

Progress Seminar

Seminar Title	: Investigating the impact of Ribose-induced Advanced Glycation end products on aging and anti-aging effects of Piceatannol on <i>Drosophila melanogaster</i>
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Venue	: Ls Seminar Room
Date and Time	: 30 Jul 2025 (4-5 PM)
Abstract	: Aging is a universal phenomenon. Every organism in this living world ages with time. Of many factors responsible for aging, diet and food are some of the significant contributors. Advanced Glycation End (AGE) products are one such factor that accumulates during aging and age-related diseases. However, whether exogenous AGE compounds cause aging or not is an area to be explored specific organs can describe aging and aging-related phenomena in an organism. <i>Drosophila melanogaster</i> , a well-known model organism, is used to decode aging and age-associated phenomena. In this study, we fed Ribose induced Advanced Glycation End (Rib-AGE) products to <i>D. melanogaster</i> to study the aging mechanism. The Rib-AGE-induced aging was checked in <i>Drosophila</i> 's gut, as the gut can indicate the overall physical health of an organism. Rib-AGE was synthesized and characterized by different methods and then fed to flies. Reactive oxygen species (ROS) and Nitric oxide species (NO) were higher in the Rib-AGE-fed flies, and the antioxidant level was lower. The intestinal permeability was altered. The structural arrangement of the gut's microfilament seemed to be damaged. Cell death was elevated in comparison to control. The food intake was found to be reduced. The relative mRNA expression of the <i>Sirtuin 2</i> and <i>Sirtuin 6</i> genes of <i>D. melanogaster</i> was downregulated in Rib-AGE-fed flies compared to the control. The survival percentage was lower in Rib-AGE-fed flies. From this study, it was confirmed that Rib-AGE accelerated aging by changing the redox and downregulating the <i>Sirtuin 2</i> and <i>Sirtuin 6</i> . As the Rib-AGE was fed through the diet. Diet and any diet-mediated stress can affect the hormonal pathway. We checked the level of Ecdysteroids, Juvenile hormone-related genes and their associated behaviors. In Rib-AGE-fed flies, we found developmental delay and a higher pupation zone. JH synthesis-related genes like JHAMT, CYP6G2, were down-regulated, and JHE, responsible for JH metabolism, was up-regulated in Rib-AGE-fed flies. Taiman, which acts as a co-activator of JH, was also down-regulated. Furthermore, the receptors like Methoprene Tolerant and Kr-h1 were downregulated. As these genes are also responsible for fertility, we checked the courtship assay, mating latency, courtship latency and fecundity. We found that Rib-AGE-fed flies showed lower courtship events/minute and lower fecundity, whereas they showed higher mating and courtship latency. The ovary size was reduced in Rib-AGE-fed flies. 20-Hydroxyecdysone, an antagonist to JH, was upregulated. Finally, we found out that ingestion of Rib-AGE through diet upregulates the Relish and downregulates the dFOXO, leading to upregulation of Attacin A. Altogether, the current study finds that Rib-AGE causes continuous tissue damage and accelerates aging in the organism <i>Drosophila melanogaster</i> .