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Autism: A complete therapeutic approach to ameliorate propionic acid intoxicated mitochondrial complexes dysfunction: Breakthrough to develop a new diagnostic strategies

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Mitochondrial complexes enzymes (I, II, IV & V) dysfunction increases neuroinflammatory cytokines, oxidative stress and alterations of brain metabolic enzymes may be key pathological hallmarks of autism. Propionic acid (PPA), an endogenous metabolite produced by gut bacteria and commonly served as food preservative. Here, first time in the history of this Propionic acid animal model we established and validate the huge range of behavioural, biochemical, neuropathological, morphological and histopathological effects of direct adenylyl cyclase activator Forskolin (FSK) in adult rat's brain tissue homogenate, serum and urine in comparison with control drugs used in Autistic patients. Intraventricular injection of PPA in rats caused impairment in memory, grip strength posture and cognitive function. Biochemical analysis of brain homogenate, serum and urine samples in PPA treated rats showed an increase in altered mitochondrial complexes activities, inflammatory cytokines, oxidative stress and lipid biomarkers. Neurohistological and morphological alterations of hippocampus, basal ganglia and cerebral cortex of PPA treated rats exhibit severe neuronal space, irregular damaged cells, dense pyknotic nuclei associated marked focal diffused gliosis. Forskolin (10, 20 and 30 mg/kg, p.o) once daily treatment for a period of 15 days significantly improved motor performance and cognitive behavior task. Further, Forskolin treatment

significantly improved mitochondrial complexes enzyme activity, attenuated inflammatory and oxidative damage of rat brain. In present research work, neuroprotective effects of direct AC activator Forskolin responsible for activation of cAMP/PKA further leads to CREB activation, and through the repairing in the basal ganglia, cortex and hippocampus functioning associate with mitochondrial dysfunctioning in autism as well as Forskolin effectively reduced the side effects such as weight gain, gastric discomforts, irritation associated with control drugs used in Autistic patients.

Speaker Biography

Sidharth Mehan is working as Associate Professor in Department of Pharmacology at ISF College of Pharmacy, Moga, Punjab, India, one of the best well renowned and prestigious Pharma education and research institute in India. He has more than 10 years of academics, research and administrative experience to his credit and simultaneously working as Doping Control Officer on empanelment in Ministry of Youth Affairs & Sports, Govt. of India, Delhi and working online as Senior Clinical Dietitian & Nutritionist consultant in Sanjivani Hospital (A Super & Multi speciality Hospital), Sirsa, Haryana as well as in other online medical agencies in India. He has published more than 75 research and review articles in prestigious National and International Journals. His areas of research include molecular pharmacology, Behavioral Pharmacology, Neuropharmacology, Sports Sciences and Traditional and Complementary systems of Medicine. He has so far guided 24 M. Pharm Research projects and 04 Doctoral Theses. Furthermore, he is associated with Animal welfare activities for last 12 years.

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