TRANSLATIONAL INHIBITORS AS POTENTIAL THERAPEUTIC TOOL OF HUMAN NEUROBLASTOMA THROUGH MITOCHONDRIAL GENE EXPRESSION.

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ABSTRACT:

Background: Neuroblastoma is a solid extracranial neuroendocrine tumour and most common type of cancer of infancy. It originates from any neural crest of the developing sympathetic nervous system and undergoes malignant transformation. It is a complex heterogeneous disease and many factors such as molecular, cellular and genetic features are involved in its development. Mitochondria plays a pivotal role in neuronal cell survival or death. Neurons are highly reliant on aerobic oxidative phosphorylation (OXPHOS) for their energy needs. Defective activities of mitochondrial complexes I, II, III and IV have been identified in many neurological and neurodegenerative diseases. Human mitochondria with its own genetic material meet the needs required for the assembly of subunits of the oxidative phosphorylation (OXPHOS) complexes.

Objectives: A number of translational inhibitors are known that could potentially effect translation of mitochondrial protein synthesis. Among these Puromycin, Homoharringtonine and Cyclohexamide were selected for the present study. The effect of these translational inhibitors on mitochondrial gene expression for the treatment of neuroblastoma are not well established. Therefore, in this study, we have investigated the effects of these translational inhibitors on the expression of human mitochondrial gene expression in SH-SY5Y neuroblastoma cells.

Methodology: To study the effect of translational inhibitors, we use IC_{50} and IC_{25} concentration through Flow cytometry. Mitochondrial gene expression analysis is studied through QRT PCR. Mitochondrial protein expression analysis is studied via Western blotting. Mitochondrial induce oxidative stress is measured through ROS generation DCFDA flourimetric assay. Statistical analysis is analysed through one way ANOVA.

Results: We observed a significant effect on the level of mitochondrial transcripts upon exposure to these translation inhibitors in SH-SY5Y cells, however, the effects on expression

of mitochondrial proteins were minimal. This suggests that translational inhibitors might not directly affect the abundance of mitochondrial proteins.

Conclusion: Translational inhibitors induce significant effect on mitochondrial gene expression that can be lead to the new targeted therapy for treating Neuroblastoma.

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