

High-resolution imaging and high-content analysis of mitochondrial efficiency and OXPHOS relevance in grade II bladder cancer cells.

Ducci G.^{1,2*}, Pasquale V.^{1,2}, Campioni G.^{1,2}, Ventrici A.¹, Arrigoni E.¹, Vanoni M.^{1,2}, Vago R.³, Sacco E.^{1,2}

E-mail: g.ducci@campus.unimib.it

¹ Department of Biotechnology and Bioscience, University of Milano-Bicocca, Milan 20126, Italy.

² SYSBIO.ISBE.IT, Centre of Systems Biology, Milano 20126, Italy.

³ Urological Research Institute, Division of Experimental Oncology, IRCCS San Raffaele Hospital, Milan 20126, Italy.

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Abstract:

Bladder cancer is one of the most prevalent deadly diseases worldwide. We previously characterized energy metabolism and cellular properties associated to spread and tumor progression of two human bladder cancer cell lines, RT112 and 5637, which despite being classified as the same histological grade (G2), are respectively representative of luminal-like and basal-like tumors with different prognoses. Metabolic flux analysis performed with Seahorse technology showed that both cell lines make extensive use of OXPHOS, but RT112 cells are more energetic and produce greater amounts of ATP by both mitochondrial respiration and glycolysis, while only 5637 perform endogenous fatty acid oxidation. Using the Operetta CLS system and the Harmony software (Perkin Elmer) we performed quantitative imaging on viable cells stained with fluorescent probes specific for mitochondrial mass and membrane potential, mitochondrial and total ROS content, total and peroxidized lipids. The results, confirmed by FACS analysis, allowed to highlight significant differences in the mitochondrial functions and in the redox homeostasis of the two cell lines that correlate with the metabolic parameters previously obtained with Seahorse technology.

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