

**1998 ABSTRACT FORM FOR BOTH SCIENTIFIC PAPERS AND SCIENTIFIC EXHIBITS**

The Society of Nuclear Medicine 45th Annual Meeting  
Metro Toronto Convention Center  
Sunday, June 7--Thursday, June 11, 1998

No 07443

Do Not Fold Or Bend This Form/Abstract Will Be Published As Typed

Type Abstract Here: (Be sure to stay within border—12.4 × 14.9 cm) (4 7/8" × 5 7/8")

**EFFECT OF HYPOXIA AND HYPERBARIC OXYGEN ON THE UPTAKE AND DISTRIBUTION OF rCBF SPECT IN THE HUMAN BRAIN AT REST. M Pagani,**

R Ansjön, C Jonsson, F Lind, J Uusijärvi, G Sumen, D Salmaso, H Jacobsson, S A Larsson. Institute of Experimental Medicine, Institute of Psychology, CNR, Rome, Italy; Department of Anaesthesiology, Department of Diagnostic Radiology, Section of Nuclear Medicine, Department of Radiation Physics, Karolinska Hospital/Institute, Stockholm, Sweden.

Acute hypoxia and hyperoxia elicit several biochemical and cerebrovascular responses that result in changes in cerebral blood flow (CBF). The decrements in cognitive and perceptual functions during acute hypoxia have been reported to vary between individuals and to affect differentially brain functions and regions. However no reports seem to be available on the regional (rCBF) distribution under acute hypoxia and hyperoxia.

**Methods.** We studied the rCBF in six healthy volunteers in hypobaric hypoxia (HH, 50.7 kPa/PiO<sub>2</sub>=10.5 kPa), hyperbaric oxygen (HBO, 250 kPa/PiO<sub>2</sub>=250 kPa) and normobaric normoxia (control, 100 kPa/PiO<sub>2</sub>=21 kPa). Methylene blue stabilized 99m-Tc-HMPAO was injected after 40 min of exposition to the different ambient conditions. The uptake in 64 functional brain volumes (VOIs) of the CBA was investigated by SPECT (TRIAD, Trionix Res. Lab) and analysed bilaterally in the frontal, parietal, temporal, occipital and cingulate cortex and in the basal ganglia and central structures. Analysis of variance and post-hoc test were used for data analysis.

**Results.** The global uptake in HH was significantly higher than in control (p<0.002) and the latter in turn significantly higher than in HBO (p<0.001). The conditions significantly affected the overall VOIs uptake (p<0.0007) and the uptake in Brodmann 4 (p<0.016), 45 (p<0.03), 44 (p<0.005), 21 (p<0.002), 39 (p<0.004), 17 (p<0.03) as well as nc. caudatus and the putamen (p<0.0004 and p<0.002). They even affected the uptake in temporal lobe (p<0.003), parietal association cortex (p<0.03) and striatum (p<0.001). HH alone affected selectively Brodmann 4 (p<0.015), 44 (p<0.003), 21 (p<0.04) 39 (p<0.01) nc. caudatus (p<0.004) and putamen (p<0.005). When only control to HH analysis was considered, significant laterality was also found in Brodmann 4, 44, nc. caudatus and putamen (p<0.04 - 0.005).

**Conclusion.** These results support previous findings that CBF is increased during HH and decreased during HBO and that different brain structures react in an independent manner to changes in ambient conditions. Acute hypoxia and hyperoxia affected rCBF in several brain areas, specifically in temporal and parietal association cortex. This may play a role in the previously reported alterations in memory performance during hypoxia.

List the name, address, telephone number and e-mail address of the individual who should receive all correspondence:

Stig A Larsson  
Department of Hospital Physics, Section for Nuclear Medicine  
Karolinska Hospital  
S-171 76 STOCKHOLM, Sweden  
Telephone: 46-8-729 31 72 FAX: 46-8-729 49 39  
e-mail: stig@nucmed.ks.se

List the name and degree of presenting author:

Marco Pagani MD

List two keywords for Subject Index (See Meeting Memo for details):

hypoxia; hyperbaric oxygen;