

**PENENTUAN NFKB (Nuclear Kappa Beta) SEBAGAI BIOMARKER  
ATHEROSKLEROSIS DALAM KAJIAN NUTRIGENOMIK  
(Upaya Mendapatkan Diagnostic Kit Untuk Deteksi Dini Penyakit  
Vaskuler)**

**LAPORAN PROGRAM INSENTIF  
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## ABSTRAK

Penentuan NFkB(Nuclear Kappa Beta) Sebagai Biomarker Atherosklerosis dalam Kajian Nutrigenomik (Upaya Mendapatkan Diagnostic Kit Untuk Deteksi Dini Penyakit Vaskuler)

**Latar belakang.** Atherosklerosis merupakan salah satu penyebab kematian tertinggi di Indonesia. Dysfungsi endothel merupakan faktor yang terlibat dalam proses penyakit tersebut. Circulating endothelial cell (CEC) merupakan metode baru dan dapat digunakan untuk menilai terjadinya disfungsi/kerusakan endotel. Penelitian terdahulu banyak membuktikan bahwa atherosklerosis merupakan proses inflamasi kronis, terlihat dari meningkatnya aktivasi NFkB, molekul adesi (ICAM-1.VCAM-1), sitokine (TNF, IL), vasoactive substance (eNOS, NO) dan faktor koagulasi (PAI-1).

**Metode. Penelitian** experiment murni laboratois, menggunakan hewan coba ratus novergicus strain wistar, diberikan High Fat Diet (HFD) selama 2,4 dan 6 bulan, dengan kontrol diet normal, Pengukuran variabel aktivasi NFkB, molekul adesi (ICAM-1.VCAM-1), sitokine (TNF, IL), vasoactive substance (eNOS, NO) dan faktor koagulasi (PAI-1) dengan ELISA dan imunohistokimia, CEC dengan flowcitometri.

**Hasil dan Pembahasan.** Terdapat peningkatan yang signifikan ( $p=0,00$ ) pada selang kepercayaan 99% ekspresi NFkB, molekul adesi (ICAM-1.VCAM-1), sitokine (TNF, IL), vasoactive substance (eNOS, NO) dan faktor koagulasi (PAI- 1) serta jumlah CEC kelompok pemberian HFD dengan rata-rata tertinggi pemberian HFD 6 bulan. Hal ini menunjukkan pemberian HFD memicu peningkatan mediator proinflamasi. Hal tersebut terjadi oleh karena aktivasi NFkB, suatu faktor transkripsi yang berperan penting dalam prose inflamasi.

**Kesimpulan Saran.** NFkB merupakan biomarker terjadinya disfungsi endothel, sehingga disarankan penelitian selanjutnya untuk mendeteksi NFkB dalam CEC populasi high risk penyakit jantung.

Kata kunci : NFkB, circulating endothelial cell, atherosklerosis

## ABSTRACT

Determination of NFkB (Nuclear Beta Kappa) As a Atherosclerosis biomarker in Nutrigenomics Study (Efforts to Obtain Diagnostic Kit For Early Detection of Vascular Disease)

**Background.** Atherosclerosis have been assigned as the cause of cardiovascular diseases in Indonesia and lead to high mortality rate. Endothelial dysfunction is one of the most common factor involve in this process. Circulating endothelial cells (CEC's) have been detected in this event and can be counted. Preliminary study reports inflammatory reactions play an important role which can be seen in the raising of activation of NFkB, adhesion molecules (ICAM1, VCAM-1), cytokine (TNFalpha, and interleukins).

### Methods

An experimental study involving Wistar Rat have been done in 2 consecutive years. Three group were given high fat diet (HFD) with control groups in normal diet. After 2, 4 and 6 months, all parameters of inflammatory reactions of atherosclerosis were examined.

Examination of NFkB were done by ELISA method, CEC with flowcytometri, NO and eNOS examined by ELISA and immunohistochemical study, ICAM, VCAM, immunohistochemical study, TNF alpha immunohistochemical study, interleukin were examined by immunohistochemical study

**Result and Discussion :** There was a significant increase ( $p = 0.00$ ) at 99% confidence interval NFkB expression, adhesion molecule (ICAM-1.VCAM-1), sitokine (TNF, IL), vasoactive substance (eNOS, NO) and coagulation factors (PAI - 1) and amount of CEC group of HFD with the highest average of 6 months of HFD. This shows an increase of HFD trigger proinflammatory mediators. This occurs because of activation of NFkB, a transcription factor that plays an important role in the inflammatory process. Conclusion: NFkB is a biomarker of endothel dysfunction, which recommended further research to detect CEC NFkB in high-risk population for heart disease

Keywords: NFkB, circulating endothelial cell, atherosclerosis

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