

## DAFTAR PUSTAKA

1. Siberry GK, Paul ME, Shearer WT. HIV infection and allergic disease. In: Middleton's Allergy: Principles and Practice 9th ed. Philadelphia: Elsevier; 2020:1168–80.
2. Vailant J, Guilick P. HIV disease current practice. In: StatPearls. Philadelphia: StatPearls Publishing; 2022:1–10.
3. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global HIV & AIDS statistics - fact sheet. UNAIDS. 2021: 2020–2.
4. Ditjen P2P Kemenkes RI. Laporan Kinerja Direktorat Jenderal Pencegahan dan Pengendalian Penyakit. Kemenkes RI. 2020.
5. Riono P, Challacombe SJ. HIV in Indonesia and in neighbouring countries and its social impact. Oral Dis. 2020;26(S1):28–33.
6. Mohamad WMW, Ab Rahman WSW, Al-Salih SAA, Hussin CMC. Immunological and haematological changes in HIV infection. In: Trends in Basic and Therapeutic Options in HIV Infection - Towards a Functional Cure 1st ed. InTech; 2015:105–28.
7. Haase AT. Population biology of HIV-1 infection: Viral and CD4+ T cell demographics and dynamics in lymphatic tissues. Annu Rev Immunol. 1999;17:625–56.
8. Baratawidjaja G K dan Iris R. Imunologi dasar. Imunologi Dasar Edisi ke-12. Jakarta: Balai penerbit FKUI; 2018: 207.
9. Osuji FN, Onyenekwe CC, Ahaneku JE, Ukibe NR. The effects of highly active antiretroviral therapy on the serum levels of pro-inflammatory and anti-inflammatory cytokines in HIV infected subjects. J Biomed Sci. 2018;25(1):1–8.
10. Musa F, Shaviya N, Mambo F, Abonyo C, Barasa E, Wafula P, et al. Cytokine profiles in highly active antiretroviral treatment non-adherent, adherent and naive HIV-1 infected patients in Western Kenya. Afr Health Sci. 2021;21(4):1584–92.
11. Clerici M. Beyond IL-17: New cytokines in the pathogenesis of HIV infection. Curr Opin HIV AIDS. 2010;5(2):184–8.

12. Katsikis PD, Mueller YM, Villinger F. The cytokine network of acute hiv infection: a promising target for vaccines and therapy to reduce viral set-point? *PLoS Pathog.* 2011;7(8):1-5.
13. Lu D, Zhang JB, Wang YX, Geng ST, Zhang Z, Xu Y, et al. Association between CD4+ T cell counts and gut microbiota and serum cytokines levels in HIV-infected immunological non-responders. *BMC Infect Dis.* 2021;21(1):1-11.
14. Mak TW, Saunders ME. T-cell differentiation and effector functions. In: *the immune response* 1st ed. Philadelphia: Academic Press; 2006:403-32.
15. Pett SL, Kelleher AD, Emery S. Role of interleukin-2 in patients with HIV infection. *Drugs.* 2010;70(9):1115-30.
16. Ohotu EO, Onyemelukwe N, Odurukwe OU, Ezema CI. The relationship between IL-2 cytokine secretion and CD4 T-lymphocyte depletion in people living with HIV/AIDS. *Int J Community Res.* 2015;4(4):53-8.
17. Vandergeeten C, Fromentin R CN. The role of cytokines in the establishment, persistence and eradication of the HIV reservoir. *Cytokine Growth Factor Rev.* 2012;23(0):143-9.
18. Kaur R, Singh Dhakad M. Study of Th1/Th2 cytokine profiles in HIV/AIDS patients in a tertiary care hospital in India. *J Med Microbiol Diagn.* 2016;05(01):1-5.
19. Xie Z, Zheng J, Wang Y, Li D, Maermaer T, Li Y, et al. Deficient IL-2 produced by activated CD56+ T cells contributes to impaired NK cell-mediated ADCC function in chronic HIV-1 infection. *Front Immunol.* 2019;10(7):1647:1-13.
20. Xia H, Jiang W, Zhang X, Qin L, Su B, Li Z, et al. Elevated level of CD4+ T cell immune activation in acutely HIV-1-infected stage associates with increased IL- 2 production and cycling expression, and subsequent CD4+ T cell preservation. *Front Immunol.* 2018;9(3):1-9.
21. Szymańska B, Jurkowska K, Knysz B, Piwowar A. Differences in expression of selected interleukins in HIV-infected subjects undergoing antiretroviral therapy. *Viruses.* 2022;14:997:1-14.

22. Meira DA, Souza LR, Lima CRG, Henriques RMS, Pardini MI, Silva VA, et al. Correlation between cytokine serum levels, number of CD4 T cells/mm<sup>3</sup> and viral load in HIV-1 infected individuals with or without antiretroviral therapy. *J. Venom. Anim. Toxins incl. Trop. Dis.* 2004;10(3):293–310.
23. Soufian S, Agakhani A, Mohraz M, Banifazi M, Eslamifar A, Boland-Ghamat Z, et al. No evidence of the Th1 to Th2 cytokine shift during the course of HIV infection. *Iran J Pathol.* 2012;(4):80–5.
24. Clerici M, Shearer GM. The T helper cell shift in AIDS: significance for pharmacotherapy. *Clin Immunother.* 1995;3(2):95–101.
25. Lucey DR, Clerici M, Shearer GM. Type 1, and type 2 cytokine dysregulation in human infectious, neoplastic, and inflammatory diseases. *Clin Microbiol Rev.* 1996;9(4):532–62.
26. Orsilles MÁ, Pieri E, Cooke P, Caula C. IL-2 and IL-10 serum levels in HIV-1-infected patients with or without active antiretroviral therapy. *Apmis.* 2006;114(1):55–60.
27. Ul-Haq Z, Naz S, Mesaik MA. Interleukin-4 receptor signaling and its binding mechanism: A therapeutic insight from inhibitors tool box. *Cytokine Growth Factor Rev.* 2016;32:3–15.
28. Yong X, Liu Z, Jiang L, Tao R, Liu W, Zhang L, et al. Dynamic changes of Th1/Th2/Th17 cytokines and human beta defensin 2 in HIV-infected patients with oral candidiasis during the first year of highly active anti-retroviral therapy. *Arch Oral Biol.* 2018;92(4):62–7.
29. Gorenc L, Zidovec Lepej S, Grgic I, Planinic A, Iscic Bes J, Vince A, et al. The comparison of Th1, Th2, Th9, Th17 and Th22 cytokine profiles in acute and chronic HIV-1 infection. *Microb Pathog.* 2016;97:125–30.
30. Gillespie SL, Chinen J, Paul ME, Shearer WT. Human immunodeficiency virus infection and acquired immunodeficiency syndrome. *Clinical Immunology: Principles and Practice.* Philadelphia: Elsevier; 2019:545-60.

31. Patel P, Raizes E, Broyles LN. Human immunodeficiency virus infection. In: Hunter's Tropical Medicine and Emerging Infectious Disease 10th ed. Philadelphia: Elsevier; 2023:232–66.
32. Mak TW, Bradley JD. Immunodeficiency. Primer to The Immune Response 2nd ed. Philadelphia: Elsevier; 2016:377–421.
33. Kemenkes. Penanggulangan human immunodeficiency virus, acquired immunodeficiency syndrome, dan infeksi menular seksual. Permenkes no 23 tahun 2022.
34. Becker Y. The changes in the T helper 1 (Th1) and T helper 2 (Th2) cytokine balance during HIV-1 infection are indicative of an allergic response to viral proteins that may be reversed by Th2 cytokine inhibitors and immune. *Virus Genes*. 2004;28(1):5–18.
35. Minhajat R, Djaharuddin I, Halim R, Benyamin AF, Bakri S. Drugs hypersensitivity reaction in patient with human immunodeficiency virus (HIV) infection. *J Allergy Ther*. 2017;08(01):252:1-4.
36. Spellberg B, Edwards JE. Type 1/type 2 immunity in infectious diseases. *Clin Infect Dis*. 2001;32(1):76–102.
37. Pol JG, Caudana P, Paillet J, Piaggio E, Kroemer G. Effects of interleukin-2 in immunostimulation and immunosuppression. *J Exp Med*. 2020;217(1):1–15.
38. Alecu M, Geleriu L, Coman G, Galățescu L. The interleukin-1, interleukin-2, interleukin-6 and tumour necrosis factor alpha serological levels in localised and systemic sclerosis. *Rom J Intern Med*. 1998;36(3-4):251–9.
39. Arenas-Ramirez N, Woytschak J, Boyman O. Interleukin-2: biology, design and application. *Trends Immunol*. 2015;36(12):763–77.
40. Boyman O, Sprent J. The role of interleukin-2 during homeostasis and activation of the immune system. *Nat Rev Immunol*. 2012;12(3):180–90.
41. Gabryšová L, Alvarez-Martinez M, Luisier R, Cox LS, Sodenkamp J, Hosking C, et al. C-Maf controls immune responses by regulating disease-specific gene networks and repressing IL-2 in CD4+ T cells. *Nat Immunol*. 2018;19(5):497–507.

42. Mak TW, Saunders M. Cytokines and cytokine receptors. In: *The Immune Response*. 1st ed. Philadelphia: Academic Press; 2006:463–516.
43. Alva A, Daniels GA, Wong MKK, Kaufman HL, Morse MA, David, et al. Contemporary experience with high-dose interleukin-2 therapy and impact on survival in patients with metastatic melanoma and metastatic renal cell carcinoma. *Cancer Immunol Immunother*. 2016;65:1533–44.
44. Cunningham MW, Amaral LM, Campbell NE, Cornelius DC, Ibrahim T, Vaka VR, et al. Investigation of interleukin-2-mediated changes in blood pressure, fetal growth restriction, and innate immune activation in normal pregnant rats and in a preclinical rat model of preeclampsia. *Biol Sex Differ*. 2021;12(1):1– 10.
45. Bhopale MK. Interleukin-2 family members and their role in demyelinating disease. *Ann Immunol Immunother*. 2020;2(2):1-9.
46. Graßhoff H, Comdühr S, Monne LR, Müller A, Lamprecht P, Riemekasten G, et al. Low-dose IL-2 therapy in autoimmune and rheumatic diseases. *Front Immunol*. 2021;12(4):1-13.
47. Hussain Y, Haroon K. Immunosuppressive drugs. *Encyclopedia of Infection and Immunity*. Philadelphia: Elsevier; 2022:726–40.
48. Page A V, Liles WC. Immunomodulators. In: *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 9 th ed. Philadelphia: Elsevier; 2020:627–54.
49. Hideo O, Micheal T L. Interleukin-4. *The Cytokine Handbook*. 4th ed. San Diego: Academic Press; 2003: 227–62.
50. Burkett PR, Lee Y, Peters A, Kuchroo VK. T Cells and their subsets in autoimmunity. In: *The Autoimmune Diseases*. 5 th ed. Philadelphia: Elsevier; 2014:69–86.
51. Vaillant AAJ, Modi P, Jan A. Atopy. In: *StatPearls*. Philadelphia: StatPearls Publishing; 2022:1-2.
52. Mak TW, Saunders ME. The T cell receptor: structure of its proteins and genes. In: *The Immune Response*. Philadelphia: Elsevier; 2006: 311–40.
53. Garcia SABG, Nilmarie G. Acquired immune deficiency syndrome CD4 Count. In: *StatPearls*. Philadelphia: StatPearls Publishing; 2022:1-2.

54. Mak TW, Saunders ME. AIDS: Acquired immunodeficiency syndrome. In: *The Immune Response*. 1st ed. Philadelphia: Academic Press; 2006:785–823.
55. Zhang N, Yu SM, Yan CX, Wang XX, Teng L, Wang JY, et al. Clinical association of viral tropism and serum cytokines in untreated HIV-1 infection patients. *Res Sq*. 2022:1-13.
56. Tejaswi JKD, Rajan G. An overview on anti-retroviral drugs: a review. *Indo Am J Pharm*. 2018;8(09):1684–91.
57. Zhang X. Anti-retroviral drugs: current state and development in the next decade. *Acta Pharm Sin B*. 2018;8(2):131–6.
58. Vitoria M, Hill A, Ford N, Doherty M, Clayden P, Venter F et al. The transition to dolutegravir and other new antiretrovirals in low and middle income countries—what are the issues? *AIDS*. 2018;32:1551–61.
59. Meintjes G, Moorhouse MA, Carmona S, Davies N, Dlamini S, Van Vuuren C, et al. Adult antiretroviral therapy guidelines 2017. *South Afr J HIV Med*. 2017;18(1):1–24.
60. Atta MG, De Seigneux S, Lucas GM. Clinical pharmacology in HIV therapy. *Clin J Am Soc Nephrol*. 2019;14(3):435–44.
61. Blankson JN, Siliciano RF. Immunopathogenesis of human immunodeficiency virus infection. *Twentieth. Vol. 2, Goldman's Cecil Medicine: Twenty Fourth Edition*. Philadelphia: Elsevier Inc.; 2012:2175–77.
62. Ouattara EN, Robine M, Eholie SP, MacLean RL, Moh R, Losina E, et al. Laboratory monitoring of antiretroviral therapy for HIV infection: cost- effectiveness and budget impact of current and novel strategies. *Clin Infect Dis*. 2016;62(11):1454–62.
63. Shi P, Wang X, Su M, Meng J, Wang H, Fan W. Treatment with antiviral drugs will significantly inhibit the HIV-1 RNA POL gene expression and viral load in AIDS patients. *Dis Markers*. 2023;1-9.
64. Yang X, Su B, Zhang X, Liu Y, Wu H, Zhang T. Incomplete immune reconstitution in HIV/AIDS patients on antiretroviral therapy: challenges of immunological non-responders. *J Leukoc Biol*. 2020;107(4):597–612.

65. Direktur Jenderal P2P Kementerian Kesehatan Republik Indonesia. Laporan eksekutif perkembangan HIV/AIDS dan penyakit infeksi menular seksual (PMS) Triwulan 1 Tahun 2022. Kemenkes RI. 2022;1–23.
66. Erb P, Battegay M, Zimmerli W, Rickenbach M, Egger M. Effect of antiretroviral therapy on viral load, CD4 cell count, and progression to acquired immunodeficiency syndrome in a community human immunodeficiency virus-infected cohort. *Arch Intern Med.* 2000;160(8):1134–40.
67. Hasse B, Iff M, Ledergerber B, Calmy A, Schmid P, Hauser C, et al. Obesity trends and body mass index changes after starting antiretroviral treatment: the Swiss HIV cohort study. *Open Forum Infect Dis.* 2014;1(2):435–40.
68. Bantie B, Gebeyehu NA, Adella GA, Kassie GA, Mengstie MA, Abebe EC, et al. Trends of body mass index changes among adults on antiretroviral therapy in Northwest Ethiopia: a longitudinal data analysis. *Sci Rep.* 2024;14(1):1–11.
69. Kumar NP, Nancy AP, Moideen K, Menon PA, Banurekha V V., Nair D, et al. Low body mass index is associated with diminished plasma cytokines and chemokines in both active and latent tuberculosis. *Front Nutr.* 2023;10:1–10.
70. Ahmed EE, Refaat MM, Ahmed SMM LO. Impact of Body mass index (BMI) on serum interleukin 4 level in adult bronchial asthma subjects. *EJHM.* 2022;87(1):993–9.
71. Jones CY, Hogan JW, Snyder B, Klein RS, Rompalo A, Schuman P, et al. Overweight and human immunodeficiency virus (HIV) progression in women: associations HIV disease progression and changes in body mass index in women in the HIV epidemiology research study cohort. *Clin Infect Dis.* 2003;37(s2):S69–80.
72. Tate T, Willig AL, Willig JH, Raper JL, Moneyham L, Kempf MC, et al. HIV infection and obesity: where did all the wasting go?. *Antivir Ther.* 2012;17(7):1281–9.

73. Lakey W, Yang LY, Yancy W, Chow SC, Hicks C. Short communication: from wasting to obesity: initial antiretroviral therapy and weight gain in HIV-infected persons. *AIDS Res Hum Retroviruses*. 2013;29(3):435–40.
74. Erlandson KM, Zhang L, Lake JE, Schrack J, Althoff K, Sharma A, et al. Changes in weight and weight distribution across the lifespan among HIV-infected and uninfected men and women. *Medicine*. 2016;95(46).
75. The NAMSAL ANRS 12313 Study Group. Dolutegravir-based or low-dose efavirenz-based regimen for the treatment of HIV-1. *N Engl J Med*. 2019 Aug 29;381(9):816–26.
76. Deng M, Chen N, Lao X, Wang X, Fu J, Xing L, et al. Reasons, efficacy and safety of switching to dolutegravir-based regimens among virologically suppressed PLWH: a retrospective cohort study of 96 weeks. *Infect Drug Resist*. 2024;17:1571–82.
77. Hare S, Smith SJ, Métifiot M, Jaxa-Chamiec A, Pommier Y, Hughes SH, et al. Structural and functional analyses of the second-generation integrase strand transfer inhibitor dolutegravir (S/GSK1349572). *Mol Pharmacol*. 2011;80(4):565–72.
78. Cerrone M, Bracchi M, Wasserman S, Pozniak A, Meintjes G, Cohen K, et al. Safety implications of combined antiretroviral and anti-tuberculosis drugs. *Expert Opin Drug Saf*. 2020;19(1):23–41.
79. Gausi K, Wiesner L, Norman J, Wallis CL, Onyango-Makumbi C, Chipato T, et al. Pharmacokinetics and drug-drug interactions of isoniazid and efavirenz in pregnant women living with HIV in high TB incidence settings: importance of genotyping. *Clin Pharmacol Ther*. 2021;109(4):1034–44.
80. Costa B, Vale N. Efavirenz: history, development and future. *Biomolecules*. 2022;13(1):88.
81. Bruchfeld J, Correia-Neves M, Källenius G. Tuberculosis and HIV coinfection. *Cold Spring Harb Perspect Med*. 2015;5(7):a017871.



82. Kalsdorf B, Scriba TJ, Wood K, Day CL, Dheda K, Dawson R, et al. HIV-1 infection impairs the bronchoalveolar T-cell response to mycobacteria. *Am J Respir Crit Care Med*. 2009;180(12):1262–70.
83. Kwan C, Ernst JD. HIV and tuberculosis: a deadly human syndemic. *Clin Microbiol Rev*. 2011;24(2):351–76.
84. Garland JM, Flanigan T, Wing EJ. Human immunodeficiency virus infection. In: *Cecil Essentials of Medicine*. 10th ed. Philadelphia: Elsevier; 2022:944–62.
85. Parslow T, Stites D, Terr A, Imboden J. Medical immunology. In: *Medical Immunology*. 10th ed. New York: Lange Medical Books/McGraw-Hill, Medical Publishing Division; 2001:148.
86. Zanoni BC, Gandhi RT. Update on opportunistic infections in the era of effective antiretroviral therapy. *Infect Dis Clin North Am*. 2014;28(3):501–18.
87. Shibata S, Kikuchi T. Pneumocystis pneumonia in HIV-1-infected patients. *Respir Investig*. 2019;57(3):213–9.
88. Gondivkar S, Sarode SC, Gadail AR, Yuwanati M, Sarode GS, Gondivkar RS, et al. Oro-facial opportunistic infections and related pathologies in HIV patients: A comprehensive review. *Dis Mon*. 2021;67(9):101170.
89. Otit-Sengeri J, Colebunders R, Reynolds SJ, Muwonge M, Nakigozi G, Kiggundu V, et al. Elevated inflammatory cytokines in aqueous cytokine profile in HIV-1 infected patients with cataracts in Uganda. *BMC Ophthalmol*. 2018;18(1):1–8.
90. Onwumeh J, Okwundu CI, Kredo T. Interleukin-2 as an adjunct to antiretroviral therapy for HIV-positive adults. *Cochrane Database of Syst Rev*. 2017;2017(5).
91. Vecchiet J, Dalessandro M, Travasi F, Falasca K, Di Iorio A, Schiavone C, et al. Interleukin-4 and interferon-gamma production during hiv-1 infection and changes induced by antiretroviral therapy. *Int J Immunopathol Pharmacol*. 2003;16(2):157–66.

92. Wambani JR, Kiboi NG, Makori WM, Ogola PE, Rachuonyo HO. Immunological profiles in HIV positive patients with or without opportunistic infections and the influence of highly active antiretroviral therapy: a systematic review and update. *J Clin Cell Immunol.* 2016;7(3).
93. Tudela EV, Singh MK, Lagman M, Ly J, Patel N, Ochoa C, et al. Cytokine levels in plasma samples of individuals with HIV infection. *Austin J Clin Immunol.* 2014;1(1):1003–7.
94. Johnston V, Cohen K, Wiesner L, Morris L, Ledwaba J, Fielding KL, et al. Viral suppression following switch to second-line antiretroviral therapy: associations with nucleoside reverse transcriptase inhibitor resistance and subtherapeutic drug concentrations prior to switch. *J Infect Dis.* 2014;209(5):711–20.
95. Rajeswaren V, Wagner BD, Patnaik JL, Mandava N, Mathias MT, Manoharan N, et al. Interleukin-4 plasma levels stratified by sex and age. *Transl Vis Sci Technol.* 2023;12(8):1

