

Abstract

Proteins from the Bcl-2 family are now for over 30 years widely studied mainly for their key role in apoptosis, a principal mode of regulated cell death. In the last ten years Bcl-2 proteins were also linked to the regulation of cellular signaling, mainly cellular metabolism and respiration. In this study we aimed to analyze non-apoptotic function of Bcl-2 proteins by their genetic elimination using the CRISPR-Cas12a approach and by the subsequent analysis of mitochondrial respiration, glycolysis and metabolic profiling. Our results confirmed that Bcl-2 proteins can modulate the level of mitochondrial respiration. The elimination of anti-apoptotic proteins Bcl-2, Bcl-XL and Mcl-1 decreased high respiration of cells lacking pro-apoptotic proteins Bax and Bak to the levels observed in parental U87-MG glioblastoma cells. Therefore, the loss of anti-apoptotic Bcl-2 proteins has greatly impacted mitochondrial respiration and it points to their role in a regulation of oxidative phosphorylation.