

DAFTAR PUSTAKA

- Andrews, R. K., Lopez, J.A., Berndt, M.C., 1997. Molecular mechanisms of platelet adhesion and activation. *Int. J. Biochem. Cell Biol.* 29(1):91–105.
- Angiolillo, D. J., 2009. Antiplatelet therapy in diabetes : efficacy and limitations of current treatment strategies and future directions. *Diabetes Care* 32 (4):531–540.
- Askitosari, T.D., 2011. Frekuensi alel gen pemetabolisme obat CYP2C9*3 dan CYP2C19*17 pada populasi suku bugis di Makasar [Tesis]. Universitas Gadjah Mada, Yogyakarta.
- Awtry, E.H., Loscalzo, J., 2000. Aspirin. *Circulation* 101:1206–1218.
- Backovic, D., Ignjatovic, S., Rakicevic, L., Kusic-Tisma, J., Radojkovic, D., Calija, B., *et al.*, 2016. Influence of *CYP2C19**2 gene variant on therapeutic response during clopidogrel treatment in patient with carotid artery stenosis. *J. Med. Biochem.* 35:26-33.
- Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI., 2013. *Riset kesehatan dasar*. Kementerian Kesehatan RI, Jakarta.
- Bassand, J.P., Hamm, C.W., Ardissino, D., Boersma, E., Budaj, A., Fernandez-aviles, F., *et al.*, 2007. Guidelines for the diagnosis and treatment of non-ST-segment elevation acute coronary syndromes : the task force for the diagnosis and treatment of non-ST-segment elevation acute coronary syndromes of the European Society of Cardiology. *Eur. Heart J.* 28(13):1598–1660.
- Bauer, T., Bouman, H.J., Van Werkum, J.W., Ford, N.F., Ten Berg, J.M., Taubert, D., 2011. Impact of CYP2C19 variant genotypes on clinical efficacy of antiplatelet treatment with clopidogrel : systematic review and meta-analysis. *BMJ*. 343:d4588.
- BD Biosciences, 2000. *Introduction to Flow Cytometry*. Becton, Dickinson and Company, San Jose.
- Boden, W.E., 2012. Angina Pectoris and Stable Ischemic Heart Disease. *Elsevier*.
- Boulenc, X., Djebli, N., Shi, J., Perrin, L., Brian, W., Van Horn, R., *et al.*, 2012. Effects of omeprazole and genetic polymorphism of CYP2C19 on the clopidogrel active metabolite. *Drug Metab. Dispos.* 40 (1):187–197.
- Campbell, M.K., Farrell, S.O., 2014. *Biochemistry, Sixth edition*. Thomson Higher Education. USA.

- Chairperson, K.F., Garcia, M.A.A., Ardissino, D., Buszman, P., Camici, P.G., Crea, F., *et al.*, 2006. Guidelines on the management of stable angina pectoris : executive summary the task force on the management of stable angina pectoris of the European Society of Cardiology. *Eur. Heart J.* 27(11):1341-1381.
- Chan, M.Y., Tan, K., Tan, H.C., Huan, P.T., Li, B., Phua, Q.H., *et al.*, 2012. CYP2C19 and PON1 polymorphisms regulating clopidogrel bioactivation in Chinese, Malay and Indian subjects. *Pharmacogenomics* 13(5):533–542.
- Cho, J.H., Jeong, Y.H., Ahn, Y.J., Kang, M.K., Koh, J.S., Kim, I.S., *et al.*, 2010. The impact of smoking on post-clopidogrel platelet reactivity in patients with acute myocardial infarction. *Korean Circ. J.* 40(3):119–124.
- Collet, J.P., Hulot, J.S., Pena, A., Villard, E., Esteve, J.B., Silvain, J., *et al.*, 2009. Cytochrome P450 2C19 polymorphism in young patients treated with clopidogrel after myocardial infarction : a cohort study. *Lancet* 373(9660):309–17.
- Dean, L., 2011. Clopidogrel therapy and CYP2C19 genotype. *NCBI* 19:4–7.
- de Moraes, S.M.F., Wilkinson, G.R., Blaisdell, J., Nakamura, K., Meyer, U.A., Goldstein, J.A., 1994. The major genetic defect responsible for the polymorphism of S-Mephenytoin metabolism in humans. *J. Biol. Chem.* 269(22):15419-15422.
- Ding, Y., Xu, D., Zhang, X., Yang, H., Geng, T., He, P., *et al.*, 2015. Genetic polymorphisms and phenotypic analysis of drug-metabolizing enzyme CYP2C19 in a Li Chinese population. *Int. J. Clin. Exp. Pathol.* 8(10):13201–13208.
- Dorsam, R.T., Kunapuli, S.P., 2004. Central role of the P2Y₁₂ receptor in platelet activation. *J. Clin. Invest.* 113:340-345.
- Finegold, J.A., Asaria, P., Francis, D.P., 2012. Mortality from ischaemic heart disease by country, region, and age: Statistics from World Health Organisation and United Nations. *International Journal of Cardiology* 168:934-945.
- Gachet, C., Aleil, B., 2008. Testing antiplatelet therapy. *Eur. Heart J.* 10(A Suppl):A28-A34.
- Geiger, D.U., Mackowiak. 2012. Laboratory measurement of platelet reactivity

consider the impact of new drugs, generic options and healthcare economics. Available from : <http://www2.mlo-online.com/features/201207/tips-from-the-clinical-experts/laboratory-measurement-of-platelet-reactivity.aspx>

Genetics home reference, 2016. CYP2C19 cytochrome P450 family 2 subfamily C member 19. U.S. National Library of Medicine. Available from : <https://ghr.nlm.nih.gov/gene/CYP2C19#location>

Heemskerk, J.W.M., Bevers, E.M., Lindhout, T., 2002. Platelet activation and blood coagulation. *Thromb Haemost* 88(2):186–93.

Holmes, M.V., Perel, P., Shah, T., Hingorani, A.D., Casas, J.P., 2011. CYP2C19 genotype, clopidogrel metabolism, platelet function, and cardiovascular events. *JAMA* 306(24):2704–2714.

Horenstein, R.B., Madabushi, R., Zineh, I., Yerges-Armstrong, L.M., Peer, C.J., Schuck, R.N., *et al.*, 2014. Effectiveness of clopidogrel dose escalation to normalize active metabolite exposure and antiplatelet effects in CYP2C19 poor metabolizers. *J. Clin. Pharmacol.* 54(8):865–873.

Joshi, A. 2008., Hardy-Weinberg equilibrium and the foundation of volutionary genetics. *Resonance* 13(9):812-835.

Kamel, A.M., 2007. *Metabolic transformations of xenobiotics (introduction of biotransformation reactions)*. Bioanalytical course, University of Connecticut.

Kementerian Kesehatan RI., 2012. *Buletin jendela data dan informasi kesehatan penyakit tidak menular*. Kementerian Kesehatan RI, Jakarta.

Kim, H.S., Chang, K., Koh, Y.S., Park, M.W., Choi, Y.S., Park, C.S., *et al.*, 2013. CYP2C19 poor metabolizer is associated with clinical outcome of clopidogrel therapy in acute myocardial infarction but not stable angina. *Circ. Cardiovasc. Genet.* 6(5):514–521.

Krishna, V., Diamond, G.A., Kaul, S., 2012. The role of platelet reactivity and genotype testing in the prevention of atherothrombotic cardiovascular events remain unproven. *Circulation* 125:1288-1303.

Lakhan, R., Kumari, R., Singh, K., Kalita, J., Misra, U.K., Mittal, B., 2011. Possible role of CYP2C9 & CYP2C19 single nucleotide polymorphisms in drug refractory epilepsy. *Indian J. Med. Res.* 134:295–301.

- Lecchi, A., Razzari, C., Paoletta, S., Dupuis, A., Nakamura, L., Ohlmann, P., *et al.*, 2015. Identification of a new dysfunctional platelet P2Y₁₂ receptor variant associated with bleeding diathesis. *Blood* 125(6):1006–1013.
- Ma, T.K.W., Lam, Y.Y., Tan, V.P., Kiernan, T.J., Yan, B.P., 2010. Impact of genetic and acquired alteration in cytochrome P450 system on pharmacologic and clinical response to clopidogrel. *Pharmacol. Ther.* 125(2):249–259.
- Mangoni, A.A., Jackson, S.H.D., 2003. Age-related changes in pharmacokinetics and pharmacodynamics: basic principles and practical applications. *Br. J. Clin. Pharmacol.* 57(1):6–14.
- Marcucci, R., Giusti, B., Paniccia, R., Gori, A.M., Saracini, C., Valente, S., *et al.*, 2012. High on-treatment platelet reactivity by ADP and increased risk of MACE in good clopidogrel metabolizers. *Platelets* 23(8):586–93.
- Mega, J.L., Close, S.L., Wiviott, S.D., Shen, L., Hockett, R.D., Brandt, J.T., *et al.*, 2009. Cytochrome p-450 polymorphisms and response to clopidogrel. *The N. Engl. J. Med.* 360(4):354–62.
- Ming, C., 2014. *CYP2C19 Polymorphism In Drug Metabolism And Response* [dissertation]. Karolinska Institutet, Stockholm, Sweden.
- Murray, C.J.L., Lopez, A.D., 1997. Alternative projections of mortality and disability by cause 1990–2020 : Global burden of disease study. *Lancet* 349:1498–1504.
- Muller, O., Hamilos, M., Bartunek, J., Ulrichs, H., Mangiacapra, F., Holz, J.B., *et al.*, 2010. Relation of endothelial function to residual platelet reactivity after clopidogrel in patients with stable angina pectoris undergoing percutaneous coronary intervention. *Am. J. Cardiol.* 105(3):333–338.
- Nakata, T., Miyahara, M., Nakatani, K., Wada, H., Tanigawa, T., Komada, F., *et al.*, 2013. Relationship between CYP2C19 loss-of-function polymorphism and platelet reactivities with clopidogrel treatment in Japanese patients undergoing coronary stent implantation. *Circ. J.* 77:1436–1444.
- Nicholas, R.A., 2015. Insights into platelet P2Y₁₂ receptor activation. *Blood* 125(6):893–896.
- O'Connor, S., Montalescot, G., Collet, J.P., 2011. The P2Y₁₂ receptor as a target of antithrombotic drugs. *Purinergic Signal.* 7:325–332.
- Ogilvie, B.W., Yerino, P., Kazmi, F., Buckley, D.B., Rostami-Hodjegan, A., Paris, B.L., *et al.*, 2011. The proton pump inhibitor, omeprazole, but not

lansoprazole or pantoprazole, is a metabolism-dependent inhibitor of CYP2C19 : Implications for coadministration with clopidogrel. *Drug Metab. Dispos.* 39(11):2020–2033.

Ogu, C.C., Maxa, J.L., 2000. Drug interactions due to cytochrome P450. *BUMC Proceedings* 13(4):421–423.

Opie, Lionel H., Fox, Keith A.A., White, Harvey D., Gersh, Bernard J., 2012. Antithrombotic Agents : Trombosit Inhibitors, Acute Anticoagulants, Fibrinolytics, and Chronic Anticoagulants. *Drugs For The Heart* , Eighth Edition. *Elsevier*.

Patti, G., De Caterina, R., Abbate, R., Andreotti, F., Biasucci, L.M., Calabrò, P., *et al.*, 2014. Platelet function and long-term antiplatelet therapy in women : is there a gender-specificity? A ‘state-of-the-art’ paper. *Eur. Heart J.* 35:2213–2223.

Pettersen, A.A.R., Arnesen, H., Opstad, T.B., Seljeflot, I., 2011. The influence of CYP 2C19*2 polymorphism on platelet function testing during single antiplatelet treatment with clopidogrel. *Thrombosis Journal* 9:4.

Roden, D.M., Stein, C.M., 2009. Clopidogrel and the concept of high-risk pharmacokinetics. *Circulation* 119(16):2127–2130.

Salim, H.M.W., Cavalcanti, A.R.O., 2008. Factor influencing codon usage bias in genomes. *J. Braz. Chem. Soc.* 19(2):257–262.

Sani, Y.N., Lim, S.C., Lim, L.H., Edwin, N.E.Y., Khan, N.A.K., Goh, T.H., *et al.*, 2015. Genetic polymorphisms of CYP2C19 and the effect of the CYP2C19*2 allele on Clopidogrel P2Y₁₂ inhibition in healthy Malaysian volunteers. *Universiti Sains Malaysia, Penang*.

Sanguhl, K., Klein, T.E., Altman, R.B., 2010. Clopidogrel pathway. *Pharmacogenet. Genomics.* 20(7):463–465.

Schneider, D.J. 2009. Factors contributing to increased platelet reactivity in people with diabetes. *Diabetes Care* 32(4):525–527.

Scott, S.A., Sangkuhl, K., Shuldiner, A.R., Hulot, J.S., Thorn, C.F., Altman, R.B., *et al.*, 2012. Very important pharmacogene information for cytochrome P450, family 2, subfamily C, polypeptide 19. *Pharmacogenet. Genomics* 22(2):159–165.

Scott, S.A., Sangkuhl, K., Gardner, E.E., Stein, C.M., Hulot, J., Johnson, J.A, *et al.*, 2011. Clinical pharmacogenetics implementation consortium

guidelines for cytochrome P450-2C19 (CYP2C19) genotype and clopidogrel therapy. *Clin. Pharmacol. Ther.* 90(2):328-332.

Shin, D., Kwon, J., Park, A., Bae, Y., Shin, E., Park, S., *et al.*, 2012. Association of CYP2C19*2 and *3 genetic variants with essential hypertension in Koreans. *Yonsei Med. J.* 53(6):1113-1119.

Shuldiner, A.R., O'Connell, J.R., Bliden, K.P., Gandhi, A., Ryan, K., Horenstein, R.B., *et al.*, 2009. Association of cytochrome P450 2C19 genotype with the antiplatelet effect and clinical efficacy of clopidogrel therapy. *JAMA.* 302(8):849-857.

Trenk, D., Hochholzer, W., Fromm, M. F., Chialda, L.E., Pahl, A., Valina, C. M., *et al.*, 2008. Cytochrome P450 2C19 681G>A polymorphism and high on-clopidogrel platelet reactivity associated with adverse 1-Year clinical outcome of elective percutaneous coronary intervention with drug-eluting or bare-metal stents. *J. Am. Coll. Cardiol.* 51(20):1925-34.

University of Utah. 2008. PCR. Genetic Science Learning Center.

Vallurupalli, N.G., Goldhaber, S.Z. 2006. Gastrointestinal complications of dual antiplatelet therapy. *Circulation* 113:e655-e658.

Verdoia, M., Pergolini, P., Rolla, R., Nardin, M., Schaffer, A., Barbieri, L. 2016. Advanced age and high-residual platelet reactivity in patients receiving dual antiplatelet therapy with clopidogrel or ticagrelor. *J. Thromb. Haemost.* 14(1):57-64.

Verstuyft, C., Simon, T., Kim, R.B. 2009. Personalized medicine and antiplatelet therapy : ready for prime time?. *Eur. Heart J.* 30(16):1943-1963.

Weaver, J. L., 2000. *Introduction to flow cytometry., Methods (San Diego, Calif.)*.

World Health Organization, 2014. *Global Status Report on noncommunicable diseases 2014*.

Wu, A.H., 2011. Drug metabolizing enzyme activities versus genetic variances for drug of clinical pharmacogenomic relevance. *Clin. Proteomics* 8(1):12.

Yang, Y.S., Wong, L.P., Lee, T.C., Mustafa, A.M., Mohamed, Z., Lang, C.C., 2004. Genetic polymorphism of cytochrome P450 2C19 in healthy Malaysian subjects. *Br. J. Clin. Pharmacol.* 58(3):332-335.

Yasmina, A., de Boer, A., Klungel, O.H., Deneer, V.H., 2014. Pharmacogenomics of oral antiplatelet drugs. *Pharmacogenomics* 15(4):509-528.

Yusuf, I., Djojosebroto, M.W., Ikawati, R., Lum, K., Kaneko, A., Marzuki, S., 2003. Ethnic and geographical distributions of CYP2C19 alleles in the populations of Southeast Asia. *Adv. Exp. Med. Biol.* 531:37–46.

Zand, N., Tajik, N., Hoormand, M., Moghaddam, A.S., Milanian, I., 2005. Allele frequency of CYP2C19 gene polymorphisms in a healthy Iranian population. *IJPT* 4:124–128.