

INTISARI

Efek Pemberian Asam Asiatika Terhadap Ekspresi mRNA IL-6, TGF- β , α -SMA dan Sekresi Kolagen pada *Coculture* Sel Fibroblas NIH3T3 dan Sel Makrofag RAW264.7 yang Diinduksi Inflamasi Dan Media Tinggi Glukosa

Latar belakang: Inflamasi merupakan salah satu faktor pemicu terjadinya kondisi patologis pada diabetes. Hiperglikemia dan inflamasi yang terjadi secara persisten pada penderita diabetes merupakan pemicu utama terganggunya regulasi gen pada sel fibroblas. Gangguan tersebut ditandai dengan hipersekresi kolagen. Asam asiatika dilaporkan memiliki aktivitas anti-inflamasi dan mencegah terjadinya kerusakan sel yang diakibatkan oleh inflamasi

Tujuan penelitian: Penelitian ini bertujuan untuk mengkaji aktivitas farmakologi dan mekanisme aksi asam asiatika untuk mencegah gangguan fungsi sel fibroblas

Metode: Studi ini dilakukan menggunakan model *coculture* sel fibroblas NIH3T3 dan sel makrofag RAW264.7 yang diinkubasi dalam media kultur tinggi glukosa dan LPS selama 48 jam. Asam asiatika diberikan dalam tiga konsentrasi pada model *coculture* selama 24 jam. Pengukuran ekspresi mRNA IL-6, TGF- β , α -SMA dilakukan menggunakan *real-time* PCR. Kadar kolagen dalam media kultur diukur menggunakan pewarnaan *Sirius red*.

Hasil penelitian: Model *coculture* sel makrofag RAW264.7 dan sel fibroblas NIH3T3 dalam media kultur tinggi glukosa dan LPS menunjukkan peningkatan ekspresi mRNA IL-6, TGF- β , dan kadar kolagen dibandingkan dengan monokultur sel fibroblas NIH3T3. Pemberian asam asiatika pada model *coculture* dapat menghambat inflamasi melalui penghambatan ekspresi mRNA IL-6 pada konsentrasi 10 $\mu\text{g/mL}$ dan 5 $\mu\text{g/mL}$. Pemberian asam asiatika 2,5 $\mu\text{g/mL}$ pada model *coculture* menunjukkan ekspresi TGF- β dan kadar kolagen dalam media kultur yang lebih rendah dibandingkan monokultur sel fibroblas.

Kesimpulan: Asam asiatika dengan konsentrasi 2,5 $\mu\text{g/mL}$ yang diberikan pada model *coculture* sel NIH3T3 dan sel RAW264.7 dapat menunjukkan ekspresi IL-6, TGF- β , dan kadar kolagen yang lebih rendah dibandingkan pada model *coculture* tanpa perlakuan

Kata Kunci: *direct coculture*, asam asiatika, disfungsi sel fibroblas, Sel RAW264.7, Sel NIH3T3

ABSTRACT

Effect of Asiatic Acid on IL-6, TGF- β , α -SMA mRNA Expression and Collagen Secretion in Coculture of NIH3T3 Fibroblast Cells and RAW264.7 Macrophage Cells Induced Inflammation and High Glucose Media

Background: Inflammation is one of the most important trigger factors for pathological conditions in diabetes. Hyperglycemia and inflammation that occur persistently in diabetics is the main trigger for the disruption of gene regulation in fibroblast cells. The disorder is characterized by collagen hypersecretion. Asiatic acid is reported have anti-inflammatory activity and prevent cell damage caused by inflammation

Objective: The aim of the study is to investigate the pharmacological activity and mechanisms of action of asiatic acid to prevent fibroblast cell dysfunction

Methods: The *coculture* model of fibroblast NIH3T3 cells and macrophage RAW264.7 cells that were incubated in high glucose and LPS culture media for 48 hours. Asiatic acid with three concentrations was given to the *coculture* model for 24 hours. IL-6, TGF- β , α -SMA mRNA expression were measured by real-time PCR. Collagen levels in culture media was measured by Sirius red staining

Results: The *coculture* model of macrophage RAW264.7 cell and fibroblast NIH3T3 cells in high glucose and LPS culture media showed an increase in IL-6, TGF- β mRNA expression, and collagen levels compared to fibroblast NIH3T3 cell mono-culture. Meanwhile, administration of asiatic acid in the *coculture* model can inhibit inflammation through inhibition of IL-6 mRNA expression at concentrations (10 μ g / mL and 5 μ g / mL). Administration of 2.5 μ g / mL asiatic acid in the coculture model showed TGF- β expression and collagen levels in culture media which were lower than mono-culture of fibroblast cells.

Conclusion: Asiatic acid with a concentration of 2.5 μ g / mL given to the NIH3T3 cell coculture model and RAW264.7 cells can show IL-6, TGF- β mRNA expression, and collagen level are lower compared to the untreated coculture model

Keywords: direct coculture, asiatic acid, fibroblas cell dysfunction, RAW264.7 cells, NIH3T3 cells