SPACE LIFE SCIENCES SYMPOSIUM (A1)
Multidisciplinary Space Life Sciences Research (8)

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THE EFFECT OF MICROGRAVITY ON DROSOPHILA FEEDING AND ENERGY METABOLISM

Abstract

Purpose: The earth's gravitational force is important for various physiological functions including metabolism. It is reported that space travellers usually experience a loss in weight and body mass, and such change is likely caused by reduced food comsumption. However, Whether and how gravitational force affect animal metabilsm is still widely unknown. Here, we plan to address these issues using Drosophila melanogaster as a research model. MethodologyTo identify the impact of gravitational force on Drosophila energy metabolism, we use a 3-D microgravity simulator, which is also known as Random Position Machine, to generate a microgravity environment in the lab. Flies of various genetic background will be incuabted in the microgravity simulator for certain periods of time, and followed by a series of tests as belows: First, we will measure the level of various metabolites, including triglyceride, free fatty acid, glucose, trahalose and glycogen, to confirm whether microgravity can affect Drosophila energy metabolism. Second, since feeding behavior is important to maintain the energy level in animal body, we will test the amount of food fly consumed after incubation under microgravity invironment using food quantification assay like CAFFE assay and colorful food assay. Finally, we will measure the expression level of key metabolic genes in flies challenged by microgravity, to study the molecular mechanisms underneath the metabolic and behavioral changes. Results and ConclusionWe expect to see a change in the amount of food fly consumed after microgravity challenge, and such change will lead to major energy metabolite lavel changes. We wish we could find genes responsible for these changes and provide a hypothesis of how microgravity affect Drosophila energy metabolism and related behavior like feeding.