

WST-1细胞增殖及细胞毒性检测试剂盒

产品编号	产品名称	包装
C0036	WST-1细胞增殖及细胞毒性检测试剂盒	500次

产品简介:

- WST-1细胞增殖及细胞毒性检测试剂盒(WST-1 Cell Proliferation and Cytotoxicity Assay Kit)是一种广泛应用于细胞增殖和细胞毒性的快速高灵敏度检测试剂盒。
- WST-1是一种类似于MTT的化合物,在电子耦合试剂存在的情况下,可以被线粒体内的一些脱氢酶还原生成橙黄色的formazan(参考图1)。细胞增殖越多越快,则颜色越深;细胞毒性越大,则颜色越浅。

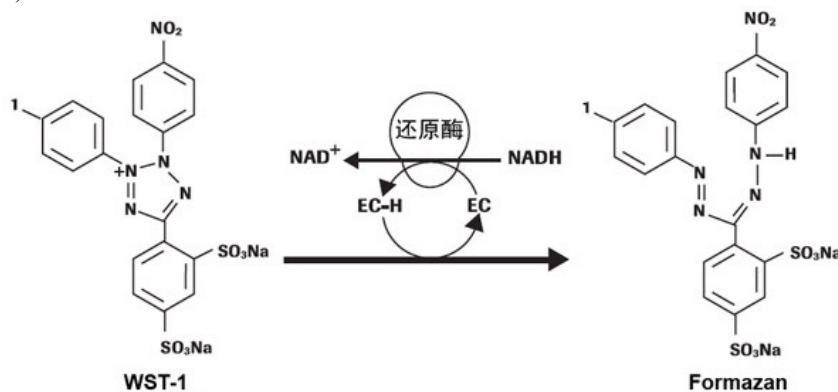


图1. WST-1检测原理图 (EC=electron coupling reagent, 即电子耦合试剂)

- WST-1是MTT的一种升级替代产品,和MTT或其它MTT类似产品如XTT、MTS等相比有明显的优点。首先,MTT被线粒体内的一些脱氢酶还原生成的formazan不是水溶性的,需要有特定的溶解液来溶解;而WST-1和XTT、MTS产生的formazan都是水溶性的,可以省去后续的溶解步骤。其次,WST-1产生的formazan比XTT和MTS产生的formazan更易溶解。再次,WST-1比XTT和MTS更加稳定,使实验结果更加稳定。另外,WST-1和MTT、XTT等相比,线性范围更宽,灵敏度更高(参考图2)。
- 本试剂盒可以用于细胞因子等诱导的细胞增殖检测,也可以用于抗癌药物等对细胞有毒试剂诱导的细胞毒性检测,或一些药物诱导的细胞生长抑制检测等。
- 本试剂盒检测非常便捷。无须使用同位素,所有的检测步骤仅在同一块96孔板内完成。不必洗涤细胞,不必收集细胞,也不必采用额外步骤去溶解formazan。可以用于大批量样品的检测。
- 酚红和血清对本试剂盒的测定无明显影响。
- WST-1对细胞无明显毒性。加入WST-1显色后,可以在不同时间反复用酶标仪读板,使检测时间更加灵活,便于找到最佳测定时间。
- 碧云天各种细胞增殖和细胞毒性检测试剂盒的比较和选择,请参考<http://www.beyotime.com/support/cell-proliferation.htm>。
- 本试剂盒可以测定500个样品。

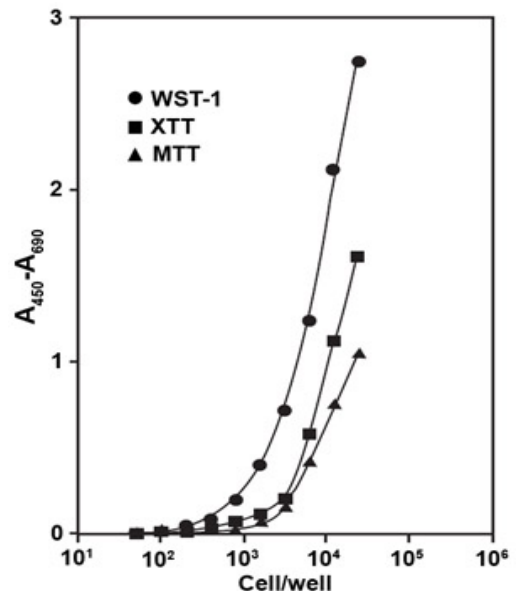


图2. WST-1、XTT和MTT的检测效果比较

注: 450nm为测定波长, 690nm为参考波长

包装清单:

产品编号	产品名称	包装
C0036-1	WST-1 (粉末)	1瓶
C0036-2	电子耦合试剂	5ml
—	说明书	1份

保存条件:

-20°C避光保存, 一年有效。WST-1粉末溶解后, 4°C避光可以保存一周, -20°C避光可以保存半年(宜适当分装, 尽量避免反复冻融)。

注意事项:

- 由于使用96孔板进行检测, 如果细胞培养时间较长, 一定要注意蒸发的问题。一方面, 由于96孔板周围一圈最容易蒸发, 可以采取弃用周围一圈的办法, 改加PBS, 水或培养液; 另一方面, 可以把96孔板置于靠近培养箱内水源的地方, 以缓解蒸发。
- 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. WST-1溶液的配制: 把5毫升电子耦合试剂加入到WST-1粉末中, 完全溶解即成WST-1溶液。WST-1溶液4°C避光可保存一周, 而不影响使用效果。短期内不使用的WST-1溶液, 分装后可以-20°C避光保存半年(尽量避免反复冻融)。冻存的WST-1溶液溶解后可能会观察到一些沉淀物, 这是正常现象, 37°C水浴孵育2-10分钟, 通常可以完全溶解。
2. 通常细胞增殖实验每孔加入100微升2000个细胞, 细胞毒性实验每孔加入100微升5000个细胞(具体每孔所用的细胞的数目, 需根据细胞的大小, 细胞增殖速度的快慢等因素决定)。按照实验需要, 进行培养并给予0-10微升特定的药物刺激。
3. 每孔加入10微升WST-1溶液。如果起始的培养体积为200微升, 则需加入20微升WST-1溶液, 其它情况以此类推。可以用加了相应量细胞培养液和WST-1溶液但没有加入细胞的孔作为空白对照。
4. 在细胞培养箱内继续孵育0.5-4小时, 对于大多数情况, 孵育1-2小时就可以了。时间长短根据细胞的类型和细胞的密度等实验情况而定, 初次实验时可以在0.5、1、2和4小时后分别用酶标仪检测, 然后选取吸光度范围比较适宜的一个时间点用于后续实验。图3为HT-1080细胞在不同时间测定的细胞数量曲线。

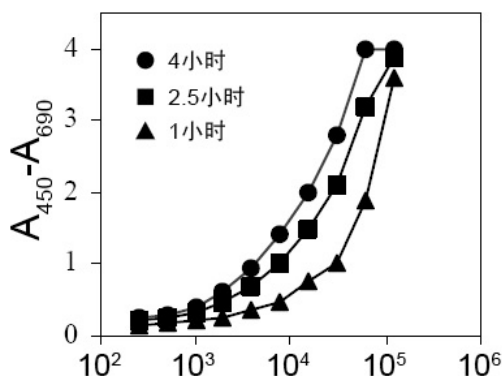


图3. HT-1080细胞培养20小时后, 加入WST-1溶液后不同时间测得的吸光度。

5. 把96孔板置于摇床上摇动一分钟, 以充分混匀待检测体系。
6. 在450nm测定吸光度。如无450nm滤光片, 可以使用420-480nm的滤光片。可以使用大于600nm的波长作为参考波长进行双波长测定。

使用本产品的文献:

1. Li H, Wang L, Ye L, Mao Y, Xie X, Xia C, Chen J, Lu Z, Song J. Influence of *Pseudomonas aeruginosa* quorum sensing signal molecule N-(3-oxododecanoyl) homoserine lactone on mast cells. *Med Microbiol Immunol*. 2009 May;198(2):113-21.
2. Yu M, Cai L, Liang M, Huang Y, Gao H, Lu S, Fei J, Huang F. Alteration of NRSF expression exacerbating 1-methyl-4-phenyl-pyridinium ion-induced cell death of SH-SY5Y cells. *Neurosci Res*. 2009 Nov;65(3):236-44.
3. Zhang Q, Zhou H, Yan B. Reducing nanotube cytotoxicity using a nanocombinatorial library approach. *Methods Mol Biol*. 2010;625:95-107.
4. Liu S, Yang P, Kang H, Lu L, Zhang Y, Pan J, Rui YC. NDRG2 induced by oxidized LDL in macrophages antagonizes growth factor productions via selectively inhibiting ERK activation. *Biochim Biophys Acta*. 2010 Feb;1801(2):106-13.
5. Yuan H, Wang Y, Wu X, Wang H, Pu J, Ding W, Wang M, Shen X, Cong H, Zhang L, Zhang M, Ju S. Characterization of the 5'-flanking region and regulation of transcription of human BAFF-R gene. *DNA Cell Biol*. 2010 Mar;29(3):133-9.
6. Cheng Y, Hu R, Jin H, Ma K, Zhou S, Cheng H, Ma D, Li X. Effect of 14-3-3 tau protein on differentiation in BeWo choriocarcinoma cells. *Placenta*. 2010;31(1):60-6.
7. Wang J, Chen B, Chen J, Cai X, Xia G, Liu R, Chen P, Zhang Y, Wang X. Synthesis and antitumor efficacy of daunorubicin-loaded magnetic nanoparticles. *Int J Nanomedicine*. 2011;6:203-11.
8. Hu B, Li C, Lu H, Zhu Z, Du S, Ye M, Tan L, Ren D, Han J, Kan S, Wang J, Jin N. Immune responses to the oral administration of recombinant *Bacillus subtilis* expressing multi-epitopes of foot-and-mouth disease virus and a cholera toxin B subunit. *J Virol Methods*. 2011 Jan;171(1):272-9.
9. Chang WQ, Wu XZ, Cheng AX, Zhang L, Ji M, Lou HX. Retigeric acid B exerts antifungal effect through enhanced reactive oxygen species and decreased cAMP. *Biochim Biophys Acta*. 2011 May;1810(5):569-76.
10. Kai W, Xiaojun X, Ximing P, Zhenqing H, Qiqing Z. Cytotoxic effects and the mechanism of three types of magnetic nanoparticles on human hepatoma BEL-7402 cells. *Nanoscale Res Lett*. 2011 Jul 29;6:480.
11. Shen X, Zhang X, Xu G, Ju S. BAFF-R gene induced by IFN- γ in multiple myeloma cells is related to NF- κ B signals. *Cell Biochem Funct*. 2011 Aug;29(6):513-20.
12. Shen X, Zhu W, Zhang X, Xu G, Ju S. A role of both NF- κ B pathways in expression and transcription regulation of BAFF-R gene in multiple myeloma cells. *Mol Cell Biochem*. 2011 Nov;357(1-2):21-30.

13. Tan C, Zhang LY, Chen H, Xiao L, Liu XP, Zhang JX. Overexpression of the human ubiquitin E3 ligase CUL4A alleviates hypoxia-reoxygenation injury in pheochromocytoma (PC12) cells. *Biochem Biophys Res Commun*. 2011 Dec 16;416(3-4):403-8.
14. Wen H, Dong C, Dong H, Shen A, Xia W, Cai X, Song Y, Li X, Li Y, Shi D. Engineered redox-responsive PEG detachment mechanism in PEGylated nano-graphene oxide for intracellular drug delivery. *Small*. 2012 Mar 12;8(5):760-9
15. Qin Y, Zhang S, Gong W, Li J, Jia J, Quan Z. Adenovirus-mediated gene transfer of tissue factor pathway inhibitor-2 inhibits gallbladder carcinoma growth in vitro and in vivo. *Cancer Sci*. 2012 Apr;103(4):723-30
16. Liu S, Liu Z, Bi D, Yuan X, Liu X, Ding S, Lu J, Niu Z. CCN3 (NOV) regulates proliferation, adhesion, migration and invasion in clear cell renal cell carcinoma. *Oncol Lett*. 2012 May;3(5):1099-1104
17. Han YH, Zhang ZW, Su J, Zhang B, Li S, Xu SW. Effects of Chicken Selenoprotein W on H₂O₂-Induced Apoptosis in CHO-K1 Cells. *Biol Trace Elem Res*. 2012 Jun;147(1-3):395-402.
18. Jia R, Cao L, Xu P, Jeney G, Yin G. In vitro and in vivo hepatoprotective and antioxidant effects of Astragalus polysaccharides against carbon tetrachloride-induced hepatocyte damage in common carp (*Cyprinus carpio*). *Fish Physiol Biochem*. 2012 Jun;38(3):871-81.
19. Li XY, Jing CQ, Zang XY, Yang S, Wang JJ. Toxic cytological alteration and mitochondrial dysfunction in PC12 cells induced by 1-octyl-3-methylimidazolium chloride. *Toxicol In Vitro*.
20. Wang H, Cheng H, Wang K, Wen T. Different effects of histone deacetylase inhibitors nicotinamide and trichostatin A (TSA) in C17.2 neural stem cells. *J Neural Transm*. 2012 Nov;119(11):1307-15.
21. Xu G, Shen XJ, Pu J, Chu SP, Wang XD, Wu XH, Sun CJ, Zhang X, Zhu BL, Ju SQ. BlyS expression and JNK activation may form a feedback loop to promote survival and proliferation of multiple myeloma cells. *Cytokine*. 2012 Nov;60(2):505-13.
22. Cao X, Zhou M, Wang S, Wang C, Hou L, Luo Y, Chen L. Inhibition on hepatitis B virus in vitro of lectin from *Musca domestica* pupa via the activation of NF- κ B. *Virus Res*. 2012 Dec;170(1-2):53-8.
23. Cai X, Dong H, Ma J, Zhu H, Wu W, Chu M, Li Y, Shi D. Effects of spatial distribution of the nuclear localization sequence on gene transfection in cationic-gene polyplexes. *J MATER CHEM B*. 2013 Jan 12;1:1712-21
24. Yuan H, Zhang W, Li H, Chen C, Liu H, Li Z. Neuroprotective effects of resveratrol on embryonic dorsal root ganglion neurons with neurotoxicity induced by ethanol. *Food Chem Toxicol*. 2013 May;55:192-201
25. Liu Z, Yu Y, Yuan Z, Zhang F, Jing C. Dexamethasone-induced apoptosis in PC12 cells. *Toxic Review*. 2013 May;32(2):34-3.
26. Yuan H, Zhang J, Liu H, Li Z. The protective effects of resveratrol on Schwann cells with toxicity induced by ethanol in vitro. *Neurochem Int*. 2013 Jun 13;63(3):146-153
27. Li T, Chen H, Yang Z, Liu XG, Zhang LM, Wang H. Evaluation of the immunosuppressive activity of artesunate in vitro and in vivo. *Int Immunopharmacol*. 2013 Jun;16(2):306-12
28. Jing C, Li X, Zhang J, Wang J. Responses of the Antioxidant System in QGY-7701 Cells to the Cytotoxicity and Apoptosis Induced by 1-Octyl-3-methylimidazolium Chloride. *J BIOCHEM MOL TOXIC*. 2013 Jun;27(6):330-6
29. Wei N, Li T, Chen H, Mei X, Cao B, Zhang YY. The Immunosuppressive Activity of Pseudolaric Acid B on T lymphocytes in vitro. *Phytother Res*. 2013 Jul;27(7):980-5
30. Weng M, Zhang M, Qin Y, Gong W, Tang Z, Quan Z, Wu K. Targeting gallbladder carcinoma: bone marrow-derived stem cells as therapeutic delivery vehicles of myxoma virus. *CHINESE MED J-PEKING*. 2014;127(12):2350-6
31. Liu XD, Zhou B, Cao RB, Feng XL, Ma ZY, Chen PY. BP5 regulated B cell development promoting anti-oxidant defence. *Amino Acids*. 2014 Jan;46(1):209-22
32. Rong WT, Lu YP, Tao Q, Guo M, Lu Y, Ren Y, Yu SQ. Hydroxypropyl-sulfobutyl- β -cyclodextrin improves the oral bioavailability of edaravone by modulating drug efflux pump of enterocytes. *EUR J PHARM SCI*. 2014 Feb;103(2):730-42
33. Bai Y, Lu H, Hu L, Hong D, Ding L, Chen B. Effect of Sedum sarmentosum BUNGE extract on aristolochic acid-induced renal tubular epithelial cell injury. *J Pharmacol Sci*. 2014 Mar;124(4):445-56
34. Weng M, Gong W, Ma M, Chu B, Qin Y, Zhang M, Lun X, McFadden G, Forsyth P, Yang Y, Quan Z. Targeting gallbladder cancer: oncolytic virotherapy with myxoma virus is enhanced by rapamycin in vitro and further improved by hyaluronan in vivo. *Mol Cancer*. 2014 Apr 13;13:82
35. Zeng M, Wei X, Wu Z, Li W, Li B, Fei Y, He Y, Chen J, Wang P, Liu X. Reactive oxygen species contribute to simulated ischemia/reperfusion-induced apoptotic cell death in human umbilical vein endothelial cells. *MED SCI MONITOR*. 2014 Jun 19;20:1017-23
36. Liu XD, Li XF, Feng XL, Zhou B, Cao RB, Chen PY. Effect of sonication on B cell development and immunomodulatory functions of Bursa of Fabricius. *Ultrason Sonochem*. 2014 Jul;21(4):1343-8
37. Yin Y, Qin T, Yu Q, Yang Q. Bursopentin (BP5) from chicken bursa of Fabricius attenuates the immune function of dendritic cells. *Amino Acids*. 2014 Jul;46(7):1763-74
38. Yu T, Li L, Bi Y, Liu Z, Liu H, Li Z. Erythropoietin attenuates oxidative stress and apoptosis in Schwann cells isolated from streptozotocin-induced diabetic rats. *J Pharm Pharmacol*. 2014 Aug;66(8):1150-60
39. Yu Y, Yang Y, Wang J. Anti-apoptotic and apoptotic pathway analysis of arsenic trioxide induced apoptosis in human gastric cancer SGC-7901 cells. *Oncol Rep*. 2014 Sep;32(3):973-8
40. Li R, Feng F, Wang Y, Yang X, Yang X, Yang VC. Folic acid-conjugated pH/temperature/redox multi-stimuli responsive polymer microspheres for delivery of anti-cancer drug. *J COLLOID INTERF SCI*. 2014 Sep 1;429:34-44
41. Yang FL, Chen FZ, Wan XX, Zhou X, Zhou MJ, Chen HC, Fu JJ, Zhang DZ. Effects of a Particular Heptapeptide on the IFN- α -Sensitive CML Cells. *Biomed Res Int*. 2015;2015:325026
42. Liu YJ, Du JL, Cao LP, Jia R, Shen YJ, Zhao CY, Xu P, Yin GJ. Anti-inflammatory and hepatoprotective effects of Ganoderma lucidum polysaccharides on carbon tetrachloride-induced hepatocyte damage in common carp (*Cyprinus carpio* L.). *Int Immunopharmacol*. 2015 Mar;25(1):112-20
43. Yu T, Li L, Chen T, Liu Z, Liu H, Li Z. Erythropoietin attenuates advanced glycation endproducts-induced toxicity of Schwann cells in vitro. *Neurochem Res*. 2015 Apr;40(4):698-712
44. Jianhe Liang, Ran Song, Qiaoling Huang, Yun Yang, Longxiang Lin, Yanmei Zhang, Pinliang Jiang, Hongping Duan, Xiang Dong, Changjian Lin. Electrochemical construction of a bio-inspired micro/nano-textured structure with cell-sized microhole arrays on biomedical titanium to enhance bioactivity. *ELECTROCHIM ACTA* 2015 Aug;174:1149-59
45. Lv S, Xu Q, Sun E, Yang T, Li J, Feng Y, Zhang Q, Wang H, Zhang J, Wu D. Autophagy Activated by Bluetongue Virus Infection Plays a Positive Role in Its Replication. *VIRUSES-BASEL*. 2015 Aug 17;7(8):4657-75
46. Li JP. Resveratrol caused apoptosis in QGY-7701 cells. *EUR REV MED PHARMACO*. 2015 Sep;19(17):3303-8
47. Bao J, Huang B, Zou L, Chen S, Zhang C, Zhang Y, Chen M, Wan JB, Su H, Wang Y, He C. Hormetic Effect of Berberine Attenuates the Anticancer Activity of Chemotherapeutic Agents. *PLoS One*. 2015 Sep 30;10(9):e0139298
48. Li Y, Xie P, Sun M, Xiang B, Kang Y, Gao P, Zhu W, Ning Z, Ren T. S1PR1 expression correlates with inflammatory responses to Newcastle disease virus infection. *Infect Genet Evol*. 2015 Oct 24;37:37-42
49. Lv S, Sun EC, Xu QY, Zhang JK, Wu DL. Endoplasmic reticulum stress-mediated autophagy contributes to bluetongue virus infection via the PERK-eIF2 α pathway. *BIOCHEM BIOPH RES CO*. 2015 Oct 23;466(3):406-12
50. Tang T, Jiang H, Yu Y, He F, Ji SZ, Liu YY, Wang ZS, Xiao SC, Tang C, Wang GY, Xia ZF. A new method of wound treatment: targeted therapy of skin wounds with reactive oxygen species-responsive nanoparticles containing SDF-1 α . *INT J NANOMED*. 2015 Oct 19;10:6571-85
51. Wu F, Li Y, Song H, Zhang Y, Zhang Y, Jiang M, Wang F, Mu Q, Zhang W, Li L, Tang D. Preventive Effect of Dihydromyricetin against Cisplatin-Induced Nephrotoxicity In Vitro and In Vivo. *EVID-BASED COMPL ALT*. 2016;2016:7937385
52. Wu F, Li Y, Song H, Zhang Y, Zhang Y, Jiang M, Wang F, Mu Q, Zhang W, Li L, Tang D. Preventive Effect of Dihydromyricetin against Cisplatin-Induced Nephrotoxicity In Vitro and In Vivo. *EVID-BASED COMPL ALT*. 2016;2016:7937385
53. He S, Lin KF, Fan JJ, Hu G, Dong X, Zhao YN, Song Y, Guo ZS, Bi L, Liu J. Synergistic Effect of Mesoporous Silica and Hydroxyapatite in Loaded Poly(DL-lactic-co-glycolic acid) Microspheres on the Regeneration of Bone Defects. *Biomed Res Int*. 2016;2016:9824827

54. Shen X, Guo Y, Qi J, Shi W, Wu X, Ju S. Binding of B-cell maturation antigen to B-cell activating factor induces survival of multiple myeloma cells by activating Akt and JNK signaling pathways. *Cell Biochem Funct*. 2016 Mar;34(2):104-10
55. Xie X, Han M, Zhang L, Liu L, Gu Z, Yang M, Yang H. Effects of Mycobacterium tuberculosis ESAT6-CFP10 Protein on Cell Viability and Production of Nitric Oxide in Alveolar Macrophages. *JUNDI SHAPUR J MICROB*. 2016 May 30;9(6):e33264
56. Li H, Gao R, Zhang Y. A Promising Trigene Recombinant Human Adenovirus Vaccine Against Classical Swine Fever Virus. *Viral Immunol*. 2016 May;29(4):244-51
57. Wang XD, Li CY, Jiang MM, Li D, Wen P, Song X, Chen JD, Guo LX, Hu XP, Li GQ, Zhang J, Wang CH, He ZD. Induction of apoptosis in human leukemia cells through an intrinsic pathway by cathachunine, a unique alkaloid isolated from *Catharanthus roseus*. *Phytomedicine*. 2016 Jun 1;23(6):641-53
58. Feng S, Yang Y, Lv J, Sun L, Liu M. Valproic acid exhibits different cell growth arrest effect in three HPV-positive/negative cervical cancer cells and possibly via inducing Notch1 cleavage and E6 downregulation. *Int J Oncol*. 2016 Jul;49(1):422-30
59. He S, Lin KF, Sun Z, Song Y, Zhao YN, Wang Z, Bi L, Liu J. Effects of Nano-hydroxyapatite/Poly(DL-lactic-co-glycolic acid) Microsphere-Based Composite Scaffold on Repair of Bone Defects: Evaluating the Role of Nano-hydroxyapatite Content. *Artif Organs*. 2016 Jul;40(7):E128-35
60. Zhang Y, Wang C, Cao Y, Gu Y, Zhang L. Selective compounds enhance osteoblastic activity by targeting HECT domain of ubiquitin ligase Smurf1. *ONCOTARGET*. 2016 Jul 18;8(31):50521-50533
61. Zhang Z, Zhou B, Zhang K, Song Y, Zhang L, Xi M. IL-27 suppresses SKOV3 cells proliferation by enhancing STAT3 and inhibiting the Akt signal pathway. *Mol Immunol*. 2016 Oct;78:155-163
62. Zhao LX, Du JR, Zhou HJ, Liu DL, Gu MX, Long FY. Differences in Proinflammatory Property of Six Subtypes of Peroxiredoxins and Anti-Inflammatory Effect of Ligustilide in Macrophages. *PLoS One*. 2016 Oct 7;11(10):e0164586
63. Lv S, Xu Q, Sun E, Zhang J, Wu D. Impaired cellular energy metabolism contributes to bluetongue-virus-induced autophagy. *Arch Virol*. 2016 Oct;161(10):2807-11
64. Cui J, Huang D, Zheng Y. Ameliorative effects of α -lipoic acid on high-fat diet-induced oxidative stress and glucose uptake impairment of T cells. *FREE RADICAL RES*. 2016 Oct;50(10):1106-1115
65. Yang C, Fu R, Zhuang Z, Wang S. Studies on the biological functions of CPS1 in AFB1 induced hepatocarcinogenesis. *Gene*. 2016 Oct 10;591(1):255-61
66. Xu D, Li Y, Zhang B, Wang Y, Liu Y, Luo Y, Niu W, Dong M, Liu M, Dong H. Resveratrol alleviates hypoxic pulmonary hypertension via anti-inflammation and anti-oxidant pathways in rats. *Int J Med Sci*. 2016 Nov 23;13(12):942-954
67. Zeng M, Wei X, Wu Z, Li W, Zheng Y, Li B, Meng X, Fu X, Fei Y. Simulated ischemia/reperfusion-induced p65-Beclin 1-dependent autophagic cell death in human umbilical vein endothelial cells. *SCI REP-UK*. 2016 Nov 18;6:37448
68. Zhang C, Wu JM, Liao M, Wang JL, Xu CJ. The ROCK/GGTase Pathway Are Essential to the Proliferation and Differentiation of Neural Stem Cells Mediated by Simvastatin. *J Mol Neurosci*. 2016 Dec;60(4):474-485
69. Yuyang WANG, Cheng CHENG, Peng GAO, Shaopeng LI, Jie SHEN, Yan LAN, Yongqiang YU and Paul K. CHU. Cold atmospheric-pressure air plasma treatment of C6 glioma cells: effects of reactive oxygen species in the medium produced by the plasma on cell death. *PLASMA SOURCES SCI T Technol*. 2017 19 025503 (6pp)
70. Yun Yang, Yanmei Zhang, Ren Hua, Qiaoling Huang, Ke Wu, Lihai Zhang, Peifu Tang and Changjian Lin. Antibacterial and cytocompatible AgNPs constructed with the assistance of Mefp-1 for orthopaedic implants. *RSC Adv*. 2017 7;38434-38443
71. Du C, Guo Y, Cheng Y, Han M, Zhang W, Qian H. Torulene and torularhodin, protects human prostate stromal cells from hydrogen peroxide-induced oxidative stress damage through the regulation of Bcl-2/Bax mediated apoptosis. *FREE RADICAL RES*. 2017 Feb;51(2):113-123
72. Yu J, Yu Q, Liu Y, Zhang R, Xue L. Hydrogen gas alleviates oxygen toxicity by reducing hydroxyl radical levels in PC12 cells. *PLoS One*. 2017 Mar 31;12(3):e0173645
73. Zhou C, Rong Y, Konishi T, Xiang Z, Zihui F, Hong M. Effect of Carbon-Ion Radiation on Drug Transporters Organic Anion Transporting Polypeptides in Breast Cancer Cells. *Radiat Res*. 2017 Jun;187(6):689-700
74. Wang J, Chen GL, Cao S, Zhao MC, Liu YQ, Chen XX, Qian C. Adipogenic niches for melanoma cell colonization and growth in bone marrow. *Lab Invest*. 2017 Jun;97(6):737-745
75. Chen GL, Ye T, Chen HL, Zhao ZY, Tang WQ, Wang LS, Xia JL. Xanthine dehydrogenase downregulation promotes TGF β signaling and cancer stem cell-related gene expression in hepatocellular carcinoma. *Oncogenesis*. 2017 Sep 25;6(9):e382
76. Tian Q, Wang Y, Zhang Q, Luo J, Jiang H, Zhang B, Mei M, Wu F, Wu Y, Peng J, Long T, Luo Y, Guo X. Phosphoprotein Gene Contributes to the Enhanced Apoptosis Induced by Wild-Type Rabies Virus GD-SH-01 In Vitro. *Front Microbiol*. 2017 Sep 5;8:1697
77. Zhong Y, Yang J, Xu WW, Wang Y, Zheng CC, Li B, He QY. KCTD12 promotes tumorigenesis by facilitating CDC25B/CDK1/Aurora A-dependent G2/M transition. *Oncogene*. 2017 Nov 2;36(44):6177-6189
78. Chen Y, Zhong M, Yuan G, Peng H. Interleukin-17 induces angiogenesis in vitro via CXCL8 and CCL2 in retinal pigment epithelium. *Mol Med Rep*. 2018 Mar;17(3):4627-4632
79. Bian J, Cao D, Shen J, Jiang B, Chen D, Bian L. N-methyl pyrrolidone promotes ankle fracture healing by inhibiting inflammation via suppression of the mitogen-activated protein kinase signaling pathway. *Exp Ther Med*. 2018 Apr;15(4):3617-3622
80. Zhou YZ, Li CZ, Gao H, Zhang YZ. The Effects of Smad3 on Adrenocorticotrophic Hormone-Secreting Pituitary Adenoma Development, Cell Proliferation, Apoptosis, and Hormone Secretion. *World Neurosurg*. 2018 Jun;114:e329-e337
81. Cai G, Yan A, Fu N, Fu Y. Thromboxane A2 receptor antagonist SQ29548 attenuates SH-SY5Y neuroblastoma cell impairments induced by oxidative stress. *Int J Mol Med*. 2018 Jul;42(1):479-488
82. Li F, Zhang C, Zhang G. m6A RNA Methylation Controls Proliferation of Human Glioma Cells by Influencing Cell Apoptosis. *Cytogenet Genome Res*. 2019;159(3):119-125
83. Liu C, Cheng Y, Du C, Lv T, Guo Y, Han M, Pi F, Zhang W, Qian H. Study on the wall-breaking method of carotenoids producing yeast *Sporidiobolus pararoseus* and the antioxidant effect of four carotenoids on SK-HEP-1 cells. *Prep Biochem Biotechnol*. 2019;49(8):767-774.
84. Chen H, Liu Gao MY, Zhang L, He FL, Shi YK, Pan XH, Wang H. MicroRNA-155 affects oxidative damage through regulating autophagy in endothelial cells. *Oncol Lett*. 2019 Feb;17(2):2237-2243
85. Yin B, Song Q, Chen L, Li X, Han Y, Wang X, Dai J, Sun X. Establishment of an immortalized intestinal epithelial cell line from tree shrews by lentivirus-mediated hTERT gene transduction. *Cytotechnology*. 2019 Feb;71(1):107-116
86. Wang H, Yuan X, Sun Y, Mao X, Meng C, Tan L, Song C, Qiu X, Ding C, Liao Y. Infectious bronchitis virus entry mainly depends on clathrin mediated endocytosis and requires classical endosomal/lysosomal system. *Virology*. 2019 Feb;528:118-136
87. Yang J, Xu WW, Hong P, Ye F, Huang XH, Hu HF, Zhang QH, Yan X, Li B, He QY. Adefovir dipivoxil sensitizes colon cancer cells to vemurafenib by disrupting the KCTD12-CDK1 interaction. *Cancer Lett*. 2019 Jun 1;451:79-91
88. Zhang GM, An SY, El-Samahy MA, Zhang YL, Wan YJ, Wang ZY, Xiao SH, Meng FX, Wang F, Lei ZH. Suppression of miR-1197-3p attenuates H2O2-induced apoptosis of goat luteinized granulosa cells via targeting PPARGC1A. *Theriogenology*. 2019 Jul 1;132:72-82
89. Tan W, Zhang Y, Li M, Zhu X, Yang X, Wang J, Zhang S, Zhu W, Cao J, Yang H, Zhang L. miR-27a-containing Exosomes Secreted by Irradiated Skin Keratinocytes Delayed the Migration of Unirradiated Skin Fibroblasts. *Int J Biol Sci*. 2019 Aug 19;15(10):2240-2255
90. Yu Y, Lang XY, Li XX, Gu RZ, Liu QS, Lan R, Qin XY. 2,3,5,4'-Tetrahydroxystilbene-2-O- β -D-glucoside attenuates MPP+/MPTP-induced neurotoxicity in vitro and in vivo by restoring the BDNF-TrkB and FGF2-Akt signaling axis and inhibition of apoptosis. *Food Funct*. 2019 Sep 1;10(9):6009-6019
91. Zhang R, Han X, Huang T, Wang X. Danggui buxue tang inhibited mesangial cell proliferation and extracellular matrix accumulation through GAS5/NF- κ B pathway. *BIOSCIENCE REP*. 2019 Oct 30;39(10). pii: BSR20181740
92. Yu ZQ, Yi HY, Ma J, Wei YF, Cai MK, Li Q, Qin CX, Chen YJ, Han XL, Zhong RT, Chen Y, Liang G, Deng Q, Tian K, Wang H, Zhang GH. Ginsenoside Rg1 Suppresses Type 2 PRRSV Infection via NF- κ B

Signaling Pathway In Vitro, and Provides Partial Protection against HP-PRRSV in Piglet. *VIRUSES-BASEL*. 2019 Nov 10;11(11). pii: E1045

93. Xue-Ping Lu, Li Xu, Li-Wei Meng, Luo-Luo Wang, Jinzhi Niu, Jin-Jun Wang. Divergent molecular evolution in glutathione S-transferase conferring malathion resistance in the oriental fruit fly, *Bactrocera dorsalis* (Hendel). *Chemosphere*. 2020 Mar;242:125203.;doi: 10.1016/j.chemosphere.2019.125203
94. Yanmei Zhang, Fumiao Wang, Qiaoling Huang, Aniruddha Balkrishna Patil, Jiejie Hu, Lili Fan, Yun Yang, Hongping Duan, Xiang Dong, Changjian Lin. Layer-by-layer immobilizing of polydopamine-assisted ϵ -polylysine and gum Arabic on titanium: Tailoring of antibacterial and osteogenic properties. *MAT SCI ENG C-MATER*. 2020 May;110:110690.;doi: 10.1016/j.msec.2020.110690
95. Haifang Wang, Ruihua Yuan, Qingwen Cao, Mian Wang, Dezhi Ren, Xiaoyan Huang, Min Wu, Linping Zhang, Xiangrong Zhao, Xueping

Huo, Yalei Pan, Qinshe Liu. Astragaloside III activates TACE/ADAM17-dependent anti-inflammatory and growth factor signaling in endothelial cells in a p38-dependent fashion. *Phytother Res*. 2020 May;34(5):1096-1107.;doi: 10.1002/ptr.6603

96. Ping Guo, Shen Chen, Daochuan Li, Jinmiao Zhang, Jiao Luo, Aihua Zhang, Dianke Yu, Michael S Bloom, Liping Chen, Wen Chen. SFPQ is involved in regulating arsenic-induced oxidative stress by interacting with the miRNA-induced silencing complexes. *Environ Pollut*. 2020 Jun;261:114160.;doi: 10.1016/j.envpol.2020.114160
97. Chong Ye, Wen-Jie Li, Hao-Han Yu, Qiu-Ping Feng, Xiu Wu, Yu-Ting Zhu, Meng-Yuan Hu, Su-Yun Xiang, Shu-Qin Yu. Binary blended co-delivery nanoparticles with the characteristics of precise pH-responsive acting on tumor microenvironment. *MAT SCI ENG C-MATER*. 2020 Dec;117:111370.;doi: 10.1016/j.msec.2020.111370

Version 2021.09.01