

DAFTAR PUSTAKA

- Abbasi, B. A., Dharan, A., Mishra, A., Saraf, D., Ahamad, I., Suravajhala, P., & Valadi, J. (2022). In Silico Characterization of Uncharacterized Proteins From Multiple Strains of Clostridium Difficile. *Frontiers in Genetics*, 13(August), 1–11. <https://doi.org/10.3389/fgene.2022.878012>
- Agus, R., Sjaforaenan, Samara, Y., & Massi, M. N. (2024). Cloning and Production of Antigen 85A Mycobacterium tuberculosis for Diagnostic Latent Tuberculosis: a Preliminary Study. *HAYATI Journal of Biosciences*, 31(2), 374–381. <https://doi.org/10.4308/hjb.31.2.374-381>
- Arrieta-Bolaños, E., Hernández-Zaragoza, D. I., & Barquera, R. (2023). An HLA map of the world: A comparison of HLA frequencies in 200 worldwide populations reveals diverse patterns for class I and class II. *Frontiers in Genetics*, 14(March), 1–19. <https://doi.org/10.3389/fgene.2023.866407>
- Barazani, O., Erdos, T., Chowdhury, R., Kaur, G., & Venketaraman, V. (2025). New Advances in the Development and Design of Mycobacterium tuberculosis Vaccines: Construction and Validation of Multi-Epitope Vaccines for Tuberculosis Prevention. *Biology*, 14(417), 1–17. <https://doi.org/https://doi.org/10.3390/biology14040417>
- Bellini, C., Vergara, E., Bencs, F., Fodor, K., Bo, S., Krivic, D., Bacsa, B., Surguta, E., Reljic, R., & Horv, K. (2023). Design and Characterization of a Multistage Peptide-Based Vaccine Platform to Target Mycobacterium tuberculosis Infection. *Bioconjugate Chemistry*, 34, 1738–1753. <https://doi.org/10.1021/acs.bioconjchem.3c00273>
- Blanch-Asensio, M., Dey, S., & Sankaran, S. (2023). In vitro assembly of plasmid DNA for direct cloning in Lactiplantibacillus plantarum WCSF1. *PLoS ONE*, 18(2 February), 1–14. <https://doi.org/10.1371/journal.pone.0281625>
- Bouzeyen, R., & Javid, B. (2022). Therapeutic Vaccines for Tuberculosis: An Overview. *Frontiers in Immunology*, 13, 1–10. <https://doi.org/10.3389/fimmu.2022.878471>
- Brown, S. D., Dreolini, L., Wilson, J. F., Balasundaram, M., & Holt, R. A. (2023). Complete sequence verification of plasmid DNA using the Oxford Nanopore Technologies' MinION device. *BMC Bioinformatics*, 24(1), 1–16. <https://doi.org/10.1186/s12859-023-05226-y>
- Chen, F., Li, Y. ya, Yu, Y. li, Dai, J., Huang, J. ling, & Lin, J. (2021). Simplified plasmid cloning with a universal MCS design and bacterial in vivo assembly. *BMC Biotechnology*, 21(1), 1–13. <https://doi.org/10.1186/s12896-021-00679-6>
- Cheng, Y. H., Wu, Y. J., Shih, Y. C., Lin, Y. Q., Chang, Y. W., Wu, Y. H., Hu, E. W., Ku, R. H., Wu, C. M., Wu, S. C., Yeh, T. Y., & Chang, C. Te. (2025). The Filterprep: A simple and efficient approach for high-yield, high-purity plasmid DNA purification. *New Biotechnology*, 90(August),

- 77–87. <https://doi.org/10.1016/j.nbt.2025.09.003>
- Du, F., Liu, Y. Q., Xu, Y. S., Li, Z. J., Wang, Y. Z., Zhang, Z. X., & Sun, X. M. (2021). Regulating the T7 RNA polymerase expression in *E. coli* BL21 (DE3) to provide more host options for recombinant protein production. *Microbial Cell Factories*, 20(1), 1–10. <https://doi.org/10.1186/s12934-021-01680-6>
- Famelis, N., Geibel, S., & Van Tol, D. (2023). Mycobacterial type VII secretion systems. *Biological Chemistry*, 404(7), 691–702. <https://doi.org/10.1515/hsz-2022-0350>
- Fatima, S., Kumari, A., Das, G., & Dwivedi, V. P. (2020). Tuberculosis vaccine: A journey from BCG to present. *Life Sciences*, 252, 1–10. <https://doi.org/10.1016/j.lfs.2020.117594>
- Ghashghaei, S., Etemadifar, Z., Tavassoli, M., & Mofid, M. R. (2023). Optimization of Degenerate PCR Conditions for Reducing Error Rates in Detection of PKS and NRPS Gene groups in Actinomycetes. *Avicenna Journal of Medical Biotechnology*, 15(1), 28–37. <https://doi.org/10.18502/AJMB.V15I1.11422>
- Gillani, M., & Pollastri, G. (2024). Protein subcellular localization prediction tools. *Computational and Structural Biotechnology Journal*, 23(February), 1796–1807. <https://doi.org/10.1016/j.csbj.2024.04.032>
- Gomes, D., Correia, M. A. S., Romão, M. J., Passarinha, L. A., & Sousa, A. (2023). Integrated approaches for the separation and purification of recombinant HPV16 E6 protein from *Escherichia coli* crude extracts. *Separation and Purification Technology*, 315(March). <https://doi.org/10.1016/j.seppur.2023.123647>
- Green, M. R., & Sambrook, J. (2012). Molecular Cloning: A Laboratory Manual (4th ed.). In *Cold Spring Harbor Laboratory Press* (Issue 2). <https://eur-lex.europa.eu/legal-content/PT/TXT/PDF/?uri=CELEX:32016R0679&from=PT%0Ahttp://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52012PC0011:pt:NOT>
- Gunawan, L. T., & Purwanto, M. G. (2020). Critical Aspects to Produce Low-Cost Protein Molecular Weight Marker: A Review. *Indonesian Journal of Biotechnology and Biodiversity*, 4(2), 118–127. <https://doi.org/10.47007/ijobb.v4i2.71>
- Hazarika Girin, Dutta Rupam, Saikia Deep Prakash, Malakar Dipika, Hazorika Mousumi, & Bora Mridusmita. (2024). A comprehensive exploration of restriction enzymes and their applications in molecular biology: A review. *World Journal of Advanced Research and Reviews*, 21(1), 2399–2404. <https://doi.org/10.30574/wjarr.2024.21.1.0269>
- Jiang, F., Han, Y., Liu, Y., & Xue, Y. (2023). A comprehensive approach to developing a multi-epitope vaccine against *Mycobacterium tuberculosis*: from *in silico* design to *in vitro* immunization evaluation. November, 1–24. <https://doi.org/10.3389/fimmu.2023.1280299>
- Kaushik, S., He, H., & Dalbey, R. E. (2022). Bacterial Signal Peptides-

- Navigating the Journey of Proteins. *Frontiers in Physiology*, 13(July), 1–25. <https://doi.org/10.3389/fphys.2022.933153>
- Koentjoro, M. P., Donastin, A., Prasetyo, E. N., Nahdlatul, U., Surabaya, U., Nahdlatul, U., Surabaya, U., & Analytics, D. (2021). A SIMPLE METHOD OF DNA EXTRACTION OF MYCOBACTERIUM TUBERCULOSIS FROM SPUTUM *Medical Laboratory Technology , Faculty of Health , Universitas Nahdlatul Ulama Surabaya , Jl . Jemursari No . 57 , Surabaya , Departement of Biology , Faculty of Science and Data*. 15(2S), 19–22. <https://doi.org/https://doi.org/10.21010/ajid v15i2S:2>
- Krasilnikov, I., Lehnerr-Ilyina, T., Djonovic, M., Artamonova, I., Nikitin, M., & Kislichkin, N. (2024). Cracking the antigenic code of mycobacteria: CFP-10/ESAT-6 tuberculosis skin test and misleading results. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 36, 1–6. <https://doi.org/10.1016/j.jctube.2024.100436>
- Li, H., Ren, W., Liang, Q., Zhang, X., Li, Q., Shang, Y., Ma, L., Li, S., & Pang, Y. (2023). A novel chemokine biomarker to distinguish active tuberculosis from latent tuberculosis: a cohort study. *QJM: An International Journal of Medicine* , 116(12), 1002–1009. <https://doi.org/10.1093/qjmed/hcad214>
- Li, X., Ren, Q., Sun, Z., Wu, Y., & Pan, H. (2024). Resuscitation Promotion Factor: A Pronounced Bacterial Cytokine in Propelling Bacterial Resuscitation. *Microorganisms*, 12(8). <https://doi.org/10.3390/microorganisms12081528>
- Lim, D. W., Yoon, T. S., Han, K. H., Sajjad, S., Shin, H. S., & Kang, S. (2023). Improved Separation in Horizontal Protein SDS-PAGE with Double-Deck Flat Electrodes and a Field Inversion Gel Electrophoresis Module. *Methods and Protocols*, 6(6), 1–9. <https://doi.org/10.3390/mps606106>
- Liu, T., Song, C., & Wang, C. (2024). NCSP-PLM: An ensemble learning framework for predicting non-classical secreted proteins based on protein language models and deep learning. *Mathematical Biosciences and Engineering*, 21(1), 1472–1488. <https://doi.org/10.3934/mbe.2024063>
- Malakar, B., Chauhan, K., Sanyal, P., Naz, S., Kalam, H., & Singh, L. V. (2023). Phosphorylation of CFP10 modulates Mycobacterium tuberculosis virulence. *MBio*, 14(5), 1–29. <https://doi.org/10.1128/mbio.01232-23>
- Mao, L., Xu, L., Wang, X., Du, J., Sun, Q., Shi, Z., Wang, J., Xing, Y., Su, Y., Xu, Y., Qi, Z., Xia, L., Ma, J., & Zhang, J. (2022). Use of DosR and Rpf antigens from Mycobacterium tuberculosis to screen for latent and relapse tuberculosis infection in a tuberculosis endemic community of Huainan City. *European Journal of Clinical Microbiology & Infectious Diseases: Official Publication of the European Society of Clinical Microbiology*, 41(7), 1039–1049. <https://doi.org/10.1007/s10096-022-04459-8>
- Murakami, M., Murakami, A. M., & Itagaki, S. (2021). A dual prokaryotic (E. coli) expression system (pdMAX). *PLoS ONE*, 16(10 October), 1–9.

<https://doi.org/10.1371/journal.pone.0258553>

- Muttaqin, Z., Massi, M. N., Sjahril, R., Halik, H., Junaedi, M. A., Rifqiani, N., Safitri, N. I., Pratika, M., Islam, I. C., Hamid, F., Natzir, R., & Ahmad, A. (2023). Detection of *rpoB* gene mutations in clinical isolates of Rifampicin-resistant *Mycobacterium tuberculosis* in Makassar City, South Sulawesi, Indonesia. *Malaysian Journal of Microbiology*, *19*(4), 380–384. <https://doi.org/http://dx.doi.org/10.21161/mjm.220133>
- Neelam, S., Devi, N. L., Shipra, J., & S, R. G. P. (2022). *ToxinPred2: an improved method for predicting toxicity*. *23*(5), 1–12.
- Nezhad, N. G., Rahman, R. N. Z. R. A., Normi, Y. M., Oslan, S. N., Shariff, F. M., & Leow, T. C. (2023). Recent advances in simultaneous thermostability-activity improvement of industrial enzymes through structure modification. *International Journal of Biological Macromolecules*, *232*(November 2022), 123440. <https://doi.org/10.1016/j.ijbiomac.2023.123440>
- Nguyen, M. N., Krutz, N. L., Limviphuvadh, V., Lopata, A. L., Gerberick, G. F., & Maurer-Stroh, S. (2022). AllerCatPro 2.0: a web server for predicting protein allergenicity potential. *Nucleic Acids Research*, *50*, 36–43. <https://doi.org/10.1093/nar/gkac446>
- Nugraha, M. F., Changestu, D. A., Ramadhan, R., Salsabila, T., Nurizati, A., Pratiwi, S. E., & Ysrafil, Y. (2024). Novel prophylactic and therapeutic multi-epitope vaccine based on Ag85A, Ag85B, ESAT-6, and CFP-10 of *Mycobacterium tuberculosis* using an immunoinformatics approach. *Osong Public Health and Research Perspectives*, *15*(4), 286–306. <https://doi.org/10.24171/j.phrp.2024.0026>
- Nurfadilah, M., Rukmana, A., & Sjatha, F. (2022). Evaluation of Tuberculosis Vaccine Candidate, pcDNA3.1-rpFD using *Mycobacterial Growth Inhibition Assay* (MGIA). *HAYATI Journal of Biosciences*, *29*(1), 1–8. <https://doi.org/10.4308/HJB.29.1.1-8>
- Panda, S., Kearns, K., Cheng, C., & Lindestam Arlehamn, C. S. (2024). From antigens to immune responses: Shaping the future of TB detection and prevention. *International Journal of Infectious Diseases*, *141*. <https://doi.org/10.1016/j.ijid.2024.106983>
- Passos, B. B. S., Araújo-Pereira, M., Vinhaes, C. L., Amaral, E. P., & Andrade, B. B. (2024). The role of ESAT-6 in tuberculosis immunopathology. *Frontiers in Immunology*, *15*(April), 1–11. <https://doi.org/10.3389/fimmu.2024.1383098>
- Pillay, K., Chiliza, T. E., Senzani, S., Pillay, B., & Pillay, M. (2024). In silico design of *Mycobacterium tuberculosis* multi-epitope adhesin protein vaccines. *Heliyon*, *10*(18). <https://doi.org/10.1016/j.heliyon.2024.e37536>
- Piorino, F., & Styczynski, M. P. (2023). Complex Dependence of *Escherichia coli*-based Cell-Free Expression on Sonication Energy During Lysis. *ACS Synthetic Biology*, *12*(10), 3131–3136. <https://doi.org/10.1021/acssynbio.3c00312>
- Ren, L., Meng, X., Sun, J., Shao, X., Shao, M., Wang, S., Li, Z., & Chen, Y. (2024). Prokaryotic expression of soluble IFN- λ 1 recombinant protein

- with cold-shock system. *Protein Expression and Purification*, 215(September 2023), 106413. <https://doi.org/10.1016/j.pep.2023.106413>
- Schami, A., Islam, M. N., Belisle, J. T., & Torrelles, J. B. (2023). Drug-resistant strains of Mycobacterium tuberculosis: cell envelope profiles and interactions with the host. *Frontiers in Cellular and Infection Microbiology*, 13(October), 1–14. <https://doi.org/10.3389/fcimb.2023.1274175>
- Sharma, N., Patiyl, S., Dhall, A., Pande, A., Arora, C., & Raghava, G. P. S. (2021). AlgPred 2.0: An improved method for predicting allergenic proteins and mapping of IgE epitopes. *Briefings in Bioinformatics*, 22(4), 1–12. <https://doi.org/10.1093/bib/bbaa294>
- Shi, J., Oger, P. M., Cao, P., & Zhang, L. (2023). Thermostable DNA ligases from hyperthermophiles in biotechnology. *Frontiers in Microbiology*, 14(May). <https://doi.org/10.3389/fmicb.2023.1198784>
- Shvartsman, E., Richmond, M. E. I., Schellenberg, J. J., Lamont, A., Perciani, C., Russell, J. N. H., Poliquin, V., Burgener, A., Jaoko, W., Sandstrom, P., & MacDonald, K. S. (2022). Comparative analysis of DNA extraction and PCR product purification methods for cervicovaginal microbiome analysis using cpn60 microbial profiling. *PLoS ONE*, 17(1), 1–16. <https://doi.org/10.1371/journal.pone.0262355>
- Srivastava, S., Dey, S., & Mukhopadhyay, S. (2023). Vaccines against Tuberculosis: Where Are We Now? *Vaccines*, 11(5), 1–23. <https://doi.org/10.3390/vaccines11051013>
- Sun, J., Zhou, X., Yu, J., Fang, S., Duan, S., & Liu, F. (2024). Diagnostic value of tuberculosis-specific antigens Ag85B, ESAT-6 and CFP10 in pulmonary tuberculosis. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 37. <https://doi.org/10.1016/j.jctube.2024.100486>
- Tanriver, G., Ali Khan, S., Góra, A., Chegou, N. N., & Mahmoudi, S. (2025). Exploring the multifaceted roles of resuscitation-promoting factors in tuberculosis: Implications for diagnosis, vaccine development, and drug targeting. *Biotechnology Reports*, 46, 1–13. <https://doi.org/10.1016/j.btre.2025.e00886>
- Teng, X. C., Ang, S. Y., Citartan, M., Tang, T. H., & Ahmed, S. A. (2023). Simple approach for expression and rapid purification of Taq DNA polymerase in three Escherichia coli strains. *Asia-Pacific Journal of Molecular Biology and Biotechnology*, 31(1), 45–52. <https://doi.org/10.35118/apjmbb.2023.031.1.05>
- Tsujimoto, Y., & Isono, N. (2024). Protein Expression Autoinduction in a Cold-Shock Expression System in Escherichia coli. *Journal of Biomolecular Techniques*, 35(1), 1–6. <https://doi.org/10.7171/3fc1f5fe.76009c9a>
- Valizadeh, A., imani Fooladi, A. A., Sedighian, H., Mahboobi, M., Gholami Parizad, E., Behzadi, E., & Khosravi, A. (2022). Evaluating the Performance of PPE44, HSPX, ESAT-6 and CFP-10 Factors in Tuberculosis Subunit Vaccines. *Current Microbiology*, 79(9), 1–14. <https://doi.org/10.1007/s00284-022-02949-8>

- Van Loon, W., Gomez, M. P., Jobe, D., Franken, K. L. M. C., Ottenhoff, T. H. M., Coninx, M., Kestens, L., Sutherland, J. S., Kampmann, B., & Tientcheu, L. D. (2020). Use of resuscitation promoting factors to screen for tuberculosis infection in household-exposed children in the Gambia. *BMC Infectious Diseases*, *20*(469), 1–9. <https://doi.org/10.1186/s12879-020-05194-1>
- Wang, Y., Li, Z., Wu, S., Fleming, J., Li, C., Zhu, G., Chen, B., Ren, B., Wang, X., Du, B., Li, P., Hu, P., Yang, J., Liu, Y., Zhou, C., Zhang, X. E., Bi, L., Yang, J., Zhang, Z., & Zhang, H. (2021). Systematic evaluation of mycobacterium tuberculosis proteins for antigenic properties identifies Rv1485 and Rv1705c as potential protective subunit vaccine candidates. *Infection and Immunity*, *89*(3), 1–14. <https://doi.org/10.1128/IAI.00585-20>
- World Health Organization. (2025). Global Tuberculosis Report. In *Blood* (Issue September). [https://doi.org/978 92 4 156450 2](https://doi.org/978%204%20156450%202)
- Wu, Y., Xiong, Y., Zhong, Y., Liao, J., & Wang, J. (2024). Role of dormancy survival regulator and resuscitation-promoting factors antigens in differentiating between active and latent tuberculosis: a systematic review and meta-analysis. *BMC Pulmonary Medicine*, *24*(1). <https://doi.org/10.1186/s12890-024-03348-4>
- Yan, Z., Kim, K., Kim, H., Ha, B., Gambiez, A., Bennett, J., De Almeida Mendes, M. F., Trevizani, R., Mahita, J., Richardson, E., Marrama, D., Blazeska, N., Koşaloğlu-Yalçın, Z., Nielsen, M., Sette, A., Peters, B., & Greenbaum, J. A. (2024). Next-generation IEDB tools: A platform for epitope prediction and analysis. *Nucleic Acids Research*, *52*(W1), W526–W532. <https://doi.org/10.1093/nar/gkae407>
- Yuliwulandari, R., Prayuni, K., Viyati, K., Mahasirimongkol, S., & Wichukchinda, N. (2024). Frequencies of HLA-B alleles in Indonesian Malay Ethnic. *Heliyon*, *10*(5), e26713. <https://doi.org/10.1016/j.heliyon.2024.e26713>
- Zhuang, L., Ye, Z., Li, L., Yang, L., & Gong, W. (2023). Next-Generation TB Vaccines: Progress, Challenges, and Prospects. *Vaccines*, *11*(8), 1–56. <https://doi.org/10.3390/vaccines11081304>