

DAFTAR PUSTAKA

- Abd Rani, N. Z., Kumolosasi, E., Jasamai, M., Jamal, J. A., Lam, K. W., & Husain, K. (2019). In vitro anti-allergic activity of *Moringa oleifera* Lam. extracts and their isolated compounds. *BMC Complementary and Alternative Medicine*, *19*(1), 1–16. <https://doi.org/10.1186/s12906-019-2776-1>
- Abdullah, M. L., Al-Shabanah, O., Hassan, Z. K., & Hafez, M. M. (2021). Eugenol-induced autophagy and apoptosis in breast cancer cells via pi3k/akt/foxo3a pathway inhibition. *International Journal of Molecular Sciences*, *22*(17). <https://doi.org/10.3390/ijms22179243>
- Adebayo, I. A., Arsad, H., & Samian, M. R. (2017). Antiproliferative Effect on Breast Cancer (Mcf7) of *Moringa Oleifera* Seed Extracts. *African Journal of Traditional, Complementary, and Alternative Medicines*, *14*(2), 282–287. <https://doi.org/10.21010/ajtcam.v14i2.30>
- Adeluw, T., McGregor, B. A., Guo, K., & Hur, J. (2021). Predicting Drug-Induced Liver Injury Using Machine Learning on a Diverse Set of Predictors. *Frontiers in Pharmacology*, *12*(August), 1–14. <https://doi.org/10.3389/fphar.2021.648805>
- Ahmed, E. A. (2025). The Potential Therapeutic Role of Beta-Caryophyllene as a Chemosensitizer and an Inhibitor of Angiogenesis in Cancer. *Molecules*, *30*(8). <https://doi.org/10.3390/molecules30081751>
- Ahmed, Z. S. O., Khan, E., Elias, N., Elshebiny, A., & Dou, Q. (2025). Updated Review on Natural Polyphenols: Molecular Mechanisms, Biological Effects, and Clinical Applications for Cancer Management. *Biomolecules*, *15*(5). <https://doi.org/10.3390/biom15050629>
- Al-Qasem, A. J., Alves, C. L., Ehmsen, S., Tuttolomondo, M., Terp, M. G., Johansen, L. E., Vever, H., Hoeg, L. V. A., Elias, D., Bak, M., & Ditzel, H. J. (2022). Co-targeting CDK2 and CDK4/6 overcomes resistance to aromatase and CDK4/6 inhibitors in ER+ breast cancer. *Npj Precision Oncology*, *6*(1), 1–16. <https://doi.org/10.1038/s41698-022-00311-6>
- Albakova, Z. (2024). HSP90 multi-functionality in cancer. *Frontiers in Immunology*, *15*, 1–13. <https://doi.org/10.3389/fimmu.2024.1436973>
- Ancuceanu, R., Lascu, B. E., Drăgănescu, D., & Dinu, M. (2025). In Silico ADME Methods Used in the Evaluation of Natural Products. *Pharmaceutics*, *17*(8), 1–58. <https://doi.org/10.3390/pharmaceutics17081002>
- Arif, M., Yustisia, I., & Padlihanah. (2020). The combination from ethanol extract of moringa leaves (*Moringa oleifera* L.) and ethanol extract of papaya leaves (*Carica papaya* L.) slows the tumor growth in sprague dawley rats induced 7,12-dimethylbenz(a)anthracene. *Medicina Clinica Practica*, *3*, 100100. <https://doi.org/10.1016/j.mcpsp.2020.100100>
- Asgharzadeh, F., Memarzia, A., Alikhani, V., Beigoli, S., & Boskabady, M. H. (2024). Peroxisome proliferator-activated receptors: Key regulators of tumor progression and growth. *Translational Oncology*, *47*, 102039. <https://doi.org/10.1016/j.tranon.2024.102039>
- Azman, M., Sabri, A. H., Anjani, Q. K., Mustaffa, M. F., & Hamid, K. A. (2022). Intestinal Absorption Study: Challenges and Absorption Enhancement Strategies in Improving Oral Drug Delivery. *Pharmaceutics*, *15*(8), 1–24.

<https://doi.org/10.3390/ph15080975>

- Bardou, P., Mariette, J., Escudié, F., Djemiel, C., & Klopp, C. (2014). SOFTWARE Open Access jvenn: an interactive Venn diagram viewer. *BMC Bioinformatics*, *15*(293), 1–7. <https://doi.org/10.1186/1471-2105-15-293>
- Biswas, P., Dey, D., Biswas, P. K., Rahaman, T. I., Saha, S., Parvez, A., Khan, D. A., Lily, N. J., Saha, K., Sohel, M., Hasan, M. M., Al Azad, S., Bibi, S., Hasan, M. N., Rahmatullah, M., Chun, J., Rahman, M. A., & Kim, B. (2022). A Comprehensive Analysis and Anti-Cancer Activities of Quercetin in ROS-Mediated Cancer and Cancer Stem Cells. *International Journal of Molecular Sciences*, *23*(19). <https://doi.org/10.3390/ijms231911746>
- Bobe, G., Zhang, Z., Kopp, R., Garzotto, M., Shannon, J., & Takata, Y. (2020). Phytol and its metabolites phytanic and pristanic acids for risk of cancer: current evidence and future directions. *European Journal of Cancer Prevention*, *29*(2), 191–200. <https://doi.org/10.1097/CEJ.0000000000000534>
- Braicu, C., Buse, M., Busuioc, C., Drula, R., Gulei, D., Raduly, L., Rusu, A., Irimie, A., & Atanasov, A. G. (2019). *MAPK - review*. 1–25.
- Brennan, M., Fritsch, C., Cosgun, S., Dumarcay, S., Colin, F., & Gérardin, P. (2020). Quantitative and qualitative composition of bark polyphenols changes longitudinally with bark maturity in *Abies alba* Mill. *Annals of Forest Science*, *77*(1). <https://doi.org/10.1007/s13595-019-0916-x>
- Buniello, A., Suveges, D., Cruz-Castillo, C., Llinares, M. B., Cornu, H., Lopez, I., Tsukanov, K., Roldán-Romero, J. M., Mehta, C., Fumis, L., McNeill, G., Hayhurst, J. D., Martínez Osorio, R. E., Barkhordari, E., Ferrer, J., Carmona, M., Uniyal, P., Falaguera, M. J., Rusina, P., ... Ochoa, D. (2025). Open Targets Platform: Facilitating therapeutic hypotheses building in drug discovery. *Nucleic Acids Research*, *53*(D1), D1467–D1475. <https://doi.org/10.1093/nar/gkae1128>
- Chandrashekar, D. S., Karthikeyan, S. K., Korla, P. K., Patel, H., Shovon, A. R., Athar, M., Netto, G. J., Qin, Z. S., Kumar, S., Manne, U., Creighton, C. J., & Varambally, S. (2022). UALCAN: An update to the integrated cancer data analysis platform. *Neoplasia*, *25*, 18–27. <https://doi.org/10.1016/j.neo.2022.01.001>
- Cheng, D., Ge, K., Yao, X., Wang, B., Chen, R., Zhao, W., Fang, C., & Ji, M. (2023). Tumor-associated macrophages mediate resistance of EGFR-TKIs in non-small cell lung cancer: mechanisms and prospects. *Frontiers in Immunology*, *14*, 1–27. <https://doi.org/10.3389/fimmu.2023.1209947>
- Cortés-Malagón, E. M., Gariglio, P., Sierra-Martínez, M., & Bonilla-Delgado, J. (2024). Retinoids: Molecular Aspects and Treatment in Premalignant Lesions and Cervical Cancer. *Cancer Control*, *31*, 1–13. <https://doi.org/10.1177/10732748241279514>
- Daina, A., Michielin, O., & Zoete, V. (2017). SwissADME: A free web tool to evaluate pharmacokinetics, drug-likeness and medicinal chemistry friendliness of small molecules. *Scientific Reports*, *7*(October 2016), 1–13. <https://doi.org/10.1038/srep42717>
- Daina, A., Michielin, O., & Zoete, V. (2019). SwissTargetPrediction: updated data and new features for efficient prediction of protein targets of small molecules. *Nucleic Acids Research*, *47*(W1), W357–W364. <https://doi.org/10.1093/nar/gkz382>
- de Alencar, M. V. O. B., Islam, M. T., de Lima, R. M. T., Paz, M. F. C. J., dos Reis, A. C.,

- da Mata, A. M. O. F., Filho, J. W. G. de O., Cerqueira, G. S., Ferreira, P. M. P., e Sousa, J. M. de C., Mubarak, M. S., & Melo-Cavalcante, A. A. de C. (2019). Phytol as an anticarcinogenic and antitumoral agent: An in vivo study in swiss mice with DMBA-Induced breast cancer. *IUBMB Life*, *71*(2), 200–212. <https://doi.org/10.1002/iub.1952>
- Di Sotto, A., Mancinelli, R., Gulli, M., Eufemi, M., Mammola, C. L., Mazzanti, G., & Di Giacomo, S. (2020). Chemopreventive potential of caryophyllane sesquiterpenes: An overview of preliminary evidence. *Cancers*, *12*(10), 1–49. <https://doi.org/10.3390/cancers12103034>
- Eom, Y. H., Kim, H. S., Lee, A., Song, B. J., & Chae, B. J. (2016). BCL2 as a subtype-specific prognostic marker for breast cancer. *Journal of Breast Cancer*, *19*(3), 252–260. <https://doi.org/10.4048/jbc.2016.19.3.252>
- Esposito, M., Amory, J. K., & Kang, Y. (2024). The pathogenic role of retinoid nuclear receptor signaling in cancer and metabolic syndromes. *Journal of Experimental Medicine*, *221*(9), 1–22. <https://doi.org/10.1084/jem.20240519>
- Fedotcheva, T. A., Fedotcheva, N. I., & Shimanovsky, N. L. (2021). Progestins as anticancer drugs and chemosensitizers, new targets and applications. *Pharmaceutics*, *13*(10), 1–21. <https://doi.org/10.3390/pharmaceutics13101616>
- Filimonov, D. A., Rudik, A. V., Dmitriev, A. V., & Poroikov, V. V. (2020). Computer-aided estimation of biological activity profiles of drug-like compounds taking into account their metabolism in human body. *International Journal of Molecular Sciences*, *21*(20), 1–13. <https://doi.org/10.3390/ijms21207492>
- Fouillaud, M., Venkatachalam, M., Girard-Valenciennes, E., Caro, Y., & Dufossé, L. (2016). Anthraquinones and derivatives from marine-derived fungi: Structural diversity and selected biological activities. *Marine Drugs*, *14*(4). <https://doi.org/10.3390/md14040064>
- Fu, L., Shi, S., Yi, J., Wang, N., He, Y., Wu, Z., Peng, J., Deng, Y., Wang, W., Wu, C., Lyu, A., Zeng, X., Zhao, W., Hou, T., & Cao, D. (2024). ADMETlab 3.0: an updated comprehensive online ADMET prediction platform enhanced with broader coverage, improved performance, API functionality and decision support. *Nucleic Acids Research*, *52*(W1), W422–W431. <https://doi.org/10.1093/nar/gkae236>
- Fu, Y., Zou, T., Shen, X., Nelson, P. J., Li, J., Wu, C., Yang, J., Zheng, Y., Bruns, C., Zhao, Y., Qin, L., & Dong, Q. (2021). Lipid metabolism in cancer progression and therapeutic strategies. *MedComm*, *2*(1), 27–59. <https://doi.org/10.1002/mco.2.27>
- Gan, S., Dai, H., Li, R., Liu, W., Ye, R., Ha, Y., Di, X., Hu, W., Zhang, Z., & Sun, Y. (2020). Identification of key differentially expressed genes between ER-positive/HER2-negative breast cancer and ER-negative/HER2-negative breast cancer using integrated bioinformatics analysis. *Gland Surgery*, *9*(3), 661–675. <https://doi.org/10.21037/GS.2020.03.40>
- Gao, Y., Yu, Y., Zhang, M., Yu, W., & Kang, L. (2024). Mechanisms of endocrine resistance in hormone receptor-positive breast cancer. *Frontiers in Oncology*, *14*, 1–17. <https://doi.org/10.3389/fonc.2024.1448687>
- Goyal, A., Afzal, M., Khan, N. H., Goyal, K., Srinivasamurthy, S. K., Gupta, G., Benod Kumar, K., Ali, H., Rana, M., Wong, L. S., Kumarasamy, V., & Subramaniyan, V. (2025). Targeting p53-p21 signaling to enhance mesenchymal stem cell regenerative potential. *Regenerative Therapy*, *29*, 352–363.

<https://doi.org/10.1016/j.reth.2025.03.007>

- Gurning, K., Primahana, G., Astuti, E., & Haryadi, W. (2025). In Vitro Cytotoxic and Molecular Docking Studies of the Network Pharmacology Approach From Bioactive Compounds of *Coleus amboinicus* Leaves Against Lung and Breast Cancer Cells. *Advances in Pharmacological and Pharmaceutical Sciences*, 2025(1). <https://doi.org/10.1155/adpp/5946648>
- Hamid, S., Hardjo, M., Ibrahim, S., Azis, I., Muis, M., Yustisia, I., & Kadir. (2025). Potential of Isothiocyanates from *Moringa* as Antiobesity: A Review. *Tropical Journal of Natural Product Research*, 9(7), 2933. <https://doi.org/10.26538/tjnpr/v9i7.1>
- Hanahan, D. (2022). Hallmarks of Cancer: New Dimensions. *Cancer Discovery*, 12(1), 31–46. <https://doi.org/10.1158/2159-8290.CD-21-1059>
- Hanahan, D., & Weinberg, R. A. (2011). Hallmarks of cancer: The next generation. *Cell*, 144(5), 646–674. <https://doi.org/10.1016/j.cell.2011.02.013>
- Hardjo, M., Hamid, S., Hardjo, N., Ibrahim, S., Azis, I., Muis, M., & Kadir, S. (2025). Antioxidant and Anti-Obesity Potentials of *Moringa oleifera* Roots in High-Fat Diet-Induced Obesity in Rats. *Tropical Journal of Natural Product Research*, 9(5), 2024. <https://doi.org/10.26538/tjnpr/v9i5.21>
- Hashiesh, H. M., Sharma, C., Goyal, S. N., Sadek, B., Jha, N. K., Kaabi, J. Al, & Ojha, S. (2021). A focused review on CB2 receptor-selective pharmacological properties and therapeutic potential of β -caryophyllene, a dietary cannabinoid. *Biomedicine and Pharmacotherapy*, 140(December 2020), 111639. <https://doi.org/10.1016/j.biopha.2021.111639>
- Hogue, C. W., & Groll, M. (2001). An automated method for finding molecular complexes in large protein interaction networks. *BMC Bioinformatics*, 29(1), 137–140. <https://academic.oup.com/nar/article-lookup/doi/10.1093/nar/29.1.137>
- Hosack, T., Damry, D., & Biswas, S. (2023). Drug-induced liver injury: a comprehensive review. *Therapeutic Advances in Gastroenterology*, 16, 1–13. <https://doi.org/10.1177/17562848231163410>
- Hu, M., Yan, H., Li, H., Feng, Y., Sun, W., Ren, Y., Ma, L., Zeng, W., Huang, F., Jiang, Z., & Dong, H. (2023). Use of network pharmacology and molecular docking to explore the mechanism of action of curcuma in the treatment of osteosarcoma. *Scientific Reports*, 13(1), 1–13. <https://doi.org/10.1038/s41598-023-36687-z>
- Hu, Y., Dong, Z., & Liu, K. (2024). Unraveling the complexity of STAT3 in cancer: molecular understanding and drug discovery. *Journal of Experimental and Clinical Cancer Research*, 43(1), 1–29. <https://doi.org/10.1186/s13046-024-02949-5>
- Huang, Y., Li, G., Hong, C., Zheng, X., Yu, H., & Zhang, Y. (2021). Potential of Steroidal Alkaloids in Cancer: Perspective Insight Into Structure–Activity Relationships. *Frontiers in Oncology*, 11(September), 1–17. <https://doi.org/10.3389/fonc.2021.733369>
- Hunsu, V. O., Facey, C. O. B., Fields, J. Z., & Boman, B. M. (2021). Retinoids as chemopreventive and molecular-targeted anti-cancer therapies. *International Journal of Molecular Sciences*, 22(14). <https://doi.org/10.3390/ijms22147731>
- Hussein Zaki, A., Haiying, B., Mohany, M., Al-Rejaie, S. S., & Abugammie, B. (2024). The effect mechanism of ergosterol from the nutritional mushroom *Leucocalocybe mongolica* in breast cancer cells: Protein expression modulation and metabolomic

profiling using UHPLC-ESI-Q. *Saudi Pharmaceutical Journal*, 32(5), 102045. <https://doi.org/10.1016/j.jsps.2024.102045>

- Imran, M., Salehi, B., Sharifi-rad, J., Gondal, T. A., Arshad, M. U., Khan, H., & Guerreiro, S. G. (2019). Kaempferol: A Key Emphasis to Its. *Molecules*, 1–16.
- Irnawati, Rohman, A., Yamin, Fadzillah, N. A., Azmi, A. A., Nurlatifah, Windarsih, A., Susidarti, R. A., & Ruslin. (2024). Moringa oleifera seed oils: Physico-chemical characterization and its authentication using FTIR spectroscopy and chemometrics. *Case Studies in Chemical and Environmental Engineering*, 10. <https://doi.org/10.1016/j.cscee.2024.100994>
- Jiang, R. Y., Zhu, J. Y., Zhang, H. P., Yu, Y., Dong, Z. X., Zhou, H. H., & Wang, X. (2024). STAT3: Key targets of growth-promoting receptor positive breast cancer. *Cancer Cell International*, 24(1). <https://doi.org/10.1186/s12935-024-03541-9>
- Joseph, C., Alsaleem, M., Orah, N., Narasimha, P. L., Miligy, I. M., Kurozumi, S., Ellis, I. O., Mongan, N. P., Green, A. R., & Rakha, E. A. (2020). Elevated MMP9 expression in breast cancer is a predictor of shorter patient survival. *Breast Cancer Research and Treatment*, 182(2), 267–282. <https://doi.org/10.1007/s10549-020-05670-x>
- Kara, M., Öztaş, E., Boran, T., Karaman, E. F., Veskokoukis, A. S., & Tsatsakis, A. M. (2021). Ameliorative effects of the sesquiterpenoid valerenic acid on oxidative stress induced in hepg2 cells after exposure to the fungicide benomyl. *Antioxidants*, 10(5). <https://doi.org/10.3390/antiox10050746>
- Kawiak, A., & Kostecka, A. (2022). Regulation of Bcl-2 Family Proteins in Estrogen Receptor-Positive Breast Cancer and Their Implications in Endocrine Therapy. *Cancers*, 14(2). <https://doi.org/10.3390/cancers14020279>
- Khanam, S., Mishra, P., Faruqui, T., Alam, P., Albalawi, T., Siddiqui, F., Rafi, Z., & Khan, S. (2025). Plant-based secondary metabolites as natural remedies: a comprehensive review on terpenes and their therapeutic applications. *Frontiers in Pharmacology*, 16, 1–19. <https://doi.org/10.3389/fphar.2025.1587215>
- Klimoszek, D., Jeleń, M., Dołowy, M., & Morak-Młodawska, B. (2024). Study of the Lipophilicity and ADMET Parameters of New Anticancer Diquinotiazines with Pharmacophore Substituents. *Pharmaceuticals*, 17(6). <https://doi.org/10.3390/ph17060725>
- Krzyzak, M., & Mulrooney, S. M. (2020). *Acute Appendicitis Review: Background, Epidemiology, Diagnosis, and Treatment Epidemiology*. 12(6), 6–13. <https://doi.org/10.7759/cureus.8562>
- Li, D. H., Liu, X. K., Tian, X. T., Liu, F., Yao, X. J., & Dong, J. F. (2023). PPARγ: A Promising Therapeutic Target in Breast Cancer and Regulation by Natural Drugs. *PPAR Research*, 2023. <https://doi.org/10.1155/2023/4481354>
- Liu, H., Zhang, Z., Huang, Y., Wei, W., Ning, S., Li, J., Liang, X., Liu, K., & Zhang, L. (2021). Plasma HSP90AA1 Predicts the Risk of Breast Cancer Onset and Distant Metastasis. *Frontiers in Cell and Developmental Biology*, 9, 1–15. <https://doi.org/10.3389/fcell.2021.639596>
- Ma, J. H., Qin, L., & Li, X. (2020). Role of STAT3 signaling pathway in breast cancer. *Cell Communication and Signaling*, 18(1), 1–13. <https://doi.org/10.1186/s12964-020-0527-z>
- Maheshwari, S., Bharti, S., Gusain, A., Khan, S. A., & Matra, N. G. (2023). *FT-IR Analysis*

of *Moringa oleifera* L . Leaf Extract and its Insecticidal activity against *Callosobruchus chinensis* L . (Coleoptera : Bruchidae) FT-IR Analysis of *Moringa oleifera* L . Leaf Extract and its Insecticidal activity against *Callosobruchus chin.* 15(October), 1047–1051.

- Marvalim, C., Datta, A., & Lee, S. C. (2023). Role of p53 in breast cancer progression: An insight into p53 targeted therapy. *Theranostics*, 13(4), 1421–1442. <https://doi.org/10.7150/thno.81847>
- Masyita, A., Mustika Sari, R., Dwi Astuti, A., Yasir, B., Rahma Rumata, N., Emran, T. Bin, Nainu, F., & Simal-Gandara, J. (2022). Terpenes and terpenoids as main bioactive compounds of essential oils, their roles in human health and potential application as natural food preservatives. *Food Chemistry: X*, 13, 100217. <https://doi.org/10.1016/j.fochx.2022.100217>
- Matthews, A., Stanway, S., Farmer, R. E., Strongman, H., Thomas, S., Lyon, A. R., Smeeth, L., & Bhaskaran, K. (2018). Long term adjuvant endocrine therapy and risk of cardiovascular disease in female breast cancer survivors : systematic review. *BMJ*, 10–13. <https://doi.org/10.1136/bmj.k3845>
- McVea, H. M., & Wood, L. J. (2023). Anatomical and Chemical Analysis of *Moringa oleifera* Stem Tissue Grown under Controlled Conditions. *Horticulturae*, 9(2). <https://doi.org/10.3390/horticulturae9020213>
- Mendoza Lara, D. F., Hernández-Caballero, M. E., Terán, J. L., Ramírez, J. S., & Carrasco-Carballo, A. (2025). Anticancer Activities of Natural and Synthetic Steroids: A Review. *ACS Omega*, 10(8), 7493–7509. <https://doi.org/10.1021/acsomega.4c08577>
- Montecillo-Aguado, M., Tirado-Rodríguez, B., & Huerta-Yepez, S. (2023). The Involvement of Polyunsaturated Fatty Acids in Apoptosis Mechanisms and Their Implications in Cancer. *International Journal of Molecular Sciences*, 24(14). <https://doi.org/10.3390/ijms241411691>
- Mukherjee, S., Das, S., Sriram, N., Chakraborty, S., & Sah, M. K. (2022). In silico investigation of the role of vitamins in cancer therapy through inhibition of MCM7 oncoprotein. *RSC Advances*, 12(48), 31004–31015. <https://doi.org/10.1039/d2ra03703c>
- Muruthi, C. W., Ngugi, M. P., Runo, S. M., & Mwitari, P. G. (2023). In Vitro Antiproliferative Effects and Phytochemical Characterization of *Carissa edulis* ((Forssk) Vahl) and *Pappea capensis* (Eckyl and Zeyh) Extracts. *Journal of Evidence-Based Integrative Medicine*, 28, 1–17. <https://doi.org/10.1177/2515690X231187711>
- Nilkhet, S., Vongthip, W., Lertpatipanpong, P., Prasansuklab, A., Tencomnao, T., Chuchawankul, S., & Baek, S. J. (2024). Ergosterol inhibits the proliferation of breast cancer cells by suppressing AKT/GSK-3 β /catenin pathway. *Scientific Reports*, 14(1), 1–13. <https://doi.org/10.1038/s41598-024-70516-1>
- Nuraeni, E. N. I., & Diatomeae, P. (2024). *Panduan praktikum*.
- Parida, B. P., Radhakrishnan, M., Goyal, V., Sharma, A., Zarekar, R., Ansari, M. A., Singh, J., Singh, S., & Narayan, G. (2025). Anti-cancer potential of non-curcuminoid bioactive from *Curcuma caesia* Roxb. (Black Turmeric): Targeting cervical cancer via PI3K/Akt pathway modulation. *European Journal of Medicinal Chemistry Reports*, 14, 100273. <https://doi.org/10.1016/j.ejmcr.2025.100273>

- Paul Shannon, 1, Andrew Markiel, 1, Owen Ozier, 2 Nitin S. Baliga, 1 Jonathan T. Wang, 2 Daniel Ramage, 2, Nada Amin, 2, Benno Schwikowski, 1, 5 and Trey Ideker^{2, 3, 4, 5}, 山本隆久, 豊田直平, 深瀬吉邦, & 大森敏行. (1971). Cytoscape: A Software Environment for Integrated Models. *Genome Research*, 13(22), 426. <https://doi.org/10.1101/gr.1239303.metabolite>
- Peng, Y., Wang, Y., Zhou, C., Mei, W., & Zeng, C. (2022). PI3K/Akt/mTOR Pathway and Its Role in Cancer Therapeutics: Are We Making Headway? *Frontiers in Oncology*, 12, 1–17. <https://doi.org/10.3389/fonc.2022.819128>
- Rahmawati, Y., Setyawati, Y., Widodo, I., Ghozali, A., & Purnomosari, D. (2018). Molecular subtypes of Indonesian breast carcinomas - Lack of association with patient age and tumor size. *Asian Pacific Journal of Cancer Prevention*, 19(1), 161–166. <https://doi.org/10.22034/APJCP.2018.19.1.161>
- Safran, M., Rosen, N., Twik, M., BarShir, R., Stein, T. I., Dahary, D., Fishilevich, S., & Lancet, D. (2021). *The GeneCards Suite BT - Practical Guide to Life Science Databases* (I. Abugessaisa & T. Kasukawa (eds.); pp. 27–56). Springer Nature Singapore. https://doi.org/10.1007/978-981-16-5812-9_2
- Saindane, M., Rallabandi, H. R., Park, K. S., Heil, A., Nam, S. E., Yoo, Y. B., Yang, J. H., & Yun, I. J. (2020). Prognostic Significance of Prostaglandin-Endoperoxide Synthase-2 Expressions in Human Breast Carcinoma: A Multiomic Approach. *Cancer Informatics*, 19. <https://doi.org/10.1177/1176935120969696>
- Samdani, M. N., Reza, R., Morshed, N., Asaduzzaman, M., & Islam, A. B. M. M. K. (2023). Ligand-based modelling for screening natural compounds targeting Minichromosome Maintenance Complex Component-7 for potential anticancer effects. *Informatics in Medicine Unlocked*, 36(December 2022), 101152. <https://doi.org/10.1016/j.imu.2022.101152>
- Sari, W. O. N., Hardjo, M., Syahrjuita, Azis, I., & Yustisia, I. (2025). In Silico Evaluation of 3,6-Anhydro-D-Galactose from *Eucheuma denticulatum* Targeting Breast Cancer-Associated Molecular Pathways. *Tropical Journal of Natural Product Research*, 9(11), 5497. <https://doi.org/10.26538/tjnpr/v9i11.33>
- Shen, C., Li, W., & Wang, Y. (2023). Research on the oncogenic role of the house-keeping gene GAPDH in human tumors. *Translational Cancer Research*, 12(3), 525–535. <https://doi.org/10.21037/tcr-22-1972>
- Sherman, B. T., Hao, M., Qiu, J., Jiao, X., Baseler, M. W., Lane, H. C., Imamichi, T., & Chang, W. (2022). DAVID: a web server for functional enrichment analysis and functional annotation of gene lists (2021 update). *Nucleic Acids Research*, 50(W1), W216–W221. <https://doi.org/10.1093/nar/gkac194>
- Singh, J., Gautam, D. N. S., Sourav, S., & Sharma, R. (2023). Role of *Moringa oleifera* Lam. in cancer: Phytochemistry and pharmacological insights. *Food Frontiers*, 4(1), 164–206. <https://doi.org/10.1002/fft2.181>
- Smith, B. C. (2011). Fundamentals of Fourier transform infrared spectroscopy, Taylor & Francis Group. In *Taylor & Francis Group*. <http://medcontent.metapress.com/index/A65RM03P4874243N.pdf%5Cnhttp://link.springer.com/content/pdf/10.1007/978-0-387-69008-7.pdf>
- Sultan, R., Ahmed, A., Wei, L., Saeed, H., Islam, M., & Ishaq, M. (2023). The anticancer potential of chemical constituents of *Moringa oleifera* targeting CDK-2 inhibition in estrogen receptor positive breast cancer using in-silico and in vitro approaches. *BMC*

- Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*, 71(3), 209–249. <https://doi.org/10.3322/caac.21660>
- Szklarczyk, D., Kirsch, R., Koutrouli, M., Nastou, K., Mehryary, F., Hachilif, R., Gable, A. L., Fang, T., Doncheva, N. T., Pyysalo, S., Bork, P., Jensen, L. J., & Von Mering, C. (2023). The STRING database in 2023: protein-protein association networks and functional enrichment analyses for any sequenced genome of interest. *Nucleic Acids Research*, 51, D638–D646. <https://doi.org/10.1093/nar/gkac1000>
- Tian, Y., Zhou, Y., Chen, F., Qian, S., Hu, X., Zhang, B., & Liu, Q. (2024). Research progress in MCM family: Focus on the tumor treatment resistance. *Biomedicine and Pharmacotherapy*, 173, 116408. <https://doi.org/10.1016/j.biopha.2024.116408>
- Wang, F., Long, S., Zhang, J., Yu, J., Xiong, Y., Zhou, W., Qiu, J., & Jiang, H. (2020). Antioxidant activities and anti-proliferative effects of *Moringa oleifera* L. extracts with head and neck cancer. *Food Bioscience*, 37, 100691. <https://doi.org/10.1016/j.fbio.2020.100691>
- Wu, K., Kwon, S. H., Zhou, X., Fuller, C., Wang, X., Vadgama, J., & Wu, Y. (2024). Overcoming Challenges in Small-Molecule Drug Bioavailability: A Review of Key Factors and Approaches. *International Journal of Molecular Sciences*, 25(23). <https://doi.org/10.3390/ijms252313121>
- Xiong, G., Wu, Z., Yi, J., Fu, L., Yang, Z., Hsieh, C., Yin, M., Zeng, X., Wu, C., Lu, A., Chen, X., Hou, T., & Cao, D. (2021). ADMETlab 2.0: An integrated online platform for accurate and comprehensive predictions of ADMET properties. *Nucleic Acids Research*, 49(W1), W5–W14. <https://doi.org/10.1093/nar/gkab255>
- Yadav, A. K., & Polasek-Sedlackova, H. (2024). Quantity and quality of minichromosome maintenance protein complexes couple replication licensing to genome integrity. *Communications Biology*, 7(1). <https://doi.org/10.1038/s42003-024-05855-w>
- Yu, S., Wang, G., Shi, Y., Xu, H., Zheng, Y., & Chen, Y. (2020). MCMs in Cancer: Prognostic Potential and Mechanisms. *Analytical Cellular Pathology*, 2020. <https://doi.org/10.1155/2020/3750294>
- Yustisia, I., Hardjo, M., Ode, W., & Sari, N. (2025). Optimization and characterization of *Kappaphycus alvarezii* and κ -carrageenan hydrolysates with potential biomedical applications. *Food Hydrocolloids for Health*, 7(October 2024). <https://doi.org/https://doi.org/10.1016/j.fhfh.2025.100205>
- Zhang, Y. Q., Zhang, W., Kong, X. T., Hai, W. X., Guo, R., Zhang, M., Zhang, S. L., & Li, B. (2024). The therapeutic effect of a novel GAPDH inhibitor in mouse model of breast cancer and efficacy monitoring by molecular imaging. *Cancer Cell International*, 24(1), 1–13. <https://doi.org/10.1186/s12935-024-03361-x>
- Zhou, F., Zhang, Y., Chang, C., Shi, D., Chen, X., Liu, X., & Shen, X. (2025). Identification of Marrubiin as a Cathepsin C Inhibitor for Treating Rheumatoid Arthritis. 1–27.
- Zhou, J., & Ottewell, P. D. (2024). The role of IL-1B in breast cancer bone metastasis. *Journal of Bone Oncology*, 46. <https://doi.org/10.1016/j.jbo.2024.100608>
- Zubair, T., & Bandyopadhyay, D. (2023). Small Molecule EGFR Inhibitors as Anti-Cancer

Agents: Discovery, Mechanisms of Action, and Opportunities. *International Journal of Molecular Sciences*, 24(3). <https://doi.org/10.3390/ijms24032651>