

INTISARI

PENGARUH SUPLEMENTASI MINYAK IKAN OMEGA 3 TERHADAP KADAR TNF ALPHA, PROLIFERASI DAN DIFERENSIASI SEL SATELIT PADA TIKUS WISTAR YANG DIINDUKSI CEDERA OTOT DENGAN MODEL *SINGLE BOUT OF DOWNHILL RUNNING EXERCISE*

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Latar belakang: Latihan *eccentric tipe single bout of downhill running exercise* menyebabkan cedera otot dan ekksesif sitokin pro inflamasi TNF- α yang berakibat pada gangguan proliferasi dan diferensiasi sel satelit yang bertanggung jawab terhadap regenerasi otot. Kemampuan minyak ikan omega 3 menurunkan inflamasi digunakan untuk memicu regenerasi otot setelah cedera.

Tujuan: Mengetahui pengaruh suplementasi minyak ikan omega 3 terhadap penurunan kadar TNF- α , proliferasi dan diferensiasi sel satelit setelah cedera otot.

Metode: Tikus wistar jantan dibagi menjadi kelompok kontrol tidak cedera, cedera otot tanpa suplementasi minyak ikan serta cedera otot dan diberikan suplementasi minyak ikan 2 jam setelah latihan dengan dosis 3,6 mg/200mgBB; 5,4 mg/200mgBB dan 7,2 mg/200mgBB melalui oral sonde. Cedera otot diinduksi melalui *downhill running* pada treadmill selama 90 menit (5 menit berlari dengan interval istirahat 2 menit). 24 jam setelah latihan dilakukan pemeriksaan kadar TNF- α serum darah yang diambil dari vena retroorbita melalui ELISA. Ekspresi MyoD dan Myogenin yang merupakan marker proliferasi dan diferensiasi melalui *Reverse Transcriptase Polymerase Chain Reaction* (RT-PCR) kemudian dianalisis densitometri. Uji statistik menggunakan *one way ANOVA* dilanjutkan dengan *post hoc* serta regresi linier.

Hasil penelitian: Kadar TNF- α lebih rendah secara signifikan pada kelompok yang diberikan suplementasi minyak ikan omega 3 dibandingkan kelompok kontrol. Ekspresi MyoD sebagai marker proliferasi sel satelit dan ekspresi Myogenin sebagai marker diferensiasi sel satelit pada jam ke 72 lebih tinggi secara signifikan pada kelompok yang diberikan suplementasi minyak ikan dibandingkan kelompok kontrol. Suplementasi minyak ikan omega 3 dosis tinggi menekan inflamasi yang menyebabkan pergeseran waktu proliferasi sel yang menyebabkan gangguan regenerasi otot.

Kesimpulan: Suplementasi minyak ikan omega 3 pada dosis yang sesuai menurunkan kadar TNF- α dan meningkatkan proliferasi dan diferensiasi sel satelit melalui ekspresi MyoD dan Myogenin.

Kata kunci: *Single bout of downhill running exercise*, cedera otot, minyak ikan omega 3, TNF- α , proliferasi sel satelit, diferensiasi sel satelit.

ABSTRACT

EFFECT OF FISH OIL OMEGA 3 SUPPLEMENTATION ON TNF ALPHA CONCENTRATION, PROLIFERATION AND DIFFERENTIATION OF SATELLITE CELL IN RAT WISTAR MUSCLE INJURY AFTER SINGLE BOUT OF DOWNHILL RUNNING EXERCISE

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Background: Single bout of downhill running exercise causes muscle injury and excessive TNF- α pro inflammatory cytokine resulted in impaired of muscle regeneration trough inhibition of satellite cell proliferation and differentiation. The ability of omega 3 to decreased inflamation is used to enhance muscle regeneration after injury.

Objective: To investigate the effect of fish oil omega 3 supplemented on decreased levels of TNF- α , proliferation and differentiation of satellite cells after muscle injury.

Methods: Male wistar rats were divided into control group (non injury), muscle injury unsupplemented group and fish oil supplemented group with different doses: low (3,6 mg/200mgBB); medium (5,4 mg/200mgBB) and high (7,2 mg/200mgBB) at 2 hour after exercise via oral sonde. Subject had performed 90 min downhill running (5 min running, 2 min rest). Blood sample were taken from retroorbital vein 24 hour following exercise for TNF- α measurement and solei muscle surgically removed 72 hour following exercise for MyoD and Myogenin expression measurement.

Results: There was significantly decreased in TNF- α levels on fish oil supplemented groups compare to unsupplemented group. MyoD and Myogenin expression as a proliferation and differentiation of satellite cell marker at 72 hour following exercise significantly higher in fish oil supplemented group than unsupplemented group. Fish oil supplementation with high doses causes delayed cell proliferation contribute to impaired cell regeneration.

Conclusion: Fish oil omega 3 increases proliferation and differentiation of satellite cells through MyoD dan Myogenin expression by decreasing TNF- α level in a dependent doses.

Keywords: *Single bout of downhill running exercise*, muscle injury, fish oil omega 3, TNF- α , satellite cell proliferation, satellite cell differentiation.