Towards an Automatic Method for Toxicity and Pharmacological Testing in *C. elegans*

Sergio H. Simonetta
Fundación Instituto Leloir, CONICET, Buenos Aires, Argentina
Correspondence to: Sergio Simonett (ssimonetta@leloir.org.ar)

In toxicity and pharmacological studies *C. elegans* are exposed to different compounds and the effects analyzed by observing worm viability or behavior. An alternative approach is to use locomotor activity as a readout, which has been instrumental for assessing compound toxicity (Dhawan *et al.*, 2000). Data acquisition usually requires microscope observation and manual counting, which is time consuming and inconvenient for extensive compound screenings. We have previously developed an automated method to detect *C. elegans* movement in which swimming worms are detected as they cross through infrared microbeams (Simonetta *et al.*, 2007).

We are currently adapting this methodology for high throughput analyses. We have developed a 384 channel apparatus and successfully recorded the behavioral changes produced by toxic compounds (Figure 1). The effect increases with compound concentration and is dependent on exposure time. Our "Worm Microtracker" might be useful for the community to develop easier and faster toxicity and paralysis assays, opening the possibility of performing high throughput studies in *C. elegans*.

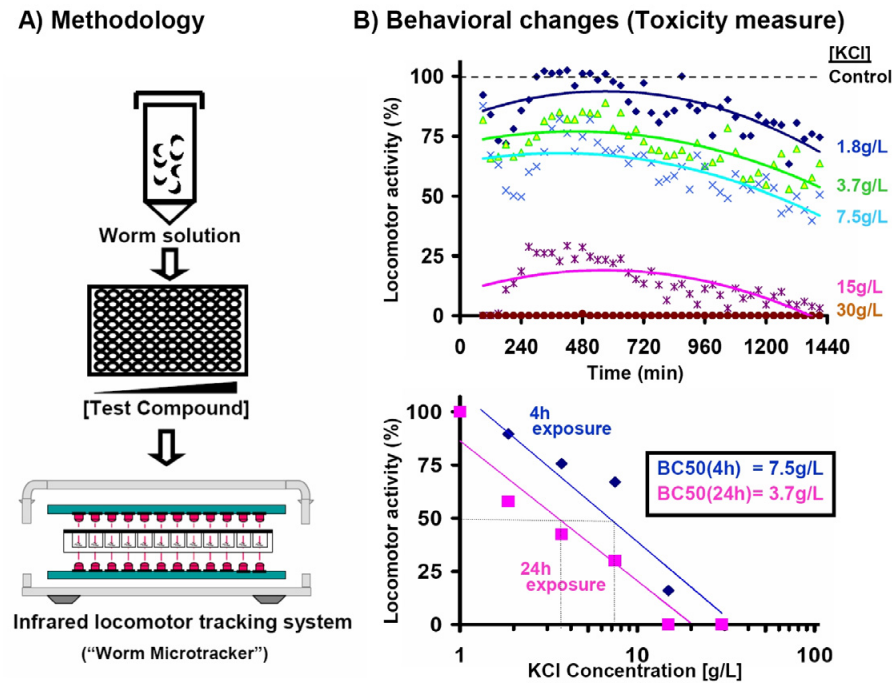

Figure 1. **Measure of compound toxicity using infrared locomotor tracking**. **A)** Schematic diagram of experimental procedure. Young adult *C. elegans* (50worms/100µl aprox.) were prepared in K buffer (53mM NaCl, 32mM KCl), transferred to a 96 well microplate (100µl/well) and adequate concentrations of KCl added. The microplate was registered continuously for 24 hours at 20°C using a 384 channel infrared tracking system. **B)** Locomotor activity plots showing the toxic effects of KCl exposure vs. time. Each dot corresponds to the mean of activity counts/30minutes for 8 replicates. Treatment plots are adjusted to a polynomial curve. **C)** Estimation of BC50 (Concentration at which movement is reduced by 50% compared with controls). Locomotor activity relative to control is plotted against KCl concentration. The BC50 was calculated graphically for 4h and 24h treatment.

References

Dhawan R, Dusenbery DB, Williams PL. (2000). Comparison of metal-induced lethality and behavioral responses in the nematode *Caenorhabditis elegans*. Environ. Toxicol. Chem. *19*, 3061-3067.

Simonetta SH and Golombek DA. (2007). An automated tracking system for *Caenorhabditis elegans* locomotor behavior and circadian studies application. J. Neurosci. Methods *161*, 273-80.