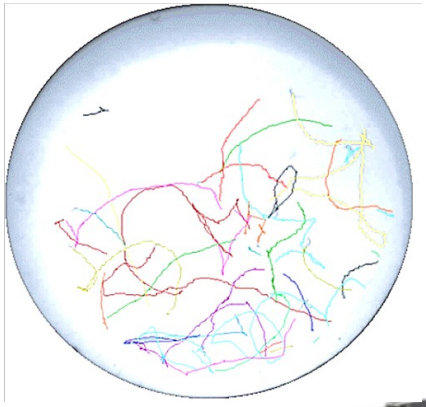
WMicrotracker SMART

8x Carousel HD version



WMicrotracker® SMART is our new technology with which you can obtain real-time information on the behavior of small animal populations based on time and space. The "Equipment + Software" system is optimized to quantify the speed and trajectory of small organisms cultured in 35 mm Petri dishes. Its integration with the 8x carousel allows to perform automated kinetics of multiple plates, as well as fully automated lifespan and healthspan experiments using C.elegans.

Phylum TECH

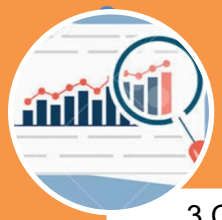
How it works?

The system has the ability to work in 2 different modes:

1) Infrared images, plate upside down: This arrangement allows tracking of the path of multiple adult C. elegans (or worms of similar size) using NGM-type solid medium cultures. The method is based on an optical phenomenon of Amplification of Silhouettes by Infrared Refraction. The infrared light waves refract at the worm-agar interface generating an amplified image that will be captured by a sensitive optical/HD camera system. The digital processing of the image is carried out using software specially designed for real-time data acquisition.

2) Infrared microbeam grid, with face-up plate: allows the quantification of the behavior of multiple organisms of size > 0.1 mm using solid, liquid or air cultures. It also allows to define the area of activity in the plate for its use in chemotaxis experiments. This patented method is based on detecting movement through the scattering of light caused by a grid of infrared microbeams.

SOFTWARE



3.Calculation of Parameters

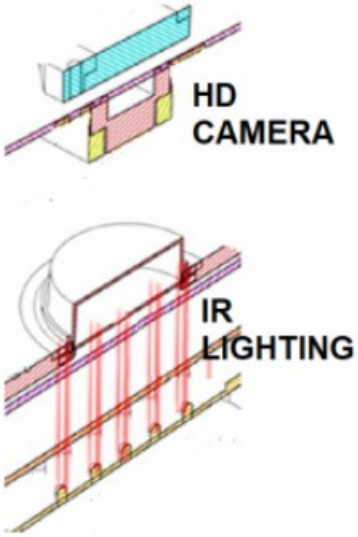
Worms into the plate
-Average speed [mm/s]
-Travel distance [mm/worm]
-Motility Score
-Rotation index
-Full list of single particle parameters.

2.Path tracking

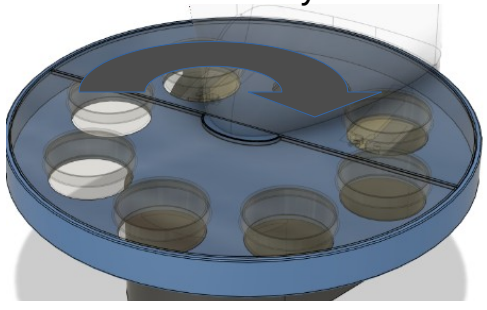
1.Organism Detection

Infrared amplification optics

Full plate imaging

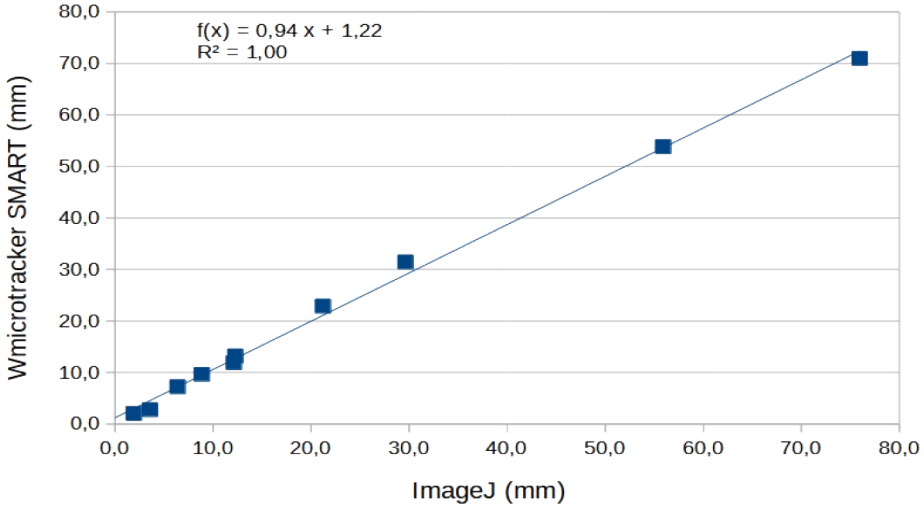


8 Plates Rotatory wheel



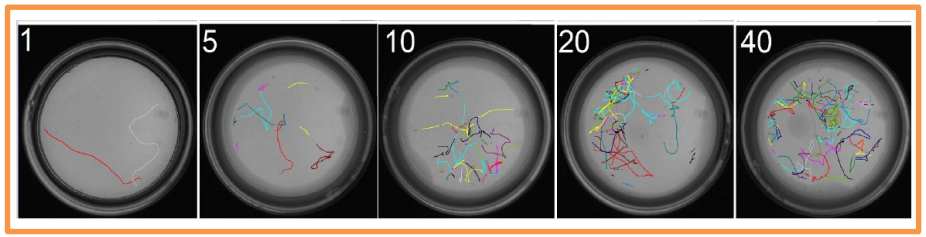
SMART

The calculated distances correlate very well with manual processing

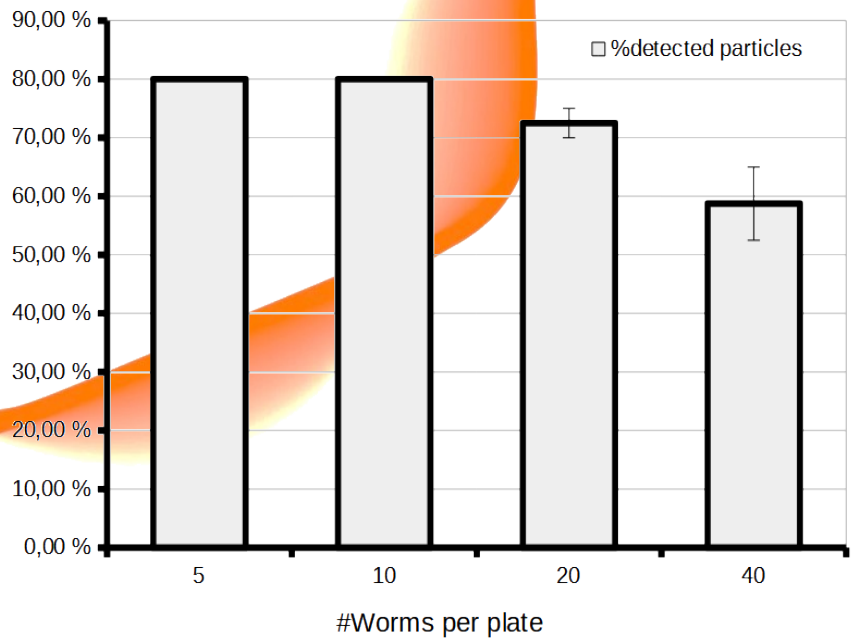


Worm Travel Distance [mm]

ImageJ	SMART
1,9	2,1
3,6	2,8
6,4	7,2
8,9	9,6
12,1	11,9
12,3	13,2
21,2	22,9
29,6	31,4
55,9	53,8
76,0	71,0

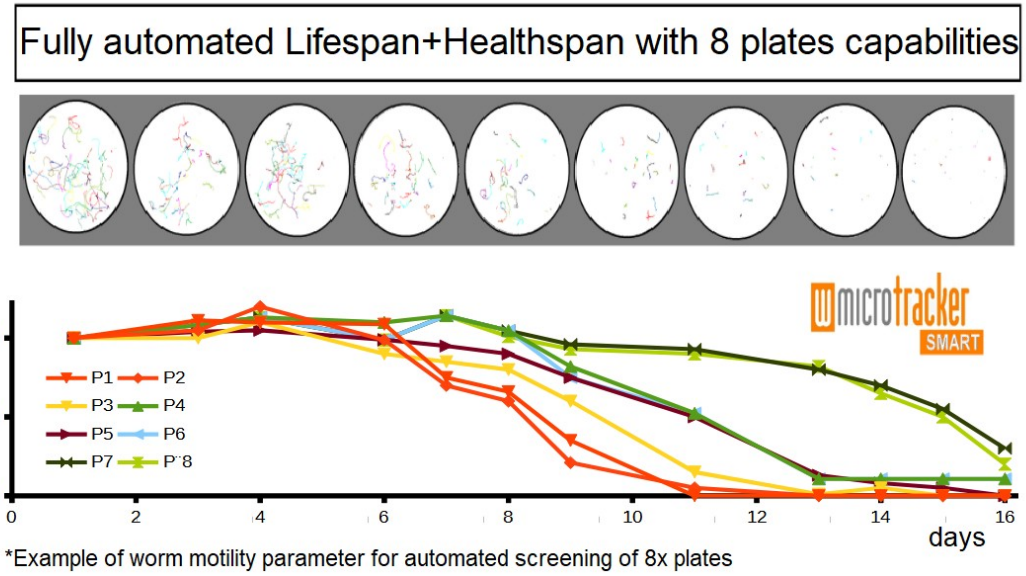


Current Algorithm is able to detect and track >80% of worms simoultaneously.



APLICATIONS

Neurodegeneration-Longevity-Toxicity-Microbiome-RNAi-Hypoxia



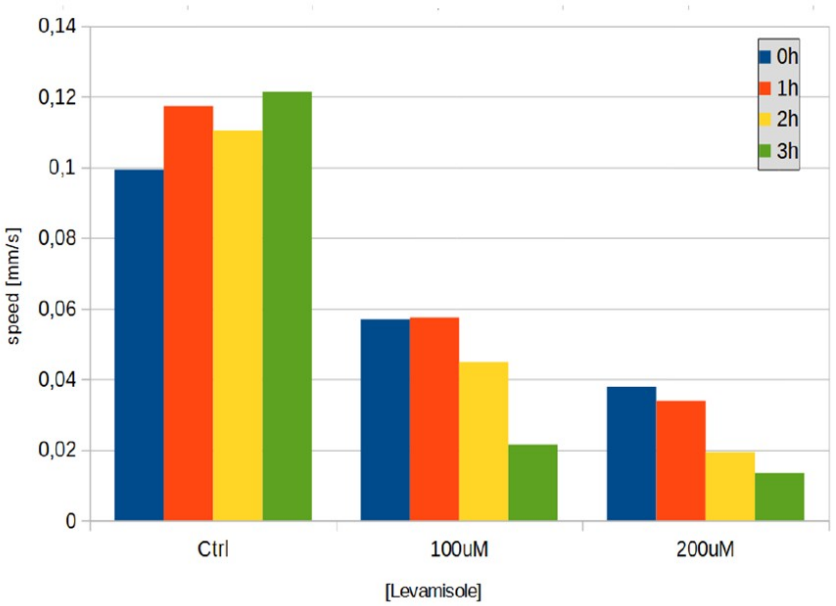
*Example of worm motility parameter for automated screening of 8x plates

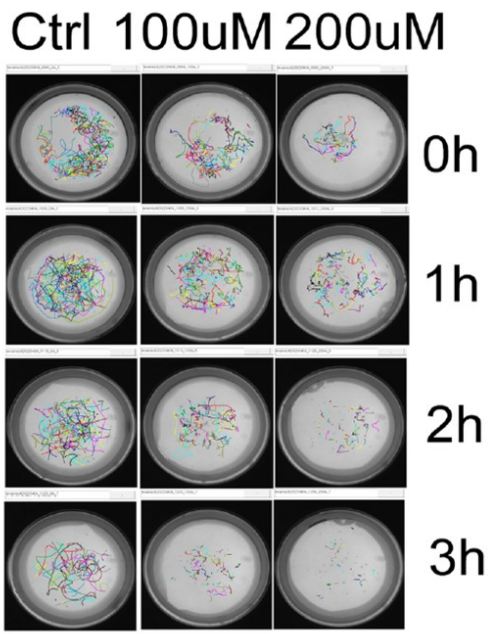
FULLY AUTOMATED LONGEVITY TEST

The graph shows the traces of individual worms on the plate and their reduction with age. 20 adult C.elegans were grown at 25°C in a 35mm Petri dish with 80 uM NGM+FuDR. Data acquisition was performed once a day, using an acquisition period of 5 minutes.

TOXICITY

Example of kinetics for treatment with levamisole. 25 worms were cultured in 35mm Petri dishes containing NGM and increasing concentrations Levamisole [0 to 200 uM]. The plates were recorded for 5 minutes every 1 hour. The graphs show the slowing down of the movement speed of the worms.





The system Includes:

WMicrotracker SMARTx8HD acquisition hardware, integrated with an 8× carousel for 35 mm Petri dishes, featuring a 5-MP infrared camera.

Plate adapters:
- Tracking Mode, side up
- Tracking Mode, side down
- Microbeam grid side up

USB Wire 1.8m (USBa to USBmini)

9 V DC, 2 A power supply (5.5 × 2.1 mm barrel plug, center-positive)*

*In some countries, it may not be included due to customs restrictions.

Product Dimensions and Manufacturing

LWH: 24cm x 22cm x 22cm [9.5”x8,6”x 8.6”]
Manufacturing technology: 3D printing

PC requirements:

IBM PC–compatible computer with the following minimum requirements:

- Intel Core i7 processor or higher
- One available USB 2.0 port (blue)
- Microsoft Windows 7 or later operating system
- Solid-state drive (SSD) recommended
- More than 10 GB of free hard-drive space for experiment image storage