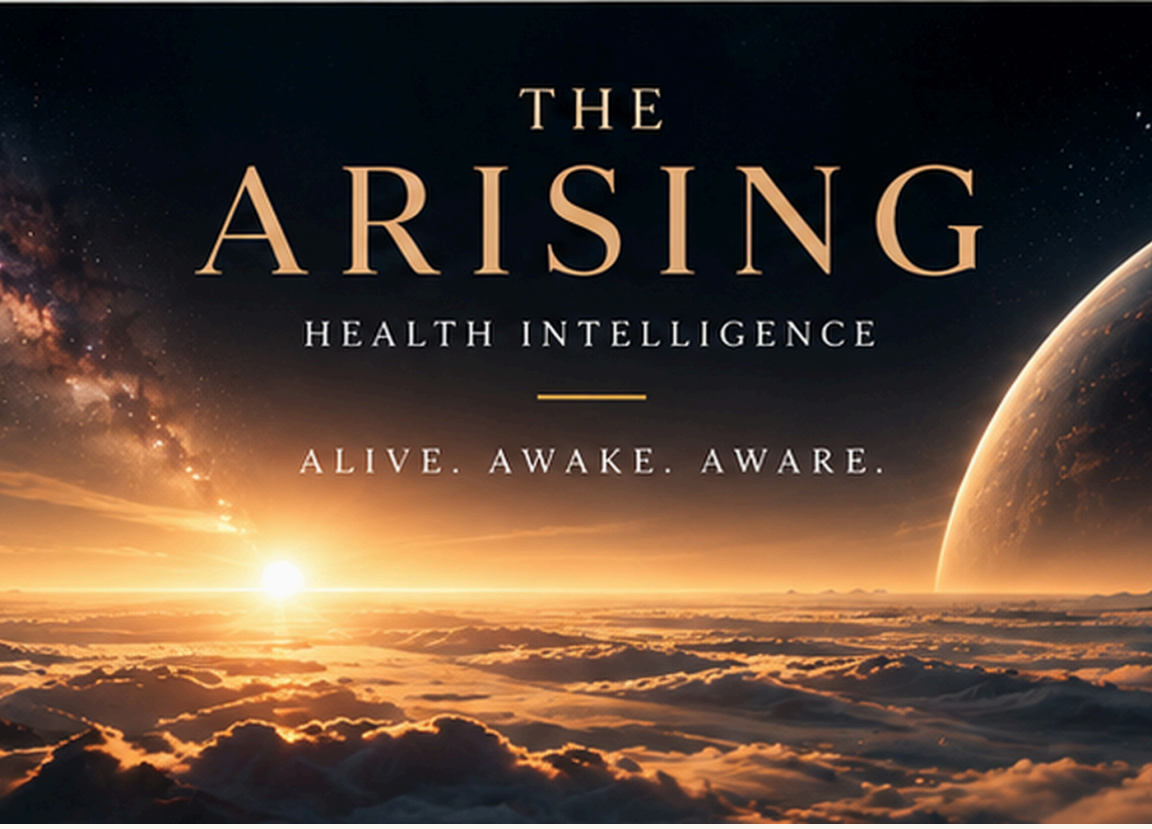


33 / INTELLIGENCE AND DISCOVERY

A Human Model Before a Human Trial

Organoids, organs on chips, and the evidence needed to trust a smaller model of a larger system.

JOHN GRIFFIN, MD

REVIEW EDITION · OCTOBER 2026

A model is useful for a question

An organoid and an organ on a chip can represent selected aspects of human biology. Neither needs to reproduce an entire person to be useful. It does need to represent the features that determine the answer being sought.

This makes validation specific. A model that helps identify liver toxicity may not predict immune responses, long-term exposure, or the effects of a drug in every patient population.

A quantitative test

A 2022 Liver-Chip study examined a blinded set of 27 known hepatotoxic and non-toxic drugs using 870 chips. The authors reported 87% sensitivity and 100% specificity for their benchmark task. [1]

The number of chips is not the number of distinct drugs or human participants. Performance on a selected benchmark also does not guarantee the same performance on every future compound. Those denominators and settings belong beside the headline figures.

The comparison needs to remain fair

A useful validation asks how the model performs against established methods and whether the prediction would change a real development decision. Independent replication, reproducible manufacturing, and performance across donors or biological conditions add confidence.

Economic savings can be modeled from improved predictions, but modeled savings are not observed reductions in development costs. The value of the platform must be tested as it is used.

A partner in a sequence of experiments

These systems can help narrow a question before a human trial, investigate mechanisms, or identify a reason to stop development early. Their role depends on the use case and evidence. A smaller model becomes misleading when its limits are omitted.

The opportunity is to make each stage of research more informative. A computational prediction can guide a chip experiment; the chip can motivate or discourage a further study; clinical evidence can reveal where both models were incomplete.

Readers should ask which part of human biology the model captures, which part it leaves out, and whether its prediction has been tested beyond the examples used to build confidence. That is how a promising miniature becomes a dependable scientific instrument.

SOURCES & READING SCOPE

Keep the claim beside its evidence

1. Lorna Ewart, Athanasia Apostolou, Skyler A Briggs, et al. Performance assessment and economic analysis of a human Liver-Chip for predictive toxicology. Communications medicine. 2022 Dec 06;2(1):154. doi:10.1038/s43856-022-00209-1. PMID:36473994. Open source →

Selected primary publication records and abstracts checked 25–26 October 2026. This is a focused reading companion, not a systematic review, a treatment protocol, or a complete appraisal of methods, supplements and later evidence.

KEEP FOLLOWING THE IDEA

Part of a connected collection

Return to a subject, follow a related booklet, or explore the wider projects. These links organize reading; they do not imply that one scientific finding proves another.

This booklet online →

Booklet directory · all 48 →

Atlas · Single-cell / virtual-cell foundation models →

Arising Health website →

The Arising book →

The Long Game →

Listen & watch →

Related booklets

25 · The Body Parts We Might Learn to Rebuild →

08 · Can We Simulate a Living Cell? →

32 · Molecules We Could Not Previously Make →

The online review collection is hosted in the shared Atlas. Its existing access settings apply. The public website remains a separate destination.