Background The PGC-1 related coactivator (PRC), which shares structural and functional features with PGC-1α, is believed to regulate several metabolic pathways as well as mitochondrial biogenesis. Its involvement in the early programming of cell proliferation suggests the existence of finely regulated crosstalk between mitochondrial functions and the cell cycle status.

Methodology/Principal Findings PRC-regulated pathways were explored in a cell-line model derived from mitochondrial-rich tumours with an essentially oxidative metabolism and specifically high PRC expression. The functional status of mitochondria was compared to the results of microarray analysis under conditions of temporal PRC inhibition. To specify the fine PRC regulation, the expression levels of the genes and proteins involved in the oxidative phosphorylation process were studied by real time quantitative PCR and western blotting. As in earlier studies on PGC-1α, we investigated the role of nitric oxide in PRC-regulated mitochondrial biogenesis and determined its action in the control of the phosphorylation status of the mitogen-activated protein kinase pathway.

Conclusion/Significance We found that nitric oxide rapidly influences PRC expression at the transcriptional level. Focusing on mitochondrial energetic metabolism, we observed that PRC differentially controls respiratory chain complexes and coupling efficiency in a time-dependent manner to maintain mitochondrial homeostasis. Our results highlight the key role of PRC in the rapid modulation of metabolic functions in response to the status of the cell cycle.
Liens
[1] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=767
[2] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=1022
[3] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=1023
[4] http://okina.univ-angers.fr/delphine.prunier/publications
[5] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=1123
[6] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=447
[7] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=765
[8] http://okina.univ-angers.fr/yves.malthiery/publications
[9] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=773
[10] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=557
[11] http://okina.univ-angers.fr/publications/ua344
[12] http://dx.doi.org/10.1371/journal.pone.0007964

Publié sur Okina (http://okina.univ-angers.fr)