J. R. CAREY, S. ZOU, P.LIEDO, A. MORICE. Life course micro-analysis: An electronic system for fine-scale monitoring of lifetime behavioural, spatial and temporal patterns of individual fruit flies with implications for studies of human behaviour. Gerontechnology 2010;9(2):202; doi:10.4017/gt.2010.09.02.300.00 **Purpose** Because historically both ethologists and animal behaviourists have largely ignored questions concerned with lifetime patterns of behavior and movement, little progress has been made in the use of model organisms for understanding healthspan and health metrics and their relationship to individual life span. Therefore the objective of the study that will be described in this presentation was to develop a high-resolution electronic system to record both the behavior and movement patterns of individual fruit flies from birth to death. In cooperation with Instituto Nacional de Astrofisical, Optica y Electronica (INAOE), in Puebla, Mexico we developed such a system[1] that records every 20 min in 1min bouts (i.e. 5 times/s for 60s) the XYZ location and the behavior (e.g. walking; feeding; resting) of flies solitarily confined in small cages throughout their lives, some of which have exceeded 5 months. **Method** The lifetime behavior and movement patterns of 27 individual Mexflies (*Anastrepha ludens*) were monitored using this system including 24 females divided equally between sugar-only or full (sugar+yeast) dietary treatments and 3 males on a full diet. **Results & discussion** An example of the output (*Figure 1*) for the hourly distance moved by individual flies for 120 days reveals distinct patterns that are similar across treatments and between the sexes (e.g. 3-hour window of most intense movement activity in late afternoon) as well as patterns that are different (e.g. movement greatest in females on sugar-only diet). With near-continuous sampling of both movement and behavior using this technology a plethora of new questions can be answered that are related to health and longevity and, therefore, that can inform studies of healthspan in humans. For example, What health information is gained by sampling daily versus sampling weekly, bi-weekly or monthly? How do individuals adjust their behavior with changing conditions through their lives and do these changes compensate for or contribute to mortality risk? Lifetime electronic behavioral monitoring can be used for testing a wide variety of hypotheses on aging that range from morbidity compression[2-3] and disability[4-6] to dietary restriction[7] and prolongevity effects of food additives[8]. This first-generation technology lays the foundation for the design of more refined monitoring systems that can be developed in coordination with and complementary to research programs concerned with individual-level continuous-time monitoring of human health over prolonged periods.

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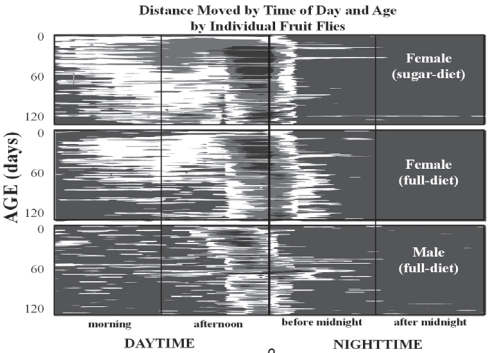

Figure 1. Example graphic[9] showing age- and time- (diel-) specific movement for individual Mexflies. Each horizontal line is color-coded in one-hour segments as either red (high), yellow (medium) or green (low) to depict movement level