

## **EXERCISE IN COLD AIR INCREASED THE H<sub>2</sub>O<sub>2</sub> RELEASE IN EXHALED BREATH CONDENSATE**

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**Introduction:** Many publications indicated that winter athletes have bronchial hyperresponsiveness and symptoms like bronchoconstriction and changes in the epithelial cells caused by the inhalation of cold and dry air. Therefore the exhaled breath and the arising exhaled breath condensate are interesting because they contain a number of mediators which arise from the bronchial system. H<sub>2</sub>O<sub>2</sub> for example is often described as a marker of airways inflammation especially for the upper airways. The aim of this study was to determine the influence of endurance exercise combined with cold air on the H<sub>2</sub>O<sub>2</sub> release as a marker of airway inflammation in exhaled breath. **Methods:** Twelve healthy males (23.1±1.5 years) were randomly assigned at 2 different days (with 1 day rest) to perform one 50 min run (75-80% of their maximum heart rate) under normal (N) laboratory (18.1±1.1°C) and one under cold (C) field conditions (-15.2±3.1°C). Before and immediately after each run EBC was collected from 100L of exhaled air under laboratory conditions. Hydrogen peroxide concentration was analyzed using a EcoCheck amperometer (FILT, Berlin). In further analysis release per minute and theoretical release for the total amount of water from 100L exhaled breath were calculated. **Results:** Prior to the two runs H<sub>2</sub>O<sub>2</sub> concentrations were 145±31 (Normal) and 160.0±49.1nmol/L (Cold) and theoretical release 70.3±37.1 (Normal) and 82.6±27.1pmol/min (Cold) (p>0.05). After both conditions a significant increase of H<sub>2</sub>O<sub>2</sub> concentration from 243.0±43.8nmol/L (Normal) to 420.3±49.1nmol/L (Cold) (p<0.001) together with an increase in the theoretical release from 178.9±38.1pmol/min (Normal) to 318.3±35.2 pmol/min (Cold) (p<0.001) was detected. **Summary:** The release of H<sub>2</sub>O<sub>2</sub> into the EBC has been shown under resting conditions and after exercise. Concentration and release significantly increased after exercise in cold air compared to resting and laboratory conditions and indicates an increase of inflammatory and oxidative stress. An association between H<sub>2</sub>O<sub>2</sub> and bronchial hyperresponsiveness should be investigated in further studies.