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Abstract Topic: - Cancer

Abstract Title: - Predicting the role of intermittent fasting in altering the sulfur energetics in cancer cells.

Presenting author name: - Kratika Verma

Presenting author institute: - Vellore Institute of Technology

Co-authors name: - , , , , , , , ,

Co-authors institute: - , , , , , , , ,

Aims: - Decades of cancer research have demonstrated that cancer is a genetic as well as metabolic disorder. Recent studies have seized the attention of many researchers to explore the role of intermittent fasting (IF) in tumor cells by targeting the effected metabolic pathway. Intermittent fasting, a time-specific restriction of diet, has recently shown beneficial effects on metabolic diseases like type 2 diabetes, obesity and some cancers. IF is believed to be an important and interesting strategy for parameter involved in weight management and improving metabolic health. According to various literatures, IF suppresses glucose, IGF1, insulin, MAPK pathway and heme oxygenase 1 leading to autophagic pathway activation.

Methods: - Venn was drawn between various genes involved in cellular energetics and GEO profiles of intermittent fasting. Eight common genes which were differentially expressed in IF were also involved in cellular energetics. The functional pathways were extracted using EnrichR-KG and KEGG analysis. To see if these genes interacted at the cellular level, we subjected them to STRING analysis. Finally, two genes which were initially non-impactful in the adipocytes showed a downward trend after time specific nutritional restrictions. Both are involved in sulfur metabolism and their upregulation has a role in mitigating ROS.

Results: - The gene SUOX (sulfite oxidase) and SQOR (sulfide quinone oxidoreductase) are cellular genes involved in energetics and may have a role in cancer. Enrichr- KG results show the genes are involved in sulfur metabolic pathway in human body. Targeting multiple oncogenes using chemotherapeutic drugs along with nutritional restrictions can help in better survival due to upregulation of sulfur linked metabolism.

Conclusions: - The genes under study are involved in sulfur metabolism and excess sulfur is stored in our body in the form of glutathione (GSH) which is a major antioxidant. Role of glutathione in tumor cells are both protective and pathogenic role. Low levels of glutathione will increase the level of reactive oxygen species (ROS) in cancer cells and high levels of glutathione results in decreased ROS suggesting anti tumorigenic potential. After intermittent fasting in cancer cells, SUOX and SQOR were observed to be overexpressed resulting in higher levels of glutathione hence decreased ROS. This is important for multiple drugs to work on cancer cells. In future we will explore the role of these genes in cancer cell apoptosis.

Keywords: - The gene SUOX (sulfite oxidase) and SQOR (sulfide quinone oxidoreductase) are cellular genes involved in energetics and may have a role in cancer. Enrichr- KG results show the genes are involved in sulfur metabolic pathway in human body. Targeting multiple oncogenes using

chemotherapeutic drugs along with nutritional restrictions can help in better survival due to upregulation of sulfur linked metabolism.