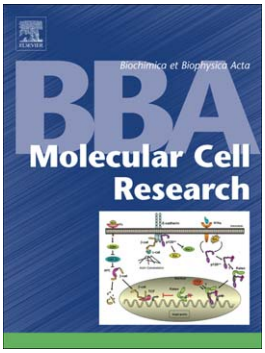

Relationship between intracellular pH, metabolic co-factors and caspase-3 activation in cancer cells during apoptosis

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Relationship between intracellular pH, metabolic co-factors and caspase-3 activation in cancer cells during apoptosis

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Abbreviations: FRET, Forster Resonance Energy Transfer; NAD(P)H, reduced nicotinamide adenine dinucleotide (phosphate); FAD, flavin adenine dinucleotide; OXPHOS, oxidative phosphorylation; pH_i, intracellular pH; FLIM, fluorescence lifetime imaging microscopy; STS, staurosporine; ROS, reactive oxygen species; NHE1, Na^+/H^+ exchanger.

Abstract

A complex cascade of molecular events occurs in apoptotic cells but cell-to-cell variability significantly complicates determination of the order and interconnections between different processes. For better understanding of the mechanisms of programmed cell death, dynamic simultaneous registration of several parameters is required. In this paper we used multiparameter fluorescence microscopy to analyze energy metabolism, intracellular pH and caspase-3 activation in living cancer cells *in vitro* during staurosporine-induced apoptosis. We performed metabolic imaging of two co-factors, NAD(P)H and FAD, and used the genetically encoded pH-indicator SypHer1 and the FRET-based sensor for caspase-3 activity, mKate2-