C. elegans Topic Meeting: Neuronal Development, Synaptic Function and Behavior

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Program and Abstract Book

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12. **Bacterial diets are able to modulate life-history treats in C. elegans models of neurodegenerative diseases**

Veuthey, Tania; Burkovski, Andreas

As life expectancy increase worldwide, age-related disorders, such us neurodegenerative diseases (ND), have become more prevalent. Moreover, treatments are only able to attenuate some symptoms, but fail to arrest characteristic neuronal proteotoxicity. Thus, new challenges emerge to science in order to understand molecular basis of these disorders. Lately, the hypothesis that gut microbes affect neurodegenerative diseases through the gut–brain axis is gaining increasing attention and a close relation between the complexity and diversity of gut microorganism and ND has been proposed. The aim of our work was to evaluate the relevance of the microbiota in the progression of proteotoxic-based disorders, assessing the impact of six non-pathogenic bacterial diets on life-history traits in *C. elegans* models of ND, relative to the standard OP50. In a first approach, we found 2 bacteria, *Escherichia coli* K12 and *E. coli* HB101, able to improve locomotion in liquid media, in worm's model of Parkinson disease (PD) at adult day 4, versus *E. coli* OP50. Moreover, an age-dependent locomotion improvement, between larva-L4 and adult day 4, was observed in solid media after feeding PD model´s worms with 4 different bacteria versus *E. coli* OP50. We also observed an increase in the developmental timing of wild-type worms grown in 4 bacteria versus *E. coli* OP50, but more interesting was the accelerated developmental rate selectively found in models of PD and Huntington disease feed with *E. coli* BL21 (DE3). In addition, we observed that using *E. coli* BL21 (DE3) as a food source, L4 larvae of PD models showed a significant increase stress resistance. When the reproductive performance was evaluated, no bacterial diet tested was shown to affect the parameters studied in all worms' models. In order to discard that the observed effect were due to changes in food intake, the pharyngeal pumping was also evaluated, without finding changes using all bacterial diets as a food source. We are currently evaluating aggregate numbers, lifespan and
mitochondrial morphology among others. Our results allowed us to identify bacteria with the ability to drive physiological outcomes and improve health status of *C. elegans* models of neurodegenerative diseases

13. **Behavioral ecology of the worm: cultivating C. elegans in rotting fruit and soil in the lab**

Lee, Jin; Indong, Rocel; Park, Jong-Min; Moon, Je-Hyun

Neurobiology and behavior studies in the worm have revealed the genes and circuitry that regulate C. elegans behaviors in the laboratory. However, the relevance of these neuronal and genetic factors on the survival and reproductive fitness of the worm in its natural habitat is unknown. C. elegans is commonly found in the wild flourishing in rotting fruit and soil. In order to simulate these conditions, we are incubating soil and apples in a plant growth chamber varying temperature, humidity, and day-night cycling, to identify an optimal growth condition for C. elegans. In these optimal conditions, C. elegans can grow in population by more than 3000-fold within 8 days starting from L1 larvae. One of our goals is to characterize the ecological succession of the microbial communities that allow C. elegans to flourish in these habitats. In addition, we find that the C. elegans can migrate to different positions within the