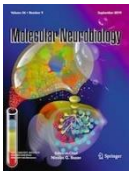
O2k brief Aging

https://wiki.oroboros.at/index.php/O2k-Publications:_Aging,_senescence

High-resolution respirometry: aging



Effect of Initial Aging and High-Fat/High-Fructose Diet on Mitochondrial Bioenergetics and Oxidative Status in Rat Brain

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Effect of age and/or dietary treatment on brain mitochondrial physiology

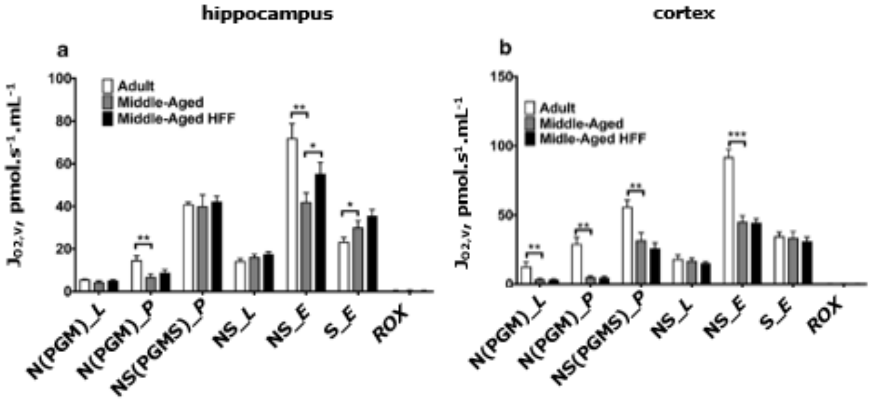

Figure 1. Age-induced decrease in ADP or FCCP supported respiration with N-linked substrates or NS-linked substrates, respectively. High-Fat/High Fructose (HFF) diet increases respiration with N- and NS-linked substrates in the hippocampus mitochondria **(a)**. Mitochondria from the frontal cortex suffer a significant age-related decrease with N- and NS-linked substrates with no respiration effect from HFF diet **(b)**. Values are means ± SEM (N = 8, *p < 0.05, ** p < 0.01, *** p < 0.001). *

O2k-brief communicated by D D Antunes and L Tindle-Solomon
Oroboros Instruments

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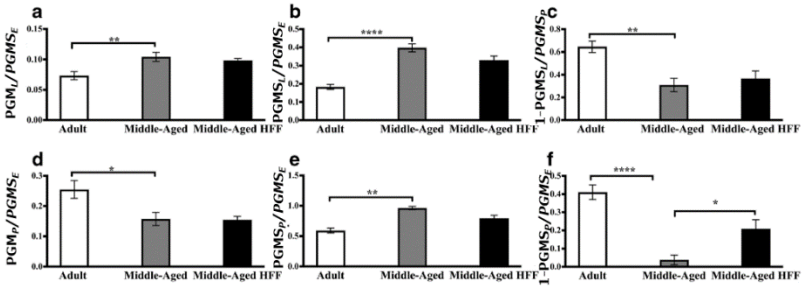
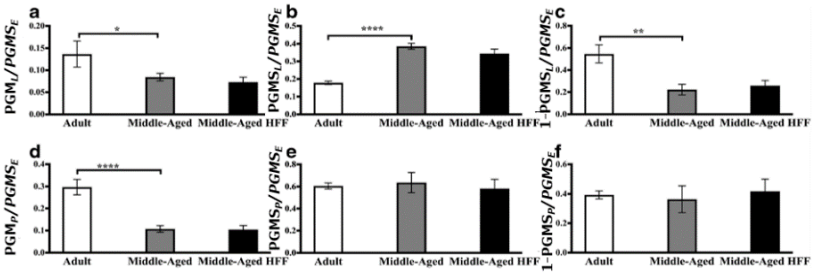
High-resolution respirometry: aging

Impaired coupling efficiency and limitation by ATP synthase in an age-dependent manner



Functional impairment of Complex I with age in the cortex



Figures 2 and 3. Respiratory flux control ratios and coupling control factors in hippocampus **(2)** and frontal cortex **(3)**. Leak respiration with electron provision from complex I ($PGM_L/PGMS_E$) **(a)** and complexes I and II ($PGMS_L/PGMS_E$) **(b)**, coupling efficiency of oxidative phosphorylation ($1 - PGMS_L/PGMSP$) **(c)**, phosphorylating respiration with electron provision from complex I ($PGM_P/PGMS_E$) **(d)**, and complexes I and II ($PGMS_P/PGMS_E$) **(e)**, apparent excess capacity of the electron transport chain ($1 - PGM_P/PGMS_E$) **(f)** Values are the means ± SEM (N=8). *p < 0.05, ** p < 0.01, **** p < 0.0001

Keywords: Substrates added and their corresponding rates: malate + pyruvate + glutamate = N(PGM)_*L*, ADP = N(PGM)_*P*, succinate = NS(PGMS)_*P*, oligomycin = NS_*L*, FCCP = NS_*E*, rotenone = S_*E*, antimycin A = *ROX*

PGM_L = LEAK respiration with complex I substrate; $PGMS_L$ = LEAK respiration with complex I and II substrates; PGM_P = phosphorylating respiration with complex I substrate; $PGMS_P$ = phosphorylating respiration with complex I and II substrates; $PGMS_E$ = maximum capacity of the electron transfer pathway with complex I and II substrates

Reference: Crescenzo R, Spagnuolo MS, Cancelliere R, Iannotta L, Mazzoli A, Gatto C, Iossa S, Cigliano L (2019) Effect of initial aging and high-fat/high-fructose diet on mitochondrial bioenergetics and oxidative status in rat brain. Mol Neurobiol [Epub ahead of print].

Text slightly modified based on the recommendations of the COST Action MitoEAGLE CA15203. Doi:10.26124/mitofit:190001.v6

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