

## DAFTAR PUSTAKA

- Ali, H., Alahmad, B., Al-Shammari, A.A., Alterki, A., Hammad, M., Cherian, P., Alkhairi, I., Sindhu, S., Thanaraj, T.A., Mohammad, A., Alghanim, G., Deverajan, S., Ahmad, R., El-Shazly, S., Dashti, A.A., Shehab, M., Al-Sabah, S., Alkandari, A., Abubaker, J., et al. 2021. Previous COVID-19 Infection and Antibody Levels After Vaccination. *Front. Public Health*, 9(1):1–11.
- Altawalrah, H. 2021. Antibody Responses to Natural SARS-CoV-2 Infection or after COVID-19 Vaccination. *Vaccines*, 9(8):910.
- Anggraini, D.P., Eddy Mart Salim, Nur Riviaty, Erial Bahar, Syamsu Indra, Nova Kurniati, Ahmad Rasyid, Yuniza. 2022. The Role of Nutritional Status on SARS-CoV-2 IgG Levels After COVID-19 Vaccination in Palembang. *BSM*, 6(9):2122–2126.
- Azak, E., KARADENIZLI, A., UZUNER, H., KARAKAYA, N., CANTURK, N.Z., HULAGU, S. 2021. Comparison of an inactivated Covid19 vaccine-induced antibody response with concurrent natural Covid19 infection. *IJJID*, 113(1):58–64.
- Azkur, A.K., Akdis, M., Azkur, D., Sokolowska, M., van de Veen, W., Brüggem, M., O'Mahony, L., Gao, Y., Nadeau, K., Akdis, C.A. 2020. Immune response to SARS-CoV-2 and mechanisms of immunopathological changes in COVID-19. *Allergy*, 75(7):1564–1581.
- Bradford, S., Hurwitz, I., Yingling, A. V, Ye, C., Cheng, Q., Noonan, T.P., Raval, J.S., Sosa, N.R., Mertz, G.J., Perkins, D.J., Harkins, M.S. 2020. Severe Acute Respiratory Syndrome Coronavirus 2 Neutralizing Antibody Titers in Convalescent Plasma and Recipients in New Mexico: An Open Treatment Study in Patients With Coronavirus Disease 2019. *J. Infect. Dis*, 222(10):1620–1628.
- Chilamakuri, R., Agarwal, S. 2021. COVID-19: Characteristics and Therapeutics. *Cell J*, 10(2):206.
- Chowdhury, I., Mishu, F.A., Alam, M.M., Yasmin, R., Rahman, M.M., Mollah, F.H. 2021. Comparison of antibody level after SARS-CoV-2 infection in case of home treated and hospital treated patients. *BIRDEM Med. J.*, 12(1):11–15.
- Cobas. 2022. Elecsys Anti-SARS-CoV-2 S Elecsys Anti-SARS-CoV-2 S, 2(1):1–24.
- Cook, I.F. 2008. Sexual dimorphism of humoral immunity with human vaccines. *Vaccine*, 26(29–30):3551–3555.
- Cox, R.J., Brokstad, K.A. 2020. Not just antibodies: B cells and T cells mediate immunity to COVID-19. *Nat. Rev. Immunol.*, 20(10):581–582.
- Cucunawangsih, C., Wijaya, R.S., Lugito, N.P.H., Suriapranata, I. 2021. Antibody response to the inactivated SARS-CoV-2 vaccine among healthcare workers,

Indonesia. *IIJID*, 113(1):15–17.

- Dahlan, M.S. 2013. *Besar Sampel dan Cara Pengambilan Sampel dalam Penelitian Kedokteran dan Kesehatan*. 3 ed. Jakarta.
- Danni, Ferguson, A., Cervinski, M.A., Lynch, K.L., Kyle, P.B. 2020. AACC Guidance Document on Biotin Interference in Laboratory Tests. *JALM*, 5(3):575–587.
- Deeks, J.J., Dinnes, J., Takwoingi, Y., Davenport, C., Spijker, R., Taylor-Phillips, S., Adriano, A., Beese, S., Dretzke, J., Ferrante di Ruffano, L., Harris, I.M., Price, M.J., Dittrich, S., Emperador, D., Hooft, L., Leeftang, M.M., Van den Bruel, A. 2020. Antibody tests for identification of current and past infection with SARS-CoV-2. *CDSR*, 2020(6):238.
- Diao, B., Wang, C., Tan, Y., Chen, X., Liu, Ying, Ning, L., Chen, L., Li, M., Liu, Yueping, Wang, G., Yuan, Z., Feng, Z., Zhang, Y., Wu, Y., Chen, Y. 2020. Reduction and Functional Exhaustion of T Cells in Patients With Coronavirus Disease 2019 (COVID-19). *Front. immunol.*, 11(1):1–7.
- Doerre, A., Doblhammer, G. 2022. The influence of gender on COVID-19 infections and mortality in Germany: Insights from age- and gender-specific modeling of contact rates, infections, and deaths in the early phase of the pandemic. *PLOS ONE*. Diedit oleh S.A. Cheong, 17(5):e0268119.
- Duggan, J., Otter, A., Andrews, N. 2020. *Evaluation of Roche Elecsys Anti- SARS-CoV-2 serology assay for the detection of anti-SARS-CoV-2 antibodies About Public Health England*. PHE.
- Ebinger, J.E., Fert-Bober, J., Printsev, I., Wu, M., Sun, N., Prostko, J.C., Frias, E.C., Stewart, J.L., Van Eyk, J.E., Braun, J.G., Cheng, S., Sobhani, K. 2021. Antibody responses to the BNT162b2 mRNA vaccine in individuals previously infected with SARS-CoV-2. *Nat. Med.*, 27(6):981–984.
- Fernandes, M. da C.R., Vasconcelos, G.S., de Melo, A.C.L., Matsui, T.C., Caetano, L.F., de Carvalho Araújo, F.M., Fonseca, M.H.G. 2023. Influence of age, gender, previous SARS-CoV-2 infection, and pre-existing diseases in antibody response after COVID-19 vaccination: A review. *Mol. Immunol.*, 156(1):148–155.
- Gaebler, C., Wang, Z., Lorenzi, J.C.C., Muecksch, F., Finkin, S., Tokuyama, M., Cho, A., Jankovic, M., Schaefer-Babajew, D., Oliveira, T.Y., Cipolla, M., Viant, C., Barnes, C.O., Bram, Y., Breton, G., Hägglöf, T., Mendoza, P., Hurley, A., Turroja, M., et al. 2021. Evolution of antibody immunity to SARS-CoV-2. *Nature*, 591(7851):639–644.
- Gorbalenya, A.E., Baker, S.C., Baric, R.S., de Groot, R.J., Drosten, C., Gulyaeva, A.A., Haagmans, B.L., Lauber, C., Leontovich, A.M., Neuman, B.W., Penzar, D., Perlman, S., Poon, L.L.M., Samborskiy, D. V., Sidorov, I.A., Sola, I., Ziebuhr, J. 2020. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat. Microbiol.*, 5(4):536–

544.

- Grifoni, A., Weiskopf, D., Ramirez, S.I., Mateus, J., Dan, J.M., Moderbacher, C.R., Rawlings, S.A., Sutherland, A., Premkumar, L., Jadi, R.S., Marrama, D., de Silva, A.M., Frazier, A., Carlin, A.F., Greenbaum, J.A., Peters, B., Krammer, F., Smith, D.M., Crotty, S., et al. 2020. Targets of T Cell Responses to SARS-CoV-2 Coronavirus in Humans with COVID-19 Disease and Unexposed Individuals. *Cell*, 181(7):1489-1501.e15.
- Grigoryan, L., Pulendran, B. 2020. The immunology of SARS-CoV-2 infections and vaccines. *Semin. Immunol.*, 50(1):1–69.
- Guglielmi, V., Colangeli, L., D’Adamo, M., Sbraccia, P. 2021. Susceptibility and Severity of Viral Infections in Obesity: Lessons from Influenza to COVID-19. Does Leptin Play a Role? *Int. J. Mol. Sci.*, 22(6):3183.
- Gupta, D., Parthasarathy, H., Sah, V., Tandel, D., Vedagiri, D., Reddy, S., Harshan, K.H. 2021. Inactivation of SARS-CoV-2 by  $\beta$ -propiolactone causes aggregation of viral particles and loss of antigenic potential. *Virus Res.*, 305(1):1–8.
- Haq, A., Pant, A.B. 2020. Efforts at COVID-19 vaccine development: Challenges and successes. *Vaccines*, 8(4):1–16.
- Harrison, A.G., Lin, T., Wang, P. 2020. Mechanisms of SARS-CoV-2 Transmission and Pathogenesis. *Trends Immunol.*, 41(12):1100–1115.
- Higgins, V., Fabros, A., Wang, X.Y., Bhandari, M., Daghfal, D.J., Kulasingam, V. 2020. Analytical and clinical evaluation of four anti-SARS-CoV-2 serologic (IgM, IgG, and total) immunoassays. *medRxiv*, 1(1):1–31.
- Higgins, V., Fabros, A., Kulasingam, V. 2021. Quantitative Measurement of Anti-SARS-CoV-2 Antibodies : *J. Clin. Microbiol.*, 59(4):1–7.
- Hosseini, A., Hashemi, V., Shomali, N., Asghari, F., Gharibi, T., Akbari, M., Gholizadeh, S., Jafari, A. 2020. Innate and adaptive immune responses against coronavirus. *Biomed. Pharmacother.*, 132(1):1–7.
- Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., et al. 2020. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223):497–506.
- Imai, K., Kitagawa, Y., Tabata, S., Kubota, K., Nagura-Ikeda, M., Matsuoka, M., Miyoshi, K., Sakai, J., Ishibashi, N., Tarumoto, N., Takeuchi, S., Ito, T., Maesaki, S., Tamura, K., Maeda, T. 2021. Antibody response patterns in COVID-19 patients with different levels of disease severity in Japan. *J. Med. Virol.*, 93(5):3211–3218.
- Infantino, M., Pieri, M., Nuccetelli, M., Grossi, V., Lari, B., Tomassetti, F., Calugi, G., Pancani, S., Benucci, M., Casprini, P., Manfredi, M., Bernardini, S. 2021. The

- WHO International Standard for COVID-19 serological tests: towards harmonization of anti-spike assays. *Int. Immunopharmacol.*, 100(January):1–8.
- Iyer, A.S., Jones, F.K., Nodoushani, A., Kelly, M., Becker, M., Slater, D., Mills, R., Teng, E., Kamruzzaman, M., Garcia-Beltran, W.F., Astudillo, M., Yang, D., Miller, T.E., Oliver, E., Fischinger, S., Atyeo, C., Iafrate, A.J., Calderwood, S.B., Lauer, S.A., et al. 2020. Persistence and decay of human antibody responses to the receptor binding domain of SARS-CoV-2 spike protein in COVID-19 patients. *Sci. Immunol.*, 5(52):1–13.
- Jain, S., Batra, H., Yadav, P., Chand, S. 2020. COVID-19 Vaccines Currently under Preclinical and Clinical Studies, and Associated Antiviral Immune Response. *Vaccines*, 8(4):649.
- Jordan, S.C. 2021. Innate and adaptive immune responses to SARS-CoV-2 in humans: relevance to acquired immunity and vaccine responses. *Clin. Exp. Immunol.*, 204(3):310–320.
- Jun, Liang, B., Chen, C., Wang, H., Fang, Y., Shen, S., Yang, Xiaoli, Wang, B., Chen, L., Chen, Q., Wu, Y., Liu, J., Yang, Xuecheng, Li, W., Zhu, B., Zhou, W., Wang, H., Li, S., Lu, S., et al. 2021. SARS-CoV-2 infection induces sustained humoral immune responses in convalescent patients following symptomatic COVID-19. *Nat. Commun.*, 12(1):1813.
- Kim, Y., Lee, J.H., Ko, G.Y., Ryu, J.H., Jang, J.H., Bae, H., Yoo, S.-H., Choi, A.-R., Jung, J., Lee, J., Oh, E.-J. 2021. Quantitative SARS-CoV-2 Spike Antibody Response in COVID-19 Patients Using Three Fully Automated Immunoassays and a Surrogate Virus Neutralization Test. *Diagnostics*, 11(8):1496.
- Kompaniyets, L., Goodman, A.B., Belay, B., Freedman, D.S., Sucusky, M.S., Lange, S.J., Gundlapalli, A. V., Boehmer, T.K., Blanck, H.M. 2021. Body Mass Index and Risk for COVID-19–Related Hospitalization, Intensive Care Unit Admission, Invasive Mechanical Ventilation, and Death — United States, March–December 2020. *MMWR.*, 70(10):355–361.
- Kotsiou, O.S., Papagiannis, D., Fradelos, E.C., Siachpazidou, D.I., Perlepe, G., Miziou, A., Kyritsis, A., Vavougiou, G.D., Kalantzis, G., Gourgouliani, K.I. 2021. Defining Antibody Seroprevalence and Duration of Humoral Responses to SARS-CoV-2 Infection and/or Vaccination in a Greek Community. *Int. J. Environ. Res. Public Health*, 19(1):407.
- Koutsakos, M., Lee, W.S., Wheatley, A.K., Kent, S.J., Juno, J.A. 2022. T follicular helper cells in the humoral immune response to SARS-CoV-2 infection and vaccination. *J. Leukoc. Biol.*, 111(2):355–365.
- Krammer, F. 2020. SARS-CoV-2 vaccines in development. *Nature*, 586(7830):516–527.
- Kreutmair, S., Kauffmann, M., Unger, S., Ingelfinger, F. 2020. Preexisting

- comorbidities shape the immune response associated with severe COVID-19. *J ALLERGY CLIN IMMUNOL*, 150(2):312–324.
- Kudlay, D., Svistunov, A. 2022. COVID-19 Vaccines: An Overview of Different Platforms. *Bioeng.*, 9(2):72.
- Kwok, S.L.L., Cheng, S.M.S., Leung, J.N., Leung, K., Lee, C.-K., Peiris, J.M., Wu, J.T. 2022. Waning antibody levels after COVID-19 vaccination with mRNA Comirnaty and inactivated CoronaVac vaccines in blood donors, Hong Kong, April 2020 to October 2021. *Euro Surveill.*, 27(2):2–6.
- L’Huillier, A.G., Meyer, B., Andrey, D.O., Arm-Vernez, I., Baggio, S., Didierlaurent, A., Eberhardt, C.S., Eckerle, I., Grasset-Salomon, C., Huttner, A., Posfay-Barbe, K.M., Royo, I.S., Pralong, J.A., Vuilleumier, N., Yerly, S., Siegrist, C.-A., Kaiser, L. 2021. Antibody persistence in the first 6 months following SARS-CoV-2 infection among hospital workers: a prospective longitudinal study. *CMI*, 27(5):784.e1-784.e8.
- Lakshmi Priya, T., Gopinath, S.C.B., Tang, T.-H. 2016. Biotin-Streptavidin Competition Mediates Sensitive Detection of Biomolecules in Enzyme Linked Immunosorbent Assay. *PLoS One*. Diedit oleh S. D’Auria, 11(3):1–14.
- Letko, M., Marzi, A., Munster, V. 2020. Functional assessment of cell entry and receptor usage for SARS-CoV-2 and other lineage B betacoronaviruses. *Nat. Microbiol.*, 5(4):562–569.
- Liu, C., Zhang, J., Zeng, Y., Huang, C., Chen, F., Cao, Y., Wu, S., Wei, D., Lin, Z., Zhang, Y., Zhang, L., Teng, J., Li, Z., Hong, G., Yang, T., Ye, H., Tu, H., Xiao, Y., Huang, L., et al. 2023. Effectiveness of SARS-CoV-2-inactivated vaccine and the correlation to neutralizing antibodies: A test-negative case–control study. *J. Med. Virol.*, 95(1):1–9.
- Ma, Q., Liu, J., Liu, Q., Kang, L., Liu, R., Jing, W., Wu, Y., Liu, M. 2021. Global Percentage of Asymptomatic SARS-CoV-2 Infections among the Tested Population and Individuals with Confirmed COVID-19 Diagnosis: A Systematic Review and Meta-analysis. *JAMA Network Open*, 4(12):1–18.
- Mackey, K., Arkhipova-Jenkins, I., Armstrong, C., Gean, E., Anderson, J., Paynter, R.A., Helfand, M. 2021. Antibody Response Following SARS-CoV-2 Infection and Implications for Immunity: A Rapid Living Review. *AHRQ (US)*, 1(1):8–14.
- Maeda, K., Mehta, H., Drevets, D.A., Coggeshall, K.M. 2010. IL-6 increases B-cell IgG production in a feed-forward proinflammatory mechanism to skew hematopoiesis and elevate myeloid production. *Blood*, 115(23):4699–4706.
- Marimuthu, K., Lim, N., Lim, Z.Q., Thevasagayam, N.M., Koh, V., Chiew, C.J., Ma, S., Koh, M., Low, P.Y., Tan, S.B., Ho, J., Maurer-Stroh, S., Lee, V.J.M., Leo, Y.-S., Tan, K.B., Cook, A.R., Tan, C.C. 2022. Analysis of COVID-19 Incidence and Severity Among Adults Vaccinated With 2-Dose mRNA COVID-19 or

- Inactivated SARS-CoV-2 Vaccines With and Without Boosters in Singapore. *JAMA Network Open*, 5(8):e2228900.
- Mason, R.J. 2020. Pathogenesis of COVID-19 from a cell biology perspective. *Eur. Respir. J*, 55(4):1–9.
- Meng, Charles, A., Cagigi, A., Christ, W., Österberg, B., Falck-Jones, S., Azizmohammadi, L., Åhlberg, E., Falck-Jones, R., Svensson, J., Nie, M., Warnqvist, A., Hellgren, F., Lenart, K., Arcoverde Cerveira, R., Ols, S., Lindgren, G., Lin, A., Maecker, H., et al. 2023. Delayed generation of functional virus-specific circulating T follicular helper cells correlates with severe COVID-19. *Nat. Commun.*, 14(1):2164.
- Meschi, S., Matusali, G., Colavita, F., Lapa, D., Bordi, L., Puro, V., Leoni, B.D., Galli, C., Capobianchi, M.R., Castilletti, C. 2021. Predicting the protective humoral response to a SARS-CoV-2 mRNA vaccine. *Clin Chem Lab Med* 2021, 59(12):1–9.
- Nugraha, J., Permatasari, C.A., Fitriah, M., Tambunan, B.A., Fuadi, M.R. 2022. Kinetics of anti-SARS-CoV-2 responses post complete vaccination with coronavac: A prospective study in 50 health workers. *J Public Health Res*, 11(3):1–8.
- Nuswantoro, A., Salim, M., Wahyumarniasari, D., Aprillia, D. 2023. Serum Albumin and Immunoglobulin G Anti-SARS-CoV-2 Levels in COVID-19 SinoVac Vaccine Recipients. *MJMHS*, 19(1):43–47.
- Ophinni, Y., Hasibuan, A.S., Widhani, A., Maria, S., Koesnoe, S., Yuniastuti, E., Karjadi, T.H., Rengganis, I., Djauzi, S. 2020. COVID-19 Vaccines: Current Status and Implication for Use in Indonesia. *Indones J Intern Med*, 52(4):388–412. Tersedia pada: <http://www.ncbi.nlm.nih.gov/pubmed/33377885>.
- Parameswaran, A., Apsingi, S., Eachempati, K.K., Dannana, C.S., Jagathkar, G., Iyer, M., Aribandi, H. 2022. Incidence and severity of COVID-19 infection post-vaccination: a survey among Indian doctors. *J. Infect.*, 50(4):889–895.
- Perrotta, F., Corbi, G., Mazzeo, G., Boccia, M., Aronne, L., D’Agnano, V., Komici, K., Mazzarella, G., Parrella, R., Bianco, A. 2020. COVID-19 and the elderly: insights into pathogenesis and clinical decision-making. *Aging clin. exp. res.*, 32(8):1599–1608.
- Primorac, D., Vrdoljak, K., Brlek, P., Pavelić, E., Molnar, V., Matišić, V., Erceg Ivkošić, I., Parčina, M. 2022. Adaptive Immune Responses and Immunity to SARS-CoV-2. *Front. immunol.*, 13(1):1–13.
- Qun, Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K.S.M., Lau, E.H.Y., Wong, J.Y., Xing, X., Xiang, N., Wu, Y., Li, C., Chen, Q., Li, D., Liu, T., Zhao, J., Liu, M., et al. 2020. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. *NEJM*, 382(13):1199–1207.

- Rabbani, G., Ahn, S.N. 2021. Review: Roles of human serum albumin in prediction, diagnoses and treatment of COVID-19. *IInt. J. Biol. Macromol.*, 193(January):948–955.
- Randolph, H.E., Barreiro, L.B. 2020. Herd Immunity: Understanding COVID-19. *Immunity*, 52(5):737–741.
- Rawat, K., Kumari, P., Saha, L. 2021. COVID-19 vaccine: A recent update in pipeline vaccines, their design and development strategies. *Eur. J. Pharmacol.*, 892(January):1–12.
- Sanyaolu, A., Okorie, C., Marinkovic, A., Patidar, R., Younis, K., Desai, P., Hosein, Z., Padda, I., Mangat, J., Altaf, M. 2020. Comorbidity and its Impact on Patients with COVID-19. *SN CCM*, 2(8):1069–1076.
- Schaffner, A., Risch, L., Aeschbacher, S., Risch, C., Weber, M.C., Thiel, S.L., Jüngert, K., Pichler, M., Grossmann, K., Wohlwend, N., Lung, T., Hillmann, D., Bigler, S., Bodmer, T., Imperiali, M., Renz, H., Kohler, P., Vernazza, P., Kahlert, C.R., et al. 2020. Characterization of a Pan-Immunoglobulin Assay Quantifying Antibodies Directed against the Receptor Binding Domain of the SARS-CoV-2 S1-Subunit of the Spike Protein: A Population-Based Study. *J. Clin. Med.*, 9(12):1–20.
- Seyahi, E., Bakhdiyarli, G., Oztas, M., Kuskucu, M.A., Tok, Y., Sut, N., Ozcifci, G., Ozcaglayan, A., Balkan, I.I., Saltoglu, N., Tabak, F., Hamuryudan, V. 2021. Antibody response to inactivated COVID-19 vaccine (CoronaVac) in immune-mediated diseases: a controlled study among hospital workers and elderly. *Rheumatol. Int.*, 41(8):1429–1440.
- Shirin, T., Bhuiyan, T.R., Charles, R.C., Amin, S., Bhuiyan, I., Kawser, Z., Rahat, A., Alam, A.N., Sultana, S., Aleem, M.A., Khan, M.H., Khan, S.R., LaRocque, R.C., Calderwood, S.B., Ryan, E.T., Slater, D.M., Banu, S., Clemens, J., Harris, J.B., et al. 2020. Antibody responses after COVID-19 infection in patients who are mildly symptomatic or asymptomatic in Bangladesh. *IJJID*, 101(1):220–225.
- Simnani, F.Z., Singh, D., Kaur, R. 2022. COVID-19 phase 4 vaccine candidates, effectiveness on SARS-CoV-2 variants, neutralizing antibody, rare side effects, traditional and nano-based vaccine platforms: a review. *3 Biotech*, 12(1):1–30.
- Søgaard, O.S., Reekie, J., Johansen, I.S., Nielsen, H., Benfield, T., Wiese, L., Stærke, N.B., Iversen, K., Fogh, K., Bodilsen, J., Iversen, M., Knudsen, L.S., Klastrup, V., Larsen, F.D., Andersen, S.D., Hvidt, A.K., Andreasen, S.R., Madsen, L.W., Lindvig, S.O., et al. 2022. Characteristics associated with serological COVID-19 vaccine response and durability in an older population with significant comorbidity: the Danish Nationwide ENFORCE Study. *CMI*, 28(8):1126–1133.
- Stephens, D.S., McElrath, M.J. 2020. COVID-19 and the Path to Immunity. *JAMA*, 324(13):1279.

- Tambunan, R.T.H. 2021. Pengukuran Antibodi Kuantitatif Antibodi Anti-SARS-COV-2. *Majalah Ilmiah METHODA*, 11(2):106–114.
- Uysal, E.B., Gümüş, S., Bektöre, B., Bozkurt, H., Gözalan, A. 2022. Evaluation of antibody response after COVID-19 vaccination of healthcare workers. *J. Med. Virol.*, 94(3):1060–1066.
- Walker, G.J., Naing, Z., Stella, A.O., Yeang, M., Caguicla, J., Ramachandran, V., Isaacs, S.R., Agapiou, D., Bull, R.A., Stelzer-Braid, S., Daly, J., Gosbell, I.B., Hoad, V.C., Irving, D.O., Pink, J.M., Turville, S., Kelleher, A.D., Rawlinson, W.D. 2020. SARS Coronavirus-2 microneutralisation and commercial serological assays correlated closely for some but not all enzyme immunoassays. *medRxiv*, 13(247):1–10.
- Wang, H., Zhang, Y., Huang, B., Deng, W., Quan, Y., Wang, W., Xu, W., Zhao, Y., Li, N., Zhang, J., Liang, H., Bao, L., Xu, Y., Ding, L., Zhou, W., Gao, H., Liu, J., Niu, P., Zhao, L., et al. 2020. Development of an Inactivated Vaccine Candidate, BBIBP-CorV, with Potent Protection against SARS-CoV-2. *Cell*, 182(3):713-721.e9.
- Wang, Y., Sibaii, F., Lee, K., J. Gill, M., L. Hatch, J. 2021. A comparison study of SARS-CoV-2 IgG antibody between male and female COVID-19 patients: a possible reason underlying different outcome between gender. *medRxiv*, 1(165):1–13.
- Wei, J., Stoesser, N., Matthews, P.C., Ayoubkhani, D., Studley, R., Bell, I., Bell, J.I., Newton, J.N., Farrar, J., Diamond, I., Rourke, E., Howarth, A., Marsden, B.D., Hoosdally, S., Jones, E.Y., Stuart, D.I., Crook, D.W., Peto, T.E.A., Pouwels, K.B., et al. 2021. Antibody responses to SARS-CoV-2 vaccines in 45,965 adults from the general population of the United Kingdom. *Nat. Microbiol.*, 6(9):1140–1149.
- Wei, J., Pouwels, K.B., Stoesser, N., Matthews, P.C., Diamond, I., Studley, R., Rourke, E., Cook, D., Bell, J.I., Newton, J.N., Farrar, J., Howarth, A., Marsden, B.D., Hoosdally, S., Jones, E.Y., Stuart, D.I., Crook, D.W., Peto, T.E.A., Walker, A.S., et al. 2022. Antibody responses and correlates of protection in the general population after two doses of the ChAdOx1 or BNT162b2 vaccines. *Nat. Med.*, 28(5):1072–1082.
- Westgard, S., Bayat, H., Westgard, J. 2018. Analytical Sigma metrics: A review of Six Sigma implementation tools for medical laboratories. *Biochem Med (Zagreb)*, 2(2):1–9.
- WHO. 2021. Background document on the inactivated vaccine Sinovac-CoronaVac against COVID-19. *World Health Organization*, (1):1–30.
- WHO. 2022. COVID-19 weekly epidemiological update. *World Health Organization*, (58):1–23. Tersedia pada: <https://www.who.int/publications/m/item/covid-19->

weekly-epidemiological-update.

- De Wit, E., Van Doremalen, N., Falzarano, D., Munster, V.J. 2016. SARS and MERS: Recent insights into emerging coronaviruses. *Nat. Rev. Microbiol.*, 14(8):523–534.
- Wölfel, R., Corman, V.M., Guggemos, W., Seilmaier, M., Zange, S., Müller, M.A., Niemeyer, D., Jones, T.C., Vollmar, P., Rothe, C., Hoelscher, M., Bleicker, T., Brünink, S., Schneider, J., Ehmann, R., Zwirgmaier, K., Drosten, C., Wendtner, C. 2020. Virological assessment of hospitalized patients with COVID-2019. *Nature*, 581(7809):465–469.
- Xiaowei, Geng, M., Peng, Y., Meng, L., Lu, S. 2020. Molecular immune pathogenesis and diagnosis of COVID-19. *J. Pharm. Anal.*, 10(2):102–108.
- Xiuyuan, Liu, Y., Lei, X., Li, P., Mi, D., Ren, L., Guo, L., Guo, R., Chen, T., Hu, J., Xiang, Z., Mu, Z., Chen, X., Chen, J., Hu, K., Jin, Q., Wang, J., Qian, Z. 2020. Characterization of spike glycoprotein of SARS-CoV-2 on virus entry and its immune cross-reactivity with SARS-CoV. *Nat. Commun.*, 11(1):1620.
- Yalçın, T.Y., Topçu, D.İ., Doğan, Ö., Aydın, S., Sarı, N., Erol, Ç., Kuloğlu, Z.E., Azap, Ö.K., Can, F., Arslan, H. 2022. Immunogenicity after two doses of inactivated virus vaccine in healthcare workers with and without previous COVID-19 infection: Prospective observational study. *J. Med. Virol.*, 94(1):279–286.
- Zaki, A.M., van Boheemen, S., Bestebroer, T.M., Osterhaus, A.D.M.E., Fouchier, R.A.M. 2012. Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia. *NEJM*, 367(19):1814–1820.
- Zhe, Shi, L., Wang, Y., Zhang, J., Huang, L., Zhang, C., Liu, S., Zhao, P., Liu, H., Zhu, L., Tai, Y., Bai, C., Gao, T., Song, J., Xia, P., Dong, J., Zhao, J., Wang, F.-S. 2020. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir. Med.*, 8(4):420–422.
- Zheng, J., Deng, Y., Zhao, Z., Mao, B., Lu, M., Lin, Y., Huang, A. 2022. Characterization of SARS-CoV-2-specific humoral immunity and its potential applications and therapeutic prospects. *Cell. Mol. Immunol.*, 19(2):150–157.
- Zhou, X., Zhu, D., Liao, Y., Liu, W., Liu, H., Ma, Z., Xing, D. 2014. Synthesis, labeling and bioanalytical applications of a tris(2,2'-bipyridyl)ruthenium(II)-based electrochemiluminescence probe. *Nat. Protoc.*, 9(5):1146–1159.
- Zunyou, McGoogan, J.M. 2020. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China. *JAMA*, 323(13):1239.