

DAFTAR PUSTAKA

- Aertgeerts, K., Skene, R., Yano, J., Sang, B.C., Zou, H., Snell, G., Jennings, A., Iwamoto, K., Habuka, N., Hirokawa, A., Ishikawa, T., Tanaka, T., Miki, H., Ohta, Y., and Sogabe, S., 2011, Structural analysis of the mechanism of inhibition and allosteric activation of the kinase domain of HER2 protein, *J. Biol. Chem.*, 286, 18756–18765.
- Ajaykumar, C., 2020, Overview on the side effects of doxorubicin,. In, *Advances in Precision Medicine Oncology.*, pp. 1–20.
- Alam, M., Rashid, S., Fatima, K., Adnan, M., Shafie, A., Akhtar, M.S., Ganie, A.H., Eldin, S.M., Islam, A., Khan, I., and Hassan, M.I., 2023, Biochemical features and therapeutic potential of α -mangostin: Mechanism of action, medicinal values, and health benefits, *Biomed. Pharmacother.*, 163, 114710.
- Alam, S., and Khan, F., 2014, QSAR and docking studies on xanthone derivatives for anticancer activity targeting DNA topoisomerase II α , *Drug Des. Devel. Ther.*, 8, 183.
- Amanatie, A., Jumina, J., Mustofa, M., Hanafi, M., Kadidae, L.O., and Sahidin, I., 2017, Synthesis of 2-hidroxyxanthone from xanthone as a basic material for new antimalarial drugs, *Asian J. Pharm. Clin. Res.*, 10, 242–246.
- Anonim, 2024, World Cancer Day 2024, diakses pada 21 April 2025.
- Anonim, 2025, WHO Cancer Fact Sheets, diakses pada 21 April 2025.
- Anonim, 2025, Global Surge in Candida Infections Spurs New Treatment Guidelines, diakses 21 April 2025.
- Anonim, 2025, World Malaria Day 2025, diakses pada 21 April 2025.
- Anzaku, A.A., Akyala, J.I., Juliet, A., and Obianuju, E.C., 2017, Antibacterial activity of lauric acid on some selected clinical isolates, *Ann. Clin. Lab. Res.*, 5, 170.
- Arcelia, F., Asymida, F., Lubis, N.F.M., and Pasaribu, A.P., 2018, Severe falciparum malaria: A case report, *IOP Conf. Ser. Earth Environ. Sci.*, 125, 012021.
- Armunanto, R., Schwenk, C.F., Tran, H.T., and Rode, B.M., 2004, Structure and dynamics of Au⁺ ion in aqueous solution: ab initio QM/MM MD simulations, *J. Am. Chem. Soc.*, 126, 2582–2587.
- Baelmans, R., Deharo, E., Muoz, V., Sauvain, M., and Ginsburg, H., 2000, Experimental conditions for testing the inhibitory activity of chloroquine on the formation of β -hematin, *Exp. Parasitol.*, 96, 243–248.

- Balouiri, M., Sadiki, M., and Ibnsouda, S.K., 2016, Methods for *in vitro* evaluating antimicrobial activity: A review, *J. Pharm. Anal.*, 6, 71–79.
- Banerjee, P., Eckert, A.O., Schrey, A.K., and Preissner, R., 2018, ProTox-II: A webserver for the prediction of toxicity of chemicals, *Nucleic Acids Res.*, 46, W257–W263.
- Barbosa, F., Araújo, J., Gonçalves, V.M.F., Palmeira, A., Cunha, A., Silva, P.M.A., Fernandes, C., Pinto, M., Bousbaa, H., Queirós, O., and Tiritan, M.E., 2024, Evaluation of antitumor activity of xanthenes conjugated with amino acids, *Int. J. Mol. Sci.*, 25, 2121.
- Batista, R., de Jesus Silva Júnior, A., and de Oliveira, A.B., 2009, Plant-derived antimalarial agents: New leads and efficient phytomedicines. Part II. Non-alkaloidal natural products, *Molecules*, 14, 3037–3072.
- Bayarri, G., Hospital, A., and Orozco, M., 2021, 3dRS, a web-based tool to share interactive representations of 3D biomolecular structures and molecular dynamics trajectories, *Front. Mol. Biosci.*, 8, 726232.
- Benedetti, M.S., Whomsley, R., Poggesi, I., Cawello, W., Mathy, F.X., Delporte, M.L., Papeleu, P., and Watelet, J.B., 2009, Drug metabolism and pharmacokinetics, *Drug Metab. Rev.*, 41, 344–390.
- Bernatová, S., Samek, O., Pilát, Z., Šerý, M., Ježek, J., Ják, P., Šiler, M., Krzyžánek, V., Zemánek, P., Holá, V., Dvoráková, M., and Ružicka, F., 2013, Following the mechanisms of bacteriostatic versus bactericidal action using Raman spectroscopy, *Molecules*, 18, 13188–13199.
- Birch, A.J., Baldas, J., Hlubucek, J.R., Simpson, T.J., and Westerman, P.W., 1976, Biosynthesis of the fungal xanthone ravenelin, *J. Chem. Soc. Perkin Trans. I*, 1976, 898–904.
- Bosson, J., 2023, Scope and limitations of the preparation of xanthenes using Eaton's reagent, *Turkish J. Chem.*, 47, 1420–1428.
- Buławowska, A., Sławiński, J., Hałas, R., Hering, A., Gucwa, M., Ochocka, J.R., and Stefanowicz-Hajduk, J., 2023, An *in vitro* antimicrobial, anticancer and antioxidant activity of *N*–[(2-arylmethylthio)phenylsulfonyl]cinnamamide derivatives, *Molecules*, 28, 3087.
- Campoccia, D., Ravaioli, S., Santi, S., Mariani, V., Santarcangelo, C., De Filippis, A., Montanaro, L., Arciola, C.R., and Daglia, M., 2021, Exploring the anticancer effects of standardized extracts of poplar-type propolis: *In vitro* cytotoxicity toward cancer and normal cell lines, *Biomed. Pharmacother.*, 141, 111895.
- Cao, D., Wang, J., Zhou, R., Li, Y., Yu, H., and Hou, T., 2012, ADMET evaluation in drug discovery. 11. Pharmacokinetics Knowledge Base (PKKB): A comprehensive database of pharmacokinetic and toxic properties for drugs, *J. Chem. Inf. Model.*, 52, 1132–1137.

- Carballeira, N.M., 2008, New advances in fatty acids as antimalarial, antimycobacterial and antifungal agents, *Prog. Lipid Res.*, 47, 50–61.
- Casillas-Vargas, G., Ocasio-Malavé, C., Medina, S., Morales-Guzmán, C., Del Valle, R.G., Carballeira, N.M., and Sanabria-Ríos, D.J., 2021, Antibacterial fatty acids: An update of possible mechanisms of action and implications in the development of the next-generation of antibacterial agents, *Prog. Lipid Res.*, 82, 101093.
- Chaianantakul, N., Sirawaraporn, R., and Sirawaraporn, W., 2013, Insights into the role of the junctional region of *Plasmodium falciparum* dihydrofolate reductase-thymidylate synthase, *Malaria J.*, 12, 1–13.
- Chandrasekaran, B., Abed, S.N., Al-Attraqchi, O., Kuche, K., and Tekade, R.K., 2018, Computer-aided prediction of pharmacokinetic (ADMET) properties, *Dosage Form Design Parameters*, 2, 731–755.
- Che, X., Hu, J., Wang, L., Zhu, Z., Xu, Q., Lv, J., Fu, Z., Sun, Y., Sun, J., Lin, G., Lu, R., and Yao, Z., 2011, Expression, purification, and activity assay of peptide deformylase from *Escherichia coli* and *Staphylococcus aureus*, *Mol. Cell. Biochem.*, 357, 47–54.
- Chen, T.R., Drabkowski, D., Hay, R.J., Macy, M., and Peterson, W., 1987, WiDr is a derivative of another colon adenocarcinoma cell line, HT-29, *Cancer Genet. Cytogen.*, 27, 125–134.
- Chen, W., Shi, C., Mackerell, A.D., and Shen, J., 2015, Conformational dynamics of two natively unfolded fragment peptides: Comparison of the AMBER and CHARMM force fields, *J. Phys. Chem. B*, 119, 7902.
- Chen, X., Leng, J., Rakesh, K.P., Darshini, N., Shubhavathi, T., Vivek, H.K., Mallesha, N., and Qin, H.L., 2017, Synthesis and molecular docking studies of xanthone attached amino acids as potential antimicrobial and anti-inflammatory agents, *MedChemComm*, 8, 1706.
- Cheng, P., Zhu, L., Guo, W., Liu, W., Yao, J., Dong, G., Zhang, Y., Zhuang, C., Sheng, C., Miao, Z., and Zhang, W., 2012, Synthesis of novel benzoxanthone analogues as non-camptothecin topoisomerase I inhibitors, *J. Enzyme Inhib. Med. Chem.*, 27, 437–442.
- Chinappi, M., Via, A., Marcatili, P., and Tramontano, A., 2010, On the mechanism of chloroquine resistance in *Plasmodium falciparum*, *PLoS ONE*, 5, e14064.
- Cho, H.J., Jung, M.J., Woo, S., Kim, J., Lee, E.S., Kwon, Y., and Na, Y., 2010, New benzoxanthone derivatives as topoisomerase inhibitors and DNA cross-linkers, *Bioorg. Med. Chem.*, 18, 1010–1017.
- Cox, J. and Weinman, S., 2016, Mechanisms of doxorubicin resistance in hepatocellular carcinoma, *Hepatic Oncol.*, 3, 57–59.

- Daina, A., Michielin, O., and Zoete, V., 2017, SwissADME: A free web tool to evaluate pharmacokinetics, drug-likeness and medicinal chemistry friendliness of small molecules, *Sci. Rep.*, 7, 1–13.
- Daoud, N.E.-H., Borah, P., Deb, P.K., Venugopala, K.N., Hourani, W., Alzweiri, M., Bardaweel, S.K., and Tiwari, V., 2021, ADMET profiling in drug discovery and development: Perspectives of *in silico*, *in vitro* and integrated approaches, *Curr. Drug Metab.*, 22, 503–522.
- Davis, W.W. and Stout, T.R., 1971, Disc plate method of microbiological antibiotic assay: I. Factors influencing variability and error, *Appl. Microbiol.*, 22, 659.
- De, P., Baltas, M., and Bedos-Belval, F., 2011, Cinnamic acid derivatives as anticancer agents-A review, *Curr. Med. Chem.*, 18, 1672–1703.
- de los Rios, S. and Perona, J.J., 2007, Structure of the *Escherichia coli* leucine-responsive regulatory protein Lrp reveals a novel octameric assembly, *J. Mol. Biol.*, 366, 1589–1602.
- Deng, H., Xu, Q., Guo, H.Y., Huang, X., Chen, F., Jin, L., Quan, Z.S., and Shen, Q.K., 2023, Application of cinnamic acid in the structural modification of natural products: A review, *Phytochemistry*, 206, 113532.
- Desbois, A.P., and Smith, V.J., 2010, Antibacterial free fatty acids: Activities, mechanisms of action and biotechnological potential, *Appl. Microbiol. Biotechnol.*, 85, 1629–1642.
- Devan, K., Peedikayil, F., Chandru, T., Kottayi, S., Dhanesh, N., and Suresh, K., 2019, Antimicrobial efficacy of medium chain fatty acids as root canal irrigants: An *in vitro* study, *J. Indian Soc. Pedod. Prev. Dent.*, 37, 258–264.
- Dhanoa, G.K., Kushnir, I., Qimron, U., Roper, D.I., and Sagona, A.P., 2022, Investigating the effect of bacteriophages on bacterial FtsZ localisation, *Front. Cell. Infect. Microbiol.*, 12, 863712.
- Dickert, H., Machka, K., and Braveny, I., 1981, The uses and limitations of disc diffusion in the antibiotic sensitivity testing of bacteria, *Infection*, 9, 18–24.
- Dong, J., Wang, N.N., Yao, Z.J., Zhang, L., Cheng, Y., Ouyang, D., Lu, A.P., and Cao, D.S., 2018, ADMETlab: A platform for systematic ADMET evaluation based on a comprehensively collected ADMET database, *J. Cheminformatics*, 10, 29.
- Doron, S. and Gorbach, S.L., 2008, Bacterial Infections: Overview, *Int. Encycl. Public Health*, 2008, 273–282.
- Du, Z. and Lovly, C.M., 2018, Mechanisms of receptor tyrosine kinase activation in cancer, *Mol. Cancer*, 17, 1–13.

- Dunning, K., 2022, Biodiversity conservation policy in megadiverse countries: Comparing policy systems for 2020 targets to inform management in the coming decades, *J. Environ. Manage.*, 302, 113815.
- Egan, W.J., Merz, K.M., and Baldwin, J.J., 2000, Prediction of drug absorption using multivariate statistics, *J. Med. Chem.*, 43, 3867–3877.
- Fatmasari, N., Kurniawan, Y.S., Jumina, J., Anwar, C., Priastomo, Y., Pranowo, H.D., Zulkarnain, A.K., and Sholikhah, E.N., 2022, Synthesis and *in vitro* assay of hydroxyxanthenes as antioxidant and anticancer agents, *Sci. Rep.*, 12, 1535.
- Fatmayanti, B.R., Jumina, Purwono, B., Kurniawan, Y.S., Pranowo, H.D., and Sholikhah, E.N., 2024, Oleate epoxides derived from palm oil as new anticancer agents: Synthesis, cytotoxicity evaluation, and molecular docking studies against FASN protein, *ChemistrySelect*, 9, e202400752.
- Feng, L.S., Cheng, J.B., Su, W.Q., Li, H.Z., Xiao, T., Chen, D.A., and Zhang, Z.L., 2022, Cinnamic acid hybrids as anticancer agents: A mini-review, *Arch. Pharm.*, 355, e2200052.
- Ferreri, C., Sansone, A., Chatgililoglu, C., Ferreri, R., Amézaga, J., Burgos, M.C., Arranz, S., and Tueros, I., 2022, Critical review on fatty acid-based food and nutraceuticals as supporting therapy in cancer, *Int. J. Mol. Sci.*, 23, 6030.
- Fitriastuti, D., Jumina, and Priatmoko, 2017, Heme polymerization inhibition activity (HPIA) assay of synthesized xanthone derivative as antimalarial compound, *AIP Conf. Proc.*, 1823, 20120.
- Fonte, M., Fontinha, D., Moita, D., Caño-Prades, O., Avalos-Padilla, Y., Fernández-Busquets, X., Prudêncio, M., Gomes, P., and Teixeira, C., 2023, New 4-(*N*-cinnamoylbutyl)aminoacridines as potential multi-stage antiparasmodial leads, *Eur. J. Med. Chem.*, 258, 115575.
- Foster, K.A., Oster, C.G., Mayer, M.M., Avery, M.L., and Audus, K.L., 1998, Characterization of the A549 cell line as a type II pulmonary epithelial cell model for drug metabolism, *Exp. Cell Res.*, 243, 359–366.
- Fraga, C.A.M., 2009, Drug hybridization strategies: Before or after lead identification?, *Expert Opin. Drug Discov.*, 4, 605–609.
- Frenkel, D. and Smith, B., 2001, *Understanding Molecular Simulation: From Algorithms to Applications*, 2nd Edition, Academic Press, Cambridge.
- Gaikwad, N., Nanduri, S., and Madhavi, Y. V., 2019, Cinnamamide: An insight into the pharmacological advances and structure-activity relationships, *Eur. J. Med. Chem.*, 181, 111561.
- GBD 2021 Antimicrobial Resistance Collaborators, 2024, Global burden of bacterial antimicrobial resistance 1990–2021: A systematic analysis with forecasts to 2050, *Lancet*, 404, 1199–1226.

- Ge, Y.X., Wang, Y.H., Zhang, J., Yu, Z.P., Mu, X., Song, J.L., Wang, Y.Y., Yang, F., Meng, N., Jiang, C.S., and Zhang, H., 2009, New cinnamic acid-pregnenolone hybrids as potential antiproliferative agents: Design, synthesis and biological evaluation, *Steroids*, 152, 108499.
- Ghose, A.K., Viswanadhan, V.N., and Wendoloski, J.J., 1999, A knowledge-based approach in designing combinatorial or medicinal chemistry libraries for drug discovery. 1. A qualitative and quantitative characterization of known drug databases, *J. Comb. Chem.*, 1, 55–68.
- Göller, A.H., Kuhnke, L., Montanari, F., Bonin, A., Schneckener, S., ter Laak, A., Wichard, J., Lobell, M., and Hillisch, A., 2020, Bayer's *in silico* ADMET platform: A journey of machine learning over the past two decades, *Drug Discov. Today*, 25, 1702–1709.
- Gomes, M.N., Muratov, E.N., Pereira, M., Peixoto, J.C., Rosseto, L.P., Cravo, P.V.L., Andrade, C.H., and Neves, B.J., 2017, Chalcone derivatives: promising starting points for drug design, *Molecules*, 22, 1210.
- Goodwin, E.C., and DiMaio, D., 2000, Repression of human papillomavirus oncogenes in HeLa cervical carcinoma cells causes the orderly reactivation of dormant tumor suppressor pathways, *Proc. Natl. Acad. Sci. USA*, 97, 12513–12518.
- Gutierrez, C., and Schiff, R., 2011, HER2: Biology, detection, and clinical implications, *Arch. Path. Lab. Med.*, 135, 55–62.
- Han, Z., Feng, D., Wang, W., Wang, Y., Cheng, M., Yang, H., and Liu, Y., 2023, Influence of fatty acid modification on the anticancer activity of the antimicrobial peptide figainin 1, *ACS Omega*, 8, 41876–41884.
- Hanna, T.P., King, W.D., Thibodeau, S., Jalink, M., Paulin, G.A., Harvey-Jones, E., O'Sullivan, D.E., Booth, C.M., Sullivan, R., and Aggarwal, A., 2020, Mortality due to cancer treatment delay: Systematic review and meta-analysis, *BMJ*, 371, m4087.
- Hassanpour, S.H., and Dehghani, M., 2017, Review of cancer from perspective of molecular, *J. Cancer Res. Pract.*, 4, 127–129.
- Heise, C.J., and Cobb, M.H., 2006, Expression and characterization of MAP kinases in bacteria, *Methods*, 40, 209–212.
- Hermawan, F., Jumina, J., Pranowo, H.D., Sholikhah, E.N., and Iresha, M.R., 2022, Computational design of thioxanthone derivatives as potential antimalarial agents through *Plasmodium falciparum* protein inhibition, *Indones. J. Chem.*, 22, 263–271.
- Howden, B.P., Giulieri, S.G., Lung, T.W.F., Baines, S.L., Sharkey, L.K., Lee, J.Y.H., Hachani, A., Monk, I.R., and Stinear, T.P., 2023, *Staphylococcus aureus* host interactions and adaptation, *Nat. Rev. Microbiol.*, 21, 380–395.

- Huan, M.L., Zhou, S.Y., Teng, Z.H., Zhang, B.L., Liu, X.Y., Wang, J.P., and Mei, Q.B., 2009, Conjugation with alpha-linolenic acid improves cancer cell uptake and cytotoxicity of doxorubicin, *Bioorg. Med. Chem. Lett.*, 19, 2579–2584.
- Huang, G., Huang, Q., Wei, Y., Wang, Y., and Du, H., 2019, Multiple roles and diverse regulation of the Ras/cAMP/protein kinase A pathway in *Candida albicans*, *Mol. Microbiol.*, 111, 6–16.
- Hurt, D.E., Widom, J., and Clardy, J., 2006, Structure of *Plasmodium falciparum* dihydroorotate dehydrogenase with a bound inhibitor, *Acta Crystallogr. D Biol. Crystallogr.*, 62, 312–323.
- Iresha, M.R., Jumina, J., Pranowo, H.D., Sholikhah, E.N., and Hermawan, F., 2022, Synthesis, cytotoxicity evaluation and molecular docking studies of xanthyl-cinnamate derivatives as potential anticancer agents, *Indones. J. Chem.*, 22, 1407–1417.
- Ji, Y.B., Chen, W.J., Shan, T.Z., Sun, B.Y., Yan, P.C., and Jiang, W., 2020, Antibacterial diphenyl ether, benzophenone and xanthone derivatives from *Aspergillus flavipes*, *Chem. Biodiversity*, 17, e1900640.
- Jogunola, O., Salmi, T., Eränen, K., Wärnå, J., and Mikkola, J.P., 2011, Rates and equilibria of ester hydrolysis: Combination of slow and rapid reactions, *Chem. Eng. Process.*, 50, 665–674.
- Jóźwiak, M., Filipowska, A., Fiorino, F., and Struga, M., 2020, Anticancer activities of fatty acids and their heterocyclic derivatives, *Eur. J. Pharmacol.*, 871, 172937.
- Jumina, Lavendi, W., Singgih, T., Triono, S., Kurniawan, Y.S., and Koketsu, M., 2019, Preparation of monoacylglycerol derivatives from indonesian edible oil and their antimicrobial assay against *Staphylococcus aureus* and *Escherichia coli*, *Sci. Rep.*, 9, 10941.
- Jumina, Mutmainah, M., Purwono, B., Kurniawan, Y.S., and Syah, Y.M., 2019, Antibacterial and antifungal activity of three monosaccharide monomyristate derivatives, *Molecules*, 24, 3692.
- Jumina, Nurmala, A., Fitria, A., Pranowo, D., Sholikhah, E.N., Kurniawan, Y.S., and Kuswandi, B., 2018, Monomyristin and monopalmitin derivatives: Synthesis and evaluation as potential antibacterial and antifungal agents, *Molecules*, 23, 3141.
- Kaper, J.B., Nataro, J.P., and Mobley, H.L.T., 2004, Pathogenic *Escherichia coli*, *Nat. Rev. Microbiol.*, 2, 123–140.
- Kaur, N., Chugh, V., and Gupta, A.K., 2012, Essential fatty acids as functional components of foods - A review, *J. Food Sci. Technol.*, 51, 2289.

- Ke, X.Y., Zhao, B.J., Zhao, X., Wang, Y., Huang, Y., Chen, X.M., Zhao, B.X., Zhao, S.S., Zhang, X., and Zhang, Q., 2010, The therapeutic efficacy of conjugated linoleic acid-paclitaxel on glioma in the rat, *Biomaterials*, 31, 5855–5864.
- Kessler, S.Q.S., Lang, P.M., Dal-Pizzol, T.S., and Montagner, F., 2022, Resistance profiles to antifungal agents in *Candida albicans* isolated from human oral cavities: systematic review and meta-analysis, *Clin. Oral Investig.*, 26, 6479–6489.
- Khameneh, B., Iranshahy, M., Soheili, V., and Fazly Bazzaz, B.S., 2019, Review on plant antimicrobials: A mechanistic viewpoint, *Antimicrob. Resist. Infect. Control*, 8, 1–28.
- Kurniawan, Y.S., Amrulloh, H., Yudha, E., Fatmasari, N., Hermawan, F., Fitria, A., Pranowo, H.D., Sholikhah, E.N., and Jumina, J., 2025, Evaluation of Xanthone and cinnamoylbenzene as anticancer agents for breast cancer cell lines through *in vitro* and *in silico* assays, *J. Multidiscipl. Appl. Nat. Sci.*, 5, 87–102.
- Kurniawan, Y.S., Priyanga, K.T.A., Jumina, Pranowo, H.D., Sholikhah, E.N., Zulkarnain, A.K., Fatimi, H.A., and Julianus, J., 2021, An update on the anticancer activity of xanthone derivatives: A review, *Pharmaceuticals*, 14, 1144.
- Lee, H.S., Jo, S., Lim, H.S., and Im, W., 2012, Application of binding free energy calculations to prediction of binding modes and affinities of MDM2 and MDMX inhibitors, *J. Chem. Inf. Model.*, 52, 1821–1832.
- Leeds, J.A., and Dean, C.R., 2006, Peptide deformylase as an antibacterial target: A critical assessment, *Curr. Opin. Pharmacol.*, 6, 445–452.
- Lewars, E.G., 2024, *Computational Chemistry: Introduction to the Theory and Applications of Molecular and Quantum Mechanics*, Springer Cham, Cham.
- Lica, J.J., Wieczór, M., Grabe, G.J., Heldt, M., Jancz, M., Misiak, M., Gucwa, K., Brankiewicz, W., Maciejewska, N., Stupak, A., Bagiński, M., Rolka, K., Hellmann, A., and Składanowski, A., 2021, Effective drug concentration and selectivity depends on fraction of primitive cells, *Int. J. Mol. Sci.*, 22, 4931.
- Liguori, I., Russo, G., Curcio, F., Bulli, G., Aran, L., Della-Morte, D., Gargiulo, G., Testa, G., Cacciatore, F., Bonaduce, D., and Abete, P., 2018, Oxidative stress, aging, and diseases, *Clin. Interv. Aging*, 13, 757–772.
- Lind, M.J., 2011, Principles of cytotoxic chemotherapy, *Syst. Ther.*, 39, 711–716.
- Lipinski, C.A., Lombardo, F., Dominy, B.W., and Feeney, P.J., 2001, Experimental and computational approaches to estimate solubility and permeability in drug discovery and development settings, *Adv. Drug Deliv. Rev.*, 46, 3–26.

- Liu, J., Zhang, J., Wang, H., Liu, Z., Zhang, C., Jiang, Z., and Chen, H., 2017, Synthesis of xanthone derivatives and studies on the inhibition against cancer cells growth and synergistic combinations of them, *Eur. J. Med. Chem.*, 133, 50–61.
- Loh, Z.H., Kwong, H.C., Lam, K.W., Teh, S.S., Ee, G.C.L., Quah, C.K., Ho, A.S.H., and Mah, S.H., 2021, New 3-*O*-substituted xanthone derivatives as promising acetylcholinesterase inhibitors, *J. Enzyme Inhib. Med. Chem.*, 36, 627–639.
- Lovitt, C.J., Shelper, T.B., and Avery, V.M., 2018, Doxorubicin resistance in breast cancer cells is mediated by extracellular matrix proteins, *BMC Cancer*, 18, 1–11.
- Lundberg, B.B., Risovic, V., Ramaswamy, M., and Wasan, K.M., 2003, A lipophilic paclitaxel derivative incorporated in a lipid emulsion for parenteral administration, *J. Controll. Release*, 86, 93–100.
- Mahavorasirikul, W., Viyanant, V., Chaijaroenkul, W., Itharat, A., and Na-Bangchang, K., 2010, Cytotoxic activity of Thai medicinal plants against human cholangiocarcinoma, laryngeal and hepatocarcinoma cells *in vitro*, *BMC Complement. Altern. Med.*, 10, 1–8.
- Malheiro, J.F., Maillard, J.Y., Borges, F., and Simões, M., 2019, Evaluation of cinnamaldehyde and cinnamic acid derivatives in microbial growth control, *Int. Biodeterior. Biodegradation*, 141, 71–78.
- Mancini, A., Imperlini, E., Nigro, E., Montagnese, C., Daniele, A., Orrù, S., and Buono, P., 2015, Biological and nutritional properties of palm oil and palmitic acid: Effects on health, *Molecules*, 20, 17339–17361.
- Michalska, K., Karpiuk, I., Król, M., and Tyski, S., 2013, Recent development of potent analogues of oxazolidinone antibacterial agents, *Bioorg. Med. Chem.*, 21, 577–591.
- Miladiyah, I., Yuanita, E., Nuryadi, S., Jumina, J., Haryana, S.M., and Mustofa, M., 2020, Synergistic effect of 1,3,6-trihydroxy-4,5,7-trichloroxanthone in combination with doxorubicin on b-cell lymphoma cells and its mechanism of action through molecular docking, *Curr. Ther. Res.*, 92, 100576.
- Minghetti, L., 2004, Cyclooxygenase-2 (COX-2) in inflammatory and degenerative brain diseases, *J. Neuropathol. Exp. Neurol.*, 63, 901–910.
- Mollica, L., Theret, I., Antoine, M., Perron-Sierra, F., Charton, Y., Fourquez, J.M., Wierzbicki, M., Boutin, J.A., Ferry, G., Decherchi, S., Bottegoni, G., Ducrot, P., and Cavalli, A., 2016, Molecular dynamics simulations and kinetic measurements to estimate and predict protein-ligand residence times, *J. Med. Chem.*, 59, 7167–7176.

- Morales, G., Sierra, P., Mancilla, A., Paredes, A., Loyola, L.A., Gallardo, O., and Borquez, J., 2003, Secondary metabolites from four medicinal plants from northern Chile: Antimicrobial activity and biotoxicity against *Artemia salina*, *J. Chil. Chem. Soc.*, 48, 13–18.
- Mosmann, T., 1983, Rapid colorimetric assay for cellular growth and survival: Application to proliferation and cytotoxicity assays, *J. Immunol. Methods*, 65, 55–63.
- Muegge, I., 2003, Selection criteria for drug-like compounds, *Med. Res. Rev.*, 23, 302–321.
- Na, Y., 2009, Recent cancer drug development with xanthone structures, *J. Pharm. Pharmacol.*, 61, 707–712.
- Naghavi, M., Vollset, S.E., Ikuta, K.S., Swetschinski, L.R., Gray, A.P., Wool, E.E., Aguilar, G.R., Mestrovic, T., Smith, G., Han, C., Hsu, R.L., Chalek, J., Araki, D.T., Chung, E., Raggi, C., Hayoon, A.G., Weaver, N.D., Lindstedt, P.A., Smith, A.E., *et al.*, 2024, Global burden of bacterial antimicrobial resistance 1990–2021: A systematic analysis with forecasts to 2050, *Lancet*, 404, 1199–1226.
- Narasimhan, S., Maheshwaran, S., Abu-Yousef, I.A., Majdalawieh, A.F., Rethavathi, J., Das, P.E., and Poltronieri, P., 2017, Anti-bacterial and anti-fungal activity of xanthenes obtained via semi-synthetic modification of α -mangostin from *Garcinia mangostana*, *Molecules*, 22, 275.
- Naveed, M., Hejazi, V., Abbas, M., Kamboh, A.A., Khan, G.J., Shumzaid, M., Ahmad, F., Babazadeh, D., FangFang, X., Modarresi-Ghazani, F., WenHua, L., and XiaoHui, Z., 2018, Chlorogenic acid (CGA): A pharmacological review and call for further research, *Biomed. Pharmacother.*, 97, 67–74.
- Nikolić, M., Marković, T., Mojović, M., Pejin, B., Savić, A., Perić, T., Marković, D., Stević, T., and Soković, M., 2013, Chemical composition and biological activity of *Gaultheria procumbens* L. essential oil, *Ind. Crops Prod.*, 49, 561–567.
- Nisar, S., Hanif, M.A., Rashid, U., Hanif, A., Akhtar, M.N., and Ngamcharussrivichai, C., 2021, Trends in widely used catalysts for fatty acid methyl esters (FAME) production: A review, *Catalysts*, 11, 1085.
- Nitbani, F.O., Jumina, Siswanta, D., and Solikhah, E.N., 2016, Isolation and antibacterial activity test of lauric acid from crude coconut oil (*Cocos nucifera* L.), *Procedia Chem.*, 18, 132–140.
- Nordström, F.L., and Rasmuson, Å.C., 2006, Solubility and melting properties of salicylic acid, *J. Chem. Eng. Data*, 51, 1668–1671.
- Pagadala, N.S., Syed, K., and Tuszyński, J., 2017, Software for molecular docking: A review, *Biophys. Rev.*, 9, 91–102.

- Paiva, P., Medina, F.E., Viegas, M., Ferreira, P., Neves, R.P.P., Sousa, J.P.M., Ramos, M.J., and Fernandes, P.A., 2021, Animal fatty acid synthase: A chemical nanofactory, *Chem. Rev.*, 121, 9502–9553.
- Parambath, S., Dao, A., Kim, H.Y., Zawahir, S., Izquierdo, A.A., Tacconelli, E., Govender, N., Oladele, R., Colombo, A., Sorrell, T., Ramon-Pardo, P., Fusire, T., Gigante, V., Sati, H., Morrissey, C.O., Alffenaar, J.W., and Beardsley, J., 2024, *Candida albicans*—A systematic review to inform the World Health Organization Fungal Priority Pathogens List, *Med. Mycol.*, 62, myae045.
- Perković, I., Raić-Malić, S., Fontinha, D., Prudêncio, M., Pessanha de Carvalho, L., Held, J., Tandarić, T., Vianello, R., Zorc, B., and Rajić, Z., 2020, Harmicines - Harmine and cinnamic acid hybrids as novel antiplasmodial hits, *Eur. J. Med. Chem.*, 187, 111927.
- Phillips, M.A., and Rathod, P., 2010, Plasmodium dihydroorotate dehydrogenase: A promising target for novel anti-malarial chemotherapy, *Infect. Disord. Drug Targets*, 10, 226.
- Phyo, A.P., Dahal, P., Mayxay, M., and Ashley, E.A., 2022, Clinical impact of vivax malaria: A collection review, *PLOS Med.*, 19, e1003890.
- Pinto, M.M.M., Palmeira, A., Fernandes, C., Resende, D.I.S.P., Sousa, E., Cidade, H., Tiritan, M.E., Correia-Da-silva, M., and Cravo, S., 2021, From natural products to new synthetic small molecules: A journey through the world of xanthenes, *Molecules*, 26, 431.
- Pinto, M.M.M., Sousa, M.E., and Nascimento, M.S.J., 2005, Xanthone derivatives: New insights in biological activities, *Curr. Med. Chem.*, 12, 2517–2538.
- Pires, D.E.V., Blundell, T.L., and Ascher, D.B., 2015, pkCSM: Predicting small-molecule pharmacokinetic and toxicity properties using graph-based signatures, *J. Med. Chem.*, 58, 4066–4072.
- Pontiki, E., Peperidou, A., Fotopoulos, I., and Hadjipavlou-Litina, D., 2018, Cinnamate hybrids: A unique family of compounds with multiple biological activities, *Curr. Pharm. Biotechnol.*, 19, 1019–1048.
- Prayong, P., Barusrux, S., and Weerapreeyakul, N., 2008, Cytotoxic activity screening of some indigenous Thai plants, *Fitoterapia*, 79, 598–601.
- Prestinaci, F., Pezzotti, P., and Pantosti, A., 2015, Antimicrobial resistance: A global multifaceted phenomenon, *Pathog. Glob. Health*, 109, 309.
- Qian, Y., Zhang, H.J., Zhang, H., Xu, C., Zhao, J., and Zhu, H.L., 2010, Synthesis, molecular modeling, and biological evaluation of cinnamic acid metronidazole ester derivatives as novel anticancer agents, *Bioorg. Med. Chem.*, 18, 4991–4996.
- Rahimi, A.M., Cai, M., and Hoyer-Fender, S., 2022, Heterogeneity of the NIH3T3 Fibroblast Cell Line, *Cells*, 11, 2677.

- Resende, D.I.S.P., Durães, F., Maia, M., Sousa, E., and Pinto, M.M.M., 2020, Recent advances in the synthesis of xanthonones and azaxanthonones, *Org. Chem. Front.*, 7, 3027–3066.
- Rodríguez-Melcón, C., Alonso-Calleja, C., García-Fernández, C., Carballo, J., and Capita, R., 2021, Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) for twelve antimicrobials (biocides and antibiotics) in eight strains of *Listeria monocytogenes*, *Biology*, 11, 46.
- Ruwizhi, N., and Aderibigbe, B.A., 2020, Cinnamic acid derivatives and their biological efficacy, *Int. J. Mol. Sci.*, 21, 5712.
- Rząd, K., Ioannidi, R., Marakos, P., Pouli, N., Olszewski, M., Kostakis, I.K., and Gabriel, I., 2023, Xanthone synthetic derivatives with high anticandidal activity and positive mycostatic selectivity index values, *Sci. Rep.*, 13, 11893.
- Patil, P.S., 2016, Drug discovery and ADMET process: A Review, *Int. J. Adv. Res. Biol. Sci.*, 3, 181–192.
- Salas, P.F., Herrmann, C., Cawthray, J.F., Nimphius, C., Kenkel, A., Chen, J., De Kock, C., Smith, P.J., Patrick, B.O., Adam, M.J., and Orvig, C., 2013, Structural characteristics of chloroquine-bridged ferrocenophane analogues of ferroquine may obviate malaria drug-resistance mechanisms, *J. Med. Chem.*, 56, 1596–1613.
- Seleem, D., Chen, E., Benso, B., Pardi, V., and Murata, R.M., 2016, *In vitro* evaluation of antifungal activity of monolaurin against *Candida albicans* biofilms, *PeerJ*, 4, e2148.
- Selvaraj, J., Vishnu Priya, V., Vijayalakshmi, P., and Ponnulakshmi, R., 2021, *In silico* and *in vitro* study on the inhibition of FtsZ protein of *Staphylococcus aureus* by active compounds from *Andrographis paniculata*, *J. Biol. Active Prod. Nat.*, 11, 116–128.
- Sha, C., and Lee, P.C., 2024, EGFR-targeted therapies: A literature review, *J. Clin. Med.*, 13, 6391.
- Shepherd, M.G., 1987, Cell envelope of *Candida albicans*, *Crit. Rev. Microbiol.*, 15, 7–25.
- Shibuya, M., 2011, Vascular endothelial growth factor (VEGF) and its receptor (VEGFR) signaling in angiogenesis: A Crucial target for anti- and pro-angiogenic therapies, *Genes Cancer*, 2, 1097–1105.
- Siegel, R.L., Kratzer, T.B., Giaquinto, A.N., Sung, H., and Jemal, A., 2025, Cancer statistics, 2025, *CA Cancer J. Clin.*, 75, 10–45.
- Singh, A., Kaur, N., Sharma, S., Mohinder, P., and Bedi, S., 2016, Recent progress in biologically active xanthonones, *J. Chem. Pharm. Res.*, 8, 75–131.

- Sinha, S., Tam, B., and Wang, S.M., 2022, Applications of molecular dynamics simulation in protein study, *Membranes*, 12, 844.
- Smit, F.J., van Biljon, R.A., Birkholtz, L.M., and N'Da, D.D., 2015, Synthesis and *in vitro* biological evaluation of dihydroartemisinin-chalcone esters, *Eur. J. Med. Chem.*, 90, 33–44.
- Sousa, M.E., and Pinto, M.M.M., 2005, Synthesis of xanthenes: An overview, *Curr. Med. Chem.*, 12, 2447–2479.
- Sousa, S.F., Fernandes, P.A., and Ramos, M.J., 2007, General performance of density functionals, *J. Phys. Chem. A*, 111, 10439–10452.
- Spasov, D.S., 2024, Binding affinity determination in drug design: Insights from lock and key, induced fit, conformational selection, and inhibitor trapping models, *Int. J. Mol. Sci.*, 25, 7124.
- Stamos, J., Sliwkowski, M.X., and Eigenbrot, C., 2002, Structure of the epidermal growth factor receptor kinase domain alone and in complex with a 4-anilinoquinazoline inhibitor, *J. Biol. Chem.*, 277, 46265–46272.
- Su, Q.G., Liu, Y., Cai, Y.C., Sun, Y.L., Wang, B., and Xian, L.J., 2011, Antitumour effects of xanthone derivatives and the possible mechanisms of action, *Invest. New Drugs*, 29, 1230–1240.
- Surjadjaja, C., Surya, A., and Baird, J.K., 2016, Epidemiology of *Plasmodium vivax* in Indonesia, *Am. J. Trop. Med. Hyg.*, 95, 121–132.
- Szlasa, W., Zendran, I., Zalesińska, A., Tarek, M., and Kulbacka, J., 2020, Lipid composition of the cancer cell membrane, *J. Bioenerg. Biomembr.*, 52, 321–342.
- Tanamatayarat, P., Limtrakul, P., Chunsakaow, S., and Duangrat, C., 2003, Screening of some rubiaceae plants for cytotoxic activity against cervix carcinoma (KB-3-1) cell line, *Thai J. Pharm. Sci.*, 27, 167–172.
- Tangwatcharin, P., and Khopaibool, P., 2012, Activity of virgin coconut oil, lauric acid or monolaurin in combination with lactic acid against *Staphylococcus aureus*, *Southeast Asian J. Trop. Med. Public Health*, 43, 969–985.
- Thomas, P., Leslie, K.A., Welters, H.J., and Morgan, N.G., 2021, Long-chain saturated fatty acid species are not toxic to human pancreatic β -cells and may offer protection against pro-inflammatory cytokine induced β -cell death, *Nutr. Metab.*, 18, 9.
- Tjahjani, S., 2017, Antimalarial activity of *Garcinia mangostana* L rind and its synergistic effect with artemisinin *in vitro*, *BMC Complement. Altern. Med.*, 17, 131.
- Tonari, K., Mitsui, K., and Yonemoto, K., 2002, Structure and antibacterial activity of cinnamic acid related compounds, *J. Oleo Sci.*, 51, 271–273.

- Tripathi, N., Goel, B., Bhardwaj, N., Sahu, B., Kumar, H., and Jain, S.K., 2022, Virtual screening and molecular simulation study of natural products database for lead identification of novel coronavirus main protease inhibitors, *J. Biomol. Str. Dyn.*, 40, 3655–3667.
- Tse, E.G., Korsik, M., and Todd, M.H., 2019, The past, present and future of anti-malarial medicines, *Malaria J.*, 18, 1–21.
- Tucker, J.A., Klein, T., Breed, J., Breeze, A.L., Overman, R., Phillips, C., and Norman, R.A., 2014, Structural insights into FGFR kinase isoform selectivity: Diverse binding modes of AZD4547 and ponatinib in complex with FGFR1 and FGFR4, *Structure*, 22, 1764–1774.
- van den Berg, B., Chembath, A., Jefferies, D., Basle, A., Khalid, S., and Rutherford, J.C., 2016, Structural basis for Mep2 ammonium transceptor activation by phosphorylation, *Nat. Comm.*, 7, 1–11.
- Vann, K.R., Oviatt, A.A., and Osheroff, N., 2021, Topoisomerase II poisons: Converting essential enzymes into molecular scissors, *Biochemistry*, 60, 1630–1641.
- Veber, D.F., Johnson, S.R., Cheng, H.Y., Smith, B.R., Ward, K.W., and Kopple, K.D., 2002, Molecular properties that influence the oral bioavailability of drug candidates, *J. Med. Chem.*, 45, 2615–2623.
- Viegas-Junior, C., Danuello, A., Bolzani, V.S., Barreiro, E.J., and Fraga, C.A.M., 2007, Molecular hybridization: A useful tool in the design of new drug prototypes, *Curr. Med. Chem.*, 14, 1829–1852.
- Vilar, S., Chakrabarti, M., and Costanzi, S., 2010, Prediction of passive blood-brain partitioning: straightforward and effective classification models based on in silico derived physicochemical descriptors, *J. Mol. Graph. Model.*, 28, 899–903.
- Vivas, L., Easton, A., Kendrick, H., Cameron, A., Lavandera, J.L., Barros, D., Gomez De Las Heras, F., Brady, R.L., and Croft, S.L., 2005, *Plasmodium falciparum*: Stage specific effects of a selective inhibitor of lactate dehydrogenase, *Exp. Parasitol.*, 111, 105–114.
- Wang, L., Wu, Y., Deng, Y., Kim, B., Pierce, L., Krilov, G., Lupyan, D., Robinson, S., Dahlgren, M.K., Greenwood, J., Romero, D.L., Masse, C., Knight, J.L., Steinbrecher, T., Beuming, T., Damm, W., Harder, E., Sherman, W., Brewer, M., *et al.*, 2015, Accurate and reliable prediction of relative ligand binding potency in prospective drug discovery by way of a modern free-energy calculation protocol and force field, *J. Am. Chem. Soc.*, 137, 2695–2703.
- Wang, R., Yang, W., Fan, Y., Dehaen, W., Li, Y., Li, H., Wang, W., Zheng, Q., and Huai, Q., 2019, Design and synthesis of the novel oleanolic acid-cinnamic acid ester derivatives and glycyrrhetinic acid-cinnamic acid ester derivatives with cytotoxic properties, *Bioorg. Chem.*, 88, 102951.

- Wu, C.C., Li, Y.C., Wang, Y.R., Li, T.K., and Chan, N.L., 2013, On the structural basis and design guidelines for type II topoisomerase-targeting anticancer drugs, *Nucleic Acids Res.*, 41, 10630–10640.
- Wu, Z., Lei, T., Shen, C., Wang, Z., Cao, D., and Hou, T., 2019, ADMET evaluation in drug discovery. 19. Reliable prediction of human cytochrome P450 inhibition using artificial intelligence approaches, *J. Chem. Inf. Model.*, 59, 4587–4601.
- Xu, Y.Y., Cao, Y., Ma, H., Li, H.Q., and Ao, G.Z., 2013, Design, synthesis and molecular docking of α,β -unsaturated cyclohexanone analogous of curcumin as potent EGFR inhibitors with antiproliferative activity, *Bioorg. Med. Chem.*, 21, 388–394.
- Yilmaz, G., Guler, E., Barlas, F.B., Timur, S., and Yagci, Y., 2016, Polymeric thioxanthenes as potential anticancer and radiotherapy agents, *Macromolecul. Rapid Commun.*, 37, 1046–1051.
- Yoon, B.K., Jackman, J.A., Kim, M.C., and Cho, N.J., 2015, Spectrum of membrane morphological responses to antibacterial fatty acids and related surfactants, *Langmuir*, 31, 10223–10232.
- Yoon, B.K., Jackman, J.A., Valle-González, E.R., and Cho, N.J., 2018, Antibacterial free fatty acids and monoglycerides: Biological activities, experimental testing, and therapeutic applications, *Int. J. Mol. Sci.*, 19, 1144.
- Yu, S., Kim, T., Yoo, K.H., and Kang, K., 2017, The T47D cell line is an ideal experimental model to elucidate the progesterone-specific effects of a luminal A subtype of breast cancer, *Biochem. Biophys. Res. Commun.*, 486, 752–758.
- Yuanita, E., Pranowo, H.D., Mustofa, M., Swasono, R.T., Syahri, J., and Jumina, J., 2019, Synthesis, characterization and molecular docking of chloro-substituted hydroxyxanthone derivatives, *Chem. J. Moldova*, 14, 2345–1688.
- Yuanita, E., Pranowo, H.D., Siswanta, D., Swasono, R.T., Mustofa, Zulkarnain, A.K., Syahri, J., and Jumina, 2018, One-pot synthesis, antioxidant activity and toxicity evaluation of some hydroxyxanthenes, *Chem. Chem. Technol.*, 12, 290–295.
- Yuanita, E., Sudarma, I.M., Sudewiningsih, N.M., Syahri, J., Dharmayani, N.K.T., Sudirman, Ulfa, M., and Sumarlan, I., 2020, Antibacterial activity and molecular docking studies of series hydroxyxanthone, *AIP Conf. Proc.*, 2243, 020032.
- Yue, Q.X., Liu, X., and Guo, D.A., 2010, Microtubule-binding natural products for cancer therapy, *Planta Med.*, 76, 1037–1043.

- Yuthavong, Y., Tarnchompoo, B., Vilaivan, T., Chitnumsub, P., Kamchonwongpaisan, S., Charman, S.A., McLennan, D.N., White, K.L., Vivas, L., Bongard, E., Thongphanchang, C., Taweechai, S., Vanichtanankul, J., Rattanajak, R., Arwon, U., Fantauzzi, P., Yuvaniyama, J., Charman, W.N., and Matthews, D., 2012, Malarial dihydrofolate reductase as a paradigm for drug development against a resistance-compromised target, *Proc. Natl. Acad. Sci. USA*, 109, 16823–16828.
- Yuvaniyama, J., Chitnumsub, P., Kamchonwongpaisan, S., Vanichtanankul, J., Sirawaraporn, W., Taylor, P., Walkinshaw, M.D., and Yuthavong, Y., 2003, Insights into antifolate resistance from malarial DHFR-TS structures, *Nat. Struct. Mol. Biol.*, 10, 357–65.
- Zakiah, M., Syarif, R.A., Mustofa, M., Jumina, J., Fatmasari, N., and Sholikhah, E.N., 2021, *In vitro* antiplasmodial, heme polymerization, and cytotoxicity of hydroxyxanthone derivatives, *J. Trop. Med.*, 2021, 8866681.
- Zare, M.A., Rohani, S.M.R., Raeisi, M., Hosseini, S.J., and Hashemi, M., 2014, Antibacterial effects of monolaurin, sorbic acid and potassium sorbate on *Staphylococcus aureus* and *Escherichia coli*, *J. Food Qual. Hazards Control*, 1, 52–55.
- Zhang, P., Yue, L., Leng, Q., Chang, C., Gan, C., Ye, T., and Cao, D., 2024, Targeting FGFR for cancer therapy, *J. Hematol. Oncol.*, 17, 39.
- Zhang, Y., Xia, M., Jin, K., Wang, S., Wei, H., Fan, C., Wu, Y., Li, X., Li, X., Li, G., Zeng, Z., and Xiong, W., 2018, Function of the c-Met receptor tyrosine kinase in carcinogenesis and associated therapeutic opportunities, *Mol. Cancer*, 17, 45.
- Zhao, L., Zhang, H., Hao, T., and Li, S., 2015, *In vitro* antibacterial activities and mechanism of sugar fatty acid esters against five food-related bacteria, *Food Chem.*, 187, 370–377.
- Ziegler, C.A., and Freddolino, P.L., 2023, *Escherichia coli* leucine-responsive regulatory protein bridges DNA *in vivo* and tunably dissociates in the presence of exogenous leucine, *ASM J.*, 14, e02690-22.
- Ziegler, C.A., and Freddolino, P.L., 2021, The leucine-responsive regulatory proteins/feast-famine regulatory proteins: An ancient and complex class of transcriptional regulators in bacteria and archaea, *Crit. Rev. Biochem. Mol. Biol.*, 56, 373.
- Zou, X., Tang, X.Y., Qu, Z.Y., Sun, Z.W., Ji, C.F., Li, Y.J., and Guo, S.D., 2022, Targeting the PDGF/PDGFR signaling pathway for cancer therapy: A review, *Int. J. Biol. Macromol.*, 202, 539–557.