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Phaleria macrocarpa's extract reduce autophagy through TNF- α and MDA in preeclampsia-induced HUVEC culture

Leo Simanjuntak¹, M Fidel Ganis Siregar², Johannes C Mose³ and Sarma N Lumbanraja²

¹Universitas HKBP Nommensen, Indonesia

²Universitas Sumatera Utara, Indonesia ³Universitas Padjadjaran, Indonesia

The preeclampsia etiopathogenesis remains unclear but endothelial dysfunction and oxidative stress play L important role. TNF-α is considered as specific markers for preeclampsia. Malondialdehyde (MDA) is the final product of lipid peroxidation, used as the oxidative stress marker. Autophagy plays an important role in preeclampsia as observed in the failure of trophoblast invasion and spiral artery remodeling. It is proven that TNF-α increased LC3-II expression in trophoblast cell line cultures. Another cause of autophagy is oxidative stress. LC3-II is used as a typical marker in autophagy. HUVEC culture is an in vitro model widely used to study the pathogenesis of preeclampsia. Phaleria macrocarpa (Scheff.) Boerl also known as Mahkota Dewa in Indonesia is widely used as an anti-inflammation and antioxidant. This study aimed to determine the effects of Phaleria macrocarpa's extract on inflammation, oxidative stress and autophagy in endothelial cells by measuring the TNF-α, MDA and LC3-II level in preeclampsia-induced HUVEC. Phaleria macrocarpa's extract reduce TNF- α level significantly at concentration of 7.813 µg/mL and at 62.5 µg/mL reduce TNF- α level to normal level. Phaleria macrocarpa's extract reduce MDA level significantly at concentration of 3.906 μg/mL and at 15.625 μg/mL reduce MDA level to normal level. There was no significant decrease in mean LC3-II levels between control and PE model and Phaleria macrocarpa's extract at concentration more than 250 µg/mL needed to reduce LC3-II level in preeclampsia model to normal pregnancy level. Each TNF-a and MDA has strong positive correlation (r=0.958 and r=0.847) with LC3-II levels. The correlation between values indicates that when reduced $TNF-\alpha$ and MDA level, a proportional decrease in LC3-II levels also occurs, where a decrease in TNF- α level of 1 pg/mL will reduce LC3-II levels by 0.413 pg/mL and a decrease in MDA level of 1 pmol/mL will reduce LC3-II levels by 0.222 pg/mL. In conclusion, TNF-α has a stronger positive correlation to LC3-II level than MDA. However, Phaleria macrocarpa's extract might be used to overcome endothelial dysfunction, oxidative stress and autophagy in preeclampsia.

Biography

Leo Simanjuntak is an Obstetrician and Gynecologist and a Senior Lecturer at Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas HKBP Nommensen, Medan, Indonesia. He/She has completed master's degree in Obstetrics and Gynecology and PhD program at Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia.

leosimanjuntak66@gmail.com