nagi bioscience

NAGI SNAPSHOT GUIDES

Accelerating Early Toxicology Testing with novel NAMs

Chose the best candidates in early preclinical studies, from setup to actionable insights.

The Challenge

Current early toxicology bottlenecks:

- *In vitro* assays lack whole-organism insights.
- Mammalian testing is costly, slow, and raises ethical concerns.

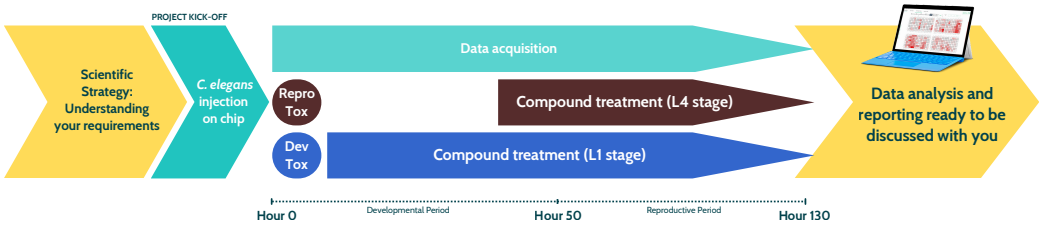
Need: A middle ground that is predictive, scalable, and sustainable.

The ideal scenario? Being able to get multiple, insightful datapoints in one-shot assay as early as possible in your pipeline and with a full organism model.

A Multi-Endpoint, One-Shot Approach to Toxicity Screening

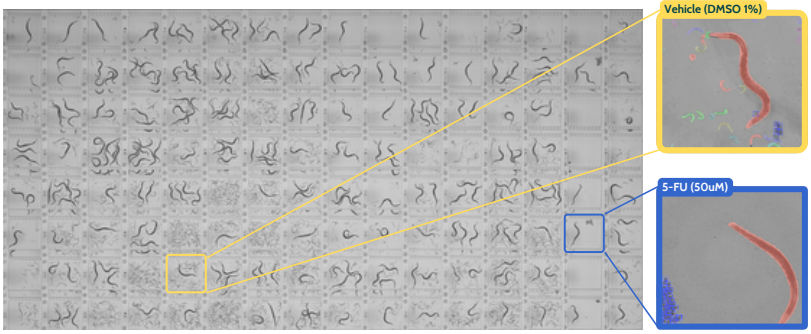
C. elegans screening with SydLab™ One provides a rapid, cost-effective, and reliable alternative that bridges the gap between *in vitro* cell-based assays and traditional mammalian testing, offering a whole-organism approach to toxicity screening.

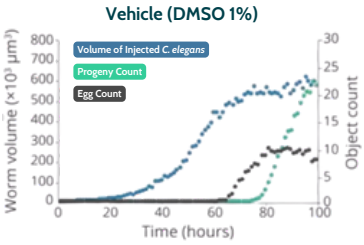
- **Whole-organism Predictivity:** Bridge the gap between *in vitro* and *in vivo*.
- **Animal Reduction:** Practical application of a NAMs technology and model[1] .
- **Holistic Toxicity Insights:** Early multi-endpoint readouts accelerate decision-making.
- **Sustainable Science:** Fewer animals, faster data, same scientific rigor.



READOUTS

- Worm maximum size
- Growth dynamics
- Sexual maturity
- Egg accumulation
- Embryo survival
- Larvae emergence
- Larvae accumulation
- Progeny size





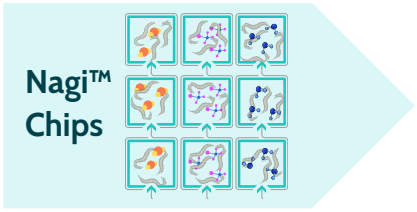
[1] Hunt, P. R. (2017) The *C. elegans* model in toxicity testing. *J. Appl. Toxicol.*, 37: 50–59. doi: 10.1002/jat.3357.

Why *C. elegans*?

Conserved Genes & Pathways	Predictive Accuracy	Ethical & Cost-Effective	Comprehensive Analysis
C. elegans shares ~60–80% of it's genes and signaling pathways with humans, making it a valuable model for studying human health and toxicity.	High sensitivity in identifying toxic compounds, especially in developmental toxicity studies, with overall balanced accuracy of ~84%.	Reduces downstream numbers on mammalian testing, aligning with the 3Rs principle.	Monitors multiple biological endpoints, including growth, reproduction, and behavior, providing a holistic view of toxicity

The Approach: *C. elegans* as a Complementary Tool in Multi-tiered Toxicity Testing Enhancing Risk Identification and Reducing Animal Testing

Screening Phase NAMs: *C. elegans,* organoids, and zebrafish models efficiently filter out low-risk compounds.



Mammalian Testing Phase: Ensure a comprehensive view before proceeding to mammalian studies.

SydLab™ One: Automated culture in a highly consistent manner:

More than ~ 50% reduction in low-risk compounds

More than 30% decrease in mammalian testing

Nagi Bioscience's technology

A **game-changer** for toxicology by integrating ***C. elegans*** into toxicology workflows, Nagi Bioscience advances science while promoting ethical testing practices.
Our solutions enhance **predictive accuracy, streamline chemical screening,** and pave the way for a **sustainable, animal-reduced** future in toxicology.

Martin, M. T., et al. (2009). "The U.S. EPA's Toxicity Reference Database (ToxRefDB)."
Hunt, P. R. (2017). "The *C. elegans* model in toxicity testing"
OECD Guidelines (2018). "Alternative models in toxicology screening."

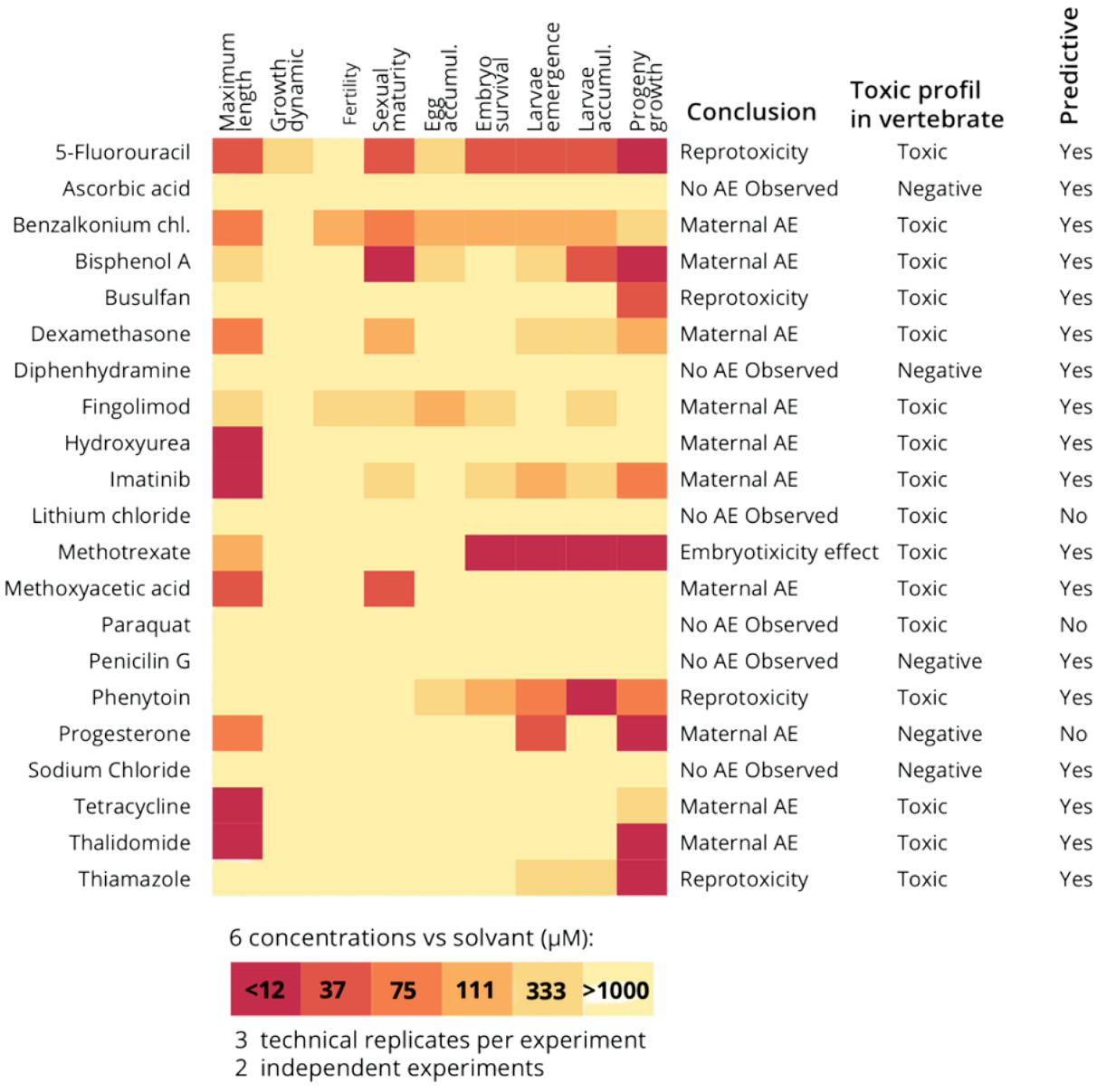
Nagi™ DART: How we answer your safety questions

We applied the Nagi™ DART assay to blindly assess 21 benchmark chemicals (at 5 concentrations) with known toxic effects or no effects.

Balanced accuracy of 85.7%

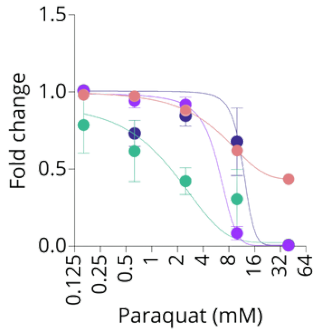
21 benchmark chemicals with known Reprotox effects, either positive or negative, were tested in blind on the microfluidic platform SydLab™ One.

5 concentrations for each chemical (1mM, 333µM, 111µM, 37µM and 12µM) were tested and compared to the negative control (DMSO 1%). Three technical repeats were executed, each chemical being tested twice. No-Observed-Adverse-Effect Level (NOAEL) was determined and their toxicity profile described.



Let's look closer: AI-driven multi-phenotypic analysis

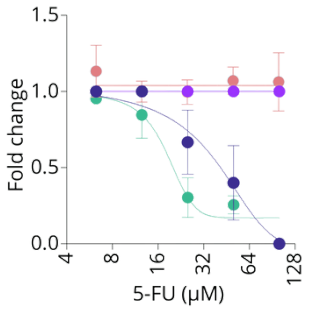
Effects of Paraquat



	End points	NOAEL (mM)
Maternal effects	Maximum length	2.5
	Growth dynamic	2.5
Repro toxicity	Fertility	2.5
	Sexual maturity	0.16
	Egg accumulation	0.16
	Embryo survival	0.16
	Larvae emergence	0.16
	Larvae accumulation	0.63

Paraquat caused significant maternal adverse effects at high doses (NOAEL: 2.5 mM) and pronounced reproductive toxicity at lower doses (NOAEL: 0.16 mM).

Effects of 5FU



	End points	NOAEL (µM)
Maternal effects	Maximum length	>100
	Growth dynamic	>100
Repro toxicity	Fertility	>100
	Sexual maturity	>100
	Egg accumulation	50
	Embryo survival	50
	Larvae emergence	50
	Larvae accumulation	12.5

5-FU exhibited no maternal adverse effects at the tested doses but demonstrated strong reproductive toxicity at intermediate doses (NOAEL: 50 µM).

Throughput and Translational Impact

	in vitro	nagi bioscience	Zebrafish	Mice
Throughput	> 384 drugs/month	384 drugs/month	30-40 drugs/month	3-5 drugs/month
Translational value	Low	High	High	High

The numbers of drugs per month/year refer to the number of compounds that can be tested in 30 days, without technical repetitions or controls.

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Explore the Swiss knife platform for safety and efficacy testing

Accelerate your research with Nagi Bioscience

Let's connect

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