

## Pengaruh latihan fisik aerobik dan anaerobik terhadap panjang telomer relatif sel darah putih dan sel otot jantung tikus = Effect of aerobic and anaerobic physical exercise on leukocyte and cardiomyocyte relative telomere length in rats

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### Abstrak

Pendahuluan: Berdasarkan intensitas, durasi, dan bagaimana energi untuk kerja otot dihasilkan, latihan fisik dibagi menjadi latihan fisik aerobik dan anaerobik. Beberapa penelitian menunjukkan adanya hubungan antara latihan fisik dengan perubahan panjang telomer sel darah putih SDP, dan sel otot jantung.

Pemendekan telomer SDP sering dihubungkan dengan penyakit kronik tidak menular, salah satunya penyakit kardiovaskular. Di Indonesia belum ada penelitian yang membandingkan pengaruh latihan fisik aerobik dan anaerobik terhadap perubahan panjang telomer SDP dan sel otot jantung.

Tujuan: Membandingkan efek latihan fisik aerobik dan anaerobik terhadap perubahan panjang telomer SDP dan sel otot jantung.

Metode: Penelitian ini menggunakan 24 tikus putih jantan berusia 11-13 bulan, berat rata-rata 300 gram. Dibagi secara acak dalam 3 kelompok: 1 kontrol; 2 latihan fisik aerobik; 3 latihan fisik anaerobik.

Latihan fisik dilakukan 5 kali/minggu selama 4 dan 12 minggu. Perhitungan panjang telomer relatif menggunakan Real-Time PCR. Hasil: Secara signifikan terdapat perbedaan panjang telomer relatif SDP kelompok aerobik 4 minggu dan 12 minggu dibanding kontrol 4 minggu  $p=0,012$  dan  $p=0,009$ . Tidak terdapat perbedaan bermakna kelompok anaerobik 4 dan 12 minggu dibanding kontrol 4 minggu  $p=0,208$  dan  $p=0,141$ .

Terdapat perbedaan bermakna panjang telomer relatif sel otot jantung kelompok aerobik maupun anaerobik dibanding kontrol. Kesimpulan: Latihan fisik aerobik memberikan efek lebih baik dibanding anaerobik dalam perubahan panjang telomer SDP. Sedangkan latihan fisik aerobik maupun anaerobik tidak mempengaruhi perubahan panjang telomer sel otot jantung. Kata Kunci: Latihan fisik aerobik, latihan fisik anaerobik, telomer, sel darah putih, sel otot jantung

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Introduction Aerobic and anaerobic physical exercise are two types of physical exercise that differ based on the intensity, interval, and type of muscle fibers incorporated. Telomere length TL of leukocyte, a measure of replicative senescence, decreases with aging. Recent evidence supports that telomere length of leukocytes may be inversely correlated with the risk of several age related diseases. In Indonesia, there has been no specific research to find out the effect of aerobic and anaerobic physical exercise on changes in telomere length of leukocyte and cardiomyocyte. Methods This study was conducted on 24 male white rats *Rattus norvegicus* 250 300 grams age 11 13 months, randomly allocated into 3 groups 1 control 2 aerobic physical exercise APE and 3 anaerobic physical exercise AnPE. Physical exercise was performed 5 times a week, for 4 and 12 weeks. Measurement of relative telomere length using Real Time PCR. Result Relative leukocyte TL was found significantly longer in 4 and 12 weeks APE group compared to 4 week control  $p=0,012$  and  $p=0,009$ . Relative leukocyte TL was found not significantly different between 4 and 12 weeks AnPE group compared 4 weeks control group  $p=0,208$  and  $p=0,141$ . Cardiomyocyte relative telomere length APE and AnPE are no significantly better compare to control group. Conclusion Leukocyte TL is preserved in group of APE. Keywords Aerobic physical exercise, anaerobic physical exercise, telomere length, leukocyte,

cardiomyocyte.