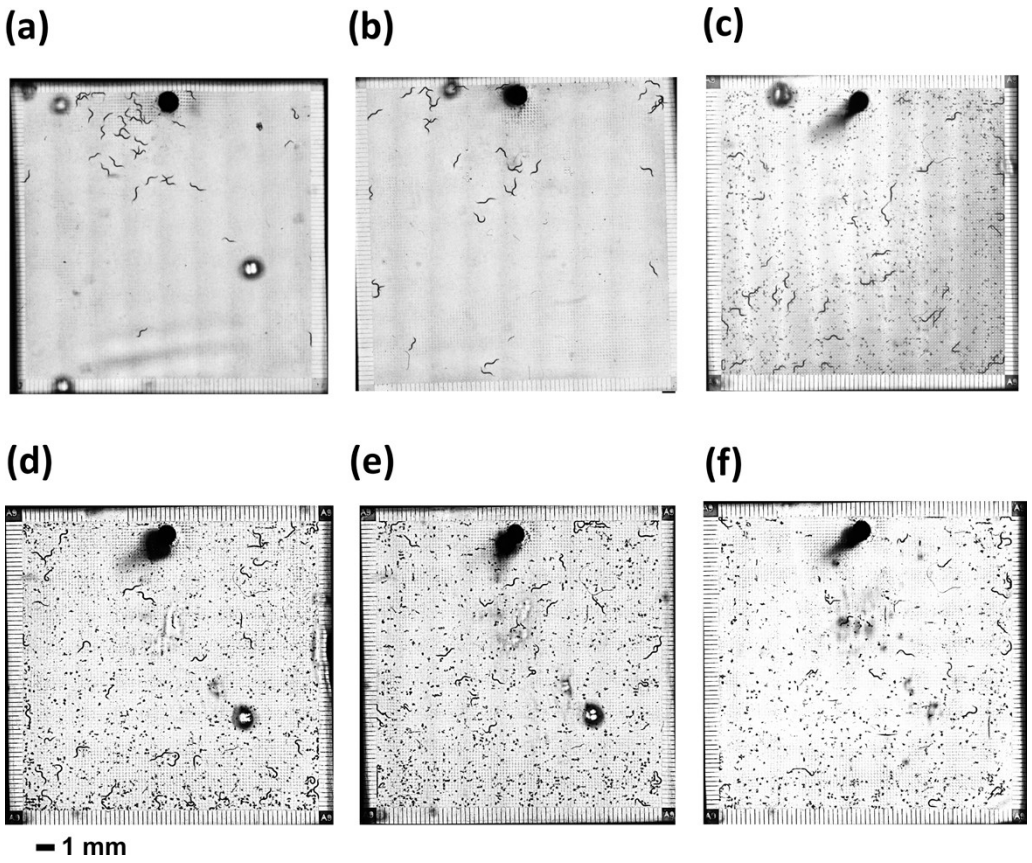
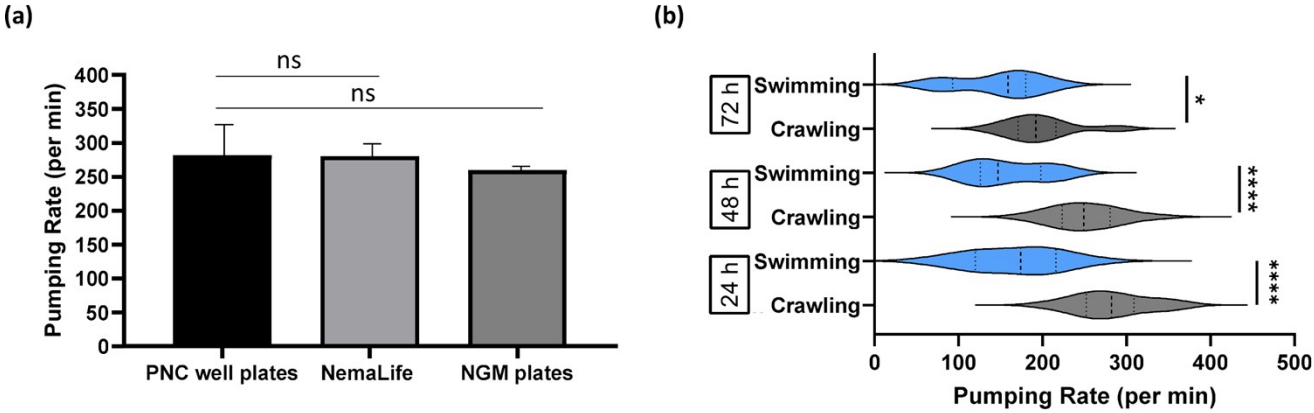
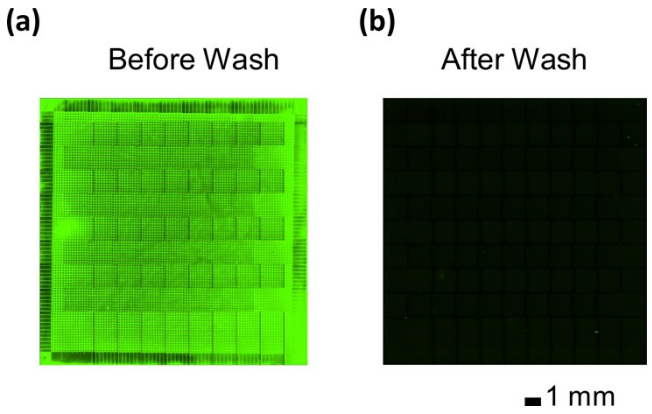


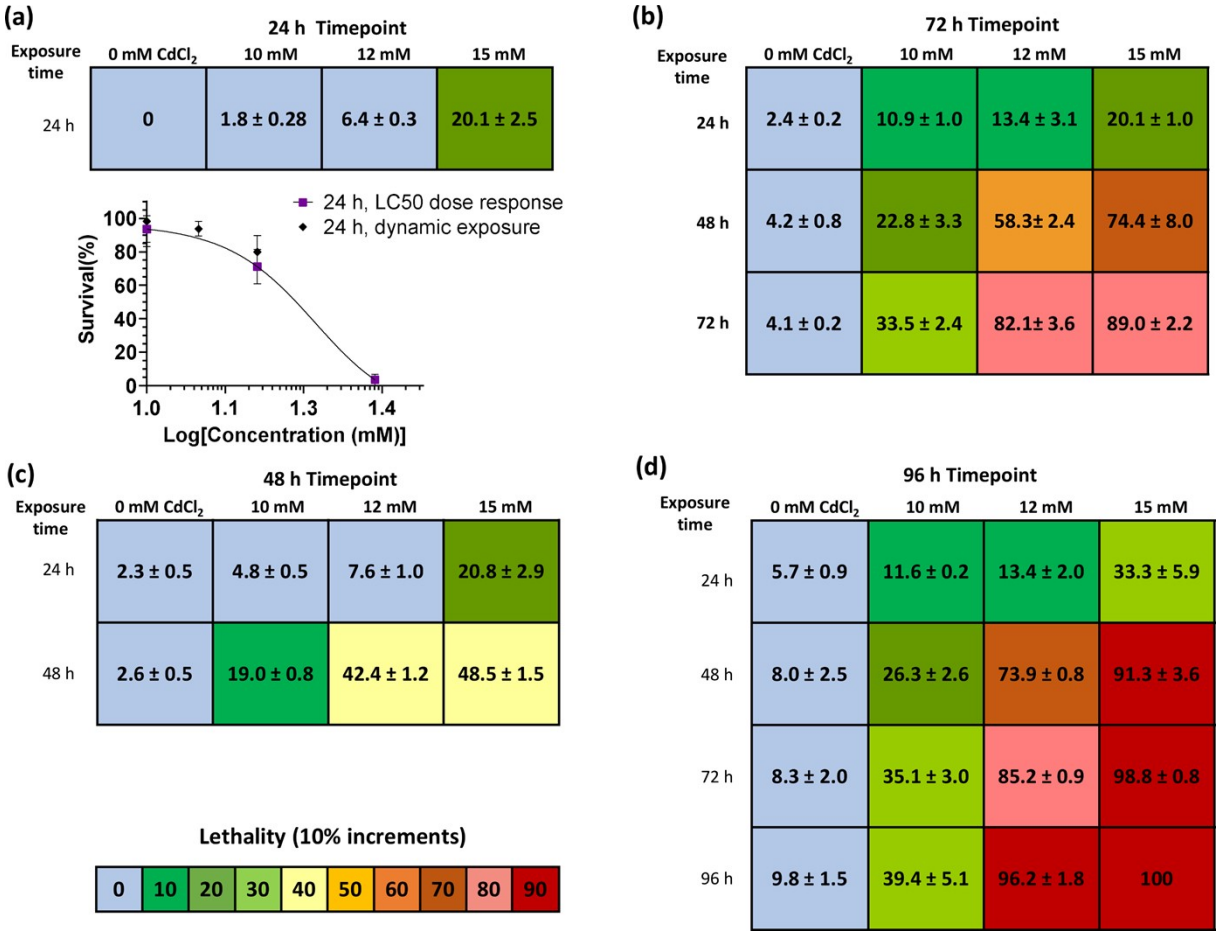
SI Fig. 1. Images, from lifespan studies (culture optimization) using FUdR-sterilization, showing that worms remain viable with passive feeding and unchanged food from OP50 diffusion. (a) Day 0(loading)- day 4 from hatching. **(b)** Day 2 **(c)** Day 5 **(d)** Day 7 **(e)** Day 10 **(f)** Day 14



SI Fig. 2. Pharyngeal pumping studies to examine toxin consumption in swimming vs. crawling worms (a) Comparable pharyngeal pumping rates in day 2 adult crawling worms between PNC wellplates(N=3 trials, n= 10 worms per condition per trial) vs. NemaLife (Rahman et al. (2020)*Scientific Reports*) and agar plates (Lazakovitch et al. (2008) *Developmental Dynamics*) to show that this platform's environment is not introducing changes (2-sided Welch t-tests, , p=0.947, SD error bars) **(b**) The consistently lower pharyngeal pumping in worms housed in the swimming chamber highlights that swimming worms consume less of the toxin incorporated in the OP50 media compared to crawling worms, thus providing another explanation for the consistent trend of higher LC_{50}s observed in swimming worms (N=3 trials, n= 10 worms per condition per trial) (Kolmogorov-Smirinov, p=<0.0001-0.0409) .



SI Fig. 3. Standardized toxin wash protocol confirmed through fluorescent tracer imaging, shown before and after washing. (a) Prior to washing, the chamber is filled with fluorescein. **(b)** After washing, residual signal is minimal, confirming clearance of small molecules.



SI Fig. 4. Dynamic exposure to toxins in N=1 trial, n= 3 device replicates per dose/exposure duration condition, 30-40 worms per PNC (a) 24 h after loading (top), comparison between 24 h dynamic exposure vs. dose response studies (bottom) showing ns (2-way ANOVA, p=0.0741->0.999, SD error bars)(see **Fig. 4** for dose response sample sizes)**(b)** 48 h after loading **(c)** 72 h after loading **(d)** 96 h after loading

SI Fig 5. Dose-response comparison of worms exposed to ethanol for 24 hr with devices untreated and treated with 5 w/v% pluronic solution (N=2 trials, n= 1 PNC/dose/condition, 30-40 worms per PNC). The difference between the curves is established by the extra sum-of-squares F test (p=0.0341, SD error bars).

SI Table 1. Tabulated LC_{50} values from PNCs, and liquid culture in standard well plates after 24 hrs of chemical exposure. The rat LD_{50} values, exposure time and sample size are also shown.

Test Agent	PNC LC_{50} (mM)	Liquid Culture LC_{50} (mM)	Rat LD_{50} (mg/kg)	Rat Exposure Time	Rat Sample Size
Glycerol	2431 ± 99.5	2324 [10]	27,200 [61]	10 days	12
Ethanol	2272 ± 674	1143 [10]	10,060 ± 839 [64]	24 h	10/dose
Sucrose	1268 ± 132	_____	35,400 ± 1400 [61]	24 h	4-8 or 16-20/dose

NaCl	489 ± 30	297 [10]	3000 [67]	_____	_____
KCl	489 ± 77	407 [10]	3020 [70]	24 h	_____
Ascorbic Acid	202 ± 40	_____	11,900 [63]	_____	_____
Paraquat	94.5 ± 10	61 [57]	177 ± 38.5 [65]	120 h	10/dose
$CdCl_2$	17.3 ± 4.1	4.6 [10]	88 [66]	_____	5/dose
$ZnCl_2$	9.38 ± 2.5	10.5 [58]	350 [69]	48 h	____
$CuSO_4$	8.41 ± 3.1	1.57 [59]	269 [68]	96 h	7/dose
$K_2Cr_2O_7$	4.03 ± 0.76	0.54 [60]	77 [68]	96 h	7/dose

SI Table 2. 11 test agents and the concentrations tested for acute toxicity studies(**Fig. 4-5**)

Test Agent	Concentrations (mM)
Glycerol	0, 500, 2000, 3000, 5000, 7000
Ethanol	0, 500, 750, 1000, 4000, 8000
Sucrose	0, 500, 750, 1000,1500,2000
NaCl	0, 50, 100, 200, 300, 500
KCl	0, 50, 100, 200, 300, 500

Ascorbic Acid	0, 50, 100, 200, 300, 500
Paraquat	0, 0.05, 0.50, 5.00, 50.0, 500
$CdCl_2$	0, 0.05, 1, 10, 15, 25
$ZnCl_2$	0, 0.5, 1, 5, 10, 25
$K_2Cr_2O_7$	0, 0.5, 1, 5, 10, 25
$CuSO_4$	0, 0.5, 1, 5, 10, 25