Effect of Glucose Metabolism and Insulin Functional Regulation on GLUT 3 Receptor Gene Expression in the Pilocarpine Induced Epileptic Rats

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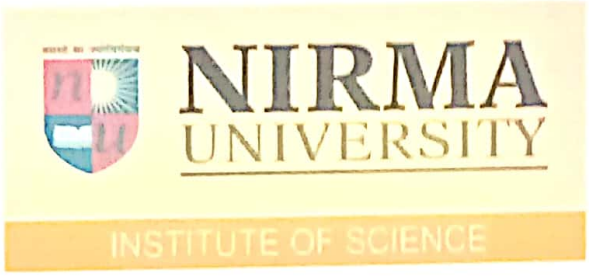

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CERTIFICATE

This is to certify that the thesis entitled "**Effect of Glucose Metabolism and Insulin functional regulation on GLUT 3 Receptor Gene Expression on Pilocarpine Induced Epileptic Rats**" submitted to the Institute of Science, in partial fulfillment of requirement for the award of Degree of M.Sc in Biochemistry and M.Sc in Microbiology, is a faithful record of bonafide research work carried out by Madhavi Joshi (11MBC010), Komal Rajani (11MBC015) and Yash Joshi (11MMB006) under my guidance and supervision. No part of this thesis has been submitted for any other degree or diploma. I further certify that any help or information received during the work on this thesis has been duly acknowledged.

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Declaration:
The above dissertation was carried out jointly by Madhvi Joshi, Komal Rajani and Yash Joshi under my guidance.

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Abstract

Epilepsy is a disorder of central nervous system in which seizures reoccur, which lead to an abnormal neural firing. Epilepsy is a complex disease with diverse clinical characteristics that preclude a singular mechanism. Temporal lobe epilepsy is a most common form of focal epilepsy which is difficult to control by medication. There are two major theories for cause of epilepsy: 1. Neurotransmitter imbalance 2. Mossy fibre sprouting. Glucose metabolism alters during epileptic condition. Abnormal glucose metabolism alters glucose concentration in brain during ictal and interictal period of epilepsy. In current investigation epilepsy was induced by using pilocarpine in adult wistar rats. Glucose (500mg/kg body weight) and insulin (0.01 IU/kg body weight, 0.05 IU/kg body weight) treatment was given to epileptic and control rats. To evaluate memory and cognition modified Karl Lashely. maze and T- maze test was performed. Significantly improved results were observed in E+G+I 1 group of rats in comparison with epileptic rats when insulin dose was 0.01 IU/ kg body weight. Negative effect of glucose and insulin treatment was observed in control rats treated with glucose insulin (0.01 IU/kg body weight). To evaluate motor function ladder rung test was performed. Significantly improved results were observed in E+G+I group of rats in comparison with epileptic rats in motor activity also with 0.01 IU/kg body weight insulin dose. Activity of Sodium Potassium ATPase in cerebral cortex was significantly decreased in epileptic rats. But activity of Sodium Potassium ATPase in E+G+I group of rats was significantly increased. Acetylcholine esterase activity in muscle was significantly increased in epileptic rats and again decreased in E+G+I group of rats (Insulin-0.01 IU/kg body weight). Activity of Malate dehydrogenase was significantly decreased in epileptic rats in comparison with control rats and after glucose, insulin treatment (0.01 IU/kg body weight) activity of Malate dehydrogenase in E+G+I group of rats significantly increased. These results suggest that glucose and insulin treatment has some role to correct abnormal glucose metabolism. Good quality RNA was isolated from cerebral cortex which was used for the preparation of cDNA. GLUT 3 specific primer was designed and used to check its expression. Amplified product was obtained but significant results were not obtained.