Supplementary Table 1 The classic formula Zuo Gui Pill

Latin name	Chinese name	production batch number
Radix Rehmanniae Praeparata (24 g)	Shu Di Huang	Lot.No. 2403063
Rhizoma Dioscoreae Oppositae (12 g)	Shan Yao	Lot.No. 2405091
Fructus Lycii (12 g)	Gou Qi Zi	Lot.No. 2404223
Fructus Corni (12 g)	Shan Zhu Yu	Lot.No. 2312032
Radix Cyathulae (9 g)	Chuan Niu Xi	Lot.No. 2402161
Semen Cuscutae (12 g)	Tu Si Zi	Lot.No. 2404161
Colla Cornus Cervi (12 g)	Lu Jiao Jiao	Lot.No. 2311132
Colla Carapacis et Plastri (12 g)	Gui Ban Jiao	Lot.No. 2402131

Supplementary Table 2 The blood sample levels

Indicators	ANOVA results (F value, *df* value, *P* value)	Effect size (η^2)	Levene's test	Post hoc power analysis	Model vs. Control [mean diff (95%CI), *P* values]	ZGP *vs* model [mean diff (95%CI), *P* values]	ZGP + Fer-1 *vs* ZGP [mean diff (95%CI), *P* values]
TC	F (6, 14) = 199.6,*P*<0.0001	0.95	*p*>0.05	>0.99	[2.7121,3.1059],p<0.0001	[-0.9473,-0.5535],p<0.0001	[-0.6477,-0.2539],p<0.0001
TG	F (6, 14) = 714.8,P<0.0001	0.95	*p*>0.05	>0.99	[0.7725,0.8565],p<0.0001	[-0.3434,-0.2594],p<0.0001	[-0.2604,-0.1764],p<0.0001
LDL-C	F (6, 14) = 526.6,P<0.0001	0.95	*p*>0.05	>0.99	[0.8494,0.9296],p<0.0001	[-0.4867,-0.4066],p<0.0001	[-0.3754,-0.2953],p<0.0001
IFCC-HbA1c	F (6, 14) = 1250.9,P<0.0001	0.95	*p*>0.05	>0.99	[72.5419,77.3856],p<0.0001	[-11.3686,-6.5248],p<0.0001	[-47.7710,-42.9273],p<0.0001
Linsulin	F (6, 14) = 99.9,P<0.0001	0.95	*p*>0.05	>0.99	[17.3322,20.8617],p<0.0001	[-7.1396,-3.6101],p<0.0001	[-2.8675,0.6620]p>0.05
MDA	F (6, 14) = 2394.8,P<0.0001	0.95	*p*>0.05	>0.99	[0.6745,0.7068],p<0.0001	[-0.1764,-0.1442],p<0.0001	[-0.4065,-0.3742],p<0.0001

GSH/GSSH	F (6, 14) = 1318.9,P<0.0001	0.95	*p*>0.05	>0.99	[-1.8146,-1.7140],p<0.0001	[0.6945,0.7950],p<0.001	[0.2329,0.3335],p<0.001
SOD	F (6, 14) = 16130.6,P<0.0001	0.95	*p*>0.05	>0.99	[-1.9808,-1.9485],p<0.0001	[0.0885,0.1208],p<0.001	[0.1319,0.1641],p<0.001
BMD	F (6, 14) = 38.5,P<0.0002	0.95	*p*>0.05	>0.99	[-0.1883,-0.1394],p<0.0001	[0.0379,0.0868],p<0.001	[0.0011,0.0500],p<0.05
BV/TV	F (6, 14) = 53.2,P<0.0002	0.95	*p*>0.05	>0.99	[-24.3725,-18.6209],p<0.0001	[3.4775,9.2291],p<0.001	[2.9675,8.7191],p<0.05
BS/BV	F (6, 14) = 121.7,P<0.0003	0.95	*p*>0.05	>0.99	[-14.0902,-11.6432],p<0.0001	[4.4065,6.8535],p<0.001	[2.6298,5.0768],p<0.001
Tb.N	F (6, 14) = 15.7,P<0.0003	0.95	*p*>0.05	>0.99	[-1.7116,-1.0342],p<0.0001	[0.1353,0.8127],p<0.05	[0.13680,0.8142],p<0.05
Tb.SP	F (6, 14) = 9.9,P<0.0004	0.95	*p*>0.05	>0.99	[0.1187,0.2150],p<0.0001	[-0.1424,-0.0461],p<0.05	[-0.0679,0.0284],p>0.05
Tb.Th	F (6, 14) = 111.2,P<0.0004	0.95	*p*>0.05	>0.99	[-0.0953,-0.0784],p<0.0001	[0.0278,0.0447],p<0.001	[0.0213,0.0382],p<0.001
BS/TV	F (6, 14) = 31.3,P<0.0005	0.95	*p*>0.05	>0.99	[-6.4507,-4.5626],p<0.0001	[0.7493,2.6374],p<0.05	[0.4626,2.3507],p<0.05

PINP	F (6, 14) = 95.6,P<0.0001	0.95	*p*>0.05	>0.99	[-27.0119,-21.6548],p<0.0001	[2.3148,7.6719],p<0.05	[8.5081,13.8652],p<0.0001
TRACP5b	F (6, 14) = 320.9,P<0.0001	0.95	*p*>0.05	>0.99	[54.8952,61.1545],p<0.0001	[-41.1247,-34.8654],p<0.0001	[-12.8565,-6.5972],p<0.0001
IL6	F (6, 14) = 33.7,P<0.0001	0.95	*p*>0.05	>0.99	[15.8999,21.6170],p<0.0001	[-11.7540,-6.0369],p<0.0001	[-4.6857,1.0315],p>0.05
TNFα	F (6, 14) = 144.1,P<0.0001	0.95	*p*>0.05	>0.99	[28.2787,34.0423],p<0.0001	[-12.3386,-6.5750],p<0.0001	[-20.1781,-14.4145],p<0.0001
CD86	F (6, 14) = 19.3,P<0.0001	0.95	*p*>0.05	>0.99	[16.1222,26.8445],p<0.0001	[-11.9845 ,-1.2622],p<0.05	[-14.6145,-3.8922],p>0.05
CD80	F (6, 14) = 25.8,P<0.0001	0.95	*p*>0.05	>0.99	[15.1060,22.5007],p<0.0001	[-10.6240,-3.2293],p<0.0001	[-10.0940 ,-2.6993],p>0.05
XCT/β-actin	F (6, 28) = 7.4,P<0.0001	0.95	*p*>0.05	>0.99	[-0.7769,-0.3909],p<0.0001	[0.0244,0.4105],p<0.05	[-0.0439,0.3424],p>0.05
GPX4/β-actin	F (6, 14) = 14.3,P<0.0001	0.95	*p*>0.05	>0.99	[-0.5120,-0.3111],p<0.0001	[0.0157,0.2166],p<0.001	[-0.0547,0.1462],p>0.05
FTH1/β-actin	F (6, 21) = 10.8,P<0.0001	0.95	*p*>0.05	>0.99	[-0.8933,-0.5044],p<0.0001	[0.0409,0.4297],p<0.05	[-0.0596,0.3292],p>0.05

HO1/β-actin	F (6, 14) = 17.1,P<0.0001	0.95	*p*>0.05	>0.99	[-0.6287,-0.3859],p<0.0001	[-0.0086,0.2341],p>0.05	[0.0988,0.3416],p<0.05
Nrf2/β-actin	F (6, 21) = 7.1,P<0.0001	0.95	*p*>0.05	>0.99	[-0.1505,-0.0759],p<0.0001	[0.0252,0.0998],p<0.05	[-0.0316,0.0431],p>0.05
Rankl/β-actin	F (6, 35) = 8.2,P<0.0001	0.95	*p*>0.05	>0.99	[0.1156,0.2351],p<0.0001	[-0.1751,-0.0556],p<0.05	[-0.0758,0.0437],p>0.05
Runx2/β-actin	F (6, 28) = 13.9,P<0.0001	0.95	*p*>0.05	>0.99	[-0.3955,-0.2372],p<0.0001	[0.0286,0.1868],p<0.05	[0.0228,0.1810],p<0.05
XCT mRNA	F (6, 14) = 8.6,P<0.0001	0.95	*p*>0.05	>0.99	[-0.8896,-0.4052],p<0.0001	[0.0208,0.5051],p<0.05	[-0.1674,0.3169],p>0.05
GPX4mRNA	F (6, 14) = 24.9,P<0.0001	0.95	*p*>0.05	>0.99	[-1.0493,-0.6793],p<0.0001	[-0.0117,0.3584],p>0.05	[0.1523,0.5224],p<0.05
Nrf2mRNA	F (6, 14) = 42.8,P<0.0001	0.95	*p*>0.05	>0.99	[-1.0231,-0.7457],p<0.0001	[-0.1093,0.1681],p>0.05	[0.1917,0.4690],p<0.001
HO1mRNA	F (6, 14) = 14.7,P<0.0001	0.95	*p*>0.05	>0.99	[-1.0632,-0.6332],p<0.0001	[-0.1146,0.3154],p>0.05	[0.0867,0.5167],p<0.05
Nrf2-IHC	F (6, 14) = 520.1,P<0.0001	0.95	*p*>0.05	>0.99	[-42.3187,-38.7013],p<0.0001	[2.1713,5.7887],p<0.001	[0.1246,3.7420],p<0.05

HO1-IHC	F (6, 14) = 523.9,P<0.0001	0.95	*p*>0.05	>0.99	[-32.5687,-29.8313],p<0.0001	[4.3847,7.1220],p<0.0001	[9.5313,12.2687],p<0.0001
GPX4-IHC	F (6, 14) = 254,P<0.0001	0.95	*p*>0.05	>0.99	[-27.9306,-24.7361],p<0.0001	[2.6694,5.8639],p<0.001	[1.8361,5.0306],p<0.001