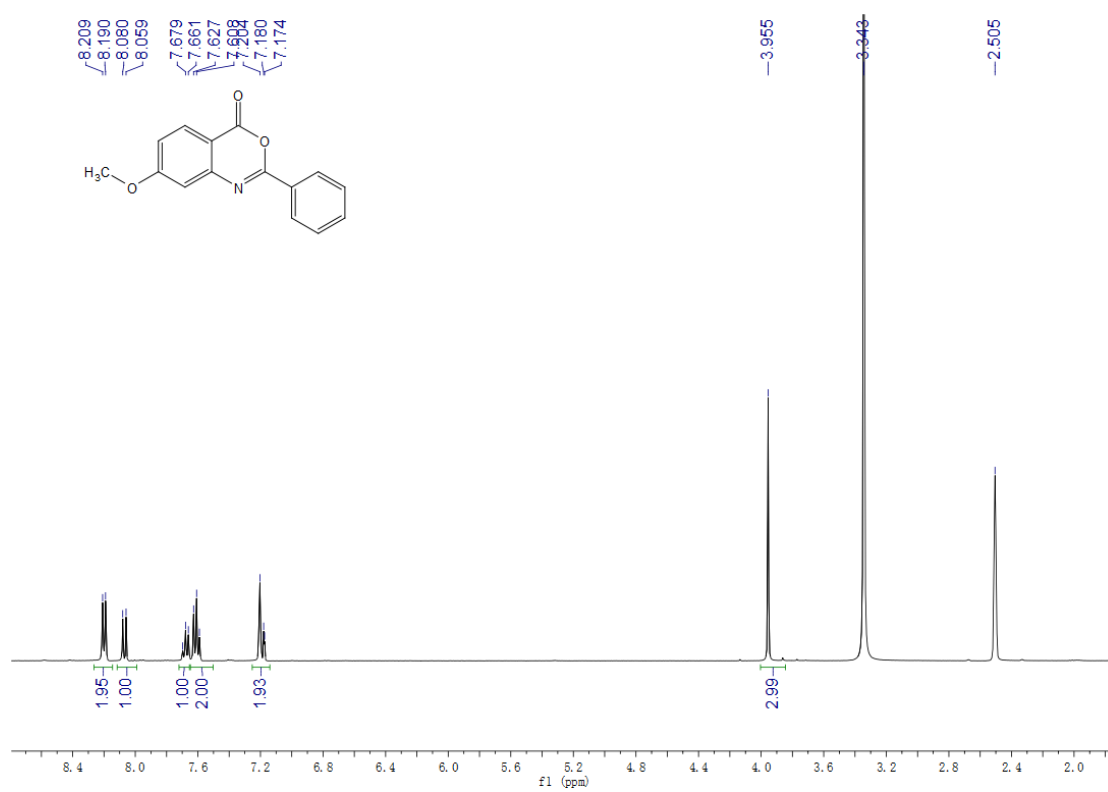
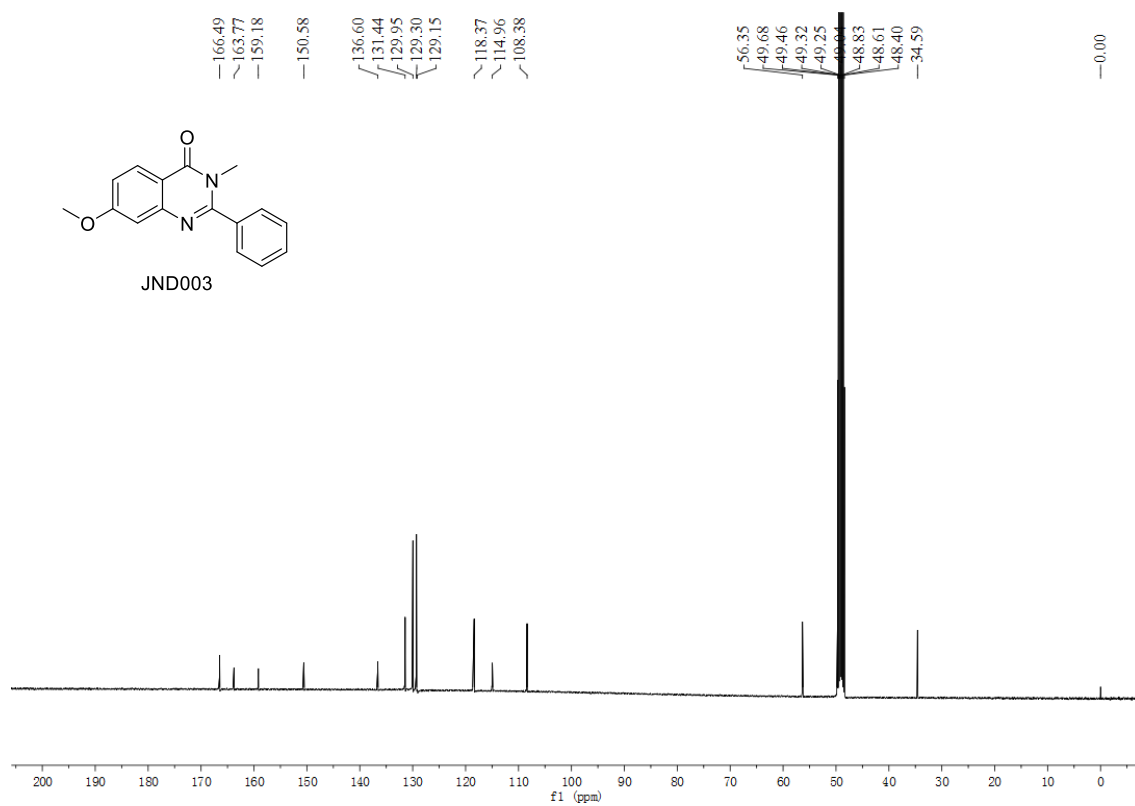
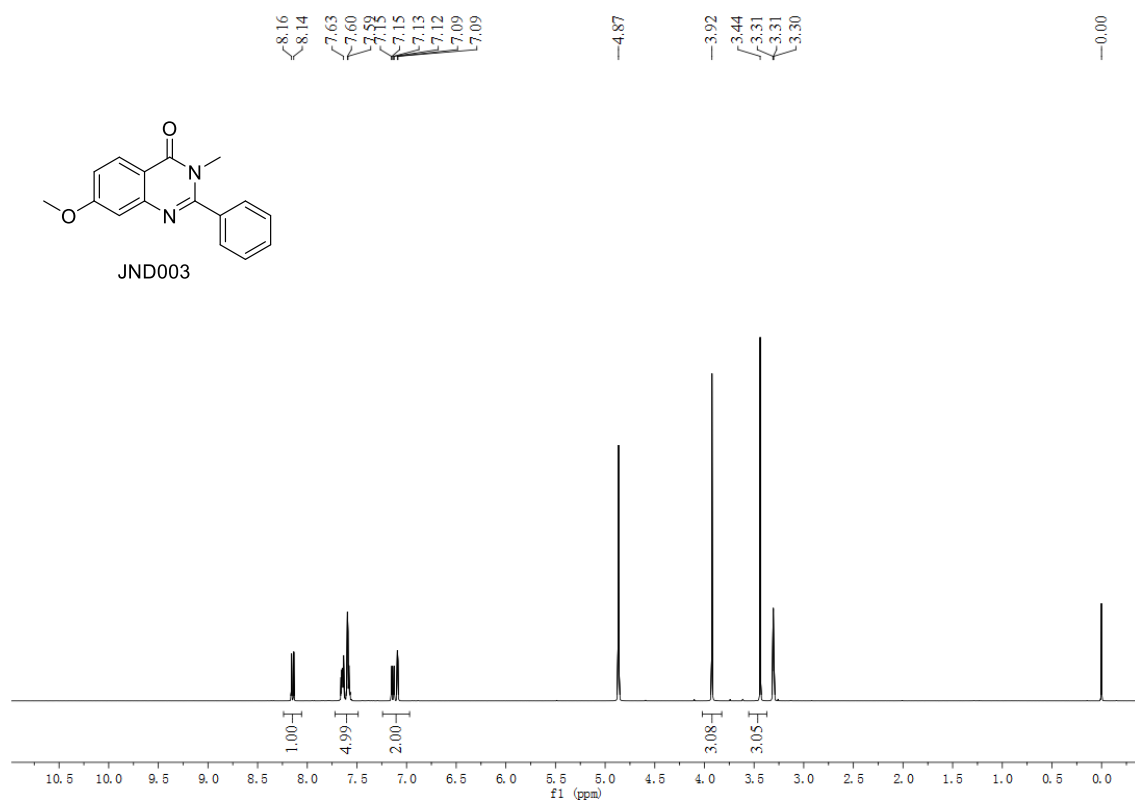


FIG. S5. Compound 7 (JND003) has no obvious effect on the differentiation of adipocytes in 3T3L1 cell.

The ^1H NMR spectra of compound 9:



The ^1H and ^{13}C NMR spectra of compound JND003:

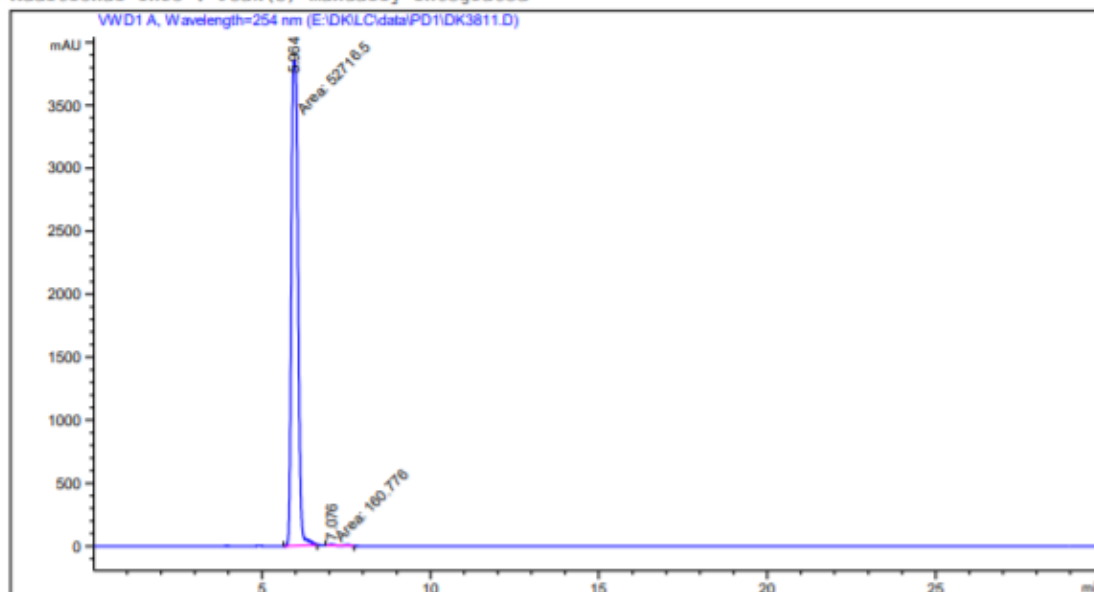


HPLC Purity Analysis of compound JND003:

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Acq. Operator   : 系统
Sample Operator : 系统
Acq. Instrument : 1260LC                      Location : 1
Injection Date  : 03/06/2021 10:11:22
                                           Inj Volume : 3.000 µl

Acq. Method     : E:\DK\TL\方法80C-20D-30min-1u.M
Last changed    : 03/06/2021 10:10:28 by 系统
                 (modified after loading)
Analysis Method : C:\Chem32\1\Methods\DEF_LC.M
Last changed    : 23/06/2014 04:13:01 by SYSTEM
Additional Info  : Peak(s) manually integrated
  
```



Area Percent Report

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Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Sample Amount  : 10.00000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
  
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	5.964	MM	0.2283	5.27165e4	3849.22583	99.6959
2	7.076	MM	0.3338	160.77625	8.02716	0.3041

Totals : 5.28772e4 3857.25299

Table S1. Pharmacokinetic parameters of compound 7 in SD rats^a

Route	T _{1/2} (h)	C _{max} (ng/mL)	AUC _(0-∞) (h*ng/mL)	Cl (mL/h/kg)	F (%)
IV (2mg/kg)	0.83±0.13	2125.44±439.00	857.18±68.62	2342.96±182.23	9.03±2.66
PO (10mg/kg)	0.74±0.07	531.03±120.31	382.57±110.38		

^a SD rats (male, three animals per group) weighing 250-270 g were used for the study.

Table S2. Tissue distribution of compound 7 in SD rats

Group 1- Compound 7-PO-30 mg/kg-Rat-Brain					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound -Brain Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	BLQ	BLQ	BLQ	NA	NA
0.5	2.01	1.36	2.19	1.85	0.44
2	1.02	BLQ	2.61	1.82	1.12
4	BLQ	BLQ	BLQ	NA	NA
Time (h)	COMPOUND 7-Brain Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	NA	NA	NA	NA	NA
0.5	22.07	14.95	24.12	20.38	4.82
2	11.27	NA	28.74	20.00	12.36
4	NA	NA	NA	NA	NA
Time (h)	Ratio-Brain tissue/Plasma			Mean	SD
	101	102	103		
0.25	NA	NA	NA	NA	NA
0.5	0.47	0.80	0.62	0.63	0.16
2	0.70	NA	0.70	0.70	0.00
4	NA	NA	NA	NA	NA
*, Detection value ×Dilution factor(11)					
NA=Not applicable					

BLQ = Below the lower limit of quantitation (LLOQ)					
Group 1- Compound 7-PO-30 mg/kg-Rat-Heart					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Heart Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	BLQ	BLQ	BLQ	NA	NA
0.5	2.07	1.49	2.19	1.92	0.37
2	BLQ	BLQ	2.81	NA	NA
4	BLQ	BLQ	BLQ	NA	NA
Time (h)	Compound 7-Heart Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	NA	NA	NA	NA	NA
0.5	22.73	16.44	24.14	21.10	4.10
2	NA	NA	30.91	NA	NA
4	NA	NA	NA	NA	NA
Time (h)	Ratio-Hearttissue/Plasma			Mean	SD
	101	102	103		
0.25	NA	NA	MA	NA	NA
0.5	0.49	0.88	0.62	0.66	0.20
2	NA	NA	0.76	NA	NA
4	NA	NA	NA	NA	NA
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Lung					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16

Time (h)	Compound 7-Lung Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	1.38	BLQ	1.40	1.39	0.01
0.5	2.82	1.75	2.94	2.50	0.65
2	1.33	1.42	3.64	2.13	1.31
4	BLQ	BLQ	BLQ	NA	NA
Time (h)	Compound 7-Lung Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	15.19	NA	15.41	15.30	0.16
0.5	31.04	19.27	32.30	27.54	7.18
2	14.64	15.62	40.01	23.43	14.37
4	NA	NA	NA	NA	NA
Time (h)	Ratio-Lungtissue/Plasma			Mean	SD
	101	102	103		
0.25	1.02	NA	0.89	0.95	0.09
0.5	0.67	1.03	0.83	0.84	0.18
2	0.91	1.04	0.98	0.98	0.06
4	NA	NA	NA	NA	NA
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Liver					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Liver Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	75.03	63.63	55.47	64.71	9.83
0.5	72.71	121.75	108.11	100.86	25.31
2	59.77	47.57	37.92	48.42	10.95
4	17.27	31.91	26.77	25.31	7.43
Time (h)	Compound 7-Liver Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	825.33	699.88	610.14	711.78	108.09

0.5	799.82	1339.23	1189.21	1109.42	278.42
2	657.47	523.29	417.10	532.62	120.46
4	189.97	350.96	294.42	278.45	81.68
Time (h)	Ratio-Liver tissue/Plasma			Mean	SD
	101	102	103		
0.25	55.17	86.43	35.18	58.93	25.83
0.5	17.21	71.41	30.65	39.76	28.23
2	40.84	34.81	10.19	28.61	16.23
4	32.65	48.95	60.61	47.40	14.04
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Stomach					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Stomach Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	800.02	754.96	914.02	823.00	81.99
0.5	1515.69	909.17	1335.91	1253.59	311.52
2	36.28	235.44	102.77	124.83	101.40
4	9.10	16.96	7.66	11.24	5.00
Time (h)	Compound 7-Stomach Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	8800.19	8304.51	10054.25	9052.98	901.85
0.5	16672.59	10000.91	14695.01	13789.50	3426.77
2	399.05	2589.83	1130.51	1373.13	1115.36
4	100.14	186.53	84.27	123.65	55.04
Time (h)	Ratio-Stomach tissue/Plasma			Mean	SD
	101	102	103		
0.25	588.27	1025.51	579.68	731.15	254.96
0.5	358.72	533.28	378.80	423.60	95.52
2	24.79	172.26	27.63	74.89	84.34

4	17.21	26.02	17.35	20.19	5.05
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Spleen					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Spleen Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	6.55	4.14	11.89	7.53	3.97
0.5	4.89	8.49	22.96	12.11	9.57
2	1.78	BLQ	2.94	2.36	0.81
4	4.53	7.73	BLQ	6.13	2.27
Time (h)	Compound 7-Spleen Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	72.01	45.53	130.83	82.79	43.66
0.5	53.78	93.35	252.61	133.24	105.25
2	19.61	NA	32.29	25.95	8.96
4	49.78	85.06	NA	67.42	24.95
Time (h)	Ratio-Spleen tissue/Plasma			Mean	SD
	101	102	103		
0.25	4.81	5.62	7.54	5.99	1.40
0.5	1.16	4.98	6.51	4.22	2.76
2	1.22	NA	0.79	1.00	0.30
4	8.56	11.86	NA	10.21	2.34
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Kindeg					
Time (h)	Compound 7-Plasma Concentration (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7- Kindeg Concentration (ng/mL)			Mean	SD
	101	102	103		
0.25	5.31	6.18	2.95	4.81	1.67
0.5	9.53	5.60	16.22	10.45	5.37
2	4.11	3.34	11.63	6.36	4.58
4	3.39	6.05	2.18	3.87	1.98
Time (h)	Compound 7- Kindeg Concentration (ng/g*)			Mean	SD
	101	102	103		
0.25	58.45	67.97	32.40	52.94	18.42
0.5	104.87	61.56	178.45	114.96	59.10
2	45.21	36.72	127.88	69.94	50.36
4	37.28	66.53	24.01	42.61	21.76
Time (h)	Ratio-Kindeg tissue/Plasma			Mean	SD
	101	102	103		
0.25	3.91	8.39	1.87	4.72	3.34
0.5	2.26	3.28	4.60	3.38	1.17
2	2.81	2.44	3.13	2.79	0.34
4	6.41	9.28	4.94	6.88	2.21
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Addominal fat					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Addominal fat Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	7.09	BLQ	15.02	11.06	5.60
0.5	11.26	144.28	10.38	55.31	77.06
2	57.63	26.93	34.98	39.85	15.92
4	266.50	74.60	38.04	126.38	122.72
Time (h)	Compound 7-Addominal fat Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	78.04	NA	165.18	121.61	61.62
0.5	123.81	1587.10	114.21	608.37	847.62
2	633.97	296.22	384.79	438.32	175.13
4	2931.54	820.57	418.41	1390.17	1349.93
Time (h)	Ratio-Addominal fat tissue/Plasma			Mean	SD
	101	102	103		
0.25	5.22	NA	9.52	7.37	3.05
0.5	2.66	84.63	2.94	30.08	47.24
2	39.38	19.70	9.40	22.83	15.23
4	503.84	114.45	86.13	234.80	233.42
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Bladder					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Bladder Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	BLQ	BLQ	6.50	NA	NA
0.5	5.83	3.65	18.83	9.44	8.21
2	31.36	3.53	7.22	14.04	15.11
4	62.28	3.00	8.92	24.73	32.65
Time (h)	Compound 7-Bladder Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	NA	NA	71.50	NA	NA
0.5	64.08	40.13	207.16	103.79	90.32
2	344.93	38.78	79.47	154.39	166.26
4	685.06	33.02	98.14	272.07	359.14
Time (h)	Ratio-Bladder tissue/Plasma			Mean	SD
	101	102	103		
0.25	NA	NA	4.12	NA	NA
0.5	1.38	2.14	5.34	2.95	2.10
2	21.42	2.58	1.94	8.65	11.07
4	117.74	4.61	20.20	47.52	61.31
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1-Compound 7-PO-30 mg/kg-Rat-Large intestine					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Large intestine Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.06	16.13	14.82	15.00	1.05
0.5	68.91	16.05	17.40	34.12	30.14
2	80.07	375.07	1043.63	499.59	493.70
4	2942.78	3083.01	5569.47	3865.09	1477.70
Time (h)	Compound 7-Large intestine Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	154.62	177.39	162.98	165.00	11.52
0.5	758.04	176.53	191.36	375.31	331.54
2	880.80	4125.75	11479.93	5495.49	5430.70
4	32370.58	33913.11	61264.17	42515.95	16254.74
Time (h)	Ratio-Large intestine tissue/Plasma			Mean	SD
	101	102	103		
0.25	10.34	21.91	9.40	13.88	6.97
0.5	16.31	9.41	4.93	10.22	5.73
2	54.71	274.42	280.57	203.23	128.66
4	5563.43	4730.09	12611.04	7634.85	4329.60
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Skeletal muscle					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7- Skeletal muscle Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	BLQ	BLQ	BLQ	NA	NA
0.5	1.06	BLQ	1.14	1.10	0.06
2	BLQ	BLQ	1.64	NA	NA
4	BLQ	BLQ	BLQ	NA	NA
Time (h)	Compound 7- Skeletal muscle Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	NA	NA	NA	NA	NA
0.5	11.67	NA	12.58	12.12	0.64
2	NA	NA	18.09	NA	NA
4	NA	NA	NA	NA	NA
Time (h)	Ratio-Skeletal muscle tissue/Plasma			Mean	SD
	101	102	103		
0.25	NA	NA	NA	NA	NA
0.5	0.25	NA	0.32	0.29	0.05
2	NA	NA	0.44	NA	NA
4	NA	NA	NA	NA	NA
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Small intestine					
Time (h)	Compound 7-Plasma Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Small intestine Concentraion (ng/mL)			Mean	SD
	101	102	103		
0.25	4138.72	53015.02	1585.33	19579.69	28983.98
0.5	47887.50	3516.82	30472.97	27292.43	22355.67
2	1894.77	3337.01	8655.74	4629.17	3560.89
4	744.28	2585.52	45.16	1124.99	1312.28
Time (h)	Compound 7-Small intestine Concentraion (ng/g*)			Mean	SD
	101	102	103		
0.25	45525.87	583165.22	17438.62	215376.57	318823.76
0.5	526762.50	38685.04	335202.67	300216.74	245912.41
2	20842.50	36707.14	95213.09	50920.91	39169.75
4	8187.06	28440.75	496.75	12374.85	14435.03
Time (h)	Ratio-Small intestinetissue/Plasma			Mean	SD
	101	102	103		
0.25	3043.27	72014.29	1005.43	25354.33	40421.55
0.5	11333.56	2062.82	8640.62	7345.67	4769.11
2	1294.55	2441.54	2327.04	2021.05	631.76
4	1407.08	3966.82	102.25	1825.39	1965.95
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Group 1- Compound 7-PO-30 mg/kg-Rat-Testis					
Time (h)	Compound 7-Plasma Concentration (ng/mL)			Mean	SD
	101	102	103		
0.25	14.96	8.10	17.34	13.47	4.80
0.5	46.48	18.75	38.79	34.68	14.31
2	16.10	15.03	40.92	24.02	14.64
4	5.82	7.17	4.86	5.95	1.16
Time (h)	Compound 7-Testis Concentration (ng/mL)			Mean	SD
	101	102	103		
0.25	1.09	BLQ	BLQ	NA	NA
0.5	2.12	5.20	1.52	2.95	1.97
2	2.26	3.46	3.07	2.93	0.61
4	BLQ	7.20	BLQ	NA	NA
Time (h)	Compound 7-Testis Concentration (ng/g*)			Mean	SD
	101	102	103		
0.25	12.00	NA	NA	NA	NA
0.5	23.30	57.20	16.74	32.41	21.71
2	24.90	38.02	33.72	32.22	6.69
4	NA	79.17	NA	NA	NA
Time (h)	Ratio-Testis tissue/Plasma			Mean	SD
	101	102	103		
0.25	0.80	NA	NA	NA	NA
0.5	0.50	3.05	0.43	1.33	1.49
2	1.55	2.53	0.82	1.63	0.86
4	NA	11.04	NA	NA	NA
*, Detection value ×Dilution factor(11)					
NA=Not applicable					
BLQ = Below the lower limit of quantitation (LLOQ)					

Table S2. Primers used for quantitative PCR

Gene	Accession number		Sequence (5'-3')
<i>Cox II</i>	AF378830	F	AATTGCTCTCCCCTCTCTACG
		R	GTAGCTTCAGTATCATTGGTGC
<i>Cs</i>	NM_026444	F	CTCTTGGGAGCCAAGAACTC
		R	GCCTGCTCCTTAGGTATCAG
<i>Erra</i>	NM_007953	F	GGAGGACGGCAGAAGTACAAA
		R	GCGACACCAGAGCGTTCAC
<i>Pgcl1a</i>	NM_008904	F	AGCCGTGACCACTGACAACGAG
		R	GCTGCATGGTTCTGAGTGCTAAG
<i>Acat2</i>	NM_001303253.1	F	GGGCTGTCACACAATGGCTA
		R	GGTCAAGGGCGTTGAAAACC
<i>Mcad</i>	NM_007382	F	TTGGCACGTTCTAACCAGAT
		R	TCGCTGGCCCATGTTTAGT
<i>Atp5b</i>	NM_016774	F	AGGGTGGGAAAATCGGACTCT
		R	ACGGGTCCTCTCACCAACAC
<i>Cyp4a12 b</i>	NM_172306.2	F	GAGTGTCTCTAATGGCTGCTTG
		R	TGGCCCTCGAACATGAAAGT
<i>Aldh1b1</i>	NM_028270.4	F	GAGCTTAGCTGGTGACGGAA
		R	GTTCTCCGGTCAGTTCAGCA
<i>Cpt1a</i>	AF017175	F	CCTCCCTGGGCATGATTG
		R	ACGCCACTCACGATGTTCTTC
<i>Sdh</i>	BC031849	F	ATCCATCGAGCCTTACC
		R	CATAGAGTCCGTCCAGTTT
<i>Gapdh</i>	AY618199.1	F	CTGCACCACCAACTGCTTAGC
		R	GGAAGGCCATGCCAGTGA