Pengaruh Perlakuan Hipoksia Hipobarik Intermiten terhadap Aktivitas Spesifik Katalase Jaringan Tersimpan Hati Tikus Sprague Dawley = The Effect of Intermittent Hypobaric Hypoxia on Catalase Specific Activity in Sprague Dawley Liver Tissue

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Abstrak

Latar Belakang
Hipoksia adalah kondisi kekurangan oksigen yang dialami oleh sel, salah satunya disebabkan oleh penurunan tekanan atmosfer (kondisi hipobarik). Hipoksia dapat menyebabkan peningkatan produksi reactive oxygen species (ROS). Sebagai kompensasi, tubuh dapat memproduksi antioksidan endogen untuk menanggulangi dampak ROS, yaitu superoksida dismutase, glutation peroksidase, katalase, dan glutation. Namun, apabila tubuh gagal dalam mempertahankan homeostasis ROS dan antioksidan, sel-sel tubuh dapat mengalami stres oksidatif. Stres oksidatif dapat memicu respons tubuh, mulai dari inflamasi hingga tumor dan kanker. Namun, beberapa penelitian sebelumnya membuktikan bahwa kondisi hipoksia hipobarik yang terjadi secara berselang (intermiten) justru dapat meningkatkan aktivitas antioksidan jaringan otak, jantung, paru, hati, dan ginjal. Oleh karena itu, penelitian ini dilakukan untuk mengetahui pengaruh perlakuan hipoksia hipobarik intermiten terhadap aktivitas spesifik antioksidan katalase pada jaringan hati.
Metode
Tikus Sprague dawley diberikan perlakuan hipoksia hipobarik dengan tekanan 523 mmHg dengan metode simulasi ketinggian pada 10.000 kaki (3048 m) di dalam hypobaric chamber training selama 1 jam per hari. Tikus dibagi menjadi 5 kelompok perlakuan: kontrol, 7 hari perlakuan, 14 hari perlakuan, 21 hari perlakuan, dan 28 hari perlakuan. Jaringan hati tikus kemudian diekstrak untuk diukur aktivitas katalasenya menggunakan metode spektrofotometri UV-vis. Aktivitas katalase tiap kelompok perlakuan dibandingkan.
Hasil
Uji hipotesis dilakukan menggunakan Kruskal Wallis terhadap data awal dan uji Welch-Anova terhadap data hasil transformasi. Kedua tes menunjukkan perbedaan yang tidak bermakna antarkelompok percobaan (Kruskal Wallis $p<0.05$; Welch-Anova $p>0.05$).
Kesimpulan
Tidak ada hubungan antara perlakuan hipoksia hipobarik intermiten terhadap aktivitas spesifik katalase jaringan tersimpan hati tikus Sprague dawley.
.....Hypoxia is a term to describe oxygen-deprived condition in body cells. One possible cause of hypoxia is a decrease in atmospheric pressure (hypobaric condition). Hypoxia could increase reactive oxygen species (ROS) production. To compensate with ROS production, the body produces endogenous antioxidants, namely superoxide dismutase,

glutathione peroxidase, catalase, and glutathione. If the body fails to maintain homeostasis of ROS and antioxidants, oxidative stress may occur. The body may perform various responses to oxidative stress, including inflammation and even cancer. Contrary to the natural phenomenon, previous researches show that hypoxic hypobaric condition that is induced intermittently could induce the activity of antioxidants in brain, heart, lungs, liver and kidney tissues. Thus, this research was conducted to observe the effect of intermittent hypobaric hypoxia on catalase specific activity in liver tissue.

Method Sprague dawley rats were treated with intermittent hypobaric hypoxia by placing them in hypobaric chamber training to simulate the altitude of 10,000 feet (atmospheric pressure of 523 mmHg). They were given the treatment for 1 hour a day. The rats were grouped into a control group, 7 days treatment group, 14 days treatment group, 21 days treatment group, and 28 days treatment group. Liver tissues were then extracted so the catalase spesific activity could be measured using spectrophotometry UV-vis method. The results were then compared.

Results

Hypothesis test was conducted using both Kruskal Wallis and Welch-Anova. Kruskal Wallis was conducted to the original data and Welch-Anova was conducted to the transformed data. Both tests showed insignificant differences between the groups (Kruskal Wallis $p<0.05$; Welch-Anova $p>0.05$).

Conclusion

There is no effect of intermittent hypobaric hypoxia on catalase specific activity in Sprague dawley liver tissue.