

# **PENGARUH HIPEROKSIA SISTEMIK TERHADAP KADAR GLUTATION (GSH) PADA OTAK DAN DARAH TIKUS SPRAGUE DAWLEY**

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## **ABSTRACT**

*Brain is highly dependent on supply of oxygen to maintain its integrity. With over-exposure to high-leveled oxygen, state of hyperoxia is achieved. Hyperoxia increases reactive oxygen species (ROS) production. Glutathione (GSH) plays a crucial role as cellular antioxidant by decomposing molecules like ROS that can potentially damage the cell. The purpose of this study is to assess changes in GSH concentration of hyperoxia-induced rats brains and blood. The rats were divided into 5 groups (n = 6/group): the control group and hyperoxia groups (1, 3, 7, and 14 days). Hyperoxia condition was obtained by exposing rats with 75% O<sub>2</sub>. GSH concentration in brains and blood was measured by using Ellman's method. Blood gas analysis and hematology and brain's microscopic examination were done. The results showed increased concentration of GSH on the first day of hyperoxia then decreased until the 14<sup>th</sup> day. Based on blood gas analysis and hematology, increased pO<sub>2</sub>, pCO<sub>2</sub>, HCO<sub>3</sub>, decreased pH and O<sub>2</sub> saturation, and changes in hematology parameters were seen. Changes in microscopic structure of brains were also found. It can be concluded that systemic hyperoxia causes decreased concentration of GSH in rats brains and blood, and respiratory acidosis partially compensated. Hyperoxia also changes brain's structure.*

*Keywords: Hyperoxia, brain, blood, glutathione, ROS*

## **ABSTRAK**

Otak sangat bergantung pada suplai oksigen untuk mempertahankan integritasnya. Dengan paparan oksigen terus menerus dan diatas normal, terjadi keadaan hiperoksia. Hiperoksia menyebabkan kenaikan produksi *reactive oxygen species* (ROS). Glutation (GSH) berperan dalam dekomposisi molekul yang berpotensi merusak (ROS) sehingga GSH memainkan peran penting sebagai antioksidan. Penelitian ini bertujuan menilai perubahan kadar GSH pada otak dan darah tikus yang diinduksi hiperoksia sistemik. Hewan coba tikus dibagi menjadi 5 kelompok (n = 6/kelompok): kelompok kontrol dan kelompok hiperoksia (1, 3, 7, dan 14 hari). Kondisi hiperoksia didapatkan dengan memaparkan tikus dengan 75% O<sub>2</sub>. Kadar GSH otak dan darah tikus diuji menggunakan metode Ellman. Selain itu dilakukan analisa gas darah, hematologi dan mikroskopik struktur otak. Hasil penelitian menunjukkan peningkatan kadar GSH pada hari pertama perlakuan, lalu terjadi penurunan sampai perlakuan hari ke-14. Berdasarkan analisis gas darah dan hematologi, terlihat peningkatan pO<sub>2</sub>, pCO<sub>2</sub>, HCO<sub>3</sub>, penurunan pH dan saturasi O<sub>2</sub>, perubahan hematologi. Didapatkan pula perubahan pada mikroskopik struktur otak. Dapat disimpulkan bahwa hiperoksia sistemik menyebabkan penurunan kadar GSH pada otak dan darah tikus, dan asidosis respiratorik terkompensasi sebagian. Hiperoksia juga mengubah struktur otak.

Kata – Kata Kunci: Hiperoksia, otak, darah, glutation, ROS