BDR SEMINAR (Kobe & online hybrid)

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Wednesday, August 28, 2024

14:00-15:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom

Zoom meeting URL will be announced on the event day by e-mail.

※This seminar is open only to BDR members.

Gut-to-brain regulation of Drosophila aging through neuropeptide F, insulin and juvenile hormone

This seminar is a part of the BDR Stage Transition Project Seminar Series for 2024-2025.

Summary

Dietary restriction slows aging in many animals, while in some cases the sensory signals from diet alone are sufficient to retard or accelerate lifespan. The digestive tract is a candidate location to sense nutrients, where neuropeptides secreted by enteroendocrine cells (EEC) produce systemic signals in response to food. Here we measure how Drosophila neuropeptide F (NPF) is secreted into adult circulation by enteroendocrine cells and find that specific enteroendocrine cells differentially respond to dietary sugar and yeast. Lifespan is increased when gut NPF is genetically depleted, and this manipulation is sufficient to blunt the longevity benefit conferred by dietary restriction. Depletion of NPF receptors at insulin producing neurons of the brain also increases lifespan, consistent with observations where loss of gut NPF decreases neuronal insulin secretion. The longevity conferred by repressing gut NPF and brain NPF receptors is reversed by treating adults with a juvenile hormone (JH) analog. JH is produced by the adult corpora allata, and inhibition of the insulin receptor at this tissue decreases JH titer and extends lifespan, while this longevity is restored to wild type by treating adults with a JH analog. Overall, enteroendocrine cells of the gut modulate Drosophila aging through interorgan communication mediated by a gut-brain-corporaallata axis, and insulin produced in the brain impacts lifespan through its control of JH titer. These data suggest that we should consider how human incretins and their analogs, which are used to treat obesity and diabetes, may impact aging.

RIKEN BDR

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