

- Aithal GP, Day CP, Kesteven PJJ, *et al.* 1990, Association of polymorphisms in cytochrome P450 CYP2C9 with warfarin dose requirement and risk of bleeding complications. *Lancet*; **353**:717-719.
- Alessandrini, M., Asfaha, S., Dodgen, T.M., Warnich, L., Pepper, M. S., 2013. Cytochrome P450 pharmacogenetics in African populations. *Drug Metabol. Rev.* **45** (2), 253–275.
- Alphey L. 1997, *Strategies for New Sequence Determination. In: Alphey I. DNA Sequencing, from experimental methods to bioinformatics.* Manchester: Bios Scientific Publishers;
- Anief, M. 2000, *Prinsip Umum dan Dasar Farmakologi.* Yogyakarta: Gadjah Mada University Press. Hal. 17-18.
- Aprijani DA, Elfaizi MA. 2004, *Bioinformatika: Perkembangan, Disiplin Ilmu dan Penerapannya di Indonesia.*
- Aspray TJ, Kitange H, Setel P *et al.* 1998, Disease burden in sub-Saharan Africa. *Lancet*, **351**:1208–9.
- Bae JW, Kim HK, Kim JH, Yang SI, Kim MJ, Jang CG., *et al* 2005, Allele and genotype frequencies of CYP2C9 in a Korean population. *Br J Clin Pharmacol.* **60**(4): 418–422. doi: 10.1111/j.1365-2125.2005.02448.x
- Blaisdell J, Mohrenweiser H, Jackson J, Ferguson S, Coulter S, Chanas B, *et al.* 2002, Identification and functional characterization of new potentially defective alleles of human CYP2C19. *Pharmacogenetics*; **12**: 703-11.
- Borst P, Evers R, Kool M, *et al.* 2000, A family of drug transporters: the multidrug resistance-associated proteins. *J Natl Cancer Inst*; **92**: 1295–302
- By Tabitha M. Powledge From: <http://www.faseb.org/opar/bloodsupply/pcr.html>
- Brinkmann U. 2002, Functional polymorphism of the human multidrug resistance (MDR1) gene: correlation with P glycoprotein expression and activity *in vivo.* *Novartis Found Symp*; **243**: 207–10
- Chain Termination (Sanger Dideoxy) Method. In: Alphey L. 1997, *DNA Sequencing, from experimental methods to bioinformatics.* Manchester: Bios Scientific Publishers Limited.
- Chaudhary N, Kabra M, Gulati S, Gupta YK, Pandey RM, Bhatia BD. 2016, Frequencies of CYP2C9 polymorphisms in North Indian population and their association with drug levels in children on phenytoin monotherapy. *BMC Pediatrics*; **16**: 66. doi: 10.1186/s12887-016-0603-0
- Crespi, C.L. dan Miller, V.P. 1997, The R144C change in the CYP2C9\*2 allele alters interaction of the cytochrome 450 with NADPH; cytochrome P450 oxidoreductase. *Pharmacogenetics*, **7**; 203-210.
- Cytochrome P450 2C19 (CYP2C19) Genotype". Mayo Medical Laboratories. June 2013.
- Desta Z, Zhao X, Shin JG, Flockhart DA. 2002, Clinical significance of the cytochrome P450 2C19 genetik polymorphism. *Clin Pharmacokinet*; **41**: 913–59.



UNIVERSITAS  
GADJAH MADA

**FREKUENSI DISTRIBUSI ALEL POLIMORFISME GENETIK GEN CYP2C9 DAN CYP2C19 PADA POPULASI SEHAT ETNIK PAPUA**

SYAHRUL TUBA, Pembimbing 1. Prof. Dr. Zullies Ikawati. Pembimbing 2. Prof. Dr. Mustofa, M.Kes., Apt

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- Dickmann LJ, Rettie AE, Kneller MB, *et al.* 2001, Identification and functional characterization of a new CYP2C9 variant (CYP2C9\* 5) expressed among African Americans. *Mol Pharmacol*; **60**:382-87.
- Dieffenbach CW, Lowe TMJ, Dveksler GS. 1995, *General Concepts for PCR Primer Design, in PCR. A Laboratory Manual. Dieffenbach CW, Dveksler GS, Editors.* New York: Cold Spring Harbor Laboratory Press.
- Eaton DL, Bammler TK. 1999, Concise review of the glutathione S-transferases and their significance to toxicology. *Toxicol Sci*; **49**: 156–64
- Evans, W. E. dan Relling, M.V. 1999, Pharmacogenomics; translating functional genomics into rational therapeutics. *Science*. 286.
- Fairbanks, D.J & W.R. Anderson. 1999, *Genetics the continuity of life.* Wadsworth publishing company, New York: xiii + 438 hlm.
- Fagerlund TH and Braaten O. 2001, No pain relief from codeine . . .? An introduction to pharmacogenomics. *Acta Anaesthesiol Scand*; **45**: 140–9
- Figueiras A, Estany-Gestal A, Aguirre C, Ruiz B, Vidal X, Carvajal A, Salado I, Salgado-Barreira A, Rodella L, Moretti U, Ibáñez L. 2016, CYP2C9 variants as a risk modifier of NSAID-related gastrointestinal bleeding: a case–control study. *Pharmacogenetics and genomics*.26(2):66.
- Flockhart DA, Clauw DJ, Sale EB, Hewett J and Woosley RL, 1994, Pharmacogenetic characteristics of the eosinophilia–myalgia syndrome. *Clin Pharmacol Ther.* **56**: 398–405.
- Freeman BD, Zelmbauer BA, McGrath S, *et al.* 2000, Cytochrome P450 Polymorphisms are associated with reduced warfarin dose. *Surgery*; **128**:281-285.
- Fromm MF, Kauffmann HM, Fritz P, *et al.* 2000, The effect of rifampin treatment on intestinal expression of human MRP transporters. *Am J Pathol*; **157**: 1575–80
- Furrer B, Candrian U, Wieland P, Luthy J. 1990, Improving PCR efficiency. *Nature*; 346:324.
- García-Martín E, Martínez C, Ladero JM, Agúndez JA, 2006, Interethnic and intraethnic variability of CYP2C8 and CYP2C9 polymorphisms in healthy individuals. *Mol Diag Ther*, **10**:29. doi:10.1007/BF03256440. PMID 16646575
- Gawronska-Szklarz, B., Adamiak-Giera, U., Wyska, E., Kurzawski, M., Gornik, W., Kaldonska, M., *et al.* 2012, CYP2C19 polymorphism affect single-dose pharmacokinetics of oral pantoprazole in healthy volunteers, *Eur J Clin Pharmacol.* **68(9)**:1267-74.
- Gonzalez FJ and Idle JR. 1994, Pharmacogenetik phenotyping and genotyping. Present status and future potential. *Clin Pharmacokinetics*; **26**: 59–70
- Goldstein JA, Ishizaki T, Chiba K, de Morais SM, Bell D, Krahn PM, Evans DA. 1997, Frequencies of the defective CYP2C19 alleles responsible for the mephenytoin poor

metabolizer phenotype in various Oriental, Caucasian, Saudi Arabian and American black populations. *Pharmacogenetics*. **7**(1):59-64.

Goldstein, J.A. and De Moris, S.M.F. 1994, Biochemistry and molecular biology of the human CYP2C family. *Pharmacogenetics*, **4**; 285-300.

Gray IC, Nobile C, Muresu R, Ford S, Spurr NK. 1995, A 2.4-megabase physical map spanning the CYP2C gene cluster on chromosome 10q24. *Genomics*. **28** (2): 328–32. doi:10.1006/geno.1995.1149. PMID 8530044

Hamajima, N., Saito, T., Matsuo, K., Kozaki, K., Takahashi, T., and Tajima, K., 2000, Polymerase chain reaction with confronting two-pair primers for polymorphism genotyping. *Jpn J Cancer Res*. **91**(9): 865–868.

Hatta FH, Lundblad M, Ramsjo M, Kang JH, Roh HK, Bertilsson L., *et al.* 2015, Differences in CYP2C9 genotype and enzyme activity between Swedes and Koreans of relevance for personalized medicine: Role of ethnicity, genotype, smoking, age, and sex. *Omics: J Integrati Biolo*, **19**(6):346-53.

Hatta, M. and Henk, L. Smits., 2007, Detection of Salmonella typhi by nested Polymerase Chain Reaction in blood, urine and stool samples. *Am J Trop Med Hyg*. **76**(1):139-43.

Hein DW, Doll MA, Fretland AJ, *et al.* 2000, Molecular Genetics and epidemiology of the NAT1 and NAT2 acetylation polymorphisms. *Cancer Epidemiol Biomarkers Prev*; **9**: 29–42

Helen oon. 2008, Malaysia. *New Holland Publisher*. Pp. 55-56. ISBN 18-453-7971-3.

Herrlin, K., Massele, A. Y., Jande, M., Alm, C., Tybring, G., Abdi, Y. A., *et al.*, 1998, Bantu Tanzanians have a decreased capacity to metabolize omeprazole and mephenytoin in relation to their CYP2C19 genotype. *Clin. Pharmacol. Ther.* **64**:391–401.

Hirota T, Eguchi S, Ieiri I. 2013, Impact of genetic polymorphisms in CYP2C9 and CYP2C19 on the pharmacokinetics of clinically used drugs. *Drug Metab Pharmacokinet*. **28**(1):28-37.

Hotez PJ, Kamath A. 2009, Neglected tropical diseases in sub-Saharan Africa: review of their prevalence, distribution, and disease burden. *PLoS Negl Trop Dis*. **3**: e412.

Ibeanu GC, Blaisdell J, Ferguson RJ *et al.* 1999, A novel transversion in the intron 5 donor splice junction of CYP2C19 and a sequence polymorphism in exon 3 contribute to the poor metabolizer phenotype for the anticonvulsant drug S-mephenytoin. *J Pharmacol Exp Ther*; **290**: 635–40.

Ikawati, Z., D Askitosari, T., Hakim, L., Tucci, J., & Mitchell, J., 2014. Allele frequency distributions of the drug metabolizer genes CYP2C9\*2, CYP2C9\*3, and CYP2C19\*17 in the Buginese population of Indonesia. *Current Pharmacogenomics and Personalized Medicine (Formerly Current Pharmacogenomics)*, **12**(4), 236-239.

Innis MA, Gelfand DH. 1994, *Optimization of PCRs*. In: Innis MA, Gelfand DH, Sninsky JJ, White TJ, editors. *PCR protocols, A Guide to Methods and Applications*. London: CRC Press; p. 5-11.

- Ingelman-Sundberg, M., 2004, Pharmacogenetics of cytochrome P450 and its applications in drug therapy: the past, present and future. *Trends Pharmacol Sci*, **25**: 193–200.
- Ingelman-Sundberg, M., 2005, Genetic polymorphisms of cytochrome P450 2D6 (CYP2D6): clinical consequences, evolutionary aspects and functional diversity. *The Pharmacogenomics Journal* volume 5, 6–13 DOI 10.1038/sj.tpj.6500285.
- Ingelman-Sundberg, M., Sim, S.C., Gomez, A., and Rodriguez-Antona, C., 2007, Influence of cytochrome P450 polymorphisms on drug therapies: pharmacogenetic, pharmacoeconomic and clinical aspects. *Pharmacol Ther.* **116**(3):496-526.
- Iohom G, Fitzgerald D. and A. J. Cunningham. 2004, Principles of Pharmacogenetics implications for the anaesthetist. *Bri J Anaesth*, **93** (3): 440–50.
- Jain, K.K., 2015, *Textbook of Personalized Medicine, 2nd ed.* 2015 edition. Ed. Humana Press, New York.
- Jakjovski K, Labachevski N, Petlichkovski A, Senev A, Trojancanec J, Atanasovska E, *et al.*, 2013, Distribution of CYP2C9 and VKORC1 Gene Polymorphisms in Healthy Macedonian Male Population. *Maced J Med Sci.* **6**(4):339-343. <http://dx.doi.org/10.3889/MJMS.1857.5773.2013.0319>.
- Kaisary A, Smith P, Jacqz E, *et al.* 1987, Genetic predisposition to bladder cancer: ability to hydroxylate debrisoquine and mephenytoin as risk factors. *Cancer Res* 1987; **47** 5488–5493.
- Kalow W. 1993, Pharmacogenetics: its biological roots and the medical challenge. *Clin Pharmacol Ther*; **54**: 235–41
- Kaneko, A., Kaneko, O., Taleo, G., Bjorkman, A. and Kobayakawa, T. 1997, High frequencies of CYP2C19 mutations and poor metabolism of proguanil in Vanuatu. *Lancet*, **349**: 921–922.
- Klein I, Sarkadi B, Varadi A. 1999, An inventory of the human ABC proteins. *Biochim Biophys Acta*; **1461**: 237–62
- Kubota, T., Chiba, K. and Ishizaki, T. 1996, Genotyping of S-mephenytoin 4'-hydroxylation in an extended Japanese population. *Clin. Pharmacol. Ther.* **60**: 661–666.
- Kruglyak L. The use of a genetic map of biallelic markers in linkage studies. *Nature Genet* 1997; **17**: 21–4
- Kwok S, Kellog DE, McKinney N, *et al.* 1990, Effects of primer-template mismatches on the polymerase chain reaction: Human Immunodeficiency Virus 1 model studies. *Nucleic Acids Res*; **18**:999-1 005.
- Lee KC, Ma JD, and Kuo GM. 2010, Pharmacogenomics: bridging the gap between science and practice. *J Am Pharm Assoc.* **50**(1): e1–14.
- Lee CR, Goldstein JA, Pieper JA. 2002. Cytochrome P450 2C9 polymorphisms: a comprehensive review of the in-vitro and human data. *Pharmacogenet Genomics*, **12**(3):251-63.
- Li J, Zhang L, Zhou H, Stoneking M, Tang K .2011, Global patterns of genetic diversity and signals of natural selection for human ADME genes. *Hum Mol Genet* **20**: 528–540.



**FREKUENSI DISTRIBUSI ALEL POLIMORFISME GENETIK GEN CYP2C9 DAN CYP2C19 PADA POPULASI SEHAT ETNIK PAPUA**

SYAHRUL TUBA, Pembimbing 1. Prof. Dr. Zullies Ikawati. Pembimbing 2. Prof. Dr. Mustofa, M.Kes., Apt

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- Li J, Bluth MH. 2011, Pharmacogenomics of drug metabolizing enzymes and transporters: implications for cancer therapy. *Pharmgenomics Pers Med*, **4**: 11–33.
- May DG, Black CM, Olsen NJ, *et al.* 1990, Scleroderma is associated with differences in individual routes of drug metabolism: a study with dapsone, debrisoquine, and mephenytoin. *Clin Pharmacol Ther*; **48**: 286–295.
- Miners JO dan Birkett DJ. 1998, Cytochrome P4502C9: an enzyme of major importance in human drug metabolism. *Br J Clin Pharmacol* **45**:525–538.
- Michel Eichelbaum, Magnus Ingelman-Sundberg dan William E. Evans. 2006, Pharmacogenomics and individualized drug therapy. *Annu Rev Med* **57**:1, 119-137
- Mc Graw J, Waller D. 2012, Cytochrome P450 variations in different ethnic populations. *Expert Opin Drug Metab Toxicol* **8**: 371–382.
- Arici M and O'zhan G., 2016, CYP2C9, CYP2C19 and CYP2D6 gene profiles and gene susceptibility to drug response and toxicity in Turkish population. *Saudi Pharmaceuti J*; ISSN: 1319-0164, Vol: 25, Issue: 3, Page: 376-380.
- Mroziewicz, M., and Tyndale, R. F. 2010, Pharmacogenetics: A Tool for Identifying Genetic Factors in Drug Dependence and Response to Treatment. *Addict Sci Clin Pract.* **5**(2): 17–29.
- Morita J, Kobayashi K, Wanibuchi A, Kimura M, Irie S, Ishizaki T, *et al.* 2004, A novel single nucleotide polymorphism (SNP) of the CYP2C19 gene in a Japanese subject with lowered capacity of mephobarbital 4'-hydroxylation. *Drug Metab Pharmacokinetic*; **19**: 236-8.
- Mueller RF, Young ID. 1998, *Emery's Elements of Medical Genetics*. 10th ed. Hong Kong: Churchill Livingstone.
- Nelson DR, Koymans L, Kamataki T, Stegeman TT, Feyereisen R, and Waxman DJ, *et al.* 1996, P450 superfamily: update on new sequences, gene mapping, accession number, and nomenclature. *DNA Cell Biol.* **12**(1):1-51.
- Pilotto A, Seripa D, Franceschi M, Scarcelli C, Colaizzo D, Grandone E., *et al.* 2007, Genetic susceptibility to nonsteroidal anti-inflammatory drug-related gastroduodenal bleeding: role of cytochrome P450 2C9 polymorphisms. *Gastroenterology*.**133**(2):465-71.
- Promega Corporation. 1998, *Betain and DMSO: Enhancing agent for PCR*. Promega Note: Promega Corporation Publisher; 65 :27-29.
- Onder, G. Pedone. 2005, *Adverse Drug Reactions as cause of Hospital Admissions*. [Online] tersedia di <http://journal.society/file.pdf> [diakses 29 November 2017].
- QIAamp DNA mini kit and QIAamp DNA blood mini kit handbook.US Patent 4,683,195 and 4,683,202.1999 Jan QIAGEN.
- Rasmaizatul Akma Rosdi, Narazah Mohd Yusoff, Rusli Ismail, Tan Soo Choon, Mohamed Saleem, Nurfadhline Musa & Surini Yusoff. 2015, High allele frequency of CYP2C9\*3 (rs1057910) in a Negrito's subtribe population in Malaysia; Aboriginal people of Jahai, *Ann Hum Biol*, DOI: 10.3109/03014460.2015.1068372



**FREKUENSI DISTRIBUSI ALEL POLIMORFISME GENETIK GEN CYP2C9 DAN CYP2C19 PADA POPULASI SEHAT ETNIK PAPUA**

SYAHRUL TUBA, Pembimbing 1. Prof. Dr. Zullies Ikawati. Pembimbing 2. Prof. Dr. Mustofa, M.Kes., Apt

UNIVERSITAS  
GADJAH MADA

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Rau T, Wohlleben G, Wuttke H, Thuerauf N, Lunkenheimer J, Lanczik M, Eschenhagen T. 2004, CYP2D6 genotype: impact on adverse effect and nonresponse during treatment with antidepressants - a pilot study. *Clin Pharmacol Ther*; **75**:386-93.

Relling MV, Giacomini KM. *Pharmacogenetics*. In: Brunton LL, Chabner B, Knollmann B, editors. 2011, *Goodman and Gilman's the pharmacological basis of therapeutics*. New York: McGraw Hill; p.145-68.

Romkes M, Faletto MB, Blaisdell JA, Raucy JL, Goldstein JA, 1991, Cloning and expression of complementary DNAs for multiple members of the human cytochrome P450IIC subfamily. *Biochemistry*. **30** (13): 3247-55. doi:10.1021/bi00227a012. PMID 2009263

Rosemary J dan Adithan C, 2007, The Pharmacogenetics of CYP2C9 and CYP2C19: ethnic variation and clinical significance. *Current Clinical Pharmacology*. **2** (1): 93-109. doi:10.2174/157488407779422302. PMID 18690857

Sambrook, J. & D.W. Russel 2001b, *Molecular cloning: A laboratory manual*. Vol 2. 3<sup>rd</sup> ed. Cold Spring Harbor Laboratory Press, New York: xxvii +8.1-14.53 hlm.

Santos, P.C., Soares, R.A., Santos, D.B., Nascimento, R.M., Coelho, G.L., Nicolau, J.C., *et al.*, 2011, CYP2C19 and ABCB1 gene polymorphisms are differently distributed according to ethnicity in the Brazilian general population. *BMC Med Genet*. **12**: 13.

Santiago Rodriguez, Tom R. Gaunt and Ian N. M. Day. 2009, Hardy-Weinberg Equilibrium Testing of Biological Ascertainment for Mendelian Randomization Studies. *Am J Epidemiol*. **169**(4): 505-514.

Schwarz UI. 2003, Clinical relevance of genetic polymorphisms in the human CYP2C9 gene. *Eur J Clin Invest*, **33**(Suppl 2):23-30.

Scordo MG, Aklillu E, Yasar U, Dahl ML, Spina E, Ingelman-Sundberg M. 2001, Genetik polymorphism of cytochrome P450 2C9 in a Caucasian and a black African population. *Br J Clin Pharmacol*. **52**: 447-450.

Seidman, L. and Mowery J., 2006, *UV spectrophotometry of DNA, RNA, and proteins*. 25 September 2017: 9 hal.

Sharrocks AD. 1994, *The design of primers for PCR*. In: Griffin HG, Griffin AM, editors. *PCR Technology, Current Innovations*. London: CRC Press; 1994. p. 511.

Slaughter RL dan Edwards DJ. 1995, Recent advances: the cytochrome P450 enzymes. *Ann Pharmacother*; **29**: 619-24.

Sim SC, Risinger C, Dahl ML, Aklillu E, Christensen M, Bertilsson L, *et al.* 2006, A common novel CYP2C19 gene variant causes ultrarapid drug metabolism relevant for the drug response to proton pump inhibitors and antidepressants. *Clin Pharmacol Ther*, **79**: 103-13.

Sim SC, Kacevska M, and Ingelman-Sundberg M. 2013, Pharmacogenomics of drug-metabolizing enzymes: a recent update on clinical implications and endogenous effects. *Pharmacogenomics J*, **13**: 1-11.

Sim, Sarah C., 2011, *CYP2C9 allele nomenclature*. Cytochrome P450 (CYP) Allele Nomenclature Committee.

Sistonen J, Fuselli S, Palo JU, Chauhan N, Padh H, Sajantila A. 2009, Pharmacogenetik variation at CYP2C9, CYP2C19, and CYP2D6 at global and microgeographic scale. *Pharmacogenet Genomics*, **19**:170–179.

Slobodan Rendic. 2002, Summary of information on human CYP enzymes: human P450 metabolism data, *Drug Metabolism Reviews*, **34**:1-2, 83-448, DOI: 10.1081/DMR-120001392

Spatzeneger M, Jaeger W. 1995, Clinical importance of hepatic cytochrome P450 in drug metabolism. *Drug Metabolism Rev*, **27**: 397–417.

Strachman T, Read AP. 1996, *Human Molecular Genetics*. Bios Scientific Publishers Limited.

Stubbins MJ, Harries LW, Smith G, *et al.* 1996, Genetik analysis of human cytochrome P450 CYP2C9 locus. *Pharmacogenetics*, **6**:429-439.

Sullivan-Klose TH, Ghanayem BI, Bell DA *et al.*, 1996, The role of the CYP2C9-Leu359 allelic variant in the tolbutamide polymorphism. *Pharmacogenetics*, **6**:341-349.

Suryandari, D.A. 2005, *Polimorfisme gen reseptor (FSH): Pengaruhnya pada sensitifitas ovarium wanita yang mengikuti program reproduksi berbantuan terhadap stimulasi FSH eksogen*. Disertasi PDIB FKUI.

Suryo. 1983, *Genetika*. Gadjah Mada University Press: Yogyakarta.

Takanashi K, Tainaka H, Kobayashi K, Yasumori T, Hosakawa M, Chiba K. 2000, CYP2C9 Ile359 and Leu359 variants: enzyme kinetic study with seven substrates. *Pharmacogenetics*, **10**(2):95-104.

Takeshi Hirota, Shunsuke Eguchi and Ichiro Ieiri. 2013, Impact of Genetik Polimorphisms in CYP2C9 and CYP2C19 on the pharmacokinetics of clinically used drugs. *Drug Metab Pharmacokinet*, **28**(1):28-37.

Taube J, Halsall D, Baglin T. 2000, Influence of cytochrome P-450 CYP2C9 polymorphisms on Warfarin sensitivity and risk of over-anticoagulation in patients on long term treatment. *Blood*, **96**:1816-1819.

Tracy C. DeLozier, *et al.* 2005, Functional Characterization of Novel Allelic Variants of CYP2C9 Recently Discovered in Southeast Asians. *J Pharmacol Exp Ther*, **315**(3):1085-90.

Troendle JF, Yu KF. 1994, A note on testing the Hardy-Weinberg law across strata. *Am J Hum Genet*, **58** :397-402.

Tsuneoka Y, Fukushima K, Matsuo Y, Ichikawa Y, Watanabe Y. 1996, Genetic analysis of the CYP2C19 gene in the Japanese population. *Life Sci*, **59**: 1711–1715.



**FREKUENSI DISTRIBUSI ALEL POLIMORFISME GENETIK GEN CYP2C9 DAN CYP2C19 PADA POPULASI SEHAT ETNIK PAPUA**

SYAHRUL TUBA, Pembimbing 1. Prof. Dr. Zullies Ikawati. Pembimbing 2. Prof. Dr. Mustofa, M.Kes., Apt

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Tucker GT. 1994, Clinical implications of genetic polymorphism in drug metabolism. *J Pharm Pharmacol*, **46** (Suppl 1):417-24.

Tukey RH, Strassburg CP. 2000, Human UDP-glucuronosyltransferases: metabolism, expression, and disease. *Annu Rev Pharmacol Toxicol*, **40**:581-616.

Xie H, Prasad HC, Kim RB, Stein CM. 2002, CYP2C9 allelic variants: ethnic distribution and functional significance. *Adv Drug Deliver Rev*; **54**: 1257-70.

Xie HG, Kim RB, Wood JJ, Stein CM. 2001, Molecular basis of ethnic differences in drug disposition and response. *Annu Rev Pharmacol Toxicol*, **41**: 815–50.

Van Booven D, Marsh S, McLeod H, Carrillo MW, Sangkuhl K, Klein TE, Altman RB. Cytochrome P450 2C9-CYP2C9. *Pharmacogenet Genomics*, **20**(4):277-81.

Van der Weide J, Steijns LSW. 1999, Cytochrome P450 enzyme system: genetik polymorphisms and impact on clinical pharmacology. *Ann Clin Biochem*; **36**: 722–9.

Winship RR 1989, An improved method for directly sequencing PCR amplified material using DMSO. *Nucleic Acids Res*; **17**: 1266.

Wittkowsky AK. Allison Burnett, Geno J Merli, Jack E Ansell, David A Garcia and Edith A Nutescu. 2013, Pharmacogenomics of Warfarin. Anticoagulation Forum *Ann Pharmacother*, **47**:714-24.

Wolfe, S.L. 1995, *An introduction to cellular and molecular biology*. Wadsworth Publishing Company, Belmont; USA; xvii + 820 hlm.

Yamada S, Onda M, Kato S, Matsuda N, Matsuhisa T, Yamada N *et al.*,2001, Genetic differences in CYP2C19 single nucleotide polymorphisms among four Asian populations. *J Gastroenterol*. **36**(10):669-72.

Yasuda SU, Zhang L, Huang SM. 2008, The role of ethnicity in variability in response to drugs: focus on clinical pharmacology studies. *Clin Pharmacol Ther*, **84**(3):417-23.

Zhang, Y., Si, D., Chen, X., Lin, N., Guo, Y., Zhou, H., & Zhong, D. 2007, Influence of CYP2C9 and CYP2C19 genetic polymorphisms on pharmacokinetics of gliclazide MR in Chinese subjects. *Br J Clin Pharmacol*, **64**(1): 67–74.