

## **MRI CHANGES IN HUMANS AND SWINE FOLLOWING HYPOBARIC EXPOSURE – POSSIBLE CELLULAR EXPLANATION FOR WHITE MATTER INJURY**

*IRM DES CHANGEMENTS CHEZ LES HUMAINS ET LES PORCS APRES EXPOSITION HYPOBARE – POSSIBLE LESION CELLULAIRE DE L'EXPLICATION DE MATIERE BLANCHE*

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**Introduction:** Human exposure to hypobaric conditions is associated with both focal and diffuse subcortical brain injury. We hypothesized that MRI parameter changes following single exposure in humans and repetitive exposure in swine would occur, possibly suggesting a cellular mechanism for the injury.

**Methods:** Magnetic resonance imaging/spectroscopy (MRI/S) was performed on 80 exposed human subjects and 60 controls before and after single exposure. Additionally, MRS/I was performed on 38 exposed swine and 12 controls before and after repetitive exposure. A two-tailed paired t-test was used for comparison.

**Results:** Exposed human subjects had a significant decrease on MRS#2 in frontal lobe white matter myo-inositol ( $p=0.030$ ) with a trend in other metabolites. Exposed swine had a significant increase in interstitial water content ( $p=0.002$ ).

**Discussion:** These human metabolite changes are consistent with acute oxidative stress affecting the glial and neuronal components of white matter, possibly reflecting a decrease in mitochondrial function. These swine fluid changes are consistent with acute interstitial white matter injury. These findings would be consistent with changes previously noted in human single exposure cerebral blood flow and human recurrent exposure white matter injury. This data raises the spectrum that every exposure incites an acute traumatic brain injury and that recurrent exposure within a critical window of susceptibility incites permanent damage. Additional study is warranted.