

**PENGARUH POLIMORFISME GEN ACTN3 R577X RS1815739
TERHADAP PERUBAHAN KETAHANAN OTOT SETELAH *SPRINT*
INTERVAL TRAINING (SIT)**

**Studi pada Mahasiswa Unit Kegiatan Mahasiswa Olahraga Universitas
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Abstrak

Latar Belakang. Ketahanan otot mempengaruhi performa dan prestasi atlet saat pertandingan. Ketahanan otot dipengaruhi variasi genetik dan dapat ditingkatkan dengan *interval training*. SIT efektif dan efisien meningkatkan daya tahan dengan komitmen waktu singkat.

Tujuan. Mengetahui pengaruh polimorfisme gen ACTN3 R577X rs1815739 terhadap perubahan ketahanan otot mahasiswa UKM Olahraga Unsoed setelah menjalani SIT.

Metode. Penelitian quasi eksperimental tanpa kontrol dengan *pre and post test design*. Subjek penelitian adalah dua puluh empat laki-laki yang dipilih melalui *consecutive sampling* dan dibagi menjadi kelompok RR, RX, dan XX. Polimorfisme gen ACTN3 R577X rs1815739 diidentifikasi dengan PCR-RFLP, sedangkan perubahan ketahanan otot diukur dengan *half squat jumps* selama satu menit. SIT dilaksanakan selama 5 minggu, 3 sesi per minggu, 1 sesi terdiri 4 repetisi dari 30 detik *sprint* dan 4 menit istirahat aktif. Perubahan ketahanan otot tiap kelompok diuji dengan *Paired T Test* dan *Wilcoxon*, sedangkan perbedaan perubahan ketahanan otot antar kelompok diuji dengan ANOVA satu arah dan *Post-Hoc LSD*.

Hasil. Terdapat peningkatan signifikan ketahanan otot setelah SIT pada semua kelompok (RR $p=0,007$; RX $p<0,001$; XX $p=0,012$). Perubahan ketahanan otot berbeda signifikan antar kelompok ($p=0,014$), dengan perbedaan signifikan pada kelompok RR-RX ($p=0,010$) dan RX-XX ($p=0,010$).

Kesimpulan. Terdapat pengaruh polimorfisme gen ACTN3 R577X rs1815739 terhadap perubahan ketahanan otot mahasiswa UKM Olahraga Unsoed setelah menjalani SIT.

Kata Kunci : Polimorfisme Gen ACTN3 R577X rs1815739, Perubahan Ketahanan Otot, *Half Squat Jumps* 1 Menit, *Sprint Interval Training* (SIT)

**EFFECT OF ACTN3 GENE POLYMORPHISM R577X RS1815739 ON
MUSCLE ENDURANCE CHANGES AFTER SPRINT INTERVAL
TRAINING (SIT)**

**Study on Student of Sports Activity Unit (SAU) of Jenderal Soedirman
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Abstract

Background. Muscle endurance affect the athletes' performance and achievements during the match. Muscle endurance is affected by genetic variation and can be enhanced with interval training. SIT effectively and efficiently improve the endurance with shorter time commitment.

Objective. The study aims to understand the effect of ACTN3 gene polymorphism R577X rs1815739 on muscle endurance changes on students of SAU of Unsoed after SIT.

Method. A quasi experimental study without control group with pre and post test design. The subjects were twenty-four men and selected through the consecutive sampling and divided into RR, RX, and XX group. ACTN3 gene polymorphism R577X rs1815739 was identified by PCR-RFLP, whereas changes in muscle endurance was measured with a half squat jumps for one minute. SIT held for 5 weeks, 3 sessions per week, 1 session consisted of four repetitions of 30 seconds sprint and 4 minutes active rest. Changes in muscle endurance after SIT each group were tested with Paired T test and Wilcoxon, while the difference in changes in muscle endurance between groups was tested by one-way ANOVA and Post-hoc LSD.

Results. There was a significant increase muscle endurance after SIT in all groups (RR $p = 0.007$; RX $p < 0.001$; XX $p = 0.012$). Muscle endurance changes differed significantly between groups ($p = 0.014$), with significant differences in RR-RX ($p = 0.010$) and RX-XX ($p = 0.010$).

Conclusion. There is the effect of ACTN3 gene polymorphisms R577X rs1815739 on muscle endurance changes on students of SAU of Unsoed after SIT.

Keywords: ACTN3 Gene Polymorphism R577X rs1815739, Muscle Endurance Changes, Half Squat Jumps 1 Minute, Sprint Interval Training (SIT)