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Poster Sessions

Regulation of mitochondrial activities by TRPA1 channel

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While aerobic organisms utilize molecular oxygen (O₂) to generate ATP efficiently, cancer cells are known to heavily rely on anaerobic respiration. However, molecular mechanisms underlying the metabolism switching are still elusive. Here we show that an O₂ sensing channel TRPA1, which are overexpressed in various types of cancer, regulates mitochondrial activities in cancer cells. Through comprehensive analysis of TRPA1-interacting proteins, we found that TRPA1 associates with several mitochondrial proteins, including NDUFAF4. NDUFAF4 overexpression allowed TRPA1 to be localized into mitochondria. Mitochondrial TRPA1 controlled mitochondrial Ca²⁺ levels, which affect mitochondrial metabolisms, in response to O₂ availability. These results suggest that TRPA1 enables cancer cells to change mitochondrial metabolisms in response to O₂ availability through interaction with NDUFAF4.