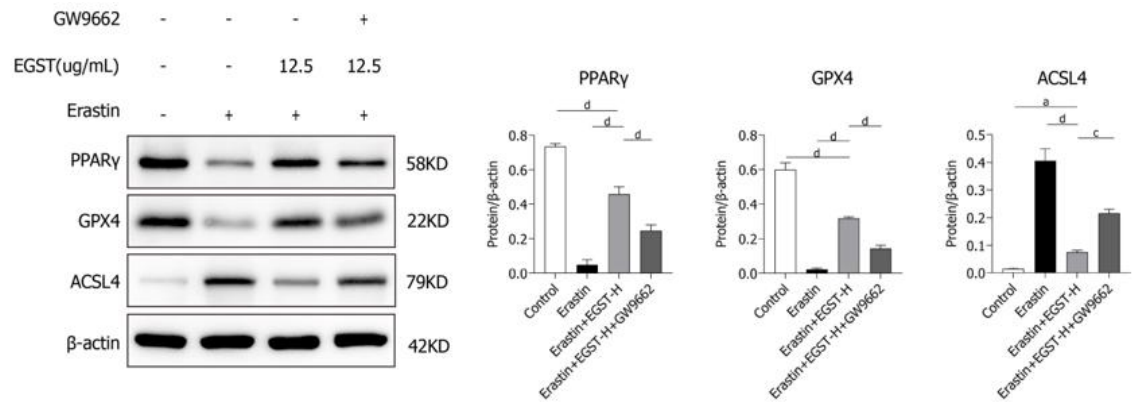




Supplementary Figure 1 The protein levels of GPX4 and PPAR γ and its target genes were detected using western blots. GW9662, the PPAR γ antagonist. Data are presented as mean $\pm$ SD (n = 3). Compared to the model group, ^a P < 0.05, ^b P < 0.01, ^c P < 0.001, ^d P < 0.0001.

Supplementary Table 1 Ferroptosis-related pathways in EGST

id	EGST_ 1	EGST_ 2	EGST_ 3	EGST_ 4	Model _1	Model _2	Model _3	Model _4
Inhca	0.0140	0.0117	0.0132	1.00E-	0.0121	1.00E-	1.00E-	0.0116
	26862	40466	29953	08	27821	08	08	48562
Acsl3	50.012	26.458	40.952	32.587	32.828	26.643	42.146	29.852
	65156	36651	26309	89846	18371	97176	46256	68272
Acsl4	6.0497	9.6923	5.4991	6.0721	7.7911	3.8534	6.0134	5.9204
	24511	69661	2288	65935	11137	92409	17942	26278
Map	50.877	57.864	39.377	36.938	34.482	23.841	60.376	46.041
1lc3a	90354	98695	95567	02241	02324	8146	16605	54135
Acsl6	0.3490	0.6183	0.2650	0.0912	0.3291	0.0361	0.3736	0.3312
	10819	87196	55971	30674	92273	63961	30647	39821
Vdac	296.82	298.20	280.59	320.06	313.82	302.32	255.35	253.72
2	73033	69932	93931	24007	40434	56872	34379	84997
Gpx4	133.82	140.70	128.46	142.37	113.89	115.22	137.95	146.72
	71822	22481	51584	72832	05517	5652	02294	26321
Prnp	51.839	60.030	46.062	42.017	52.229	33.668	54.426	50.421
	2472	10722	70394	67063	2873	75506	28323	74214
Hmo	9.4646	26.400	8.6779	6.5052	7.9023	3.7451	20.353	12.886
x1	72033	7238	18949	73887	15182	41266	33092	19549
Tfrc	75.867	60.784	80.733	101.01	96.416	107.24	32.469	65.058
	39508	78725	37502	97612	01425	04696	92502	51608
Gss	91.998	89.858	108.70	117.09	107.00	100.44	91.529	99.033
	46599	8343	7907	65765	97796	70443	42433	32326
Atg5	19.830	22.510	21.591	23.524	21.636	23.923	18.648	21.541
	83941	73793	24472	4008	10334	58938	10188	51853
Pcbp	100.10	132.26	131.05	127.47	123.31	120.26	118.46	119.43
1	8546	64899	60126	81726	04576	05628	52936	24366

Trp5	18.959	24.394	25.183	20.785	17.963	19.483	25.382	24.783
3	66346	38119	10048	69477	20912	39855	90003	56222
Slc3a	7.7922	8.6980	7.3074	6.4679	7.0723	6.2481	8.7004	7.7584
2	50891	51085	95656	51021	73113	52803	17071	22168
Ncoa	15.241	16.347	18.679	12.860	14.099	10.547	19.341	18.932
4	29447	73199	1561	19123	61877	67463	00886	49995
Cp	4.8707	10.102	3.3442	1.6023	6.8666	0.9961	5.6874	6.2681
	82309	16453	0384	52204	61211	59234	35993	45931
Acsl1	6.0560	4.4024	8.4285	4.7940	4.0284	3.4003	8.0381	8.3203
	55129	48904	13415	55961	12197	57309	49473	34436

Supplementary Table 2 Eleven highly active compounds in EGST

Compound	Mol ID	OB (%)	DL
fisetin	MOL013179	52.60	0.24
Fustin	MOL013296	50.91	0.24
(-)-taxifolin	MOL001736	60.51	0.27
Eriodyctiol(flavanone)	MOL002914	41.35	0.24
Beta-sitosterol	MOL000358	36.91	0.75
sitosterol	MOL000359	36.91	0.75
kaempferol	MOL000422	41.88	0.24
Stigmasterol	MOL000449	43.83	0.76
Stigmast-4-ene-3,6-dione	MOL006358	39.12	0.79
ent-Epicatechin	MOL000073	48.96	0.24
quercetin	MOL000098	46.43	0.28

Supplementary Table 3 Combined with the free energy meter

Complex	ΔE_{vdw}	ΔE_{ele}	ΔE_{pol}	ΔE_{nonp} ol	ΔE_{MMP} BSA	-TAS	ΔG_{bind}
Protein-L	-216.799	-7.967±	89.784±	-29.372±	-164.355	18.231±	-146.124
igand	±5.475	2.967	4.743	0.285	±8.248	4.256	±7.86
Complex	ΔE_{vdw}	ΔE_{ele}	ΔE_{pol}	ΔE_{nonp} ol	ΔE_{MMP} BSA	-TAS	ΔG_{bind}

Supplementary Table 4 Detection of 50 kinds of bile acids in mouse feces

Cpd Name	LLOD (ng/m L)	LLOQ (ng/m L)	ULOQ (ng/m L)	R	R^2	Regression Equation
Dehydrolithocholic acid	0.25	0.5	5000	0.9989	0.9977	$y = -16.61436 x^2 + 1.12563e5 x$
Isolithocholic acid	2.5	5	5000	0.9978	0.9957	$y = 29613.06576 x$
Lithocholic acid	2.5	5	5000	0.9929	0.9859	$y = 5.07305e4 x$
23-Nordeoxycholic acid	0.25	0.5	5000	0.9916	0.9832	$y = 7.00329e4 x$
7-Ketolithocholic acid	2.5	5	5000	0.9924	0.9848	$y = 8497.25177 x$
12-Ketolithocholic acid	5	10	5000	0.9963	0.9926	$y = 7018.33965 x$
Apocholic acid	0.25	0.5	5000	0.9952	0.9904	$y = 4.74670e4 x$
Ursodeoxycholic acid	0.5	1	5000	0.9970	0.9941	$y = 11854.95732 x$
Hyodeoxycholic acid	0.5	1	5000	0.9983	0.9966	$y = 11743.42235 x$
Chenodeoxycholic acid	0.5	1	5000	0.9983	0.9967	$y = 19310.50128 x + -2265.39199$
Deoxycholic acid	0.25	0.5	5000	0.9965	0.9930	$y = 7.72544e4 x$
Isodeoxycholic acid	0.25	0.5	4000	0.9992	0.9984	$y = (2.37451e8 + 2.61205e8 x^{1.13107}) / (3269.08328 + x^{1.13107})$

Dehydrocholic acid	2.5	5	5000	0.99 41	0.9883	$y = 15846.17181 x + -9.18729e4$
7,12-Diketolithocholic acid	2.5	5	5000	0.99 25	0.9851	$y = 5555.71521 x$
7-Ketodeoxycholic acid	0.25	0.5	5000	0.99 71	0.9943	$y = 4.23474e4 x$
12-Dehydrocholic acid	2.5	5	5000	0.99 22	0.9844	$y = 6568.28778 x$
3-Dehydrocholic acid	0.5	1	5000	0.99 31	0.9862	$y = 5.21601e4 x$
Ursocholic acid	0.25	0.5	5000	0.99 26	0.9853	$y = 3.23941e4 x + -18931.27596$
α -Muricholic acid	0.5	1	5000	0.99 54	0.9909	$y = 8154.87671 x + -27114.64035$
β -Muricholic acid	0.5	1	5000	0.99 33	0.9866	$y = 13694.73244 x + 858.85314$
Hyochoolic acid	0.5	1	5000	0.99 58	0.9916	$y = 4392.17823 x + 7326.91033$
Allochoolic acid	0.25	0.5	4000	0.99 71	0.9942	$y = 5.67254e4 x$
Cholic acid	0.25	0.5	4000	0.99 87	0.9975	$y = 5.22957e4 x + -21307.24621$
Glycolithocholic acid	0.05	0.1	5000	0.99 97	0.9994	$y = (3.22170e9 + 4.60166e8 x^{1.20040}) / (8024.72337 + x^{1.20040})$
Glycoursodeoxycholic acid	0.25	0.5	4000	0.99 71	0.9942	$y = 6.88809e4 x + -4.29667e4$
Glycohyodeoxycholic acid	0.25	0.5	5000	0.99 16	0.9832	$y = 7.90842e4 x + -11173.93255$

Glycodeoxycholic acid	0.25	0.5	5000	0.9918	0.9836	$y = 9.47827e4 x + -17284.87463$
Glycodehydrocholic acid	0.5	1	5000	0.9982	0.9964	$y = 5.63284e4 x + -5.89442e4$
Glycocholic acid	0.05	0.1	5000	0.9926	0.9852	$y = 7.18621e4 x + 1830.46435$
Taurolithocholic acid	0.05	0.1	5000	0.9914	0.9829	$y = 8.26936e4 x$
Tauroursodeoxycholic acid	0.5	1	5000	0.9962	0.9924	$y = 4.88092e4 x + -8.06633e4$
Taurohyodeoxycholic acid	0.25	0.5	4000	0.9927	0.9855	$y = 7.08563e4 x$
Taurochenodeoxycholic acid	0.05	0.1	5000	0.9973	0.9947	$y = 5.53774e4 x + -24132.26108$
Taurodeoxycholic acid	0.25	0.5	5000	0.9955	0.9911	$y = 7.29544e4 x + -4.39800e4$
Tauro α -Muricholic acid	0.5	1	5000	0.9974	0.9947	$y = 4.33555e4 x + -7.31056e4$
Taurocholic acid	0.25	0.5	5000	0.9955	0.9910	$y = 3.95582e4 x + -3.94632e4$
Isoallolithocholic acid	10	20	4000	0.9959	0.9919	$y = 29903.00278 x + 22042.86888$
Murideoxycholic acid	0.5	1	5000	0.9970	0.9940	$y = 12847.94524 x + 14075.27186$
Isoursodeoxycholic acid	2.5	5	5000	0.9947	0.9894	$y = 12770.08597 x + -6.92005e4$
Isohyodeoxycholic acid	2.5	5	5000	0.9936	0.9872	$y = 13716.16752 x + -6.93761e4$
3-Epideoxycholic acid	2.5	5	5000	0.99	0.9952	$y = 7.41718e4 x$

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Nor Cholic Acid	0.5	1	5000	0.9964	0.9928	$y = 5.52589e4 x + 6218.87878$
3 β -Cholic Acid	0.5	1	5000	0.9973	0.9946	$y = 4.05959e4 x + -27260.95109$
ω -Muricholic Acid	0.5	1	5000	0.9981	0.9961	$y = 11793.79201 x + 5941.85149$
Glycochenodeoxycholic acid	0.25	0.5	4000	0.9942	0.9885	$y = 9.67469e4 x + -13871.10931$
Lithocholic Acid-3-Sulfate	0.25	0.5	5000	0.9904	0.9809	$y = 7.93259e4 x$
Glycohyocholic acid	0.25	0.5	5000	0.9938	0.9876	$y = 7.80307e4 x + -19585.56007$
Tauro β -Muricholic acid	0.5	1	5000	0.9964	0.9928	$y = 3.62042e4 x + -9.80560e4$
Taurohyocholic acid	0.25	0.5	5000	0.9967	0.9934	$y = 3.52961e4 x + -7.86479e4$
Chenodeoxycholic acid-3- β -D-Glucuronide	0.25	0.5	5000	0.9981	0.9961	$y = 5.25012e4 x + -9513.95560$

Supplementary Table 5 The model group had 16 down-regulated bile acids

name	Control-Mean	Model-Mean	Pvalue
Lithocholic acid	28520.37	12832.31833	0.02636437
Apocholic acid	366.0766667	236.04	0.030673009
Hyodeoxycholic acid	83461.79167	30949.125	0.008226775
α -Muricholic acid	39385.1	9513.73	0.010023607
β -Muricholic acid	102952.7	25393.615	0.00107921
Hyochoolic acid	3306.763333	1298.865	0.005191835
Taurolithocholic acid	122.3216667	31.1	0.020067155
Tauroursodeoxycholic acid	332.6933333	180.4883333	0.007859738
Taurohyodeoxycholic acid	1487.286667	181.21	0.002763364
Taurochenodeoxycholic acid	536.9416667	161.3766667	0.02265927
Taurodeoxycholic acid	1548.068333	549.455	0.038055069
Tauro α -Muricholic acid	5750.028333	2457.931667	0.00917015
Taurocholic acid	4779.27	2104.825	0.035454672
3 β -Cholic Acid	8776.248333	1504.876667	0.001209694
ω -Muricholic Acid	194549.8883	68389.825	0.006467701
Tauro β -Muricholic acid	5663.686667	2391.255	0.007009528