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Metabolic profile of murine melanoma studied by nuclear magnetic resonance

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Using murine melanocytes, a new model of murine melanoma, called Tm-1, was produced by repeated cycles of cell disadhesion. In this strain, galectin-3, a multifunctional endogenous lectin that seems to act by modulating the mitochondrial response to different types of stress, is silenced. Through transfection of original Tm-1, we produced two new strains of melanomas, one expressing galectin-3, and the other not. In order to evaluate the changes in glucose metabolism induced by galectin-3, these cells were cultivated in different conditions of oxygen tension and glucose level. Approximately 107 cells were collected from each culture. The metabolic extraction protocol with methanol:water (1:1) was applied, each sample was sonicated five times, centrifuged and the supernatant was collected. These were lyophilized and then diluted in D₂O for resonance experiments. The 29 absorption lines of each spectrum were integrated individually and used as input for principal component analyses and partial least squares discriminant analyses. The changes in concentration of certain metabolites were attributed to the impact of galectin-3 in the mitochondrial homeostasis process. Among all metabolites pointed out by analyses, the most relevant were lactate, free choline, GPC/PC, creatine, acetate, 3-hydroxybutyrate and taurine. It seems that galectin-3 acts in mitochondrial homeostasis only in the specific case where tumorigenic cells are exposed to stress, such as hypoxia. A probable explanation for the homeostasis relies on fact that cells expressing galectin-3 are able to remove from cellular environment those mitochondria that do not properly metabolize pyruvate received from the glycolytic pathway ("deficient" mitochondria).

Biography

Said Rahnamaye Rabbani graduated and obtained MSc in Physics. He got his D. Phil from Oxford University in Biophysics. He worked in several universities in Brazil and since 1988, he is the fellow of Sao Paulo University. Since 1999, he built and is actually coordinating the Magnetic Resonance Laboratory. He was the president of research committee of Physics Institute of USP. He acted as visiting scientist in National University of Cordoba, Atomic Center of Bariloche in Argentina and National University of San Antonio Abad of Cusco, Peru. He coordinated and acted as member of organizing committee of several national and international conferences.

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