

References

- Abdullahi, M. S., Piro, R. M., Suratanee, A., & Plaimas, K. (2025). GenPath-PPH: Integrating gene expression and pathway networks via persistent path homology enhances detection of disease-relevant pathways. *Computational and Structural Biotechnology Journal*, 27(1), 5348–5362. <https://doi.org/10.1016/j.csbj.2025.11.018>
- Ahmadi, S. E., Rahimian, E., Rahimi, S., Bahman Zarandi, Mehran Bahraini, Soleymani, M., Safdari, S. M., Ashkan Shabannezhad, Niloofar Jaafari, & Safa, M. (2024). From regulation to deregulation of p53 in hematologic malignancies: Implications for diagnosis, prognosis and therapy. *Biomarker Research*, 12(1). <https://doi.org/10.1186/s40364-024-00676-9>
- Ahn, J., Urist, M., & Prives, C. (2003). Questioning the Role of Checkpoint Kinase 2 in the p53 DNA Damage Response. *Journal of Biological Chemistry*, 278(23), 20480–20489. <https://doi.org/10.1074/jbc.m213185200>
- Akhtar, R. S., Geng, Y., Klocke, B. J., Latham, C. B., Villunger, A., Michalak, E. M., Strasser, A., Carroll, S. L., & Roth, K. A. (2006). BH3-only proapoptotic bcl-2 family members noxa and puma mediate neural precursor cell death. *The Journal of Neuroscience : The Official Journal of the Society for Neuroscience*, 26(27), 7257–7264. <https://doi.org/10.1523/JNEUROSCI.0196-06.2006>
- Algeciras-Schimmich, A., Barnhart, B. C., & Peter, M. E. (2013). Apoptosis Dependent and Independent Functions of Caspases. In *www.ncbi.nlm.nih.gov*. Landes Bioscience. <https://www.ncbi.nlm.nih.gov/books/NBK6198/>
- Ashkenazi, A. (2015). Targeting the extrinsic apoptotic pathway in cancer: lessons learned and future directions. *Journal of Clinical Investigation*, 125(2), 487–489. <https://doi.org/10.1172/jci80420>
- Beebe-Wang, N., Dincer, A. B., & Lee, S.-I. (2022). An automatic integrative method for learning interpretable communities of biological pathways. *NAR Genomics and Bioinformatics*, 4(2). <https://doi.org/10.1093/nargab/lqac044>

- Bernardi, P., Gerle, C., Halestrap, A. P., Jonas, E. A., Karch, J., Mnatsakanyan, N., Pavlov, E., Sheu, S.-S., & Soukas, A. A. (2023). Identity, structure, and function of the mitochondrial permeability transition pore: controversies, consensus, recent advances, and future directions. *Cell Death & Differentiation*, 30(8), 1869–1885. <https://doi.org/10.1038/s41418-023-01187-0>
- Bhat, K. P. L., Salazar, K. L., Balasubramaniyan, V., Wani, K., Heathcock, L., Hollingsworth, F., James, J. D., Gumin, J., Diefes, K. L., Kim, S. H., Turski, A., Azodi, Y., Yang, Y., Doucette, T., Colman, H., Sulman, E. P., Lang, F. F., Rao, G., Copray, S., & Vaillant, B. D. (2011). The Transcriptional Coactivator TAZ Regulates Mesenchymal Differentiation in Malignant Glioma. *Genes & Development*, 25(24), 2594–2609. <https://doi.org/10.1101/gad.176800.111>
- Bolland, H., Ma, T. S., Ramlee, S., Ramadan, K., & Hammond, E. M. (2021). Links between the unfolded protein response and the DNA damage response in hypoxia: a systematic review. *Biochemical Society Transactions*. <https://doi.org/10.1042/bst20200861>
- Bong, A. H. L., Hua, T., So, C. L., Peters, A. A., Robitaille, M., Tan, Y. Y., Roberts-Thomson, S. J., & Monteith, G. R. (2022). AKT Regulation of ORAI1-Mediated Calcium Influx in Breast Cancer Cells. *Cancers*, 14(19), 4794. <https://doi.org/10.3390/cancers14194794>
- Cacioppo, R., & Lindon, C. (2022). Regulating the regulator: A survey of mechanisms from transcription to translation controlling expression of mammalian cell cycle kinase aurora a. *Open Biology*, 12(9). <https://doi.org/10.1098/rsob.220134>
- Cahalan, M. D. (2009). STIMulating store-operated Ca²⁺ entry. *Nature Cell Biology*, 11(6), 669–677. <https://doi.org/10.1038/ncb0609-669>
- Cahill, K. E., Morshed, R. A., & Yamini, B. (2015). Nuclear factor-KB in glioblastoma: insights into regulators and targeted therapy. *Neuro-Oncology*, 18(3), 329–339. <https://doi.org/10.1093/neuonc/nov265>
- Cao, L., Kim, S., Xiao, C., Wang, R.-H., Coumoul, X., Wang, X., Li, W. M., Xu, X. L., De Soto, J. A., Takai, H., Mai, S., Elledge, S. J., Motoyama, N., & Deng, C.-X. (2006). ATM–Chk2–p53 activation

- prevents tumorigenesis at an expense of organ homeostasis upon Brca1 deficiency. *The EMBO Journal*, 25(10), 2167–2177. <https://doi.org/10.1038/sj.emboj.7601115>
- Cao, X., Liu, M., Zou, D., Zhang, J., Huang, J., & Li, K. (2025). Multilayered insights into the full spectrum of diffuse gliomas: a novel prognostic evaluation model. *Discover Oncology*, 16(1). <https://doi.org/10.1007/s12672-025-03551-7>
- Carruthers, R., Ahmed, S. U., Ramachandran, S., Strathdee, K., Kurian, K. M., Hedley, A., Gomez-Roman, N., Kalna, G., Neilson, M., Gilmour, L., Stevenson, K., Hammond, E. M., & Chalmers, A. J. (2018). Replication Stress Drives Constitutive Activation of the DNA Damage Response and Radioresistance in Glioblastoma Stem-like Cells. *Cancer Research*, 78(17), 5060–5071. <https://doi.org/10.1158/0008-5472.can-18-0569>
- Chen, J., Ying, C., Gu, Z., Zhu, B., Wang, J., Qian, Y., Zheng, H., Zhang, J., & Wang, Y. (2025). Construction of a Prognostic Model Using RNA Processing Factor Genes and the Key Role of *NSUN6* in Glioma Outcomes. *Journal of Cellular and Molecular Medicine*, 29(12). <https://doi.org/10.1111/jcmm.70668>
- Chen, Y., Zhang, Z., Zhang, Y., Jiang, J., Luo, Y., Fei, X., Ru, Y., Li, B., Zhang, H., Liu, T., Yang, Y., Kuai, Le, Song, J., & Luo, Y. (2023). Gene set enrichment analysis and ingenuity pathway analysis to verify the impact of Wnt signaling in psoriasis treated with taodan granules. *American Journal of Translational Research*, 15(1), 422–434. <https://pubmed.ncbi.nlm.nih.gov/36777818/>
- Chen, Z., Boehnke, M., Wen, X., & Mukherjee, B. (2021). Revisiting the genome-wide significance threshold for common variant GWAS. *G3 Genes|Genomes|Genetics*, 11(2). <https://doi.org/10.1093/g3journal/jkaa056>
- Chen, Z., Wang, K., Hou, C., Jiang, K., Chen, B., Chen, J., Lao, L., Qian, L., Zhong, G., Liu, Z., Zhang, C., & Shen, H. (2017). Crl4bdcaf11 e3 ligase targets p21 for degradation to control cell cycle progression in human osteosarcoma cells. *Scientific Reports*, 7(1). <https://doi.org/10.1038/s41598-017-01344-9>

- Chibaya, L., Karim, B., Zhang, H., & Jones, S. N. (2021). Mdm2 phosphorylation by Akt regulates the p53 response to oxidative stress to promote cell proliferation and tumorigenesis. *Proceedings of the National Academy of Sciences*, 118(4). <https://doi.org/10.1073/pnas.2003193118>
- Ching, B., Chen, X. L., Yong, J. H. A., Wilson, J. M., Hiong, K. C., Sim, E. W. L., Wong, W. P., Lam, S. H., Chew, S. F., & Ip, Y. K. (2013). Increases in apoptosis, caspase activity and expression of p53 and bax, and the transition between two types of mitochondrion-rich cells, in the gills of the climbing perch, *anabas testudineus*, during a progressive acclimation from freshwater to seawater. *Frontiers in Physiology*, 4. <https://doi.org/10.3389/fphys.2013.00135>
- Chizu Tanikawa, Zhang, Y., Yamamoto, R., Tsuda, Y., Tanaka, M., Funauchi, Y., Mori, J., Imoto, S., Yamaguchi, R., Nakamura, Y., Satoru Miyano, Nakagawa, H., & Matsuda, K. (2017). The Transcriptional Landscape of p53 Signaling Pathway. *EBioMedicine*, 20, 109–119. <https://doi.org/10.1016/j.ebiom.2017.05.017>
- Choi, H., Kim, H., Chung, H., Lee, D.-S., & Kim, J. (2024). Application of computational algorithms for single-cell RNA-seq and ATAC-seq in neurodegenerative diseases. *Briefings in Functional Genomics*, 24. <https://doi.org/10.1093/bfpg/ela044>
- Conceicao, N. D., V., Sun, Y., Zboril, E. K., De la Chapa, J. J., & Singh, B. B. (2019). Loss of Ca²⁺ entry via Orai–TRPC1 induces ER stress, initiating immune activation in macrophages. *Journal of Cell Science*, 133(5). <https://doi.org/10.1242/jcs.237610>
- D’Costa, R. M., Islam, Md. S., & Islam, Md. M. (2026). A dual gene-signature framework for glioma survival prediction with multi-cohort validation. *Immunobiology*, 231(3), 153187. <https://doi.org/10.1016/j.imbio.2026.153187>
- Dho, S. H., Cho, M., Woo, W., Jeong, S., & Kim, L. K. (2025). Caspases as master regulators of programmed cell death: Apoptosis, pyroptosis and beyond. *Experimental & Molecular Medicine*. <https://doi.org/10.1038/s12276-025-01470-9>
- D’Orazi, G., Cecchinelli, B., Bruno, T., Manni, I., Higashimoto, Y., Saito, S., Gostissa, M., Coen, S., Marchetti, A., Del Sal, G., Piaggio, G., Fanciulli, M., Appella, E., & Soddu, S. (2001).

- Homeodomain-interacting protein kinase-2 phosphorylates p53 at Ser 46 and mediates apoptosis. *Nature Cell Biology*, 4(1), 11–19. <https://doi.org/10.1038/ncb714>
- Dar, A. A., Goff, L. W., Majid, S., Berlin, J., & El-Rifai, W. (2010). Aurora Kinase Inhibitors - Rising Stars in Cancer Therapeutics? *Molecular Cancer Therapeutics*, 9(2), 268–278. <https://doi.org/10.1158/1535-7163.mct-09-0765>
- de Pins, B., Mendes, T., Giralt, A., & Girault, J.-A. (2021). The Non-receptor Tyrosine Kinase Pyk2 in Brain Function and Neurological and Psychiatric Diseases. *Frontiers in Synaptic Neuroscience*, 13. <https://doi.org/10.3389/fnsyn.2021.749001>
- Durga, Y., & Pusapati, R. (2025). Drug resistance in glioblastoma: Challenges, mechanisms and therapeutic strategies (Review). *Molecular and Clinical Oncology*, 24(1), 1–17. <https://doi.org/10.3892/mco.2025.2913>
- Engeland, K. (2022). Cell cycle regulation: p53-p21-RB signaling. *Cell Death & Differentiation*, 29(5), 1–15. <https://doi.org/10.1038/s41418-022-00988-z>
- Eskander, G., Abdelhamid, S. G., Wahdan, S. A., & Radwan, S. M. (2025). Insights on the crosstalk among different cell death mechanisms. *Cell Death Discovery*, 11(1). <https://doi.org/10.1038/s41420-025-02328-9>
- Farber, C. R., & Lusk, A. J. (2008). Integrating global gene expression analysis and genetics. *Advances in Genetics*, 571–601. [https://doi.org/10.1016/s0065-2660\(07\)00420-8](https://doi.org/10.1016/s0065-2660(07)00420-8)
- Fasano, M., Pirozzi, M., Falco, V. D., Miceli, C., Farese, S., Zotta, A., Famiglietti, V., Vitale, P., Giovanni, I. D., Brancati, C., Carfora, V., Solari, D., Somma, T., Cavallo, L., Cappabianca, P., Conson, M., Pacelli, R., Ciardiello, F., & Addeo, R. (2024). Temozolomide based treatment in glioblastoma: 6 vs. 12 months. *Oncology Letters*, 28(3). <https://doi.org/10.3892/ol.2024.14551>
- Fei, J., Kaczmarek, N., Luch, A., Glas, A., Carell, T., & Naegeli, H. (2011). Regulation of Nucleotide excision repair by uv-ddb: Prioritization of Damage recognition to internucleosomal DNA. *PLoS Biology*, 9(10), e1001183. <https://doi.org/10.1371/journal.pbio.1001183>

- Gatz, S. A., & Wiesmüller, L. (2006). P53 in recombination and repair. *Cell Death & Differentiation*, 13(6), 1003–1016. <https://doi.org/10.1038/sj.cdd.4401903>
- Green, D. R. (2022). The mitochondrial pathway of Apoptosis. *Cold Spring Harbor Perspectives in Biology*, 14(5), a041038. <https://doi.org/10.1101/cshperspect.a041038>
- Georgescu, M.-M. . (2010). PTEN Tumor Suppressor Network in PI3K-Akt Pathway Control. *Genes & Cancer*, 1(12), 1170–1177. <https://doi.org/10.1177/1947601911407325>
- Giang, L. H., Wu, K.-S., Lee, W.-C., Chu, S.-S., Do, A. D., Huang, M.-H., Lin, Y.-L., Hsieh, C.-L., Sung, S.-Y., Yen, Y., Wong, T.-T., & Chang, C.-C. (2024). RRM2 inhibition alters cell cycle through ATM/Rb/E2F1 pathway in atypical teratoid rhabdoid tumor. *Neoplasia*, 58, 101075. <https://doi.org/10.1016/j.neo.2024.101075>
- Giorgi, C., Bonora, M., Sorrentino, G., Missiroli, S., Poletti, F., Suski, J. M., Galindo Ramirez, F., Rizzuto, R., Di Virgilio, F., Zito, E., Pandolfi, P. P., Wieckowski, M. R., Mammano, F., Del Sal, G., & Pinton, P. (2015). p53 at the endoplasmic reticulum regulates apoptosis in a Ca²⁺-dependent manner. *Proceedings of the National Academy of Sciences*, 112(6), 1779–1784. <https://doi.org/10.1073/pnas.1410723112>
- Guo, Y., Fan, J., Liu, S., & Hao, D. (2022). Orai1 downregulation causes proliferation reduction and cell cycle arrest via inactivation of the Ras-NF-KB signaling pathway in osteoblasts. *BMC Musculoskeletal Disorders*, 23(1). <https://doi.org/10.1186/s12891-022-05311-y>
- Haidurov, A., Zheltukhin, A. O., Snezhkina, A. V., Krasnov, G. S., Kudryavtseva, A. V., & Budanov, A. V. (2025). p53-regulated SESN1 and SESN2 regulate cell proliferation and cell death through control of STAT3. *Cell Communication and Signaling*, 23(1). <https://doi.org/10.1186/s12964-025-02104-3>
- Hamard, P.-J., & Manfredi, J. J. (2012). Mdm2's dilemma: To Degrade or to translate p53? *Cancer Cell*, 21(1), 3–5. <https://doi.org/10.1016/j.ccr.2011.12.018>

- Handayani, L., Chegodaev, D., Steven, R., & Kenji Satou. (2025). Identification of Key Genes Associated with Overall Survival in Glioblastoma Multiforme Using TCGA RNA-Seq Expression Data. *Genes*, 16(7), 755–755. <https://doi.org/10.3390/genes16070755>
- Hay, N. (2011). Interplay between FOXO, TOR, and Akt. *Biochimica et Biophysica Acta*, 1813(11), 1965–1970. <https://doi.org/10.1016/j.bbamcr.2011.03.013>
- He, R., Liu, Y., Fu, W., He, X., Liu, S., Xiao, D., & Tao, Y. (2024). Mechanisms and cross-talk of regulated cell death and their epigenetic modifications in tumor progression. *Molecular Cancer*, 23(1), 267. <https://doi.org/10.1186/s12943-024-02172-y>
- Hernández Borrero, L. J., & El-Deiry, W. S. (2021). Tumor suppressor p53: Biology, signaling pathways, and therapeutic targeting. *Biochimica et Biophysica Acta (BBA) - Reviews on Cancer*, 1876(1), 188556. <https://doi.org/10.1016/j.bbcan.2021.188556>
- Hetz, C. A., Hunn, M., Rojas, P., Torres, V., Leyton, L., & Quest, A. F. G. (2002). Caspase-dependent initiation of apoptosis and necrosis by the fas receptor in lymphoid cells: Onset of necrosis is associated with delayed ceramide increase. *Journal of Cell Science*, 115(23), 4671–4683. <https://doi.org/10.1242/jcs.00153>
- Hide, T., Makino, K., Nakamura, H., Yano, S., Anai, S., Takezaki, T., Kuroda, J., Shinojima, N., Ueda, Y., & Kuratsu, J. (2013). New Treatment Strategies to Eradicate Cancer Stem Cells and Niches in Glioblastoma. *Neurologia Medico-Chirurgica*, 53(11), 764–772. <https://doi.org/10.2176/nmc.ra2013-0207>
- Hirao, A. (2000). DNA Damage-Induced Activation of p53 by the Checkpoint Kinase Chk2. *Science*, 287(5459), 1824–1827. <https://doi.org/10.1126/science.287.5459.1824>
- Hsin, H., Kim, M. J., Wang, C.-F., & Sheng, M. (2010). Proline-Rich Tyrosine Kinase 2 Regulates Hippocampal Long-Term Depression. *The Journal of Neuroscience*, 30(36), 11983–11993. <https://doi.org/10.1523/jneurosci.1029-10.2010>

- Huang, B., Yu, Z., & Liang, R. (2021). Effect of long-term adjuvant temozolomide chemotherapy on primary glioblastoma patient survival. *BMC Neurology*, 21(1).
<https://doi.org/10.1186/s12883-021-02461-9>
- Huang, K., Xiao, C., Glass, L. M., Critchlow, C. W., Gibson, G., & Sun, J. (2021). Machine learning applications for therapeutic tasks with genomics data. *Patterns*, 100328.
<https://doi.org/10.1016/j.patter.2021.100328>
- Hwang, P. M., Bunz, F., Yu, J., Rago, C., Chan, T. A., Murphy, M. P., Kelso, G. F., Smith, R. A. J., Kinzler, K. W., & Vogelstein, B. (2001). Ferredoxin reductase affects p53-dependent, 5-fluorouracil-induced apoptosis in colorectal cancer cells. *Nature Medicine*, 7(10), 1111–1117.
<https://doi.org/10.1038/nm1001-1111>
- Ito, A., Lai, C.-H., Zhao, X., Saito, S., Hamilton, M. H., Appella, E., & Yao, T.-P. (2001). p300/CBP-mediated p53 acetylation is commonly induced by p53-activating agents and inhibited by MDM2. *The EMBO Journal*, 20(6), 1331–1340. <https://doi.org/10.1093/emboj/20.6.1331>
- Iyer, N. G., Chin, S.-F. ., Ozdag, H., Daigo, Y., Hu, D.-E. ., Cariati, M., Brindle, K., Aparicio, S., & Caldas, C. (2004). p300 regulates p53-dependent apoptosis after DNA damage in colorectal cancer cells by modulation of PUMA/p21 levels. *Proceedings of the National Academy of Sciences*, 101(19), 7386–7391. <https://doi.org/10.1073/pnas.0401002101>
- Jin, S., Tong, T., Fan, W., Fan, F., Antinore, M. J., Zhu, X., Mazzacurati, L., Li, X., Petrik, K. L., Rajasekaran, B., Wu, M., & Zhan, Q. (2002). GADD45-induced cell cycle g2-m arrest associates with altered subcellular distribution of cyclin b1 and is independent of p38 kinase activity. *Oncogene*, 21(57), 8696–8704. <https://doi.org/10.1038/sj.onc.1206034>
- Jin, W. (2020). Role of JAK/STAT3 Signaling in the Regulation of Metastasis, the Transition of Cancer Stem Cells, and Chemoresistance of Cancer by Epithelial–Mesenchymal Transition. *Cells*, 9(1), 217. <https://doi.org/10.3390/cells9010217>

- Joruiz, S. M., Muhlinen, N. V., Horikawa, I., Gilbert, M. R., & Harris, C. C. (2024). Distinct functions of wild-type and R273H mutant $\Delta 133p53\alpha$ differentially regulate glioblastoma aggressiveness and therapy-induced senescence. *Cell Death and Disease*, 15(6). <https://doi.org/10.1038/s41419-024-06769-5>
- Kabir, M. H., Patrick, R., Ho, J. W. K., & O'Connor, M. D. (2018). Identification of active signaling pathways by integrating gene expression and protein interaction data. *BMC Systems Biology*, 12(S9). <https://doi.org/10.1186/s12918-018-0655-x>
- Kanehisa, M., & Goto, S. (2000). KEGG: Kyoto encyclopedia of genes and genomes. *Nucleic Acids Research*, 28(1), 27–30.
- Karsy, M., Guan, J., Jensen, R., Huang, L. E., & Colman, H. (2016). The Impact of Hypoxia and Mesenchymal Transition on Glioblastoma Pathogenesis and Cancer Stem Cells Regulation. *World Neurosurgery*, 88, 222–236. <https://doi.org/10.1016/j.wneu.2015.12.032>
- Khabibov, M., Garifullin, A., Boumber, Y., Khaddour, K., Fernandez, M., Khamitov, F., Khalikova, L., Kuznetsova, N., Kit, O., & Kharin, L. (2022). Signaling pathways and therapeutic approaches in glioblastoma multiforme (Review). *International Journal of Oncology*, 60(6). <https://doi.org/10.3892/ijo.2022.5359>
- Khan, H. Y., Mazahir, I., Reddy, S., Fazili, F., & Azmi, A. S. (2020). Roles of CRAC channel in cancer: implications for therapeutic development. *Expert Review of Precision Medicine and Drug Development*, 5(5), 371–382. <https://doi.org/10.1080/23808993.2020.1803062>
- Kim, M., Ladomersky, E., Mozny, A., Kocherginsky, M., O'Shea, K., Reinstein, Z. Z., Zhai, L., Bell, A., Lauing, K. L., Bollu, L., Rabin, E., Dixit, K., Kumthekar, P., Platanias, L. C., Hou, L., Zheng, Y., Wu, J., Zhang, B., Hrachova, M., & Merrill, S. A. (2021). Glioblastoma as an age-related neurological disorder in adults. *Neuro-Oncology Advances*, 3(1). <https://doi.org/10.1093/noajnl/vdab125>
- Kim, S. H., Jung, I. R., & Hwang, S. S. (2022). Emerging role of anti-proliferative protein BTG1 and BTG2. *BMB Reports*, 55(8), 380–388. <https://doi.org/10.5483/bmbrep.2022.55.8.092>

- Kimura, A., Tsubaki, M., Obana, T., Matsuo, T., Komori, R., Nagai, N., Yamamoto, T., & Nishida, S. (2025). MDM2 inhibitors induce apoptosis by suppressing MDM2 and enhancing p53, Bax, Puma and Noxa expression levels in imatinib-resistant chronic myeloid leukemia cells. *Biomedical Reports*, 22(4). <https://doi.org/10.3892/br.2025.1943>
- Kucheryavykh, L., & Yuriy Kucheryavykh. (2025). The Role of Pyk2 Kinase in Glioblastoma Progression and Therapeutic Targeting. *Cancers*, 17(16), 2611–2611. <https://doi.org/10.3390/cancers17162611>
- Kukurba, K. R., & Montgomery, S. B. (2015). RNA Sequencing and Analysis. *Cold Spring Harbor Protocols*, 2015(11), pdb.top084970. <https://doi.org/10.1101/pdb.top084970>
- Kumar, S., Wang, C.-Y., Lalwani, H. K., Ngadio, J. L., Wulandari, F. S., Solomon, D. D., & Liu, H.-P. (2026). Comprehensive in Silico investigation of L-Glutamine transporters and metabolism in Glioblastoma. *Pharmaceuticals*, 19(3), 455. <https://doi.org/10.3390/ph19030455>
- Kumari, N., Narasimha Pullaguri, Subha Narayan Rath, Bajaj, A., Sahu, V., & Kiran, K. (2024). Dysregulation of calcium homeostasis in cancer and its role in chemoresistance. *Cancer Drug Resistance*. <https://doi.org/10.20517/cdr.2023.145>
- Kwee, I. (2025). What is GSEA analysis and how to perform it. In BigOmics Analytics. <https://bigomics.ch/blog/a-short-guide-to-gene-set-and-pathway-enrichment-analysis/>
- Lee, Y.-S., Kalimuthu, K., Park, Y. S., Luo, X., Choudry, M. H. A., Bartlett, D. L., & Lee, Y. J. (2020). BAX-dependent mitochondrial pathway mediates the crosstalk between ferroptosis and apoptosis. *Apoptosis*, 25(9-10), 625–631. <https://doi.org/10.1007/s10495-020-01627-z>
- Li, H., Wu, Y., Chen, Y., Jinquan Lv, Qu, C., Mei, T., Zheng, Y., Ye, C., Li, F., Ge, S., Yao, A., & Jia, L. (2025). Overcoming temozolomide resistance in glioma: recent advances and mechanistic insights. *Acta Neuropathologica Communications*, 13(1). <https://doi.org/10.1186/s40478-025-02046-4>
- Liardo, E., Pham, A.-T., Ghilardi, A. F., Zhelay, T., Szteyn, K., Gandi, N. L., Ekkati, A., Koerner, S., Kozak, J. A., & Sun, L. (2024). Discovery of selective Orai channel blockers bearing an indazole or a

- pyrazole scaffold. *European Journal of Medicinal Chemistry*, 278, 116805.
<https://doi.org/10.1016/j.ejmech.2024.116805>
- Liu, H., Hughes, J. D., Rollins, S., Chen, B., & Perkins, E. (2011). Calcium entry via ORAI1 regulates glioblastoma cell proliferation and apoptosis. *Experimental and Molecular Pathology*, 91(3), 753–760. <https://doi.org/10.1016/j.yexmp.2011.09.005>
- Liu, H., & Julie. (2024). A circle of life: Platelet and megakaryocyte cytoskeleton dynamics in health and disease. *Open Biology*, 14(6). <https://doi.org/10.1098/rsob.240041>
- Liu, S., Li, Z., Lan, S., Hao, H., Baz, A. A., Yan, X., Gao, P., Chen, S., & Chu, Y. (2024). The dual roles of Activating transcription factor 3 (ATF3) in Inflammation, apoptosis, ferroptosis, and pathogen infection responses. *International Journal of Molecular Sciences*, 25(2), 824. <https://doi.org/10.3390/ijms25020824>
- Liu, X., Feng, C., Yan, L., Cao, J., Zhu, X., Li, M., & Zhao, G. (2025). Calcium channels as pharmacological targets for cancer therapy. *Clinical and Experimental Medicine*, 25(1). <https://doi.org/10.1007/s10238-025-01632-z>
- Lukashchuk, N., & Vousden, K. H. (2007). Ubiquitination and degradation of Mutant p53. *Molecular and Cellular Biology*, 27(23), 8284–8295. <https://doi.org/10.1128/mcb.00050-07>
- Luo, L., Gao, W., Wang, J., Wang, D., Peng, X., Jia, Z., Jiang, Y., Li, G., Tang, D., & Wang, Y. (2018). Study on the mechanism of cell cycle checkpoint kinase 2 (chek2) gene dysfunction in chemotherapeutic drug resistance of Triple negative breast cancer cells. *Medical Science Monitor*, 24, 3176–3183. <https://doi.org/10.12659/msm.907256>
- Maier-Hauff, K., Ulrich, F., Nestler, D., Niehoff, H., Wust, P., Thiesen, B., Orawa, H., Budach, V., & Jordan, A. (2010). Efficacy and safety of intratumoral thermotherapy using magnetic iron-oxide nanoparticles combined with external beam radiotherapy on patients with recurrent glioblastoma multiforme. *Journal of Neuro-Oncology*, 103(2), 317–324. <https://doi.org/10.1007/s11060-010-0389-0>

- Manic, G., Obrist, F., Sistigu, A., & Vitale, I. (2015). Trial Watch: Targeting ATM–CHK2 and ATR–CHK1 pathways for anticancer therapy. *Molecular & Cellular Oncology*, 2(4), e1012976. <https://doi.org/10.1080/23723556.2015.1012976>
- Marechal, A., & Zou, L. (2013). DNA Damage Sensing by the ATM and ATR Kinases. *Cold Spring Harbor Perspectives in Biology*, 5(9), a012716–a012716. <https://doi.org/10.1101/cshperspect.a012716>
- Minella, A. C., Swanger, J., Bryant, E., Welcker, M., Hwang, H., & Clurman, B. E. (2002). P53 and p21 form an inducible barrier that protects cells against cyclin e-cdk2 deregulation. *Current Biology*, 12(21), 1817–1827. [https://doi.org/10.1016/s0960-9822\(02\)01225-3](https://doi.org/10.1016/s0960-9822(02)01225-3)
- Moll, U. M., & Petrenko, O. (2004). The MDM2-p53 interaction. *Molecular Cancer Research*, 1(14), 1001–1008. <https://aacrjournals.org/mcr/article/1/14/1001/232350/The-MDM2-p53-Interaction>
- Montessuit, S., Somasekharan, S. P., Terrones, O., Lucken-Ardjomande, S., Herzig, S., Schwarzenbacher, R., Manstein, D. J., Bossy-Wetzel, E., Basañez, G., Meda, P., & Martinou, J.-C. (2010). Membrane remodeling induced by the Dynamin-Related protein drp1 stimulates bax oligomerization. *Cell*, 142(6), 889–901. <https://doi.org/10.1016/j.cell.2010.08.017>
- Morciano, G., Marchi, S., Morganti, C., Sbano, L., Bittremieux, M., Kerkhofs, M., Corricelli, M., Danese, A., Karkucinska-Wieckowska, A., Wieckowski, M. R., Bultynck, G., Giorgi, C., & Pinton, P. (2018). Role of Mitochondria-Associated ER Membranes in Calcium Regulation in Cancer-Specific Settings. *Neoplasia* (New York, N.Y.), 20(5), 510–523. <https://doi.org/10.1016/j.neo.2018.03.005>
- Motiani, R. K., Hyzinski-García, M. C., Zhang, X., Henkel, M. M., Abdullaev, I. F., Kuo, Y.-H., Matrougui, K., Mongin, A. A., & Trebak, M. (2013). STIM1 and Orai1 Mediate CRAC Channel Activity and are Essential for Human Glioblastoma Invasion. *Pflugers Archiv : European Journal of Physiology*, 465(9), 1249–1260. <https://doi.org/10.1007/s00424-013-1254-8>

- Mustafa, M., Ahmad, R., Tantry, I. Q., Ahmad, W., Siddiqui, S., Alam, M., Abbas, K., Moinuddin, Hassan, Md. I., Habib, S., & Islam, S. (2024). Apoptosis: A Comprehensive Overview of Signaling Pathways, Morphological Changes, and Physiological Significance and Therapeutic Implications. *Cells*, 13(22), 1838. <https://doi.org/10.3390/cells13221838>
- Nag, S. (2013). The MDM2-p53 pathway revisited. *Journal of Biomedical Research*. <https://doi.org/10.7555/jbr.27.20130030>
- Nagasaka, M., Miyajima, C., Aoki, H., Aoyama, M., Morishita, D., Inoue, Y., & Hayashi, H. (2022). Insights into regulators of p53 acetylation. *Cells*, 11(23), 3825. <https://doi.org/10.3390/cells11233825>
- NavaneethaKrishnan, S., Rosales, J. L., & Lee, K.-Y. (2019). ROS-Mediated cancer cell killing through dietary phytochemicals. *Oxidative Medicine and Cellular Longevity*, 2019, 1–16. <https://doi.org/10.1155/2019/9051542>
- Ng, L. Y., Ma, H. T., & Poon, R. Y. C. (2023). Cyclin A–CDK1 suppresses the expression of the cdk1 activator CDC25A to safeguard timely mitotic entry. *Journal of Biological Chemistry*, 299(3), 102957. <https://doi.org/10.1016/j.jbc.2023.102957>
- Nguyen, T. T. T., Shang, E., Shu, C., Kim, S., Mela, A., Humala, N., Mahajan, A., Yang, H. W., Akman, H. O., Quinzii, C. M., Zhang, G., Westhoff, M.-A., Karpel-Massler, G., Bruce, J. N., Canoll, P., & Siegelin, M. D. (2021). Aurora kinase A inhibition reverses the Warburg effect and elicits unique metabolic vulnerabilities in glioblastoma. *Nature Communications*, 12(1), 5203. <https://doi.org/10.1038/s41467-021-25501-x>
- Nikolaos, M., Lauffenburger, D. A., & Nilsson, A. (2024). Inference of drug off-target effects on cellular signaling using interactome-based deep learning. *IScience*, 27(4), 109509–109509. <https://doi.org/10.1016/j.isci.2024.109509>
- Ogawara, Y., Kishishita, S., Obata, T., Isazawa, Y., Suzuki, T., Tanaka, K., Masuyama, N., & Gotoh, Y. (2002). Akt Enhances Mdm2-mediated Ubiquitination and Degradation of p53. *Journal of Biological Chemistry*, 277(24), 21843–21850. <https://doi.org/10.1074/jbc.m109745200>

- Ortiz, P., K. I., Rechberger, J. S., Nonnenbroich, L. F., Daniels, D. J., & Sarkaria, J. N. (2023). MDM2 Inhibition in the Treatment of Glioblastoma: From Concept to Clinical Investigation. *Biomedicines*, 11(7), 1879. <https://doi.org/10.3390/biomedicines11071879>
- P. Gorjala, Cairncross, J. G., & Gary, R. K. (2016). p53-dependent up-regulation of CDKN1A and down-regulation of CCNE2 in response to beryllium. *Cell Proliferation*, 49(6), 698–709. <https://doi.org/10.1111/cpr.12291>
- Park, C.-M., Park, M.-J., Kwak, H.-J., Moon, S.-I., Yoo, D.-H., Lee, H.-C., Park, I.-C., Rhee, C. H., & Hong, S.-I. (2006). Induction of p53-mediated apoptosis and recovery of chemosensitivity through p53 transduction in human glioblastoma cells by cisplatin. *International Journal of Oncology*, 28(1), 119–125. <https://pubmed.ncbi.nlm.nih.gov/16327987/>
- Park, J., Shim, J.-K., Yoon, S.-J., Kim, S. H., Chang, J. H., & Kang, S.-G. (2019). Transcriptome profiling-based identification of prognostic subtypes and multi-omics signatures of glioblastoma. *Scientific Reports*, 9(1). <https://doi.org/10.1038/s41598-019-47066-y>
- Patel, A. P., Tirosh, I., Trombetta, J. J., Shalek, A. K., Gillespie, S. M., Wakimoto, H., Cahill, D. P., Nahed, B. V., Curry, W. T., Martuza, R. L., Louis, D. N., Rozenblatt-Rosen, O., Suva, M. L., Regev, A., & Bernstein, B. E. (2014). Single-cell RNA-seq highlights intratumoral heterogeneity in primary glioblastoma. *Science*, 344(6190), 1396–1401. <https://doi.org/10.1126/science.1254257>
- Peña-Blanco, A., & García-Sáez, A. J. (2017). Bax, Bak and beyond — mitochondrial performance in apoptosis. *The FEBS Journal*, 285(3), 416–431. <https://doi.org/10.1111/febs.14186>
- Perrault, E. N., Shireman, J. M., Ali, E. S., Lin, P., Predy, I., Park, C., Shreya Budhiraja, Shivani Baisiwala, Dixit, K., C. David James, Heiland, D. H., Issam Ben-Sahra, Pott, S., Basu, A., Miska, J., & Ahmed, A. U. (2023). Ribonucleotide reductase regulatory subunit M2 drives glioblastoma TMZ resistance through modulation of dNTP production. *Science Advances*, 9(20). <https://doi.org/10.1126/sciadv.ade7236>

- Pontisso, I., Ornelas-Guevara, R., Chevet, E., Combettes, L., & Dupont, G. (2024). Gradual ER calcium depletion induces a progressive and reversible UPR signaling. *PNAS Nexus*, 3(6). <https://doi.org/10.1093/pnasnexus/pgae229>
- Pouyan, A., Ghorbanlo, M., Eslami, M., Jahanshahi, M., Ziaei, E., Salami, A., Mokhtari, K., Shahpasand, K., Farahani, N., Meybodi, T. E., Entezari, M., Taheriazam, A., Hushmandi, K., & Hashemi, M. (2025). Glioblastoma multiforme: insights into pathogenesis, key signaling pathways, and therapeutic strategies. *Molecular Cancer*, 24(1). <https://doi.org/10.1186/s12943-025-02267-0>
- Puca, R., Nardinocchi, L., Sacchi, A., Rechavi, G., Givol, D., & D'Orazi, G. (2009). HIPK2 modulates p53 activity towards pro-apoptotic transcription. *Molecular Cancer*, 8(1). <https://doi.org/10.1186/1476-4598-8-85>
- Qazi, M. A., Vora, P., Venugopal, C., Sidhu, S. S., Moffat, J., Swanton, C., & Singh, S. K. (2017). Intratumoral heterogeneity: pathways to treatment resistance and relapse in human glioblastoma. *Annals of Oncology*, 28(7), 1448–1456. <https://doi.org/10.1093/annonc/mdx169>
- Rajaa, E., Aguado, C., Ghita Ghislat, Esteve, J. M., Gil, A., Loutfi, M., & Knecht, E. (2013). PTEN Increases Autophagy and Inhibits the Ubiquitin-Proteasome Pathway in Glioma Cells Independently of its Lipid Phosphatase Activity. *PLOS ONE*, 8(12), e83318–e83318. <https://doi.org/10.1371/journal.pone.0083318>
- Ranjan, T., Yu, A., Elhamdani, S., Howard, C. M., Lirette, S. T., Denning, K. L., Valluri, J., & Claudio, P. P. (2023). Treatment of unmethylated MGMT-promoter recurrent glioblastoma with cancer stem cell assay-guided chemotherapy and the impact on patients' healthcare costs. *Neuro-Oncology Advances*, 5(1). <https://doi.org/10.1093/noajnl/vdad055>
- Reimand, J., Isserlin, R., Voisin, V., Kucera, M., Tannus-Lopes, C., Rostamianfar, A., Wadi, L., Meyer, M., Wong, J., Xu, C., Merico, D., & Bader, G. D. (2019). Pathway Enrichment Analysis and Visualization of Omics Data Using g:Profiler, GSEA, Cytoscape and EnrichmentMap. *Nature Protocols*, 14(2), 482–517. <https://doi.org/10.1038/s41596-018-0103-9>

- Robil, N., Petel, F., Kilhoffer, M.-C., & Haiech, J. (2015). Glioblastoma and calcium signaling - analysis of calcium toolbox expression. *The International Journal of Developmental Biology*, 59(7-8-9), 407–415. <https://doi.org/10.1387/ijdb.150200jh>
- Rosati, D., Palmieri, M., Brunelli, G., Morrione, A., Iannelli, F., Frullanti, E., & Giordano, A. (2024). Differential gene expression analysis pipelines and bioinformatic tools for the identification of specific biomarkers: A Review. *Computational and Structural Biotechnology Journal*, 23. <https://doi.org/10.1016/j.csbj.2024.02.018>
- Salaun, P., Rannou, Y., & Claude, P. (2008). Cdk1, plks, auroras, and neks: The mitotic bodyguards. *Advances in Experimental Medicine and Biology*, 41–56. https://doi.org/10.1007/978-0-387-69080-3_4
- Sánchez-Álvarez, M., Strippoli, R., Donadelli, M., Bazhin, A. V., & Cordani, M. (2019). Sestrins as a Therapeutic Bridge between ROS and Autophagy in Cancer. *Cancers*, 11(10), 1415. <https://doi.org/10.3390/cancers11101415>
- Sane, S., & Rezvani, K. (2017). Essential Roles of E3 Ubiquitin Ligases in p53 Regulation. *International Journal of Molecular Sciences*, 18(2), 442. <https://doi.org/10.3390/ijms18020442>
- Sato, Y., Kurose, A., Ogawa, A., Ogasawara, K., Traganos, F., Zbigniew Darzynkiewicz, & Sawai, T. (2009). Diversity of DNA damage response of astrocytes and glioblastoma cell lines with various p53 status to treatment with etoposide and temozolomide. *Cancer Biology & Therapy*, 8(5), 452–457. <https://doi.org/10.4161/cbt.8.5.7740>
- Schleifer, H., Doleschal, B., Lichtenegger, M., Oppenrieder, R., Derler, I., Frischauf, I., Glasnov, T. N., Kappe, C. O., Romanin, C., & Groschner, K. (2012). Novel pyrazole compounds for pharmacological discrimination between receptor-operated and store-operated Ca(2+) entry pathways. *British Journal of Pharmacology*, 167(8), 1712–1722. <https://doi.org/10.1111/j.1476-5381.2012.02126.x>
- Shao, Z., Wang, K., Zhang, S., Yuan, J., Liao, X., Wu, C., Zou, Y., Ha, Y., Shen, Z., Guo, J., & Jie, W. (2020). Ingenuity pathway analysis of differentially expressed genes involved in signaling pathways

- and molecular networks in RhoE gene-edited cardiomyocytes. *International Journal of Molecular Medicine*, 46(3), 1225–1238. <https://doi.org/10.3892/ijmm.2020.4661>
- Shemarova, I. V. (2010). Signaling mechanisms of apoptosis-like programmed cell death in unicellular eukaryotes. *Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology*, 155(4), 341–353. <https://doi.org/10.1016/j.cbpb.2010.01.010>
- Shi, D., & Gu, W. (2012). Dual Roles of MDM2 in the Regulation of p53: Ubiquitination Dependent and Ubiquitination Independent Mechanisms of MDM2 Repression of p53 Activity. *Genes & Cancer*, 3(3-4), 240–248. <https://doi.org/10.1177/1947601912455199>
- Singh, S., Dey, D., Debashis Barik, Mohapatra, I., Kim, S., Sharma, M., Prasad, S., Wang, P., Singh, A., & Singh, G. (2025). Glioblastoma at the crossroads: current understanding and future therapeutic horizons. *Signal Transduction and Targeted Therapy*, 10(1). <https://doi.org/10.1038/s41392-025-02299-4>
- Sionov, R. V., Hayon, I. L., & Haupt, Y. (2013). The Regulation of p53 Growth Suppression. In [www.ncbi.nlm.nih.gov](https://www.ncbi.nlm.nih.gov/books/NBK6412/). Landes Bioscience. <https://www.ncbi.nlm.nih.gov/books/NBK6412/>
- Smith, B., Williams, J., & Steffen, S.-K. (2024). The ontology of the gene ontology. *AMIA Annual Symposium Proceedings*, 2003, 609. <https://pmc.ncbi.nlm.nih.gov/articles/PMC1480173/>
- Soragni, A., Knudsen, E. S., O'Connor, T. N., Tognon, C. E., Tyner, J. W., Gini, B., Kim, D., Bivona, T. G., Zang, X., Witkiewicz, A. K., Goodrich, D. W., Jiang, D., Gammon, S. T., Willey, C. D., Boutros, P. C., Sandulache, V. C., Osman, A. A., Myers, J. N., Mehla, K., & Singh, P. K. (2025). Acquired resistance in cancer: towards targeted therapeutic strategies. *Nature Reviews Cancer*. <https://doi.org/10.1038/s41568-025-00824-9>
- Sun, Q., Zhang, H.-L., Wang, Y., Xiu, H., Lu, Y., He, N., & Yin, L. (2025). Identification of Hub Genes and Key Pathways Associated with Sepsis Progression Using Weighted Gene Co-Expression Network Analysis and Machine Learning. *International Journal of Molecular Sciences*, 26(9), 4433. <https://doi.org/10.3390/ijms26094433>

- Suzuki, T., Blank, V., Sesay, J. S., & Crawford, D. R. (2001). Maf genes are involved in multiple stress response in human. *Biochemical and Biophysical Research Communications*, 280(1), 4–8. <https://doi.org/10.1006/bbrc.2000.4064>
- Tang, Z., Li, C., Kang, B., Gao, G., Li, C., & Zhang, Z. (2017). GEPIA: a web server for cancer and normal gene expression profiling and interactive analyzes. *Nucleic Acids Research*, 45(W1), W98–W102. <https://doi.org/10.1093/nar/gkx247>
- Taslimi, S., Brogly, S., Hanna, T. P., Shellenberger, J., Whitehead, M., & Alkins, R. (2025). A Population-Based Cohort Study of Glioblastoma (World Health Organization Grade 4 Gliomas) in Ontario: Continued Improvement in Care over 25 Years. *World Neurosurgery*, 196, 123821. <https://doi.org/10.1016/j.wneu.2025.123821>
- Terrié, E., Déliot, N., Benzidane, Y., Harnois, T., Cousin, L., Bois, P., Oliver, L., Arnault, P., Vallette, F., Constantin, B., & Coronas, V. (2021). Store-Operated Calcium Channels Control Proliferation and Self-Renewal of Cancer Stem Cells from Glioblastoma. *Cancers*, 13(14), 3428. <https://doi.org/10.3390/cancers13143428>
- Tiong, K.-L., & Chen-Hsiang Yeang. (2019). Mgsa – a multivariate gene set enrichment analysis. *BMC Bioinformatics*, 20(1). <https://doi.org/10.1186/s12859-019-2716-6>
- Tsabar, M., Mock, C. S., Venkatachalam, V., Reyes, J., Karhohs, K. W., Oliver, T. G., Aviv Regev, Ashwini Jambhekar, & Galit Lahav. (2020). A switch in p53 dynamics marks cells that escape from DSB-Induced cell cycle arrest. *Cell Reports*, 32(5), 107995–107995. <https://doi.org/10.1016/j.celrep.2020.107995>
- Unnisa, A., Greig, N. H., & Kamal, M. A. (2022). Inhibition of Caspase 3 and caspase 9 mediated apoptosis: A multimodal therapeutic target in Traumatic brain injury. *Current Neuropharmacology*, 20. <https://doi.org/10.2174/1570159x20666220327222921>
- Valdés-Rives, S. A., Casique-Aguirre, D., Germán-Castelán, L., Velasco-Velázquez, M. A., & González-Arenas, A. (2017). Apoptotic Signaling Pathways in Glioblastoma and Therapeutic

- Implications. *BioMed Research International*, 2017, 7403747.
<https://doi.org/10.1155/2017/7403747>
- Vellichirammal, N. N., & Guda, C. (2021). A compiled dataset of molecular pathways associated with fusion genes identified in pediatric cancers. *Data in Brief*, 35, 106780.
<https://doi.org/10.1016/j.dib.2021.106780>
- Waldherr, L., Tiffner, A., Mishra, D., Sallinger, M., Schober, R., Frischauf, I., Schmidt, T., Handl, V., Sagmeister, P., Köckinger, M., Derler, I., Muammer Üçal, Bonhenry, D., Patz, S., & Rainer Schindl. (2020). Blockage of Store-Operated Ca²⁺ Influx by Synta66 is Mediated by Direct Inhibition of the Ca²⁺ Selective Orai1 Pore. *Cancers*, 12(10), 2876–2876.
<https://doi.org/10.3390/cancers12102876>
- Wang, X., Sun, Q., Liu, T., Lu, H., Lin, X., Wang, W., Liu, Y., Huang, Y., Huang, G., Sun, H., Chen, Q., Wang, J., Tian, D., Yuan, F., Liu, L., Wang, B., Gu, Y., Liu, B., & Chen, L. (2024). Single-cell multi-omics sequencing uncovers region-specific plasticity of glioblastoma for complementary therapeutic targeting. *Science Advances*, 10(47).
<https://doi.org/10.1126/sciadv.adn4306>
- Warren, K. T., Liu, L., Liu, Y., Milano, M. T., & Walter, K. A. (2019). The Impact of Timing of Concurrent Chemoradiation in Patients With High-Grade Glioma in the Era of the Stupp Protocol. *Frontiers in Oncology*, 9, 186–186. <https://doi.org/10.3389/fonc.2019.00186>
- Wu, H., Wang, C., & Wu, Z. (2014). PROPER: comprehensive power evaluation for differential expression using RNA-seq. *Bioinformatics*, 31(2), 233–241.
<https://doi.org/10.1093/bioinformatics/btu640>
- Wu, W., Klockow, J. L., Zhang, M., Lafortune, F., Chang, E., Jin, L., Wu, Y., & Daldrup-Link, H. E. (2021). Glioblastoma multiforme (GBM): An overview of current therapies and mechanisms of resistance. *Pharmacological Research*, 171, 105780.
<https://doi.org/10.1016/j.phrs.2021.105780>

- Xiao, T., Wei, Z., & Wu, M. (2026). Glioblastoma cell plasticity: A new paradigm in glioblastoma therapeutic resistance. *Biochimica et Biophysica Acta (BBA) - Reviews on Cancer*, 1881(2), 189557. <https://doi.org/10.1016/j.bbcan.2026.189557>
- Xie, Q., Mittal, S., & Berens, M. E. (2014). Targeting adaptive glioblastoma: an overview of proliferation and invasion. *Neuro-Oncology*, 16(12), 1575–1584. <https://doi.org/10.1093/neuonc/nou147>
- Xu, C., Hou, P., Li, X., Xiao, M., Zhang, Z., Li, Z., Xu, J., Liu, G., Tan, Y., & Fang, C. (2024). Comprehensive understanding of glioblastoma molecular phenotypes: classification, characteristics, and transition. *Cancer Biology and Medicine*, 1–19. <https://doi.org/10.20892/j.issn.2095-3941.2023.0510>
- Xu, N., Lao, Y., Zhang, Y., & Gillespie, D. A. (2012). Akt: A Double-Edged Sword in Cell Proliferation and Genome Stability. *Journal of Oncology*, 2012, 1–15. <https://doi.org/10.1155/2012/951724>
- Yan, C., & Boyd, D. D. (2006). ATF3 regulates the stability of p53: A link to cancer. *Cell Cycle*, 5(9), 926–929. <https://doi.org/10.4161/cc.5.9.2714>
- Yao, M., Li, S., Wu, X., Diao, S., Zhang, G., He, H., Bian, L., & Lu, Y. (2018). Cellular origin of glioblastoma and its implication in precision therapy. *Cellular & Molecular Immunology*, 15(8), 737–739. <https://doi.org/10.1038/cmi.2017.159>
- Yates, L. A., Zhang, X., & Burgers, P. M. (2025). DNA Damage and Replication Stress Checkpoints. *Annual Review of Biochemistry*, 94(1), 195–221. <https://doi.org/10.1146/annurev-biochem-072324-031915>
- Yoast, R. E., Emrich, S. M., & Trebak, M. (2020). The anatomy of native CRAC channel(s). *Current Opinion in Physiology*, 17, 89. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7521663/>
- Yonetoku, Y., Kubota, H., Okamoto, Y., Ishikawa, J., Takeuchi, M., Ohta, M., & Tsukamoto, S. (2006). Novel potent and selective calcium-release-activated calcium (CRAC) channel inhibitors. Part 2: Synthesis and inhibitory activity of aryl-3-trifluoromethylpyrazoles. *Bioorganic & Medicinal Chemistry*, 14(15), 5370–5383. <https://doi.org/10.1016/j.bmc.2006.03.039>

- Yuan, J. X., & Munson, J. M. (2017). Quantitative Immunohistochemistry of the Cellular Microenvironment in Patient Glioblastoma Resections. *Journal of Visualized Experiments*, 125. <https://doi.org/10.3791/56025>
- Zhang, B., Li, M., Yang, W., Loo, J. J., Wang, S., Zhao, Y., Guo, H., Ma, X., Xia, C., & Xu, C. (2020). Oral calcium release-activated calcium modulator 1 (*orai1*) plays a role in endoplasmic reticulum stress in bovine mammary epithelial cells challenged with physiological levels of ketone bodies. *Journal of Dairy Science*, 103(5), 4691–4701. <https://doi.org/10.3168/jds.2019-17422>
- Zhang, H. S., Postigo, A. A., & Dean, D. C. (1999). Active transcriptional repression by the Rb–E2F complex mediates G1 arrest triggered by p16INK4a, TGF β , and contact inhibition. *Cell*, 97(1), 53–61. [https://doi.org/10.1016/s0092-8674\(00\)80714-x](https://doi.org/10.1016/s0092-8674(00)80714-x)
- Zhang, Q., Wang, C., & He, L. (2024). ORAI Ca²⁺ Channels in Cancers and Therapeutic Interventions. *Biomolecules*, 14(4), 417–417. <https://doi.org/10.3390/biom14040417>
- Zhang, X., Xin, P., Yoast, R. E., Emrich, S. M., Johnson, M. T., Pathak, T., Benson, J. C., Azimi, I., Gill, D. L., Monteith, G. R., & Trebak, M. (2020). Distinct pharmacological profiles of ORAI1, ORAI2, and ORAI3 channels. *Cell Calcium*, 91, 102281. <https://doi.org/10.1016/j.ceca.2020.102281>
- Zhang, Y., Dube, C., Gibert, M., Cruickshanks, N., Wang, B., Coughlan, M., Yang, Y., Setiady, I., Deveau, C., Saoud, K., Grello, C., Oxford, M., Yuan, F., & Abounader, R. (2018). The p53 Pathway in Glioblastoma. *Cancers*, 10(9), 297. <https://doi.org/10.3390/cancers10090297>
- Zhang, Y., Ma, W., Fan, W., Ren, C., Xu, J., Zeng, F., Bao, Z., Jiang, T., & Zhao, Z. (2021). Comprehensive transcriptomic characterization reveals core genes and module associated with immunological changes via 1619 samples of brain glioma. *Cell Death & Disease*, 12(12). <https://doi.org/10.1038/s41419-021-04427-8>
- Zhang, Z., Xiang, Y., Zhang, Y., Li, H., & Cheng, Y. (2025). Plasma biomarker ORAI1 as a dual prognostic value for survival and postoperative quality of life in glioma patients. *Scientific Reports*, 16(1). <https://doi.org/10.1038/s41598-025-34228-4>

- Zheng, B., Han, Y., & Zhang, H. (2025). Role of matrix metalloproteinases in the invasion of glioblastoma and drug interventions (Review). *International Journal of Molecular Medicine*, 57(2), 33. <https://doi.org/10.3892/ijmm.2025.5704>
- Zheng, Y., Zhong, Z., Zhang, C., & Gu, J. (2026). Glutamate decarboxylase 1 (GAD1) suppresses the progression of glioblastoma through GSK3 β / β -catenin pathway. *Cell Death Discovery*, 12(1). <https://doi.org/10.1038/s41420-026-02997-0>
- Zhou, Y., Meraner, P., Kwon, H. T., Machnes, D., Oh-hora, M., Zimmer, J., Huang, Y., Stura, A., Rao, A., & Hogan, P. G. (2010). STIM1 gates the store-operated calcium channel ORAI1 in vitro. *Nature Structural & Molecular Biology*, 17(1), 112–116. <https://doi.org/10.1038/nsmb.1724>
- Zhu, G., Yang, S., Wang, R., Lei, J., Ji, P., Wang, J., Tao, K., Yang, C., Ge, S., & Wang, L. (2021). P53/miR-154 Pathway Regulates the Epithelial-Mesenchymal Transition in Glioblastoma Multiforme Cells by Targeting TCF12. *Neuropsychiatric Disease and Treatment*, Volume 17, 681–693. <https://doi.org/10.2147/ndt.s273578>
- Zhu, M., Lv, B., Ge, W., Cui, Z., Zhao, K., Feng, Y., & Yang, X. (2020). Suppression of store-operated Ca²⁺ entry regulated by silencing Orai1 inhibits C6 glioma cell motility via decreasing Pyk2 activity and promoting focal adhesion. *Cell Cycle (Georgetown, Tex.)*, 19(24), 3468–3479. <https://doi.org/10.1080/15384101.2020.1843814>
- Zhu, Y., Yang, W., Zhuang, Y., Wang, F., Ge, Y., Jiang, J., & Feng, D. (2024). ELF3 overexpression contributes to the malignant transformation of HPV16 E6/E7-Immortalized keratinocytes by promoting CCNE2 expression. *Journal of Microbiology and Biotechnology*, 34(12), 2484–2491. <https://doi.org/10.4014/jmb.2408.08041>