QUANTIFICATION OF CEREBROVASCULAR CHANGES IN THE AGING LOU/C RAT USING INTRINSIC OPTICAL IMAGING

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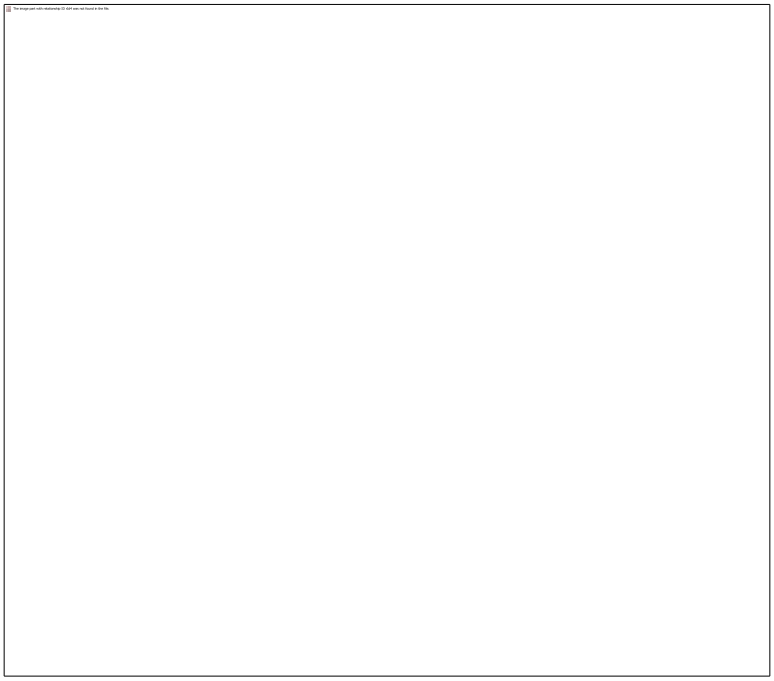
Introduction: Cerebrovascular changes may play a role in cognitive impairment with aging and Alzheimer disease.

Aim: This study aimed to quantify cerebrovascular changes in the sensorimotor cortex of young (Y), old (O) and very old (VO) Lou/C rats (5, 25 and 35 months), using optical imaging.

Methods: Rats were anesthetized with α-chloralose and mechanically ventilated. Skull was thinned to translucency and the brain illuminated by a multispectral imaging system. Changes in hemodynamic parameters (cerebral blood flow (CBF), oxidized (HbO), reduced (HbR) and total hemoglobin (HbT) concentrations) were recorded following electrical stimulations of the rat´s forepaw (train of 0.3ms at 3Hz, 10s).

Results: The amplitude of responses changed with aging and all hemodynamic parameters decreased in old and very old rats compared to young rats (ANOVA and Tuckey´s test; **P*< 0.05, ***P*< 0.01). No significant diminution was observed between old and very old rats which may signal early vascular changes.



[Response follwing forepaw stimulation]

Conclusion: The results indicate that multimodal imaging techniques can assess the impact of aging on cerebrovascular coupling. Moreover, the changes measured in old Lou/C rats suggest that hemodynamic

markers could be used to predict neuronal dysfunction as they appear to occur prior to cognitive loss in this model.