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[Randomized Controlled Trial](#) [Med Gas Res.](#) 2020 Oct-Dec;10(4):149-154.

doi: 10.4103/2045-9912.304221.

Two weeks of hydrogen inhalation can significantly reverse adaptive and innate immune system senescence patients with advanced non-small cell lung cancer: a self-controlled study

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PMID: 33380580 PMCID: [PMC8092147](#) DOI: [10.4103/2045-9912.304221](#)

Abstract

Following standard treatments, the traditional model for enhancing anti-tumor immunity involves performing immune reconstitution (e.g., adoptive immune cell therapies or immunoenhancing drugs) to prevent recurrence. For patients with advanced non-small cell lung cancer, we report here on two

objectives, the immunosenescence for advanced non-small cell lung cancer and hydrogen gas inhalation for immune reconstitution. From July 1st to September 25th, 2019, 20 non-small cell lung cancer patients were enrolled to evaluate the immunosenescence of peripheral blood lymphocyte subsets, including T cell, natural killer/natural killer T cell and gamma delta T cell. Two weeks of hydrogen inhalation was performed during the waiting period for treatment-related examination. All patients inhaled a mixture of hydrogen (66.7%) and oxygen (33.3%) with a gas flow rate of 3 L/min for 4 hours each day. None of the patients received any standard treatment during the hydrogen inhalation period. After pretreatment testing, major indexes of immunosenescence were observed. The abnormally higher indexes included exhausted cytotoxic T cells, senescent cytotoxic T cells, and killer V δ 1 cells. After 2 weeks of hydrogen therapy, the number of exhausted and senescent cytotoxic T cells decreased to within the normal range, and there was an increase in killer V δ 1 cells. The abnormally lower indexes included functional helper and cytotoxic T cells, Th1, total natural killer T cells, natural killer, and V δ 2 cells. After 2 weeks of hydrogen therapy, all six cell subsets increased to within the normal range. The current data indicate that the immunosenescence of advanced non-small cell lung cancer involves nearly all lymphocyte subsets, and 2 weeks of hydrogen treatment can significantly improve most of these indexes. The study was approved by the Ethics Committee of Fuda Cancer Hospital, Jinan University in China (approval No. Fuda20181207) on December 7th, 2018, and was registered on ClinicalTrials.gov (ID: [NCT03818347](https://clinicaltrials.gov/ct2/show/study/NCT03818347)) on January 24th, 2019.

Keywords: T cell; adaptive and innate immune system; gamma delta T cell; hydrogen inhalation; immunosenescence; natural killer T cell; natural killer cell; non-small cell lung cancer.

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Figures

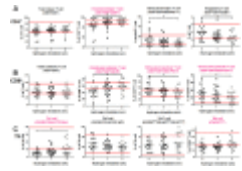


Figure 1 An immunoassay of the T...

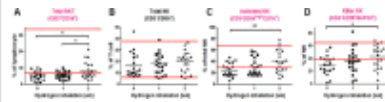


Figure 2 Immunoassay of natural killer (NK)T...

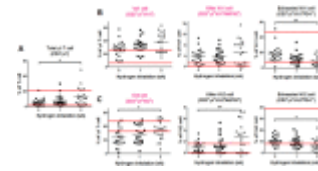


Figure 3 Immunoassay of the gamma delta...

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