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**Title:** Respiratory gas exchange and lung perfusion in man during and after head-out water immersion

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carbon dioxide  
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**Abstract:** The respiratory gas exchange for O<sub>2</sub>, CO<sub>2</sub>, and CO has been studied in nine healthy male subjects before, during, and after head-out water immersion. Distribution of lung perfusion and ventilation were determined by quantitative double nuclide scintigraphy (<sup>131</sup>I and <sup>99m</sup>Tc) and by argon washout, respectively. The well-known decrease of PaO<sub>2</sub> and increase of AaDO<sub>2</sub> during immersion is accompanied by a decrease of the CO-transfer factor. Ventilation in relation to functional residual volume does not change significantly, whereas distribution of lung perfusion becomes more even, with an increase in the apical lung zones. Immediately after the end of immersion, PaO<sub>2</sub> increases rapidly, exceeding the initial value under dry conditions. At the same time, lung perfusion is shifted markedly more towards the basal lung regions, exceeding the gravity-induced blood pooling in the erect subject under dry conditions. The observed changes tend to normalize within 2 min. The changes of respiratory gas exchange during and immediately after immersion can be explained by changes of the inequality of the ventilation-perfusion ratios. Adult Carbon Dioxide Carbon Monoxide Human \*Immersion Male Oxygen/blood Pulmonary Diffusing Capacity \*Respiration Ventilation-Perfusion

Ratio

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