

Atherosclerosis prevention mechanism through purple sweet potato (*Ipomoea batatas*) consumption: Roles of intracellular HSP 70, extracellular HSP 70, Lipoprotein associated phospholipase A2 (Lp-PLA2), high sensitivity C-reactive protein (hs-CRP) toward foam cell

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Background: Atherosclerosis is a chronic inflammatory disease involving immunological activity, inflammatory cells, proinflammatory cytokines, and primitive proteins. Natural food ingredients are highly consumed to prevent atherosclerosis. People consuming purple sweet potato (*Ipomoea batatas*) have lower incidence of coronary heart disease.

Objective: The objective of this study is to prove the mechanism of atherosclerosis prevention through the provision of purple sweet potato (*Ipomoea batatas*).

Methods: This research used a randomized post-test only control group design using 18 white rats (*Rattus norvegicus wistar strain*) that were divided into three groups containing six rats in each group, namely, the first group was normal group, the second group was given atherosclerotic diet, and the third group was a treatment group given diet of atherosclerotic and purple sweet potato (*Ipomoea batatas*) extract orally (26.6 mg). After 90 days of treatment, blood sampling was carried out for measuring the levels of extracellular Heat Shock Protein 70 (e HSP70), high sensitivity c-reactive protein (hs-CRP), lipoprotein associated phospholipase A2 (Lp-PLA2) enzyme using ELISA and measuring the intracellular Heat Shock Protein 70 (i HSP70) expression in the monocytes using immunocytochemistry and histopathologic observation on the number of foam cells in rats' aorta.

Results: The administration of purple sweet potato (*Ipomoea batatas*) extract is proved to decrease hs-CRP level and the number of foam cells in the aorta. Increase of i HSP70 expression in monocytes, activity of Lp-PLA2 enzyme and e HSP70 level in circulation occur. Path analysis showed two significant paths in atherosclerosis prevention: *Ipomoea batatas* - i HSP70-foam cell and *Ipomoea batatas* - i HSP70 - e HSP70 - Lp-PLA2-foam cell. Path of *Ipomoea*

batatas - i HSP70-foam cell is more dominant to prevent atherosclerosis. The role of intracellular Heat Shock Protein 70 (i HSP70) is dominant on the path as molecular chaperone functioned as cytoprotective on monocyte.

Conclusion: The extract of purple sweet potato (*Ipomoea batatas*) can reduce hs-CRP, foam cell and improve i HSP70, Lp-PLA2 and e HSP70. The main line in the prevention of atherosclerosis is through *Ipomoea batatas* - i HSP70-foam cell and is dominated by the role of i HSP 70.

Speaker Biography

Meddy Setiawan, MD, PhD is an Internal Medicine Specialist in Malang, Indonesia. He received his medical degree and completed his medical residency at Brawijaya University. He received his PhD degree in medicine from University of Airlangga. Currently he is affiliated with University of Muhammadiyah Malang and University of Muhammadiyah Malang Hospital as lecturer and internal medicine specialist. As an internist and a lecturer, he has interests in conducting a research on Atherosclerosis. Besides, he has also developed a textbook on Endocrine and the one on Cardiocerebrovascular for his students. He has published his researches on the field of Atherosclerosis such as 1) The Effect of Extract from Pericarp of Mangosteen (*Garcinia mangostana* Linn) as an Antioxidant in Rats Models of Atherosclerosis (published in Journal of Cardiology Indonesia, 2012), and 2) The Effect of Virgin Coconut Oil (VCO) on the Regression of Foam Cell and the Ratio Decrease of LDL/HDL Cholesterol of White Male Rat Atherosclerotic (*Rattus norvegicus* strain wistar) published in Journal of Sain Med, 2009. He also has already owned a patent for his invention on Seaweed as Antihypertensive Therapy: The Formulation of Seaweed Effervescent Tablet (*Euclima spinosum*) as an angiotensin I converting enzyme (ACE) a natural inhibitor in 2015. As a lecturer and a clinician, he also actively involves in some seminars, symposium and workshops, either as a participant or a presenter. In May, 2017 he presented his research on Basic Molecular Biology Course XV as a keynote speaker, entitled: The Role of Primitive Protein Heat Shock Protein (HSP) on chronic inflammation (Atherosclerosis). Besides, he also has received some awards firstly, from The Ministry of Culture and Education Republic of Indonesia as an advisor of Students Creativity and Research in 2013, secondly, from The Ministry of Health Republic of Indonesia as a medical practitioner for Indonesian Hajj in Saudi Arabia in 2012, 2014, thirdly from Haramain Award from the Department of Religion and Health Republic of Indonesia as a Researcher of Hajj Health in Saudi Arabia in 2014. Next, an award as an exemplary lecturer in the Faculty of Medicine in Muhammadiyah University in Malang in 2017 and finally, an award from the President of Indonesia Satyalancana Karya Satya X Years in 2016.

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