ACVBM Veterinary Botanical Medicine Herb Index

Journals publishing peer-reviewed articles on Chai Hu, two herbs used:
Bupleurum chinese (Bei Chai Hu - better for our cancer patients as it has more biological activity)
Bupleurum scorzonerifolium (Nan Chai Hu - milder overall function)

Reviews

Anticancer effect of berberine based on experimental animal models of various cancers: a systematic review and meta-analysis.
Xu J, Long Y, Ni L, Yuan X, Yu N, Wu R, Tao J, Zhang Y.
BMC Cancer. 2019 Jun 17;19(1):589.

The Role of Saikosaponins in Therapeutic Strategies for Age-Related Diseases.
Kim BM.
Oxidative Medicine and Cellular Longevity. 2018 Apr 12; 2018: 8275256

A systematic review of the active saikosaponins and extracts isolated from Radix Bupleuri and their applications.
Yuan B, Yang R, Ma Y, Zhou S, Zhang X, Liu Y.
Pharm Biol. 2017 Dec;55(1):620-635. Review.

Berberis Vulgaris and Berberine: An Update Review.
Imenshahidi M, Hosseinzadeh H.
Phytother Res. 2016 Nov;30(11):1745-1764.

Berberine and Its Role in Chronic Disease.
Cicero AF, Baggioni A.
Adv Exp Med Biol. 2016;928:27-45. Review.

Berberine and Coptidis Rhizoma as potential anticancer agents: Recent updates and future perspectives.
Wang N, Tan HY, Li L, Yuen MF, Feng Y.
J Ethnopharmacol. 2015 Dec 24;176:35-48.

Berberine and Coptidis rhizoma as novel antineoplastic agents: a review of traditional use and biomedical investigations.
Tang J, Feng Y, Tsao S, Wang N, Curtain R, Wang Y.
J Ethnopharmacol. 2009 Oct 29;126(1):5-17.

Pharmacology/Toxicology

A comprehensive review and perspectives on pharmacology and toxicology of saikosaponins.
Li X, Li X, Huang N, Liu R, Sun R.
Phytomedicine. 2018 Nov 15;50:73-87. doi: 10.1016/j.phymed.2018.09.174. Epub 2018 Sep 17. Review.

Saikosaponins: a review of pharmacological effects.
Li XQ, Song YN, Wang SJ, Rahman K, Zhu JY, Zhang H.
J Asian Nat Prod Res. 2018 May;20(5):399-411.

Saikosaponins induced hepatotoxicity in mice via lipid metabolism dysregulation and oxidative stress: a proteomic study.
Li X, Li X, Lu J, Huang Y, Lv L, Luan Y, Liu R, Sun R.
BMC Complement Altern Med. 2017 Apr 19;17(1):219.

Free PMC Article

Saikosaponin-d-mediated downregulation of neurogenesis results in cognitive dysfunction by inhibiting Akt/Foxg-1 pathway in mice.
Lixing X, Zhouye J, Liting G, Ruyi Z, Rong Q, Shiping M.
Toxicol Lett. 2018 Mar 1;284:79-85.

Activation of Fas death receptor pathway and Bid in hepatocytes is involved in saikosaponin D induction of hepatotoxicity.
Zhang F, Chen L, Jin H, Shao J, Wu L, Lu Y, Zheng S.
Environ Toxicol Pharmacol. 2016 Jan;41:8-13.

Flavonoid profiles of three **Bupleurum** species and in vitro hepatoprotective of activity **Bupleurum**flavum Forsk.
Gevrenova R, Kondeva-Burdina M, Denkov N, Zheleva-Dimitrova D.
Pharmacogn Mag. 2015 Jan-Mar;11(41):14-23.

Free PMC Article

Determination of toxic metals by ICP-MS in Asiatic and European medicinal plants and dietary supplements.
Filipiak-Szok A, Kurzawa M, Szłyk E.
J Trace Elem Med Biol. 2015 Apr;30:54-8.

Herb-induced autoimmune-like hepatitis in C57BL/6J mice.
Wang JY, Lee CY, Pan PJ, Chang WC, Chiu JH, Chen WS, Shyr YM.
Liver Int. 2014 Apr;34(4):583-93.

Antioxidant activity and hepatoprotective effect of a polysaccharide from Bei Chaihu (**Bupleurum**chinense DC).
Zhao W, Li JJ, Yue SQ, Zhang LY, Dou KF.
Carbohydr Polym. 2012 Jun 20;89(2):448-52.

Discovery of GABA(A) receptor modulator aristolactone in a commercial sample of the Chinese herbal drug "Chaihu" (**Bupleurum** chinense roots) unravels adulteration by nephrotoxic Aristolochia manshuriensis roots.
Rueda DC, Zaugg J, Quitschau M, Reich E, Hering S, Hamburger M.
Planta Med. 2012 Feb;78(3):207-10.

["Dose-time-**toxicity**" relationship study on hepatotoxicity caused by multiple dose of total **Bupleurum**saponin crude extracts to rats].
Huang W, Sun R, Zhang Z.
Zhongguo Zhong Yao Za Zhi. 2010 Dec;35(24):3344-7.

Characterization and identification of saikosaponins in crude extracts from three Bupleurum species using LC-ESI-MS.
Huang HQ, Zhang X, Lin M, Shen YH, Yan SK, Zhang WD.
J Sep Sci. 2008 Oct;31(18):3190-201.

Pharmacology and toxicology of **Bupleurum** root-containing Kampo medicines in clinical use.
Ikegami F, Sumino M, Fujii Y, Akiba T, Satoh T.
Hum Exp Toxicol. 2006 Aug;25(8):481-94. Review.

Pharmacological evaluation of several major ingredients of Chinese herbal medicines in human hepatoma Hep3B cells.
Chou CC, Pan SL, Teng CM, Guh JH.
Eur J Pharm Sci. 2003 Aug;19(5):403-12.

Interaction of multidrug resistance **reversal** agents with **P-glycoprotein** ATPase activity on blood-brain barrier.
He L, Liu GQ.
Acta Pharmacol Sin. 2002 May;23(5):423-9.

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BUPLEURUM AND CHEMOTHERAPY

Adria

Nano-Co-Delivery of **Berberine** and Anticancer Drug Using PLGA Nanoparticles: Exploration of Better Anticancer Activity and In Vivo Kinetics.
Khan I, Joshi G, Nakhate KT, Ajazuddin, Kumar R, Gupta U.
Pharm Res. 2019 Aug 16;36(10):149.

Anticancer Efficacy of the Combination of **Berberine** and PEGylated Liposomal **Doxorubicin** in Meth A Sarcoma-Bearing Mice.
Yahuafai J, Asai T, Oku N, Siripong P.
Biol Pharm Bull. 2018;41(7):1103-1106.

Free Article

Protective effect of **berberine** on acute cardiomyopathy associated with **doxorubicin** treatment.
Xiong C, Wu YZ, Zhang Y, Wu ZX, Chen XY, Jiang P, Guo HC, Xie KR, Wang KX, Su SW.
Oncol Lett. 2018 Apr;15(4):5721-5729.

Free PMC Article

L-Tetrahydropalmatine **Induces Apoptosis** in EU-4 **Leukemia** Cells by Down-Regulating X-Linked Inhibitor of **Apoptosis** Protein and Increases the Sensitivity Towards Doxorubicin.
Li S, Chen D, Pei R, et al.
Curr Mol Med. 2017;17(3):236-245.

Berberine Enhances Chemosensitivity and Induces Apoptosis Through Dose-orchestrated AMPK Signaling in Breast Cancer.
Pan Y, Zhang F, Zhao Y, Shao D, Zheng X, Chen Y, He K, Li J, Chen L.
J Cancer. 2017 Jun 5;8(9):1679-1689.

Berberine-induced cardioprotection and Sirt3 modulation in **doxorubicin**-treated H9c2 cardiomyoblasts.
Coelho AR, Martins TR, Couto R, Deus C, Pereira CV, Simões RF, Rizvanov AA, Silva F, Cunha-Oliveira T, Oliveira PJ, Serafim TL.
Biochim Biophys Acta Mol Basis Dis. 2017 Nov;1863(11):2904-2923.

Free Article

Berberine induces apoptosis in p53-null **leukemia** cells by down-regulating XIAP at the post-transcriptional level.
Liu J, Zhang X, Liu A, Liu S, Zhang L, Wu B, Hu Q.
Cell Physiol Biochem. 2013;32(5):1213-24.

Free Article

Berberine promotes antiproliferative effects of epirubicin in T24 bladder cancer cells by enhancing apoptosis and cell cycle arrest.

Zhuo Y, Chen Q, Chen B, Zhan X, Qin X, Huang J, Lv X.
Int J Clin Pharmacol Ther. 2017 Jan;55(1):32-40.

Protective effect of **berberine** on **doxorubicin**-induced acute hepatorenal toxicity in rats.
Chen X, Zhang Y, Zhu Z, Liu H, Guo H, Xiong C, Xie K, Zhang X, Su S.
Mol Med Rep. 2016 May;13(5):3953-60.

Protective effects of **berberine** against **doxorubicin**-induced cardiotoxicity in rats by inhibiting metabolism of **doxorubicin**.
Hao G, Yu Y, Gu B, Xing Y, Xue M.
Xenobiotica. 2015;45(11):1024-9.

The effect of **saikosaponin** D on doxorubicin pharmacokinetics and its MDR **reversal** in MCF-7/adr cell xenografts.
Li C, Xue HG, Feng LJ, Wang ML, Wang P, Gai XD.
Eur Rev Med Pharmacol Sci. 2017 Oct;21(19):4437-4445.

Free Article

Saikosaponin A, an active glycoside from Radix bupleuri, reverses **P-glycoprotein**-mediated multidrug resistance in MCF-7/ADR cells and HepG2/ADM cells.
Ye RP, Chen ZD.
Xenobiotica. 2017 Feb;47(2):176-184.

Reversal of P-glycoprotein-mediated multidrug resistance is induced by saikosaponin D in breast cancer MCF-7/adriamycin cells.
Li C, Guan X, Xue H, Wang P, Wang M, Gai X.
Pathol Res Pract. 2017 Jul;213(7):848-853. doi: 10.1016/j.prp.2017.01.022. Epub 2017 Feb 3.

Hormetic Effect of Berberine Attenuates the Anticancer Activity of Chemotherapeutic Agents.
Bao J, Huang B, Zou L, Chen S, Zhang C, Zhang Y, Chen M, Wan JB, Su H, Wang Y, He C.
PLoS One. 2015 Sep 30;10(9):e0139298.

Reactive oxygen species-mediated apoptosis contributes to chemosensitization effect of saikosaponins on cisplatin-induced cytotoxicity in **cancer** cells.
Wang Q, Zheng XL, Yang L, Shi F, Gao LB, Zhong YJ, Sun H, He F, Lin Y, Wang X.
J Exp Clin **Cancer** Res. 2010 Dec 9;29:159. doi: 10.1186/1756-9966-29-159.

Reactive oxygen species-mediated apoptosis contributes to chemosensitization effect of saikosaponins on cisplatin-induced cytotoxicity in cancer cells.
Wang Q, Zheng XL, Yang L, Shi F, Gao LB, Zhong YJ, Sun H, He F, Lin Y, Wang X.
J Exp Clin Cancer Res. 2010 Dec 9;29:159. doi: 10.1186/1756-9966-29-159.

Effect of Bupleuri Radix extracts on the **toxicity** of 5-fluorouracil in HepG2 hepatoma cells and normal human lymphocytes.
Kang SJ, Lee YJ, Kim BM, Kim YJ, Woo HD, Jeon HK, Chung HW.
Basic Clin Pharmacol Toxicol. 2008 Oct;103(4):305-13.

Free Article

Bupleurum and Radiation

Baicalein Inhibits MCF-7 Cell Proliferation In Vitro, Induces Radiosensitivity, and Inhibits Hypoxia Inducible Factor.
Gade S, Gandhi NM.
J Environ Pathol Toxicol Oncol. 2015;34(4):299-308.

Antitumor

Antitumor Potential of Berberine and Cinnamic Acid against Solid Ehrlich Carcinoma in Mice.
Almeer RS, Aref AM, Hussein RA, Othman MS, Abdel Moneim AE.
Anticancer Agents Med Chem. 2019;19(3):356-364.

Anti-tumor and immunomodulatory activities induced by an alkali-extracted polysaccharide BCAP-1 from **Bupleurum** chinense via NF-κB signaling pathway.Song X et al. Int J Biol Macromol. (2017)

Antioxidant and cytotoxic lignans from the roots of **Bupleurum** chinense.Li DQ et al. J Asian Nat Prod Res. (2017)

Cytotoxic triterpenoid glycosides (saikosaponins) from the roots of **Bupleurum chinense**.
Li DQ, Wu J, Liu LY, Wu YY, Li LZ, Huang XX, Liu QB, Yang JY, Song SJ, Wu CF.
Bioorg Med Chem Lett. 2015 Sep 15;25(18):3887-92. doi: 10.1016/j.bmcl.2015.07.053. Epub 2015 Jul 26.

Cytotoxic triterpenoid glycosides (saikosaponins) from the roots of **Bupleurum** chinense.
Li DQ, Wu J, Liu LY, Wu YY, Li LZ, Huang XX, Liu QB, Yang JY, Song SJ, Wu CF.
Bioorg Med Chem Lett. 2015 Sep 15;25(18):3887-92. doi: 10.1016/j.bmcl.2015.07.053. Epub 2015 Jul 26.

Anti-infective and cytotoxic properties of **Bupleurum** marginatum.
Ashour ML, El-Readi MZ, Hamoud R, Eid SY, El Ahmady SH, Nibret E, Herrmann F, Youns M, Tahrani A, Kaufmann D, Wink M.
Chin Med. 2014 Jan 17;9(1):4. doi: 10.1186/1749-8546-9-4.

Saikosaponin-d Enhances the Anticancer Potency of TNF-α via Overcoming Its Undesirable Response of Activating NF-Kappa B Signalling in **Cancer** Cells.
Wong VK, Zhang MM, Zhou H, Lam KY, Chan PL, Law CK, Yue PY, Liu L.
Evid Based Complement Alternat Med. 2013;2013:745295. doi: 10.1155/2013/745295. Epub 2013 Mar 12.

Berberine Targets AP-2/hTERT, NF-κB/COX-2, HIF-1α/VEGF and Cytochrome-c/Caspase Signaling to Suppress Human Cancer Cell Growth.
Fu L, Chen W, Guo W, Wang J, Tian Y, Shi D, Zhang X, Qiu H, Xiao X, Kang T, Huang W, Wang S, Deng W.
PLoS ONE. 2013 Jul 15; 8(7): e69240

Antiangiogenic Action

Antiangiogenic activity of **Bupleurum** longiradiatum on human umbilical venous endothelial cells.
You YJ, Lee IS, Kim Y, Bae KH, Ahn BZ.
Arch Pharm Res. 2002 Oct;25(5):640-2.

Anti-inflammatory

Saikosaponin d protects against acetaminophen-induced hepatotoxicity by inhibiting NF-κB and STAT3 signaling.
Liu A, Tanaka N, Sun L, Guo B, Kim JH, Krausz KW, Fang Z, Jiang C, Yang J, Gonzalez FJ.
Chem Biol Interact. 2014 Nov 5;223:80-6.

Bupleurum polysaccharides attenuates lipopolysaccharide-induced inflammation via modulating Toll-like receptor 4 signaling.
Wu J, Zhang YY, Guo L, Li H, Chen DF.
PLoS One. 2013 Oct 22;8(10):e78051.

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Lu CN, Yuan ZG, Zhang XL, et al. Saikosaponin a and its epimer saikosaponin d exhibit anti-inflammatory activity by suppressing activation of NF-κB signaling pathway. Int Immunopharmacol. 2012;14(1):121-6.

Inactivation of cystein-aspartic acid protease (caspase)-1 by saikosaponin A.
Han NR, Kim HM, Jeong HJ.
Biol Pharm Bull. 2011;34(6):817-23.

Phenylpropanoid NF-kappaB inhibitors from Bupleurum fruticosum.
Bremner P, Tang S, Birkmayer H, Fiebich BL, Muñoz E, Marquez N, Rivera D, Heinrich M.
Planta Med. 2004 Oct;70(10):914-8.

NMDA inhibition

Yu YH, Xie W, Bao Y, et al. Saikosaponin a mediates the anticonvulsant properties in the HNC models of AE and SE by inhibiting NMDA receptor current and persistent sodium current. *PLoS One*. 2012;7(11):e50694.

Immune Modulation and Bupleurum

Polysaccharides from **Bupleurum** Induce Immune Reversal in Late Sepsis.
Wang YX, Liu QY, Zhang M, Yang Z, Pei X, Wu X, Chen X, Hong J, Xu KZ.
Shock. 2018 Apr;49(4):451-459.

Inflammation, Macrophage in Cancer Progression and Chinese Herbal Treatment.
Deng S, Hu B, Shen KP, Xu L.
Journal of Basic and Clinical Pharmacy. 2012 May 15; 3(2): 269-272

Mechanistic study of saikosaponin-d (Ssd) on suppression of murine T lymphocyte activation.
Wong VK, Zhou H, Cheung SS, Li T, Liu L.
J Cell Biochem. 2009 May 15;107(2):303-15. doi: 10.1002/jcb.22126.

Saikosaponin a inhibits the proliferation and activation of T cells through cell cycle arrest and induction of apoptosis.
Sun Y, Cai TT, Zhou XB, Xu Q.
Int Immunopharmacol. 2009 Jul;9(7-8):978-83. doi: 10.1016/j.intimp.2009.04.006. Epub 2009 Apr 16.

Lymphoid cancer

Cytotoxic effects of Coptis chinensis and Epicedium sagittatus extracts and their major constituents (berberine, coptisine and icariin) on hepatoma and leukemia cell growth. Clinical and Experimental Pharmacology and Physiology. Lin CC, Ng LT, et al. 2004;31:65-69.

Berberine Induces Apoptotic Cell Death via Activation of Caspase-3 and -8 in HL-60 Human **Leukemia** Cells: Nuclear Localization and Structure-Activity Relationships.
Okubo S, Uto T, Goto A, Tanaka H, Nishioku T, Yamada K, Shoyama Y.

Am J Chin Med. 2017;45(7):1497-1511.

Melanoma

Bupleurum chinense polysaccharide inhibit adhesion of human melanoma cells via blocking β1 integrin function.
Tong H, Jiang G, Qi D, Bi J, Tian D, Guan X, Zheng S, Sun X.
Carbohydr Polym. 2017 Jan 20;156:244-252. doi: 10.1016/j.carbpol.2016.09.034. Epub 2016 Sep 13.

Bupleurum chinense polysaccharide inhibit adhesion of human melanoma cells via blocking β1 integrin function.
Tong H, Jiang G, Qi D, Bi J, Tian D, Guan X, Zheng S, Sun X.
Carbohydr Polym. 2017 Jan 20;156:244-252. doi: 10.1016/j.carbpol.2016.09.034. Epub 2016 Sep 13.

Anti-melanoma activity of **Bupleurum chinense**, **Bupleurum** kaoi and nanoparticle formulation of their major bioactive compound saikosaponin-d.
Hu SC, Lee IT, Yen MH, Lin CC, Lee CW, Yen FL.
J Ethnopharmacol. 2016 Feb 17;179:432-42. doi: 10.1016/j.jep.2015.12.058. Epub 2015 Dec 31.

Anti-melanoma activity of **Bupleurum** chinense, **Bupleurum** kaoi and nanoparticle formulation of their major bioactive compound saikosaponin-d.Hu SC et al. J Ethnopharmacol. (2016)

Anti-melanoma activity of **Bupleurum** chinense, **Bupleurum** kaoi and nanoparticle formulation of their major bioactive compound saikosaponin-d.
Hu SC, Lee IT, Yen MH, Lin CC, Lee CW, Yen FL.
J Ethnopharmacol. 2016 Feb 17;179:432-42. doi: 10.1016/j.jep.2015.12.058. Epub 2015 Dec 31.

Gastric Cancer

Berberine: A potential adjunct for the treatment of gastrointestinal cancers?
Hesari A, Ghasemi F, Cicero AFG, Mohajeri M, Rezaei O, Hayat SMG, Sahebkar A.
J Cell Biochem. 2018 Dec;119(12):9655-9663.

MAPK pathways are involved in the inhibitory effect of berberine hydrochloride on gastric cancer MGC 803 cell proliferation and IL-8 secretion in vitro and in vivo.
Li HL, Wu H, Zhang BB, Shi HL, Wu XJ.
Mol Med Rep. 2016 Aug;14(2):1430-8.

Lingual SCC

Berberine suppresses in vitro migration and invasion of human SCC-4 tongue squamous cancer cells through the inhibitions of FAK, IKK, NF-kappaB, u-PA and MMP-2 and -9.
Ho YT, Yang JS, Li TC, Lin JJ, Lin JG, Lai KC, Ma CY, Wood WG, Chung JG.
Cancer Lett. 2009 Jul 8;279(2):155-62.

Mammary Cancer

Antitumor effects of saikosaponin b2 on breast **cancer** cell proliferation and migration.
Ma Q, Gao FF, He X, Li K, Gao Y, Xu XL, Jiang NH, Ding L, Song WJ, He YQ, Pan WT, Wei L, Zhang JW.
Mol Med Rep. 2019 Aug;20(2):1943-1951. doi: 10.3892/mmr.2019.10385. Epub 2019 Jun 13.

Regulators and mechanisms of anoikis in triple-negative breast cancer (TNBC): A review.
Tajbakhsh A, Rivandi M, Abedini S, Pasdar A, Sahebkar A.
Crit Rev Oncol Hematol. 2019 Aug;140:17-27.

Reversal of P-glycoprotein-mediated multidrug resistance is induced by saikosaponin D in breast **cancer** MCF-7/adriamycin cells.
Li C, Guan X, Xue H, Wang P, Wang M, Gai X.
Pathol Res Pract. 2017 Jul;213(7):848-853. doi: 10.1016/j.prp.2017.01.022. Epub 2017 Feb 3.

Type I saikosaponins a and d inhibit osteoclastogenesis in bone marrow-derived macrophages and osteolytic activity of metastatic breast **cancer** cells.
Shin JE, Kim HJ, Kim KR, Lee SK, Park J, Kim H, Park KK, Chung WY.
Evid Based Complement Alternat Med. 2015;2015:582437. doi: 10.1155/2015/582437. Epub 2015 Mar 29.

Berberine hydrochloride IL-8 dependently inhibits invasion and IL-8-independently promotes cell apoptosis in MDA-MB-231 cells.
Li X, Zhao SJ, Shi HL, Qiu SP, Xie JQ, Wu H, Zhang BB, Wang ZT, Yuan JY, Wu XJ.
Oncol Rep. 2014 Dec;32(6):2777-88.

Liver Cancer

Saikosaponin-d Suppresses COX2 Through p-STAT3/C/EBPβ Signaling Pathway in Liver **Cancer**: A Novel Mechanism of Action.
Ren M, McGowan E, Li Y, Zhu X, Lu X, Zhu Z, Lin Y, He S.
Front Pharmacol. 2019 May 29;10:623. doi: 10.3389/fphar.2019.00623. eCollection 2019.

Saikosaponin a Induces Apoptosis through Mitochondria-Dependent Pathway in Hepatic Stellate Cells.
Chen CH, Chen MF, Huang SJ, Huang CY, Wang HK, Hsieh WC, Huang CH, Liu LF, Shiu LY.
Am J Chin Med. 2017;45(2):351-368.

Saikosaponin d induces cell death through caspase-3-dependent, caspase-3-independent and mitochondrial pathways in mammalian hepatic stellate cells.
Chen MF, Huang SJ, Huang CC, Liu PS, Lin KI, Liu CW, Hsieh WC, Shiu LY, Chen CH.
BMC **Cancer**. 2016 Jul 26;16:532. doi: 10.1186/s12885-016-2599-0.

Saikosaponin-d suppresses the expression of cyclooxygenase-2 through the phospho-signal transducer and activator of transcription 3/hypoxia-inducible factor-1α pathway in hepatocellular carcinoma cells.
He S, Lu G, Hou H, Zhao Z, Zhu Z, Lu X, Chen J, Wang Z.
Mol Med Rep. 2014 Nov;10(5):2556-62. doi: 10.3892/mmr.2014.2574. Epub 2014 Sep 16.

Saikosaponin D disrupts platelet-derived growth factor-β receptor/p38 pathway leading to mitochondrial apoptosis in human LO2 hepatocyte cells: a potential mechanism of hepatotoxicity.
Chen L, Zhang F, Kong D, Zhu X, Chen W, Wang A, Zheng S.
Chem Biol Interact. 2013 Oct 25;206(1):76-82.

Chemopreventive effect of saikosaponin-d on diethylinitrosamine-induced hepatocarcinogenesis: involvement of CCAAT/enhancer binding protein β and cyclooxygenase-2.
Lu XL, He SX, Ren MD, Wang YL, Zhang YX, Liu EQ.
Mol Med Rep. 2012 Mar;5(3):637-44. doi: 10.3892/mmr.2011.702. Epub 2011 Dec 9.

[Professor Ling Changquan's experience in treating primary liver cancer: an analysis of herbal medication].
Sun Z, Su YH, Yue XQ.
Zhong Xi Yi Jie He Xue Bao. 2008 Dec;6(12):1221-5. doi: 10.3736/jcim20081203. Chinese.

ERK signaling pathway is involved in p15INK4b/p16INK4a expression and HepG2 growth inhibition triggered by TPA and Saikosaponin a.

Wen-Sheng W.
Oncogene. 2003 Feb 20;22(7):955-63.

Cytotoxicity and anti-hepatitis B virus activities of saikosaponins from **Bupleurum** species.
Chiang LC, Ng LT, Liu LT, Shieh DE, Lin CC.
Planta Med. 2003 Aug;69(8):705-9.

Thyroid Carcinoma
Saikosaponin-d inhibits proliferation of human undifferentiated thyroid carcinoma cells through induction of apoptosis and cell cycle arrest.
Liu RY, Li JP.
Eur Rev Med Pharmacol Sci. 2014;18(17):2435-43.

OSA
Use of Saikosaponin D and JNK inhibitor SP600125, alone or in combination, inhibits malignant properties of human osteosarcoma U2 cells.
Gao T, Zhao P, Yu X, Cao S, Zhang B, Dai M.
Am J Transl Res. 2019 Apr 15;11(4):2070-2080. eCollection 2019.

Use of Saikosaponin D and JNK inhibitor SP600125, alone or in combination, inhibits malignant properties of human osteosarcoma U2 cells.
Gao T, Zhao P, Yu X, Cao S, Zhang B, Dai M.
Am J Transl Res. 2019 Apr 15;11(4):2070-2080. eCollection 2019.

Berberine Induced Apoptosis of Human Osteosarcoma Cells by Inhibiting Phosphoinositide 3 Kinase/Protein Kinase B (PI3K/Akt) Signal Pathway Activation.
Chen ZZ.
Iran J Public Health. 2016 May;45(5):578-85.

Yu JQ, Deng AJ, Wu LQ, et al. Osteoclast-inhibiting saikosaponin derivatives from Bupleurum chinense. *Fitoterapia*. 2013;85:101-8.

Colon Cancer
Saponins regulate intestinal inflammation in colon **cancer** and IBD.
Dong J, Liang W, Wang T, Sui J, Wang J, Deng Z, Chen D.
Pharmacol Res. 2019 Jun;144:66-72. doi: 10.1016/j.phrs.2019.04.010. Epub 2019 Apr 5. Review.

Saponins regulate intestinal inflammation in colon **cancer** and IBD.
Dong J, Liang W, Wang T, Sui J, Wang J, Deng Z, Chen D.
Pharmacol Res. 2019 Jun;144:66-72. doi: 10.1016/j.phrs.2019.04.010. Epub 2019 Apr 5. Review.

Caspase-4 is essential for saikosaponin a-induced apoptosis acting upstream of caspase-2 and γ-H2AX in colon **cancer** cells.
Kang SJ, Lee YJ, Kang SG, Cho S, Yoon W, Lim JH, Min SH, Lee TH, Kim BM.
Oncotarget. 2017 Nov 1;8(59):100433-100448. doi: 10.18632/oncotarget.22247. eCollection 2017 Nov 21.

Skin Cancer

Inclusion complex of saikosaponin-d with hydroxypropyl-β-cyclodextrin: Improved physicochemical properties and anti-skin **cancer** activity.
Hu SC, Lai YC, Lin CL, Tzeng WS, Yen FL.
Phytomedicine. 2019 Apr;57:174-182. doi: 10.1016/j.phymed.2018.11.012. Epub 2018 Nov 8.

Inclusion complex of saikosaponin-d with hydroxypropyl-β-cyclodextrin: Improved physicochemical properties and anti-skin **cancer** activity.
Hu SC, Lai YC, Lin CL, Tzeng WS, Yen FL.
Phytomedicine. 2019 Apr;57:174-182. doi: 10.1016/j.phymed.2018.11.012. Epub 2018 Nov 8.

Brain Tumors

Effects of Saikosaponin D on apoptosis in human U87 glioblastoma cells.
Li Y, Cai T, Zhang W, Zhu W, Lv S.
Mol Med Rep. 2017 Aug;16(2):1459-1464. doi: 10.3892/mmr.2017.6765. Epub 2017 Jun 13.

Dual effect of saikogenin D: in vitro inhibition of prostaglandin E2 production and elevation of intracellular free Ca2+ concentration in C6 rat glioma cells.
Kodama Y, Xiaochuan L, Tsuchiya C, Ohizumi Y, Yoshida M, Nakahata N.
Planta Med. 2003 Aug;69(8):765-7.

Induction of differentiation in rat C6 glioma cells with Saikosaponins.
Tsai YJ, Chen IL, Horng LY, Wu RT.
Phytother Res. 2002 Mar;16(2):117-21.

Dual effect of saikogenin D: in vitro inhibition of prostaglandin E2 production and elevation of intracellular free Ca2+ concentration in C6 rat glioma cells.
Kodama Y, Xiaochuan L, Tsuchiya C, Ohizumi Y, Yoshida M, Nakahata N.
Planta Med. 2003 Aug;69(8):765-7.

Ovarian Cancer

Berberine in combination with cisplatin induces necroptosis and apoptosis in ovarian cancer cells.
Liu L, Fan J, Ai G, Liu J, Luo N, Li C, Cheng Z.
Biol Res. 2019 Jul 18;52(1):37.

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Antioxidant, anticancer and apoptotic effects of the **Bupleurum** chinense root extract in HO-8910 ovarian **cancer** cells.
Gu LY, Chen Z, Zhao J, Ruan XJ, Zhao SY, Gao H.
J BUON. 2015 Sep-Oct;20(5):1341-9.

Esophageal Cancer

Research on effect of minor **bupleurum** decoction of proliferation and apoptosis of esophageal **cancer**cell strain eca-109 cell.
Li X, Sun M, Zhao Z, Yang J, Chen K.
Pak J Pharm Sci. 2014 Sep;27(5 Suppl):1675-9.

Prostate Cancer

Berberine targets epidermal growth factor receptor signaling to suppress prostate cancer proliferation in vitro.
Huang ZH, Zheng HF, Wang WL, Wang Y, Zhong LF, Wu JL, Li QX.
Mol Med Rep. 2015 Mar;11(3):2125-8.

Saikosaponin-d inhibits proliferation of DU145 human prostate **cancer** cells by inducing apoptosis and arresting the cell cycle at G0/G1 phase.
Yao M, Yang J, Cao L, Zhang L, Qu S, Gao H.
Mol Med Rep. 2014 Jul;10(1):365-72. doi: 10.3892/mmr.2014.2153. Epub 2014 Apr 15.

Leukemia

Saikosaponin-d inhibits β-conglycinin induced activation of rat basophilic leukemia-2H3 cells.
Hao Y, Piao X, Piao X.
Int Immunopharmacol. 2012 Jul;13(3):257-63. doi: 10.1016/j.intimp.2012.04.021. Epub 2012 May 11.

Lung Cancer

Potential Therapeutic Role of Z-Isochaihulactone in Lung Cancer through Induction of Apoptosis via Notch Signaling.
Ou JP, Lin HY, Su KY, Yu SL, Tseng IH, Chen CJ, Hsu HC, Chan DC, Sophia Chen YL.
Evid Based Complement Alternat Med. 2012;2012:809204.

In vitro and in vivo studies of a novel potential anticancer agent of isochaihulactone on human lung cancer A549 cells.
Chen YL, Lin SZ, Chang JY, Cheng YL, Tsai NM, Chen SP, Chang WL, Harn HJ.
Biochem Pharmacol. 2006 Jul 28;72(3):308-19.

Anti-proliferative activity of **Bupleurum** scrozonerifolium in A549 human lung **cancer** cells in vitro and in vivo.
Cheng YL, Lee SC, Lin SZ, Chang WL, Chen YL, Tsai NM, Liu YC, Tzao C, Yu DS, Harn HJ.
Cancer Lett. 2005 May 26;222(2):183-93. Epub 2004 Nov 19.

Requirement for ERK activation in acetone extract identified from **Bupleurum** scorzonerifolium induced A549 tumor cell apoptosis and keratin 8 phosphorylation.
Chen YL, Lin SZ, Chang WL, Cheng YL, Harn HJ.
Life Sci. 2005 Apr 8;76(21):2409-20.

The antiproliferative activity of saponin-enriched fraction from **Bupleurum** Kaoi is through Fas-dependent apoptotic pathway in human non-small cell lung **cancer** A549 cells.
Hsu YL, Kuo PL, Weng TC, Yen MH, Chiang LC, Lin CC.
Biol Pharm Bull. 2004 Jul;27(7):1112-5.

The proliferative inhibition and apoptotic mechanism of Saikosaponin D in human non-small cell lung **cancer** A549 cells.
Hsu YL, Kuo PL, Lin CC.
Life Sci. 2004 Jul 23;75(10):1231-42.

Acetone extract of **Bupleurum** scorzonerifolium inhibits proliferation of A549 human lung **cancer** cells via inducing apoptosis and suppressing telomerase activity.
Cheng YL, Chang WL, Lee SC, Liu YG, Lin HC, Chen CJ, Yen CY, Yu DS, Lin SZ, Harn HJ.
Life Sci. 2003 Sep 19;73(18):2383-94.

Misc

Saikosaponin d ameliorates pancreatic fibrosis by inhibiting autophagy of pancreatic stellate cells via PI3K/Akt/mTOR pathway.
Cui LH, Li CX, Zhuo YZ, Yang L, Cui NQ, Zhang SK.
Chem Biol Interact. 2019 Feb 25;300:18-26.

Treatment of primary thrombocytopenic purpura by modified minor decoction of **bupleurum**.
Duan Y, Zhao X, Xu X, Yang J, Li Z.
J Tradit Chin Med. 1995 Jun;15(2):96-8. No abstract available.

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