

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Medical Care for Humans in Space (3)

Author: Dr. Nandu Goswami  
Medical University of Graz, Austria, nandu.goswami@medunigraz.at

Dr. Helmut Lackner  
Medical University of Graz, Austria, helmut.lackner@medunigraz.at  
Prof. Jean-Pierre Montani  
University of Fribourg, Switzerland, jean-pierre.montani@unifr.ch  
Prof. Helmut Hinghofer-Szalkay  
Medical University of Graz, Austria, helmut.hinghofer@medunigraz.at

SALIVARY HORMONES, CEREBRAL BLOOD FLOWS, RESPIRATORY PATTERNS AND  
CARDIOVASCULAR RESPONSES TO ACTIVE STANDING AND PASSIVE HEAD UP TILT**Abstract**

We investigated salivary cortisol (SC), alpha amylase (AA), cerebral blood flows (CBF), respiratory frequency (RF), end tidal CO<sub>2</sub> concentration (EtCO<sub>2</sub>) and time course of hemodynamic changes (in 30 sec epochs) induced by active standing and 70° head up tilt (HUT). 14 healthy males underwent two randomized protocols: passive HUT and active standing, 2 weeks apart. HUT increased AA (+ 2.212 U/ml), heart rate (HR)(+19.27.0 bpm), mean arterial pressure (MAP)(+5.69.4 mmHg), diastolic blood pressure (DBP)(+6.78.9 mmHg), total peripheral resistance (TPR)(+179257 dyne\*s/cm<sup>5</sup>) and decreased SC (- 0.10.8 ng/ml), CBF (-4.65.6 cm/s), RF (-2.13.4 C/min), EtCO<sub>2</sub> (-4.12.6 mmHg), stroke volume (SV)(-33.414.2 ml) and cardiac output (CO) (-0.71.2 l/min). Effects of standing and HUT induced cerebral blood flow, respiratory and hemodynamic responses were not different. Stressors, however, induced different initial heart rate, diastolic blood pressure and total peripheral resistance responses. Both stresses significantly affected initial HR changes. Similarly, when comparing different periods/phases of initial responses, significant differences were seen between HR, SV, CO, DBP and TPR. Overall, when comparing active and passive standing, initial responses of HR, DBP and TPR differed. Generally speaking, active standing is equally effective as the more complex HUT protocol in eliciting orthostatic neurohormonal and cerebral blood flow responses.