碧云天生物技术/Beyotime Biotechnology
订货热线: 400-1683301或800-8283301
订货e-mail: order@beyotime.com
技术咨询: info@beyotime.com
网址: http://www.beyotime.com

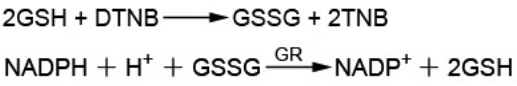
碧云天网站 微信公众号

GSH和GSSG检测试剂盒

产品编号	产品名称	包装
S0053	GSH和GSSG检测试剂盒	共100次

产品简介：

- GSH和GSSG检测试剂盒(GSH and GSSG Assay Kit)是一种简单易行的可以分别检测出GSH(还原型谷胱甘肽)和GSSG(氧化型谷胱甘肽，oxidized glutathione disulfide)含量的检测试剂盒。
- 谷胱甘肽(glutathione)是一种由3个氨基酸残基组成的小肽，全称为谷氨酰-半胱氨酰-甘氨酸，英文名称为glutamyl-cysteinyl-glycine，简称为glutathione。由于半胱氨酸上的巯基(SH)为谷胱甘肽的活性基团，所以常简写为G-SH或GSH。谷胱甘肽包括还原型谷胱甘肽(reduced glutathione, 常称为GSH)和氧化型谷胱甘肽(oxidized glutathione disulfide)两种形式。由于氧化型谷胱甘肽是由两个GSH通过巯基脱氢而成，所以常简写为G-S-S-G或GSSG。还原型谷胱甘肽是绝大多数活细胞中巯基的主要来源，对于维持蛋白质中巯基适当的氧化还原状态有重要作用，并且是动物细胞中关键的抗氧化剂。总谷胱甘肽中通常90-95%为还原型谷胱甘肽。
- 通过谷胱甘肽还原酶把GSSG还原成GSH，而GSH可以和生色底物DTNB反应产生黄色的TNB和GSSG。适当配制反应体系，前后两个反应合并起来后，总谷胱甘肽(GSSG+GSH)就相当于一个颜色产生的限速因素，总谷胱甘肽的量就决定了黄色的TNB形成量。从而通过测定A_{412}就可以计算出总谷胱甘肽的量。用适当试剂先清除样品中的GSH，然后利用上述反应原理就可以测定出GSSG的含量。用总谷胱甘肽(GSSG+GSH)的量扣除GSSG的含量，就可以计算出GSH的含量。
- 本试剂盒的具体反应原理如下：



两个反应相合并：

- 本试剂盒可以检测动物组织、血浆、红细胞、和培养细胞或其它适当样品中GSH和GSSG的含量。
- 本试剂盒提供了蛋白去除试剂M，可以更加准确地测定出含有蛋白的样品中的GSH和GSSG的量。
- 本试剂盒的检测下限为0.5μM。一个试剂盒共可以进行100次检测，可以测定100个样品的总谷胱甘肽或GSSG的含量，或可以测定出50个样品中GSH和GSSG的各自含量。

包装清单：

产品编号	产品名称	包装
S0053-1	总谷胱甘肽检测缓冲液	60ml
S0053-2	谷胱甘肽还原酶	150μl
S0053-3	氧化型谷胱甘肽 (GSSG)	5mg
S0053-4	DTNB	4.5mg
S0053-5	蛋白去除试剂M	1g
S0053-6	NADPH	4mg
S0053-7	DMSO	1.5ml
S0053-8	GSH清除辅助液	2ml
S0053-9	GSH清除试剂	500μl
—	说明书	1份

保存条件：

-20°C保存，一年有效。GSSG配制成溶液后，需适当分装，-20°C保存至少3个月有效。DTNB溶解于DMSO后，需适当分装，-20°C保存至少3个月有效。蛋白去除试剂M配制成溶液后仅限当天使用。NADPH溶解后，适当分装，-70°C保存。稀释的GSH清除辅助液和GSH清除试剂溶液均须新鲜配制使用。

注意事项：

- 本试剂盒检测时牵涉到氧化还原反应，所有氧化剂或还原剂都会干扰本试剂盒的测定。特别是DTT、巯基乙醇等含有巯基的试剂

会严重干扰本试剂盒的测定，请尽量避免。

- 一定要严格控制反应时的温度和反应时间，否则每次都需做标准曲线。
- NADPH等试剂不太稳定，要严格按照后续说明操作，谨防失活。
- 蛋白去除试剂M溶液必须新鲜配制并限当日使用。GSH清除试剂也须新鲜稀释后使用。
- 蛋白去除试剂M较难溶解，可以通过剧烈vortex并适当加热(不超过37°C)以促进溶解。
- DMSO在4°C、冰浴等较低温度情况下会凝固，可以20-25°C水浴温育片刻至全部融解后使用。
- 本产品仅限于专业人员的科学研究用，不得用于临床诊断或治疗，不得用于食品或药品，不得存放于普通住宅内。
- 为了您的安全和健康，请穿实验服并戴一次性手套操作。

使用说明：

1．试剂盒的准备工作：

a. GSSG储备液的配制：在本试剂盒提供的5mg GSSG中加入816微升Milli-Q级纯水，溶解并混匀，即为GSSG储备液，浓度为10mM。除立即待用部分外，其余GSSG储备液适当分装后-20°C保存。

b. DTNB储备液的配制：在本试剂盒提供的4.5mg DTNB中加入1.5毫升本试剂盒提供的DMSO，溶解并混匀，即为DTNB储备液。除立即待用部分外，其余DTNB储备液适当分装后-20°C保存。

c. 蛋白去除试剂M溶液的配制：称取0.2克蛋白去除试剂M，加入4毫升总谷胱甘肽检测缓冲液，配制成4毫升5%的水溶液。蛋白去除试剂M溶液必须新鲜配制并限当天使用。

d. NADPH储备液(40mg/ml)的配制：在本试剂盒提供的4mg NADPH中加入100微升Milli-Q级纯水，溶解并混匀，即为NADPH储备液。除立即待用部分外，其余NADPH储备液适当分装后-70°C保存。

e. 5倍稀释谷胱甘肽还原酶的配制：取50微升谷胱甘肽还原酶，加入200微升总谷胱甘肽检测缓冲液，混匀，即成5倍稀释的谷胱甘肽还原酶。

f. 总谷胱甘肽检测工作液的配制：根据待检测的样品数参考下表配制适当量的总谷胱甘肽检测工作液，表中三种试剂按比例混合后即为总谷胱甘肽检测工作液。

	1个样品	10个样品	20个样品
5倍稀释谷胱甘肽还原酶	6.6 μl	66 μl	132 μl
DTNB储备液	6.6 μl	66 μl	132 μl
总谷胱甘肽检测缓冲液	150 μl	1.5 ml	3 ml

g. 0.5mg/ml NADPH的配制：取10微升NADPH储备液，加入790微升总谷胱甘肽检测缓冲液，混匀即为0.5mg/ml NADPH。每检测一个样品需50微升0.5mg/ml NADPH。

h. 稀释的GSH清除辅助液的配制：在47微升Milli-Q级纯水中加入53微升GSH清除辅助液，立即混匀。稀释后的GSH清除辅助液不太稳定，每次使用时均须新鲜配制，并仅限当日使用。

i. GSH清除试剂工作液的配制：10.8微升GSH清除试剂中加入89.2微升无水乙醇，立即混匀。GSH清除剂工作液每次也须新鲜配制。

2．标准品的准备：

a. 把10mM GSSG储备液用蛋白去除试剂M溶液稀释成15μM GSSG溶液。然后依次稀释成10、5、2、1、0.5μM GSSG溶液。取15、10、5、2、1、0.5μM GSSG溶液六个点做标准曲线。注意：由于GSSG在蛋白去除试剂M溶液中不太稳定，用蛋白去除试剂M溶液配制的GSSG溶液必须新鲜配制后使用，不可冻存后再使用。

b. 如果需要测定样品中GSSG含量，按照每100微升标准品加入20微升稀释的GSH清除辅助液的比例加入稀释的GSH清除辅助液，立即vortex混匀。然后按照每100微升加入4微升GSH清除试剂工作液的比例加入GSH清除试剂工作液，立即vortex混匀，25°C反应60分钟。即可用于后续的GSSG含量的检测。

3．待测总谷胱甘肽含量样品和标准品的准备：

a. **组织样品的准备**。取组织用液氮速冻，然后研成粉末。每10毫克研碎的组织粉末，加入30微升蛋白去除试剂M溶液，充分Vortex。再加入70微升蛋白去除试剂M溶液，用玻璃匀浆器充分匀浆(对于比较容易匀浆的组织可以不用液氮速冻等处理，而直接加入适量蛋白去除试剂M溶液进行匀浆)。4°C放置10分钟后，10,000g 4°C离心10分钟，取上清用于总谷胱甘肽的测定。样品需暂时4°C保存，不立即测定的样品可以-70°C保存，但不宜超过10天。对于处理好的组织样品通常需用蛋白去除试剂M溶液进行适当稀释后再进行测定，稀释倍数通常为5-20倍。

b. **细胞样品的准备**。请尽量使用新鲜的细胞进行测定，而不要使用冻存的细胞进行测定。PBS洗涤细胞一次，离心收集细胞，吸尽上清。加入细胞沉淀体积3倍量的蛋白去除试剂M溶液，即如果细胞沉淀为10微升，则加入30微升蛋白去除试剂M溶液，充分Vortex。(细胞沉淀的体积可以根据细胞沉淀的重量进行估算。收集细胞前后分别对离心管进行称重，从而就可以计算出细胞沉淀的重量。10毫克细胞沉淀的体积可以粗略地看做10微升。）然后利用液氮和37°C水浴对样品进行两次快速的冻融。4°C或冰浴放置5分钟。4°C，10,000g离心10分钟。取上清用于总谷胱甘肽的测定。样品需暂时4°C保存，不立即测定的样品可以-70°C保存，但不宜超过10天。对于处理好的细胞样品通常需用蛋白去除试剂M溶液进行适当稀释后再进行测定，稀释倍数可以高达20倍。

c. **红细胞或血浆样品的准备**。请尽量使用新鲜的血液进行测定。600g离心10分钟，沉淀为红细胞，上清为血浆。对于红细胞，用PBS洗涤两次。取约50微升红细胞沉淀或血浆，加入50微升蛋白去除试剂M溶液，充分Vortex。4°C或冰浴放置10分钟。4°C，10,000g离心10分钟。取上清用于总谷胱甘肽的测定。样品需暂时4°C保存，不立即测定的样品可以-70°C保存，但不宜超过10天。对于处理好的红细胞样品最后需用蛋白去除试剂M溶液稀释10倍后再进行后续的测定，而对于血浆样品，应直接

取10微升进行测定。

d. **说明：**对于一些谷胱甘肽含量特别低的样品，可以通过冷冻干燥进行浓缩后再进行测定。

4. 待测GSSG含量样品的准备：

取部分上述准备好的待测总谷胱甘肽含量的样品，按照每100微升样品加入20微升稀释的GSH清除辅助液的比例加入稀释的GSH清除辅助液，立即vortex混匀。再按照每100微升样品加入4微升GSH清除试剂工作液的比例加入GSH清除工作液，立即vortex混匀，25°C反应60分钟。通过上述反应可以清除高达50μM的GSH，如果样品中GSH含量过高需进行适当稀释后再进行去除GSH的操作。通过上述处理就可以用于后续的测定。

5. 样品和标准品的测定：

a. 参考下表，使用96孔板，依次加入样品或标准品，混匀。加入150微升总谷胱甘肽检测工作液后，混匀，25°C或室温孵育5分钟。

	空白对照 (blank)	标准曲线 (standard)	样品(sample)
样品或标准品	0 μl	10 μl	x μl
蛋白去除试剂M溶液	10 μl	0 μl	10 - x μl
总谷胱甘肽检测工作液	150 μl	150 μl	150 μl
25°C或室温孵育	5 min	5 min	5 min
0.5mg/ml NADPH	50 μl	50 μl	50 μl

b. 加入50微升0.5mg/ml NADPH溶液，混匀。

c. 立即用酶标仪测定A_{412}，每5分钟测定一次或实时测定，共测定25分钟，测得5个数据。(说明：为了简化实验步骤，可以在加入NADPH溶液混匀后25分钟，仅测定一次A_{412})。如果仪器可以设置温度，把温度设置在25°C，否则就在室温状况下测定。如果酶标仪不能测定A_{412}，可以测定405-414nm附近范围的吸光度。如果标准曲线良好，但样品的吸光度比较低，可以延长孵育时间至30-60分钟，标准品和样品的吸光度在一定范围内会随时间的延长接近于线性增加的。

注意：如果进行GSSG含量测定，标准品也须平行地进行去除GSH的相关操作，以减小误差。如果样品需同时测定总谷胱甘肽含量和GSSG含量，由于两者的检测体系不同，须分别单独做标准曲线。

d. 标准品的实测效果参考图1。

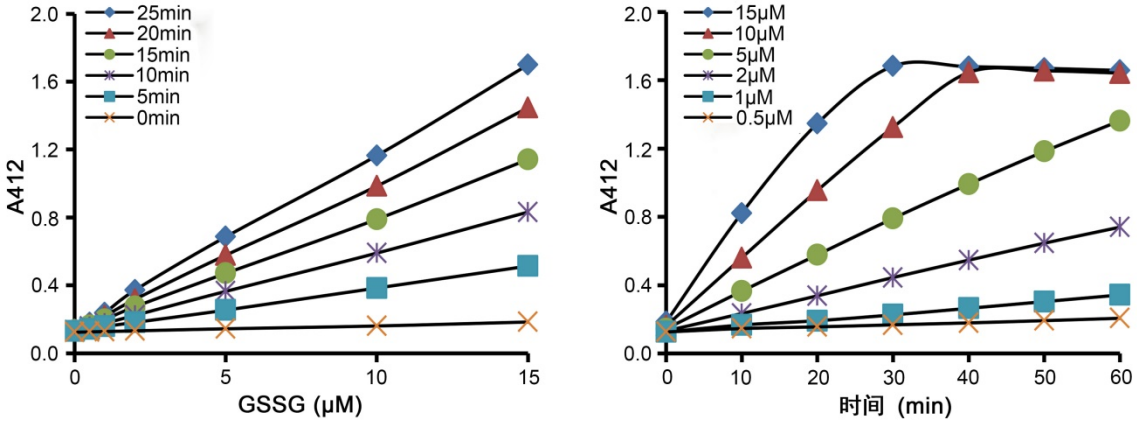


图1. GSSG标准曲线实测效果图。图中数据仅供参考，实际的检测效果可能会因具体反应条件的不同而有所不同。

6. 样品中总谷胱甘肽含量的计算：

a. **单点测定法：**即反应25分钟(或30-60分钟)后仅测定一次吸光度。根据不同浓度标准品测得的不同吸光度作出标准曲线。样品对照标准曲线即可计算出总谷胱甘肽(标准曲线计算得到的GSSG浓度乘以2)或GSSG的含量。实际计算出来的总谷胱甘肽的含量相当于把氧化型谷胱甘肽的含量乘以2再加上还原型谷胱甘肽的含量。单点法测定相对比较便捷，而动力学法测定则相对比较精确。注意：由于1个GSSG分子反应后可以还原成2个GSH分子，所以GSSG的浓度如果换算成GSH的浓度时需乘以2，例如完全清除样品中内源GSH的情况下，GSSG的浓度为5μM，则相当于GSH的浓度为10μM。

b. **动力学测定法：**先根据不同时间点测定得到的吸光度值计算出ΔA_{412}/min。然后以标准品的浓度为横坐标，以ΔA_{412}/min为纵坐标，做出标准曲线。根据样品的ΔA_{412}/min，对照标准曲线就可以计算出测定时样品中总谷胱甘肽或GSSG的含量。

c. 同时根据样品的稀释倍数以及最初样品的使用量，可以计算出每毫克组织或细胞中的总谷胱甘肽或GSSG的含量。对于细胞样品，也可以根据最初细胞的使用数量，然后另外取一定数量的细胞裂解后测定蛋白浓度，从而计算出细胞样品的蛋白量，最后计算出每毫克蛋白中总谷胱甘肽或GSSG的含量。

d. 根据测定得到的总谷胱甘肽的含量和GSSG的含量就可以计算出GSH的含量。

计算公式为：GSH=Total Glutathione-GSSG×2 (注意：Total Glutathione为通过标准曲线计算得到的GSSG浓度乘以2，同时清除GSH后得到的GSSG也要乘以2，因为1个GSSG分子在反应后可以还原成2个GSH分子)。例如通过本试剂盒测定的总谷胱甘肽(Total Glutathione)的浓度是15μM (即在测定总谷胱甘肽时通过标准曲线计算得到的GSSG浓度为7.5μM，乘以2即为总谷胱甘肽浓度)，测定的GSSG的浓度是1.2μM (即在单独测定GSSG含量时通过标准曲线计算得到的GSSG浓度为1.2μM)，那么样品中GSH的浓度为15-1.2×2=12.6μM。

相关产品：

产品编号	产品名称	包装
S0052	总谷胱甘肽检测试剂盒	100次
S0052B	蛋白去除试剂S	3g
S0053	GSH和GSSG检测试剂盒	共100次
S0054	蛋白去除试剂M	5g
S0055	谷胱甘肽还原酶检测试剂盒	100次
S0056	谷胱甘肽过氧化物酶检测试剂盒	100次
S0058	总谷胱甘肽过氧化物酶检测试剂盒	100次

使用本产品的文献：

1. Wang L, Yan B, Liu N, Li Y, Wang Q. Effects of cadmium on glutathione synthesis in hepatopancreas of freshwater crab, Sinopotamon yangtsekiense. Chemosphere 2008 Dec;74(1):51-6.
2. Hu L, Chen L, Yang G, Li L, Sun H, Chang Y, Tu Q, Wu M, Wang H. HBx sensitizes cells to oxidative stress-induced apoptosis by accelerating the loss of Mcl-1 proteinvia caspase-3 cascade. Mol Cancer 2011 Apr 20;10:43.
3. Zhang B, Chen N, Chen H, Wang Z, Zheng Q. The critical role of redox homeostasis in shikonin-induced HL-60 cell differentiation via unique modulation of theNrf2/ARE pathway. Oxid Med Cell Longev 2012;2012:781516.
4. Wang J, Jiang Z, Ji J, Wang X, Wang T, Zhang Y, Tai T, Chen M, Sun L, Li X, Zhang L. Gene expression profiling and pathway analysis of hepatotoxicity induced by triptolide in Wistar rats. Food Chem Toxicol 2013 Apr 29;58C:495-505.
5. Dai BD, Wang Y, Zhao LX, Li DD, Li MB, Cao YB, Jiang YY. Cap1p attenuates the apoptosis of Candida albicans. FEBS J 2013 Jun;280(11):2633-43.
6. Zhang L, Wang L, Hu Y, Liu Z, Tian Y, Wu X, Zhao Y, Tang H, Chen C, Wang Y. Selective metabolic effects of gold nanorods on normal and cancer cells and their application in anticancer drugscreening. Biomaterials 2013 Sep;34(29):7117-26.
7. Meng G, Xia M, Xu C, Yuan D, Schnurr M, Wei J. Multifunctional antitumor molecule 5'-triphosphate siRNA combining glutaminase silencing and RIG-I activation. Int J Cancer 2014 Apr 15;134(8):1958-71.
8. Mo C, Wang L, Zhang J, Numazawa S, Tang H, Tang X, Han X, Li J, Yang M, Wang Z, Wei D, Xiao H. The crosstalk between Nrf2 and AMPK signal pathways is important for the anti-inflammatory effect of berberine in LPS-stimulated macrophages and endotoxin-shocked mice. ANTIOXID REDOX SIGN 2014 Feb 1;20(4):574-88.
9. Xie JM, Li B, Yu HP, Gao QG, Li W, Wu HR, Qin ZH. TIGAR has a dual role in cancer cell survival through regulating apoptosis and autophagy. Cancer Res 2014 Sep 15;74(18):5127-38.
10. Xu W, Wang S, Chen Q, Zhang Y, Ni P, Wu X, Zhang J, Qiang F, Li A, Røe OD, Xu S, Wang M, Zhang R, Zhou J. TXNL1-XRCC1 pathway regulates cisplatin-induced cell death and contributes to resistance in human gastric cancer. Cell Death Dis 2014 Feb 13;5:e1055.
11. He X, Song W, Liu C, Chen S, Hua J. Rapamycin inhibits acrolein-induced apoptosis by alleviating ROS-driven mitochondrial dysfunction in male germ cells. CELL PROLIFERAT 2014 Apr;47(2):161-71.
12. Shi H, Jiang C, Ye T, Tan D, Reiter RJ, Zhang H, Liu R, Chan Z. Comparative physiological, metabolomic, and transcriptomic analyses reveal mechanisms of improved abiotic stress resistance in bermudagrass [Cynodon dactylon (L). Pers.] by exogenous melatonin. J Exp Bot 2015 Feb;66(3):681-94.
13. Shi H, Ye T, Han N, Bian H, Liu X, Chan Z. Hydrogen sulfide regulates abiotic stress tolerance and biotic stress resistance in Arabidopsis. J Integr Plant Biol 2015 Jul;57(7):628-40.
14. Zhang C, Zhou Z, Zhi X, Ma Y, Wang K, Wang Y, Zhang Y, Fu H, Jin W, Pan F, Cui D. Insights into the distinguishing stress-induced cytotoxicity of chiral gold nanoclusters and the relationship with GSTP1. Theranostics 2015 Jan 1;5(2):134-49.
15. Jiang F, Chen L, Yang YC, Wang XM, Wang RY, Li L, Wen W, Chang YX, Chen CY, Tang J, Liu GM, Huang WT, Xu L, Wang HY. CYP3A5 Functions as a Tumor Suppressor in Hepatocellular Carcinoma by Regulating mTORC2/Akt Signaling. Cancer Res 2015 Apr 1;75(7):1470-81.
16. Zheng L, Meng Y, Ma J, Zhao X, Cheng T, Ji J, Chang E, Meng C, Deng N, Chen L, Shi S, Jiang Z. Transcriptomic analysis reveals importance of ROS and phytohormones in response to short-term salinity stress in Populus tomentosa. Front Plant Sci 2015 Sep 15;6:678.
17. Guo H, Zhang N, Liu D, Wang P, Ma X. Inhibitory effect on the proliferation of human heptoma induced by cell-permeable Biomed Pharmacother 2016 Oct;83:1379-1386.
18. Deng C, Zhang B, Zhang S, Duan C, Cao Y, Kang W, Yan H, Ding X, Zhou F, Wu L, Duan G, Shen S, Xu G, Zhang W, Chen M, Huang S, Zhang X, Lv Y, Ling T, Wang L, Zou X. Low nanomolar concentrations of Cucurbitacin-I induces G2/M phase arrest and apoptosis by perturbingredox homeostasis in gastric cancer cells in vitro and in vivo. Cell Death Dis 2016 Feb 18;7:e2106.
19. Zhang J, Cao M, Yang W, Sun F, Xu C, Yin L, Pu Y. Inhibition of Glucose-6-Phosphate Dehydrogenase Could Enhance 1,4-Benzoquinone-Induced OxidativeDamage in K562 Cells. Oxid Med Cell Longev 2016;2016:3912515.
20. Fang Y, Wang J, Xu L, Cao Y, Xu F, Yan L, Nie M, Yuan N, Zhang S, Zhao R, Wang H, Wu M, Zhang X, Wang J.Autophagy maintains ubiquitination-proteasomal degradation of Sirt3 to limit oxidative stress in K562leukemia cells. ONCOTARGET 2016 Jun 14;7(24):35692-35702.
21. Deng C, Zhang B, Zhang S, Duan C, Cao Y, Kang W, Yan H, Ding X, Zhou F, Wu L, Duan G, Shen S, Xu G, Zhang W, Chen M, Huang S, Zhang X, Lv Y, Ling T, Wang L, Zou X. Low nanomolar concentrations of Cucurbitacin-I induces G2/M phase arrest and apoptosis by perturbing redox homeostasis in gastric cancer cells in vitro and in vivo. Cell Death Dis 2016 Feb 18;7:e2106.
22. Li X, Fan XX, Jiang ZB, Loo WT, Yao XJ, Leung EL, Chow LW, Liu L. Shikonin inhibits gefitinib-resistant non-small cell lung cancer by inhibiting TrxR and activating the EGFRproteasomal degradation pathway. Pharmacol Res 2017 Jan;115:45-55.
23. Sun X, Wang W, Chen J, Cai X, Yang J, Yang Y, Yan H, Cheng X, Ye J, Lu W, Hu C, Sun H, Pu J, Cao P. The Natural Diterpenoid Isoforretin A Inhibits Thioredoxin-1 and Triggers Potent ROS-Mediated AntitumorEffects. Cancer Res 2017 Feb 15;77(4):926-936.
24. Chen H, Tang X, Zhou B, Zhou Z, Xu N, Wang Y. A ROS-mediated mitochondrial pathway and Nrf2 pathway activation are involved in BDE-47induced apoptosis in Neuro-2a cells. Chemosphere 2017 Oct;184:679-686.
25. Feng RB, Wang Y, He C, Yang Y, Wan JB. Gallic acid,a natural polyphenol, protects against tert-butyl hydroperoxide-induced hepatotoxicity by activating ERK-Nrf2-Keap1-mediated antioxidative response. Food Chem Toxicol 2017 Oct 21. pii: S0278-6915(17)30631-2.
26. He X, Wu C, Cui Y, Zhu H, Gao Z, Li B, Hua J, Zhao B. The aldehyde group of gossypol induces mitochondrial apoptosis via ROS-SIRT1-p53-PUMApathway in male germline stem cell. ONCOTARGET2017 Oct 24;8(59):100128-100140.
27. Sun X, Wang W, Chen J, Cai X, Yang J, Yang Y, Yan H, Cheng X, Ye J, Lu W, Hu C, Sun H, Pu J, Cao P. The Natural Diterpenoid Isoforretin A Inhibits Thioredoxin-1 and Triggers Potent ROS-MediatedAntitumor Effects. Cancer Res

2017 Feb 15;77(4):926-936.

28. Huang R, Li X, Yu Y, Ma L, Liu S, Zong X, Zheng Q. SETD7 isa prognosis predicting factor of breast cancer and regulates redox homeostasis. ONCOTARGET 2017 Oct 6;8(55):94080-94090.
29. Li X, Fan XX, Jiang ZB, Loo WT, Yao XJ, Leung EL, Chow LW, Liu L. Shikonin inhibits gefitinib-resistant non-small cell lung cancer by inhibiting TrxR and activating the EGFR proteasomal degradation pathway. Pharmacol Res 2017 Jan;115:45-55.
30. Xu X, Xia L, Chen W, Huang Q. Detoxification of hexavalent chromate by growing Paecilomyces lilacinus XLA. Environ Pollut2017 Jun;225:47-54.
31. Xie F, Wu D, Huang SF, Cao JG, Li HN, He L, Liu MQ, Li LF, Chen LX. The endoplasmic reticulum stress-autophagy pathway is involved in apelin-13-inducedcardiomyocyte hypertrophy in vitro. Acta Pharmacol Sin 2017 Dec;38(12):1589-1600.
32. Wu H, Yu W, Meng F, Mi J, Peng J, Liu J, Zhang X, Hai C, Wang X. Polychlorinated biphenyls-153 induces metabolic dysfunction through activation of ROS/NF-κB signaling via downregulation of HNF1b. Redox Biol 2017 Aug;12:300-310.
33. Jiang Y, Cao Y, Wang Y, Li W, Liu X, Lv Y, Li X, Mi J. Cysteine transporter SLC3A1 promotes breast cancer tumorigenesis. Theranostics 2017 Feb 26;7(4):1036-1046.
34. Xu J, Bian X, Liu Y, Hong L, Teng T, Sun Y, Xu Z. Adenosine A2 receptor activation ameliorates mitochondrial oxidative stress upon reperfusion throughthe posttranslational modification of NDUFV2 subunit of complex I in the heart. FREE RADICAL BIO MED 2017 May;106:208-218.
35. Duan M, Zhang R, Zhu F, Zhang Z, Gou L, Wen J, Dong J, Wang T. A Lipid-Anchored NAC Transcription Factor Is Translocated intothe Nucleus and ActivatesGlyoxalase I Expression during Drought Stress. Plant Cell 2017 Jul;29(7):1748-1772.
36. An B, Lan J, Deng X, Chen S, Ouyang C, Shi H, Yang J, Li Y. Silencing of D-Lactate Dehydrogenase Impedes Glyoxalase System and Leads to MethylglyoxalAccumulation and Growth Inhibition in Rice. Front Plant Sci 2017 Dec 5;8:2071.
37. Duan M, Zhang R, Zhu F, Zhang Z, Gou L, Wen J, Dong J, Wang T. A Lipid-Anchored NAC Transcription Factor Is Translocated into the Nucleus and Activates Glyoxalase I Expression during Drought Stress. Plant Cell 2017 Jul;29(7):1748-1772.
38. Luo CQ, Zhou YX, Zhou TJ, Xing L, Cui PF, Sun M, Jin L, Lu N, Jiang HL. Reactive oxygen species-responsive nanoprodrug with quinone methides-mediated GSHdepletion for improved chlorambucil breast cancers therapy. J Control Release 2018 Mar 28;274:56-68.
39. Zhang Y, Li XR, Zhao L, Duan GL, Xiao L, Chen HP. DJ-1 preserving mitochondrial complex I activity plays a critical role in resveratrol-mediatedcardioprotection against hypoxia/reoxygenation-induced oxidative stress. Biomed Pharmacother 2018 Feb;98:545-552.
40. Lu MC, Jiao Q, Liu T, Tan SJ, Zhou HS, You QD, Jiang ZY. Discovery ofa head-to-tail cyclic peptide as the Keap1-Nrf2 protein-protein interaction inhibitor with high cell potency. Eur J Med Chem 2018 Jan 1;143:1578-1589.
41. Fan XY, Liu YJ, Chen K, Jiang FL, Hu YJ, Liu D, Liu Y, Ge YS. Organic arsenicals target thioredoxin reductase followed by oxidative stress and mitochondrialdysfunction resulting in apoptosis. Eur J Med Chem 2018 Jan 1;143:1090-1102.
42. Bai Z, Gao M, Xu X, Zhang H, Xu J, Guan Q, Wang Q, Du J, Li Z, Zuo D, Zhang W, Wu Y. Overcoming resistance to mitochondrial apoptosis by BZML-induced mitotic catastrophe is enhanced by inhibition of autophagy in A549/Taxol cells. CELL PROLIFERAT 2018 Mar 1.
43. Feng M, Yin H, Cao Y, Peng H, Lu G, Liu Z, Dang Z. Cadmium-induced stress response of Phanerochaete chrysosporium duringthe biodegradation of 2,2',4,4'-tetrabromodiphenyl ether (BDE-47). ECOTOX ENVIRON SAFE 2018 Jun 15;154:45-51.
44. Liu Y, Xu C, Zhu Y, Zhang L, Chen T, Zhou F, Chen H, Lin Y. The calcium-dependent kinase OsCPK24 functions in cold stress responses in rice. J Integr Plant Biol 2018 Feb;60(2):173-188.
45. Li B, He X, Zhuang M, Niu B, Wu C, Mu H, Tang F, Cui Y, Liu W, Zhao B, Peng S, Li G, Hua J Melatonin Ameliorates Busulfan-Induced Spermatogonial Stem Cell Oxidative Apoptosis in Mouse Testes. ANTIOXID REDOX SIGN 2018 Feb 10;28(5):385-400.
46. Lu MC, Jiao Q, Liu T, Tan SJ, Zhou HS, You QD, Jiang ZY Discovery of a head-to-tail cyclic peptide as the Keap1-Nrf2 protein-protein interaction inhibitor with high cell potency. Eur J Med Chem 2018 Jan 1;143:1578-1589.
47. Yang X, Wang Z, Li X, Liu B, Liu M, Liu L, Chen S, Ren M, Wang Y, Yu M, Wang B, Zou J, Zhu WG, Yin Y, Gu W, Luo J SHMT2 Desuccinylation by SIRT5 Drives Cancer Cell Proliferation. Cancer Res 2018 Jan 15;78(2):372-386.
48. Wang Y, Lei T, Yuan J, Wu Y, Shen X, Gao J, Feng W, Lu Z GCN2 deficiency ameliorates doxorubicin-induced cardiotoxicity by decreasing cardiomyocyte apoptosis and myocardial oxidative stress. Redox Biol 2018 Jul;17:25-34.
49. Wang H, Shen X, Tian G, Shi X, Huang W, Wu Y, Sun L, Peng C, Liu S, Huang Y, Chen X, Zhang F, Chen Y, Ding W, Lu ZAMPKα2 deficiency exacerbates long-term PM2.5 exposure-induced lung injury and cardiac dysfunction. FREE RADICAL BIO MED 2018 Jun;121:202-214.
50. Chen J, Zhang DM, Feng X, Wang J, Qin YY, Zhang T, Huang Q, Sheng R, Chen Z, Li M, Qin ZH TIGAR inhibits ischemia/reperfusion-induced inflammatory response of astrocytes. Neuropharmacology 2018 Mar 15;131:377-388.
51. Wu D, Han R, Deng S, Liu T, Zhang T, Xie H, Xu Y Protective Effects of Flagellin A N/C Against Radiation-Induced NLR Pyrin Domain Containing 3 Inflammasome-Dependent Pyroptosis in Intestinal Cells. INT J RADIAT ONCOL 2018 May 1;101(1):107-117.
52. Liang Y, Huang W, Zeng D, Huang X, Chan L, Mei C, Feng P, Tan CH, Chen T Cancer-targeted design of bioresponsive prodrug with enhanced cellular uptake to achieve precise cancer therapy. Drug Deliv 2018 Nov;25(1):1350-1361.
53. Wang XX, Zhang TY, Dao GH, Hu HY Tolerance and resistance characteristics of microalgae Scenedesmus sp. LX1 to methylisothiazolinone. Environ Pollut2018 Oct;241:200-211.
54. Xie HL, Zhu S, Zhang J, Wen J, Yuan HJ, Pan LZ, Luo MJ, Tan JH Glucose metabolism during in vitro maturation of mouse oocytes: An study using RNA interference. J Cell Physiol 2018 Sep;233(9):6952-6964.
55. Feng RB, Wang Y, He C, Yang Y, Wan JB Gallic acid, a natural polyphenol, protects against tert-butyl hydroperoxide- induced hepatotoxicity by activating ERK-Nrf2-Keap1-mediated antioxidative response. Food Chem Toxicol 2018 Sep;119:479-488.
56. Dai G, Zheng D, Guo W, Yang J, Cheng AY Cinobufagin Induces Apoptosis in Osteosarcoma Cells Via the Mitochondria-Mediated Apoptotic Pathway. CELL PHYSIOL BIOCHEM 46(3):1134-1147. 2018
57. Gui L, Zhou J, Zhou L, Wei S A smart copper-phthalocyanine framework nanoparticle for enhancing photodynamic therapy in hypoxic conditions by weakening cells through ATP depletion. J Mater Chem B 6(14):2078-2088. 2018 Apr 14
58. Xu C, Sun Y, Qi Y, Yu Y, He Y, Hu M, Hu Q, Wu T, Zhang D, Shang L, Deng H, Zhang Z Selective self-induced stimulus amplification prodrug platform for inhibiting multidrug resistance and lung metastasis. J Control Release 284:224-239. 2018 Aug 28
59. Liu SY, Song JY, Fan B, Wang Y, Pan YR, Che L, Sun YJ, Li GY Resveratrol protects photoreceptors by blocking caspase- and PARP-dependent cell death pathways. FREE RADICAL BIO MED 129:569-581. 2018 Dec
60. Meng Q, Xu J, Liang C, Liu J, Hua J, Zhang Y, Ni Q, Shi S, Yu XGPx1 is involved in the induction of protective autophagy in pancreatic cancer cells in response to glucose deprivation. Cell Death Dis 9(12):1187. 2018 Dec 11
61. Wu X, Li X, Li Z, Yu Y, You Q, Zhang X Discovery of Nonquinone Substrates for NAD(P)H: Quinone Oxidoreductase 1 (NQO1) as Effective Intracellular ROS Generators for the Treatment of Drug-Resistant Non-Small-Cell Lung Cancer. J Med Chem 61(24):11280-11297. 2018 Dec 27

62. Ren C, Wu H, Li D, Yang Y, Gao Y, Jizhang Y, Liu D, Ji X, Zhang X Remote Ischemic Conditioning Protects Diabetic Retinopathy in Streptozotocin-induced Diabetic Rats via Anti-Inflammation and Antioxidation. Aging Dis 9(6):1122-1133. 2018 Dec 4
63. Zhang Y, Li XR, Zhao L, Duan GL, Xiao L, Chen HP DJ-1 preserving mitochondrial complex I activity plays a critical role in resveratrol-mediated cardioprotection against hypoxia/reoxygenation-induced oxidative stress. Biomed Pharmacother 98:545-552. 2018 Feb
64. Fan XY, Liu YJ, Chen K, Jiang FL, Hu YJ, Liu D, Liu Y, Ge YS Organic arsenicals target thioredoxin reductase followed by oxidative stress and mitochondrial dysfunction resulting in apoptosis. Eur J Med Chem 143:1090-1102. 2018 Jan 1
65. Feng M, Yin H, Cao Y, Peng H, Lu G, Liu Z, Dang Z Cadmium-induced stress response of Phanerochaete chrysosporium during the biodegradation of 2,2',4,4'-tetrabromodiphenyl ether (BDE-47). ECOTOX ENVIRON SAFE 154:45-51. 2018 Jun 15
66. Luo CQ, Zhou YX, Zhou TJ, Xing L, Cui PF, Sun M, Jin L, Lu N, Jiang HL Reactive oxygen species-responsive nanoprodrug with quinone methides-mediated GSH depletion for improved chlorambucil breast cancers therapy. J Control Release 274:56-68. 2018 Mar 28
67. Wang W, Zheng W, Hu F, He X, Wu D, Zhang W, Liu H, Ma X Enhanced Biosynthesis Performance of Heterologous Proteins in CHO-K1 Cells Using CRISPR-Cas9. ACS Synth Biol 7(5):1259-1268. 2018 May 18
68. Yang Y, Wang G, Wu W, Yao S, Han X, He D, He J, Zheng G, Zhao Y, Cai Z, Yu R Camalexin Induces Apoptosis via the ROS-ER Stress-Mitochondrial Apoptosis Pathway in AML Cells. Oxid Med Cell Longev 2018:7426950. 2018 Nov 14
69. Middepogu A, Hou J, Gao X, Lin D Effect and mechanism of TiO2 nanoparticles on the photosynthesis of Chlorella pyrenoidosa. ECOTOX ENVIRON SAFE 161:497-506. 2018 Oct
70. Qiu YL, Cheng XN, Bai F, Fang LY, Hu HZ, Sun DQ Aucubin protects against lipopolysaccharide-induced acute pulmonary injury through regulating Nrf2 and AMPK pathways. Biomed Pharmacother 106:192-199. 2018 Oct
71. Wang Q, Bu S, Xin D, Li B, Wang L, Lai D Autophagy Is Indispensable for the Self-Renewal and Quiescence of Ovarian Cancer Spheroid Cells with Stem Cell-Like Properties. Oxid Med Cell Longev 2018:7010472. 2018 Sep 17
72. Yue L, Dai Z, Chen X, Liu C, Hu Z, Song B, Zheng X Development of a novel FePt-based multifunctional ferroptosis agent for high-efficiency anticancer therapy. Nanoscale 10(37):17858-17864. 2018 Sep 27
73. Wang SQ, Yang XY, Cui SX, Gao ZH, Qu XJ Heterozygous knockout insulin-like growth factor-1 receptor (IGF-1R) regulates mitochondrial functions and prevents colitis and colorectal cancer. FREE RADICAL BIO MED 134:87-98. 2019 Apr
74. Guo H, Xu J, Zheng Q, He J, Zhou W, Wang K, Huang X, Fan Q, Ma J, Cheng J, Mei W, Xing R, Cai R NRF2 SUMOylation promotes de novo serine synthesis and maintains HCC tumorigenesis. Cancer Lett 466:39-48. 2019 Dec 1
75. Guo J, Zhang T, Gu J, Cai K, Deng X, Chen K, Huang K, Wang G, Li H, Wang J Oleic Acid Protects against Hepatic Ischemia and Reperfusion Injury in Mice by Inhibiting AKT/mTOR Pathways. Oxid Med Cell Longev 2019:4842592. 2019 Dec 13
76. Zhou Q, Wang X, Shao X, Wang H, Liu X, Ke X, Xiong C, Wei L, Zou H tert-Butylhydroquinone Treatment Alleviates Contrast-Induced Nephropathy in Rats by Activating the Nrf2/Sirt3/SOD2 Signaling Pathway. Oxid Med Cell Longev 2019:4657651. 2019 Dec 18
77. Zhang J, Wang B, Zhao B, Li Y, Zhao X, Yuan Z Blueberry anthocyanin alleviate perfluorooctanoic acid-induced toxicity in planarian (Dugesia japonica) by regulating oxidative stress biomarkers, ATP contents, DNA methylation and mRNA expression. Environ Pollut 245:957-964. 2019 Feb
78. Li HS, Zhou YN, Li L, Li SF, Long D, Chen XL, Zhang JB, Feng L, Li YP HIF-1α protects against oxidative stress by directly targeting mitochondria. Redox Biol 25:101109. 2019 Jul
79. Li R, Liu Y, Shan YG, Gao L, Wang F, Qiu CG Bailcalin Protects against Diabetic Cardiomyopathy through Keap1/Nrf2/AMPK-Mediated Antioxidative and Lipid-Lowering Effects. Oxid Med Cell Longev 2019:3206542. 2019 Jul 1
80. Chen Y, Zheng Q, Jia X, Chen K, Wang Y, Wu T, Xu X, Han Z, Zhang Z, Zhang X MdGGT1 Impacts Apple miR156 Precursor Levels via Ontogenetic Changes in Subcellular Glutathione Homeostasis. Front Plant Sci 10:994. 2019 Jul 31
81. Luca M, Di Mauro M, Perry G Neuropsychiatric Disturbances and Diabetes Mellitus: The Role of Oxidative Stress. Oxid Med Cell Longev 2019:5698132. 2019 Jul 4
82. Xu C, Xu J, Ji G, Liu Q, Shao W, Chen Y, Gu J, Weng Z, Zhang X, Wang Y, Gu A Deficiency of X-ray repair cross-complementing group 1 in primordial germ cells contributes to male infertility. FASEB J 33(6):7427-7436. 2019 Jun
83. Liu Z, Li T, Zhu F, Deng S, Li X, He Y Regulatory roles of miR-22/Redd1-mediated mitochondrial ROS and cellular autophagy in ionizing radiation-induced BMSC injury. Cell Death Dis 10(3):227. 2019 Mar 7
84. Xu L, Wang L, Zhou L, Dorfman RG, Pan Y, Tang D, Wang Y, Yin Y, Jiang C, Zou X, Wu J, Zhang M The SIRT2/cMYC Pathway Inhibits Peroxidation-Related Apoptosis In Cholangiocarcinoma Through Metabolic Reprogramming. Neoplasia 21(5):429-441. 2019 May
85. Bai F, Yu Z, Gao X, Gong J, Fan L, Liu F Simvastatin induces breast cancer cell death through oxidative stress up-regulating miR-140-5p. AGING-US 11(10):3198-3219.2019 May 28
86. Yu Z, Yu Z, Chen Z, Yang L, Ma M, Lu S, Wang C, Teng C, Nie Y Zinc chelator TPEN induces pancreatic cancer cell death through causing oxidative stress and inhibiting cell autophagy. J Cell Physiol 234(11):20648-20661. 2019 Nov
87. Li K, Dong W, Qiu L, Liu Q, Lv G, Peng Y, Xie M, Lin J A new GSH-responsive prodrug of 5-aminolevulinic acid for photodiagnosis and photodynamic therapy of tumors. Eur J Med Chem 181:111582. 2019 Nov 1
88. Hu X, Liu H, Wang Z, Hu Z, Li L miR-200a Attenuated Doxorubicin-Induced Cardiotoxicity through Upregulation of Nrf2 in Mice. Oxid Med Cell Longev 2019:1512326. 2019 Nov 3
89. Lu MC, Zhao J, Liu YT, Liu T, Tao MM, You QD, Jiang ZY CPUY192018, a potent inhibitor of the Keap1-Nrf2 protein-protein interaction, alleviates renal inflammation in mice by restricting oxidative stress and NF-κB activation. Redox Biol 26:101266. 2019 Sep
90. Xiao D, Yuan D, Tan B, Wang J, Liu Y, Tan B The Role of Nrf2 Signaling Pathway in Eucommia ulmoides Flavones Regulating Oxidative Stress in the Intestine of Piglets. Oxid Med Cell Longev 2019:9719618. 2019 Sep 2
91. Liang S, Han L, Mu W, Jiang D, Hou T, Yin X, Pang X, Yang R, Liu Y, Zhang N Carboplatin-loaded SMNDs to reduce GSH-mediated platinum resistance for prostate cancer therapy. J Mater Chem B 6(43):7004-7014. 2018 Nov 21
92. Zhang J, Sheng J, Dong L, Xu Y, Yu L, Liu Y, Huang X, Wan S, Lan HY, Wang H Cardiomyocyte-specific loss of RNA polymerase II subunit 5-mediating protein causes myocardial dysfunction and heart failure. Cardiovasc Res 115(11):1617-1628. 2019 Sep 1
93. Hongdong Ma, Xindong Wang, Weilin Zhang, Haitian Li, Wei Zhao, Jun Sun, Maowei Yang Melatonin Suppresses Ferroptosis Induced by High Glucose via Activation of the Nrf2/HO-1 Signaling Pathway in Type 2 Diabetic Osteoporosis Oxid Med Cell Longev 2020 Dec 4;2020:9067610.
94. Jiani Xie, Chengyan Wang, Ning Wang, Shuang Zhu, Linqiang Mei, Xiao Zhang, Yuan Yong, Lele Li, Chunying Chen, Changshui Huang, Zhanjun Gu, Yuliang Li, Yuliang Zhao Graphdiyne nanoradioprotector with efficient free radical scavenging ability for mitigating radiation-induced gastrointestinal tract damage Biomaterials 2020 Jun;244:119940.
95. Hai-Fan Yu, Cui-Cui Duan, Zhan-Qing Yang, Yu-Si Wang, Zhan-Peng Yue, Bin Guo Malic enzyme 1 is important for uterine decidualization in response to progesterone/cAMP/PKA/HB-EGF pathway FASEB J 2020 Mar;34(3):3820-3837.
96. Qihui Jin, Yanhong Jiang, Lizhong Fu, Yanqiu Zheng, Yuxia Ding, Qian Liu Wenxin Granule Ameliorates Hypoxia/Reoxygenation-Induced Oxidative Stress in

Mitochondria via the PKC- δ/NOX2/ROS Pathway in H9c2 Cells Oxid Med Cell Longev 2020 May 20;2020:3245483.

97. Qi Lv, Haiyue Niu, Lanzhu Yue, Jiaxi Liu, Liyan Yang, Chunyan Liu, Huijuan Jiang, Shuwen Dong, Zonghong Shao, Limin Xing, Huaquan Wang Abnormal Ferroptosis in Myelodysplastic Syndrome Front Oncol 2020 Sep 2;10:1656.
98. Yue Lu, Yuqi Yang, Junhong Zhang, Hongyu Zhang, Changju Ma, Xiaojuan Tang, Jingjing Wu, Li Li, Jianan Wei, Haiming Chen, Chuanjian Lu, Ling Han Anti-Angiogenic Efficacy of PSORI-CM02 and the Associated Mechanism in Psoriasis In Vitro and In Vivo Front Immunol 2021 Apr 30;12:649591.
99. Lei Liu, Huan Wang, Meng Xu, Tian-Xiu Qiu, Jiong Chen Azoxystrobin increases the infection of spring viraemia of carp virus in fish Chemosphere 2021 Dec;285:131465.
100. Xiaohuan Zhao, Min Gao, Jian Liang, Yuhong Chen, Yimin Wang, Yuwei Wang, Yushu Xiao, Zhenzhen Zhao, Xiaoling Wan, Mei Jiang, Xueting Luo, Feng Wang, Xiaodong Sun SLC7A11 Reduces Laser-Induced Choroidal Neovascularization by Inhibiting RPE Ferroptosis and VEGF Production Front Cell Dev Biol 2021 Feb 18;9:639851.
101. Yuxiang Wang, Yawen Ding, Dan Yao, Hong Dong, Changwei Ji, Jinhui Wu, Yiqiao Hu, Ahu Yuan Copper-Based Nanoscale Coordination Polymers Augmented Tumor Radioimmunotherapy for Immunogenic Cell Death Induction and T-Cell Infiltration Small 2021 Feb;17(8):e2006231.
102. Wen-Bin Zhang, Xin Lai, Xu-Feng Guo Activation of Nrf2 by miR-152 Inhibits Doxorubicin-Induced Cardiotoxicity via Attenuation of Oxidative Stress, Inflammation, and Apoptosis Oxid Med Cell Longev 2021 Jan 26;2021:8860883.
103. Haohao Huang, Songyang Zhang, Yuanyuan Li, Zhaodan Liu, Lanjuan Mi, Yan Cai, Xinzheng Wang, Lishu Chen, Haowen Ran, Dake Xiao, Fangye Li, Jiaqi Wu, Tingting Li, Qiuying Han, Liang Chen, Xin Pan, Huiyan Li, Tao Li, Kun He, Ailing Li, Xuemin Zhang, Tao Zhou, Qing Xia, Jianghong Man Suppression of mitochondrial ROS by prohibitin drives glioblastoma progression and therapeutic resistance Nat Commun 2021 Jun 17;12(1):3720.
104. Tongyu Rui, Haochen Wang, Qianqian Li, Ying Cheng, Yuan Gao, Xuexian Fang, Xuying Ma, Guang Chen, Cheng Gao, Zhiya Gu, Shunchen Song, Jian Zhang, Chunling Wang, Zufeng Wang, Tao Wang, Mingyang Zhang, Junxia Min, Xiping Chen, Luyang Tao, Fudi Wang, Chengliang Luo Deletion of ferritin H in neurons counteracts the protective effect of melatonin against traumatic brain injury-induced ferroptosis J Pineal Res 2021 Mar;70(2):e12704.
105. Jialei Sun, Chenhao Zhou, Yue Zhao, Xiaofei Zhang, Wanyong Chen, Qiang Zhou, Bo Hu, Dongmei Gao, Lisa Raatz, Zhefang Wang, Peter J Nelson, Yuchao Jiang, Ning Ren, Christiane J Bruns, Haijun Zhou Quiescin sulfhydryl oxidase 1 promotes sorafenib-induced ferroptosis in hepatocellular carcinoma by driving EGFR endosomal trafficking and inhibiting NRF2 activation Redox Biol 2021 May;41:101942.
106. Huan He, Liang Wang, Yang Qiao, Bin Yang, Dong Yin, Ming He Epigallocatechin-3-gallate pretreatment alleviates doxorubicin-induced ferroptosis and cardiotoxicity by upregulating AMPKα2 and activating adaptive autophagy Redox Biol 2021 Nov 11;48:102185.
107. Xiaoyu Mu, Junying Wang, Hua He, Qifeng Li, Bing Yang, Junhui Wang, Haile Liu, Yalong Gao, Lufei Ouyang, Si Sun, Qinjuan Ren, Xinjian Shi, Wenting Hao, Qiaoman Fei, Jiang Yang, Lulin Li, Ryan Vest, Tony Wyss-Coray, Jian Luo, Xiao-Dong Zhang An oligomeric semiconducting nanozyme with ultrafast electron transfers alleviates acute brain injury Sci Adv 2021 Nov 12;7(46):eabk1210.
108. Mengyi Jin, Yanzi Wang, Xiaoya An, Honghua Kang, Yixin Wang, Guoliang Wang, Yang Gao, Shuiping Wu, Peter S Reinach, Zuguo Liu, Yuhua Xue, Cheng Li Phenotypic and transcriptomic changes in the corneal epithelium following exposure to cigarette smoke Environ Pollut 2021 Oct 15;287:117540.
109. Huan Wang, Qi Cheng, Kaikai Chang, Lingjie Bao, Xiaofang Yi Integrated Analysis of Ferroptosis-Related Biomarker Signatures to Improve the Diagnosis and Prognosis Prediction of Ovarian Cancer Front Cell Dev Biol 2022 Jan 5;9:807862.
110. Biting Zhou, Lijun Fang, Yanli Dong, Juhua Yang, Xiaole Chen, Nanwen Zhang, Yihua Zhu, Tianwen Huang Mitochondrial quality control protects photoreceptors against oxidative stress in the H2O2-induced models of retinal degeneration diseases Cell Death Dis 2021 Apr 20;12(5):413.
111. Qiujie Wang, Cheng Bin, Qiang Xue, Qingzhu Gao, Ailong Huang, Kai Wang, Ni Tang GSTZ1 sensitizes hepatocellular carcinoma cells to sorafenib-induced ferroptosis via inhibition of NRF2/GPX4 axis Cell Death Dis 2021 Apr 30;12(5):426.
112. Santie Li, Zhongxin Zhu, Mei Xue, Xuebo Pan, Gaozan Tong, Xinchu Yi, Junfu Fan, Yuankuan Li, Wanqian Li, Yetong Dong, Enzhao Shen, Wenjie Gong, Xuejiao Wang, Ying Yu, Yoo Jae Maeng, Xiaokun Li, Kwang Youl Lee, Litai Jin, Weitao Cong The protective effects of fibroblast growth factor 10 against hepatic ischemia-reperfusion injury in mice Redox Biol 2021 Apr;40:101859.
113. Shengbai Sun, Chaoqun Li, Kaisa Cui, Bingxin Liu, Mingyue Zhou, Yulin Cao, Jia Zhang, Zehua Bian, Bojian Fei, Zhaohui Huang Hsa_circ_0062682 Promotes Serine Metabolism and Tumor Growth in Colorectal Cancer by Regulating the miR-940/PHGDH Axis Front Cell Dev Biol 2021 Dec 8;9:770006.
114. Lei-Lei Ma, Fei-Juan Kong, Yuan-Ji Ma, Jun-Jie Guo, Shi-Jun Wang, Zheng Dong, Ai-Jun Sun, Yun-Zeng Zou, Jun-Bo Ge Hypertrophic preconditioning attenuates post-myocardial infarction injury through deacetylation of isocitrate dehydrogenase 2 Acta Pharmacol Sin 2021 Dec;42(12):2004-2015.
115. Zhusheng Huang, Yuxiang Wang, Dan Yao, Jinhui Wu, Yiqiao Hu, Ahu Yuan Nanoscale coordination polymers induce immunogenic cell death by amplifying radiation therapy mediated oxidative stress Nat Commun 2021 Jan 8;12(1):145.
116. Yuxin Liu, Xingjun Zhu, Zheng Wei, Wei Feng, Luoyuan Li, Liyi Ma, Fuyou Li, Jing Zhou Customized Photothermal Therapy of Subcutaneous Orthotopic Cancer by Multichannel Luminescent Nanocomposites Adv Mater 2021 Jul;33(30):e2008615.
117. Jing Li, Junhua Li, Yuji Pu, Sai Li, Wenxia Gao, Bin He PDT-Enhanced Ferroptosis by a Polymer Nanoparticle with pH-Activated Singlet Oxygen Generation and Superb Biocompatibility for Cancer Therapy Biomacromolecules 2021 Mar 8;22(3):1167-1176.
118. Zheng Dang, Yong Guan, Zhao Wu, Xia-Yu Tao, Ying Xiong, Hao-Bo Bai, Chang-Sheng Shao, Gang Liu, Qing Huang, Li-Jiao Tian, Yang-Chao Tian Regulating the synthesis rate and yield of bio-assembled FeS nanoparticles for efficient cancer therapy Nanoscale 2021 Nov 25;13(45):18977-18986.
119. Xingju Song, Xu Yang, Zhu Ying, Heng Zhang, Jing Liu, Qun Liu Identification and Function of Apicoplast Glutaredoxins in Neospora caninum Int J Mol Sci 2021 Nov 4;22(21):11946.
120. Xiuhan Guo, Haoze Yu, Wanjie Shen, Rui Cai, Yueqing Li, Guangzhe Li, Weijie Zhao, Shisheng Wang Synthesis and biological evaluation of NO-donor containing photosensitizers to induce ferroptosis of cancer cells Bioorg Chem 2021 Nov;116:105355.
121. Xiyu Zhang, Cuiting Zheng, Zhenqiang Gao, Lingling Wang, Chen Chen, Yuanyuan Zheng, Yan Meng PKM2 promotes angiotensin-II-induced cardiac remodelling by activating TGF-β/Smad2/3 and Jak2/Stat3 pathways through oxidative stress J Cell Mol Med 2021 Nov;25(22):10711-10723.
122. Xinbo Wang, Yueqing Chen, Xudong Wang, Hongling Tian, Yanjin Wang, Jiali Jin, Zezhi Shan, Yu'e Liu, Zhenyu Cai, Xinyuan Tong, Yi Luan, Xiao Tan, Bing Luan, Xin Ge, Hongbin Ji, Xuejun Jiang, Ping Wang Stem Cell Factor SOX2 Confers Ferroptosis Resistance in Lung Cancer via Upregulation of SLC7A11 Cancer Res 2021 Oct 15;81(20):5217-5229.
123. Yanhong Duo, Guanghong Luo, Zihuang Li, Zide Chen, Xianming Li, Zhenyou Jiang, Binlu Yu, Hao Huang, Zhengbo Sun, Xue-Feng Yu Photothermal and Enhanced Photocatalytic Therapies Conduce to Synergistic Anticancer Phototherapy with Biodegradable Titanium Diselenide Nanosheets Small 2021 Oct;17(40):e2103239.
124. Bo Zhang, Xiang Chen, Feng Ru, Yu Gan, Bingsheng Li, Weiping Xia, Guoyu Dai, Yao He, Zhi Chen Liproxstatin-1 attenuates unilateral ureteral obstruction-induced renal fibrosis by inhibiting renal tubular epithelial cells ferroptosis Cell

Death Dis 2021 Sep 11;12(9):843.

125. Chenyao Wu, Zhonglong Liu, Zhixin Chen, Deliang Xu, Lisong Chen, Han Lin, Jianlin Shi A nonferrous ferroptosis-like strategy for antioxidant inhibition-synergized nanocatalytic tumor therapeutics Sci Adv 2021 Sep 24;7(39):eabj8833.
126. Xuzhuo Chen, Chang Li, Xiankun Cao, Xinlin Jia, Xinwei Chen, Zhenqiang Wang, Weifeng Xu, Fengrong Dai, Shanyong Zhang Mitochondria-targeted supramolecular coordination container encapsulated with exogenous itaconate for synergistic therapy of joint inflammation Theranostics 2022 Apr 4;12(7):3251-3272.
127. Fanen Yuan, Qian Sun, Si Zhang, Liguo Ye, Yang Xu, Gang Deng, Zhou Xu, Shenqi Zhang, Baohui Liu, Qianxue Chen The dual role of p62 in ferroptosis of glioblastoma according to p53 status Cell Biosci 2022 Feb 25;12(1):20.
128. Chunyue Wang, Shanshan Chen, Hangyu Guo, Hongbo Jiang, Honghan Liu, Haoran Fu, Di Wang Forsythoside A Mitigates Alzheimer's-like Pathology by Inhibiting Ferroptosis-mediated Neuroinflammation via Nrf2/GPX4 Axis Activation Int J Biol Sci 2022 Feb 28;18(5):2075-2090.
129. Haiyang Zhao, Tingting Zhao, Jihong Yang, Qianqian Huang, Hua Wu, Yueyun Pan, Hui Wang, Yun Qian Epimedium protects against dyszoospermia in mice with Pex3 knockout by exerting antioxidant effects and regulating the expression level of P16 Cell Death Dis 2022 Jan 20;13(1):69.
130. Fei Jia, Yu Liu, Xinyu Dou, Chuanchao Du, Tianli Mao, Xiaoguang Liu Liensinine Inhibits Osteosarcoma Growth by ROS-Mediated Suppression of the JAK2/STAT3 Signaling Pathway Oxid Med Cell Longev 2022 Jan 25:2022:8245614.
131. Jiahong Yang, Xiaolin Sun, Ning Huang, Peng Li, Jiaqi He, Lan Jiang, Xuemei Zhang, Shu Han, Hong Xin Entacapone alleviates acute kidney injury by inhibiting ferroptosis FASEB J 2022 Jul;36(7):e22399.
132. Jing Qin, Peng-Fei Xia, Xian-Zheng Yuan, Shu-Guang Wang Chlorine disinfection elevates the toxicity of polystyrene microplastics to human cells by inducing mitochondria-dependent apoptosis J Hazard Mater 2022 Mar 5:425:127842.
133. Zifeng Huang, Jiajun Han, Peipei Wu, Chunxiao Wu, Yaohua Fan, Lijun Zhao, Xiaoqian Hao, Dongfeng Chen, Meiling Zhu Sorting Nexin 5 Plays an Important Role in Promoting Ferroptosis in Parkinson's Disease Oxid Med Cell Longev 2022 May 5:2022:5463134.
134. Jiayu Song, Jingyi Sheng, Juan Lei, Weihua Gan, Yunwen Yang Mitochondrial Targeted Antioxidant SKQ1 Ameliorates Acute Kidney Injury by Inhibiting Ferroptosis Oxid Med Cell Longev 2022 Sep 22:2022:2223957.
135. Xiaoyuan Mao, Xuan Wang, Mingzhu Jin, Qin Li, Jining Jia, Menghuan Li, Honghao Zhou, Zhaoqian Liu, Weilin Jin, Yanli Zhao, Zhong Luo Critical involvement of lysyl oxidase in seizure-induced neuronal damage through ERK-Alox5-dependent ferroptosis and its therapeutic implications Acta Pharm Sin B 2022 Sep;12(9):3513-3528.

Version 2024.03.12