

Registration Seminar

Seminar Title	: Exploring the Therapeutic Efficacy of Nutraceutical in Combatting The Pathogenesis of Type 2 Diabetes in <i>Drosophila melanogaster</i>
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Venue	: LS Seminar Room
Date and Time	: 15 May 2024 (10.30AM)
Abstract	: Diabetes mellitus (Type 2 diabetes), recognized as chronic hyperglycemia, continues to be a global health concern, with rising prevalence and severe socioeconomic expenses. Sedentary life style, high caloric diet, insomnia, excess iron accumulation, gut microbiota dysbiosis, alcohol consumption etc are the major non-genetic determinant for type 2 diabetes. While existing pharmacotherapies attempt to control blood glucose levels and minimize complications, challenges come with their high cost, side effects, and narrow therapeutic window. Hence, there is a pressing need for novel treatment options to address the disease's intricate pathogenesis. <i>Drosophila melanogaster</i> with its highest genetic homology, conserved metabolic pathway, and whole sequenced genome, provides a great platform to study metabolic disorders like Type2 diabetes. Amino acids, the building blocks of proteins, have gathered much attention for their numerous roles, including glucose metabolism, insulin secretion, and signaling pathways implicated in diabetes. In our study, combined supplementation of amino acids leucine and glutamine in optimal doses for 7 days reduces the hemolymph glucose level and lipid depositions in High sugar Diet (HSD) fed diabetic <i>Drosophila melanogaster</i> . Glutamine, a precursor of the antioxidant glutathione, when combines with leucine demonstrated enhanced DPPH scavenging and improved the activity of antioxidant enzymes like Super Oxide Dismutase (SOD), catalase, and Glutathione Peroxidase (GPx) in diabetic flies's post-treatment. Reduced nitric oxide accumulation was observed, alongside elevated thiol levels following treatment with leucine and glutamine. Improved cross-sectional arrangements of actin filaments in the gut and Malpighian tubules were noted, suggesting reduced glycation of cytoskeletal actin protein. Furthermore, enhanced efflux activity of Malpighian tubules and reduced apoptotic cell death were observed. Climbing ability also observed a significant increase post-treatment. Expression level of <i>dilp2</i> and AKT were found to be increased post treatment. Based on the above study, we conclude that combination of amino acids like leucine and glutamine in food could serve as a cost-effective nutraceutical approach to treat type 2 diabetes. The future study will focus on different traditional nutraceutical approaches like vitamins and probiotics to treat insulin resistance to reduce diabetic complications.