PROTEINS INVOLVED IN CARBON METABOLISM INDUCE BLEOMYCIN RESISTANCE

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Introduction

Proteomics is a fundamental tool in public health, since it allows the study of proteins, at a population level, that may be altered in response to a certain disease or a certain treatment. In order to determine the prognosis of patients or their reaction to some type of therapy, patterns of gene expression are also being studied. Thus, specific and more effective therapies can be administered, with fewer side effects.

Objectives

The purpose of this work is to assess the relationships between proteins involved in carbon metabolism and bleomycin resistance.

Results

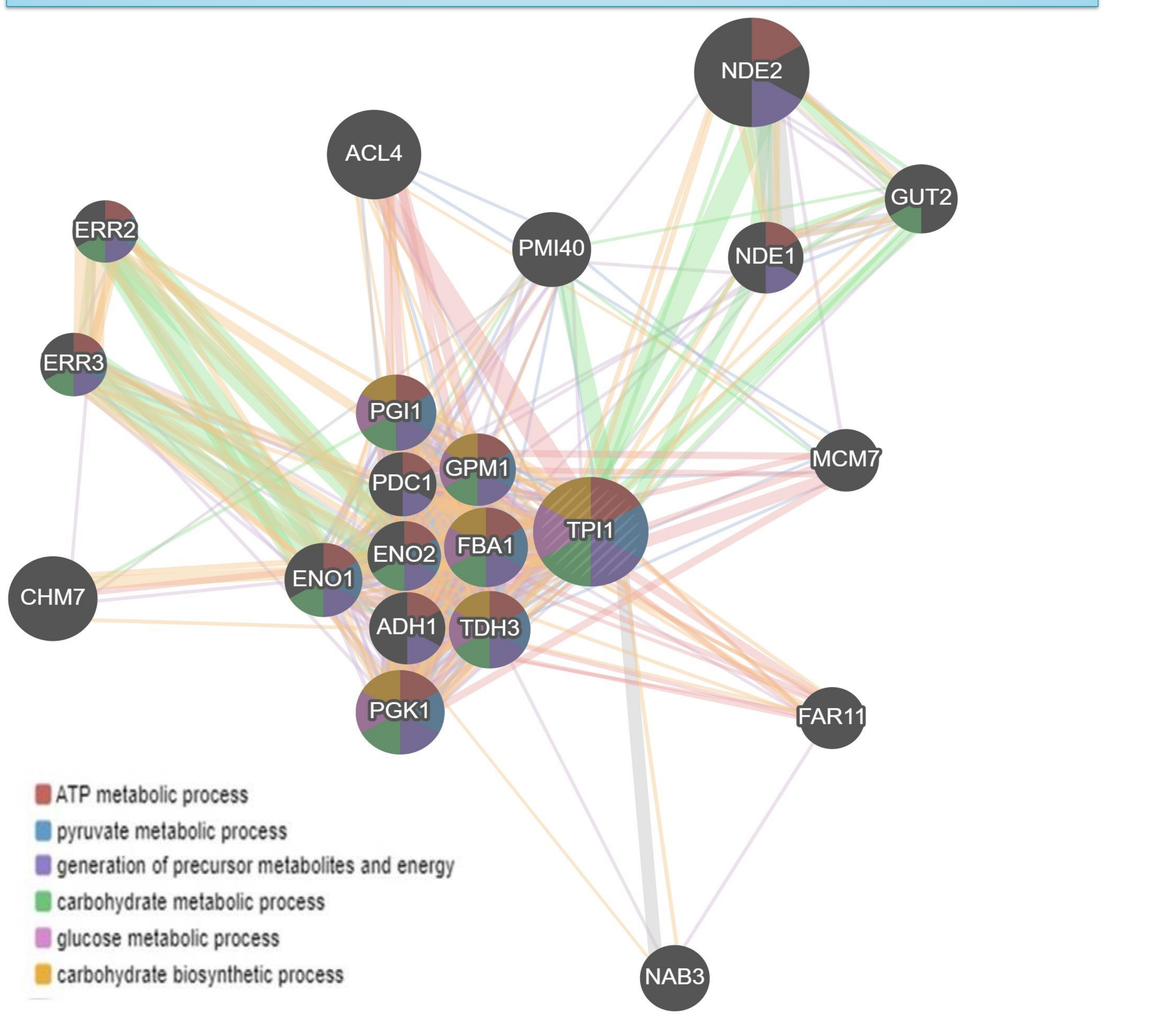
The most significant of all proteins found was the TPIS protein (TPI1 gene), which is a triose phosphate isomerase involved in the glycolytic degradation of carbohydrates to pyruvate. This protein exhibited a quite sizable increase in expression with reference to the parental cell line (4.4 times more). Carbohydrate metabolism could be induced and increased as a consequence of this overexpressed protein. The overexpression suggests that this protein may be involved in the resistance process. So, it may represent a new biomarker of resistance. The homologous gene in humans is TPI1.

Methods

A bleomycin resistant S. cerevisiae strain was obtained by continuous drug exposure. A proteomic analysis by tandem mass spectrometry using a nano HPLC-ESI-MS/MS ion trap system was carried out. The protein expression patterns between resistant and parental cell lines were compared using the emPAI index of protein abundance.

Conclusions

S. cerevisiae acquires bleomycin resistance after a long-term exposure to this drug which causes overexpression of TPIS protein. It could be involved in the resistance process. For this reason, it could be good candidates as bleomycin chemo-resistance biomarker. Knowing of the homologous gene in humans facilitates more studies of the expression of this protein in tumors.



Functions and interactions between genes that encode proteins with ΔemPAI > 2.5 in bleomycin-resistant strain.