

Mass Spectrometry Metabolomics Perspective of Breast Cancer

Manhal Abdulrahman AL-Mokhadab
Newborn Screening and Biochemical Genetics Laboratory, King Faisal Specialist Hospital & Research Center
P.O.Box 3354, Riyadh 11211, Saudi Arabia
King's College London University, Mass Spectrometry Facility, 150 Stamford Street
London SE1 9NH

I present a highly selective and sensitive GC-MS method for quantification of intracellular metabolites involved on comparison of glycolytic and pentose phosphate and metabolism including the configuration of the isoform of Glucose-6-phosphate (G6P), Fructose-6-phosphate (F6P) also for Ribulose-5-phosphate (R5P) and Ribose-5-phosphate(Ri5P) and applied to the analysis of breast cancer cells.
Method: I developed two novels GC-MS methods for studying changes in both glycolytic and PP pathway intermediates and their associated metabolite concentrations. Frist method for quantification of metabolites involved in both pathways metabolism, second method isoformeric separation of G6P,G1P and F6P, F1P and some other amino acid assisted with them pathway. In addition, third method for untargeted metabolites by using GC-MS for studying Fold changes on all breast metabolic profiles
Results: All isomers and enantiomeric forms of the metabolites were well separated with baseline resolution. Method validation provided limits of detection (LODs) for L/D-2HG ≤1nM (±2SD, Accuracy (%) ±4, %CV ±1.5, STD <5). calibration curves showed good linearity mainly over six orders of magnitude with a correlation coefficient R2 > 0.99.
Conclusions: These methods were developed and applied to the analysis of breast cancer cells and tissues to investigate changes in glycolytic and pentose phosphate pathway intermediates with identify selected enantionmer concentrations and studying the glycogen phosphorylase (PYGL) metabolon. Metabolic analyses indicated that glycogen degradation by PYGL is important for the optimal function of the pentose phosphate pathway. Thus, glycogen metabolism is a key pathway induced by hypoxia, necessary for optimal glucose utilization, which represents a targetable mechanism of metabolic adaptation. Here we describe the methodology used and give examples from the analysis of selected wild-type and modified cancer cell lines which show highly specific enatiomeric changes taking place in mutant cell lines.

Biography

Manhal has bachelors degrees in science from King Saud University . She is a resercher in King Faisal Hospital and Reserch center. She has published more than 3 papers for Inborn Errors of Metabolism .

Presenting author details
Full name : Manhal Abdulrahman AL-Mokhadab
Contact number: +966504767076
Email account: Manhal3@hotmail.com
Linked In account: http://linkedin.com/in/manhal-al-mokhadab-a911a8105

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