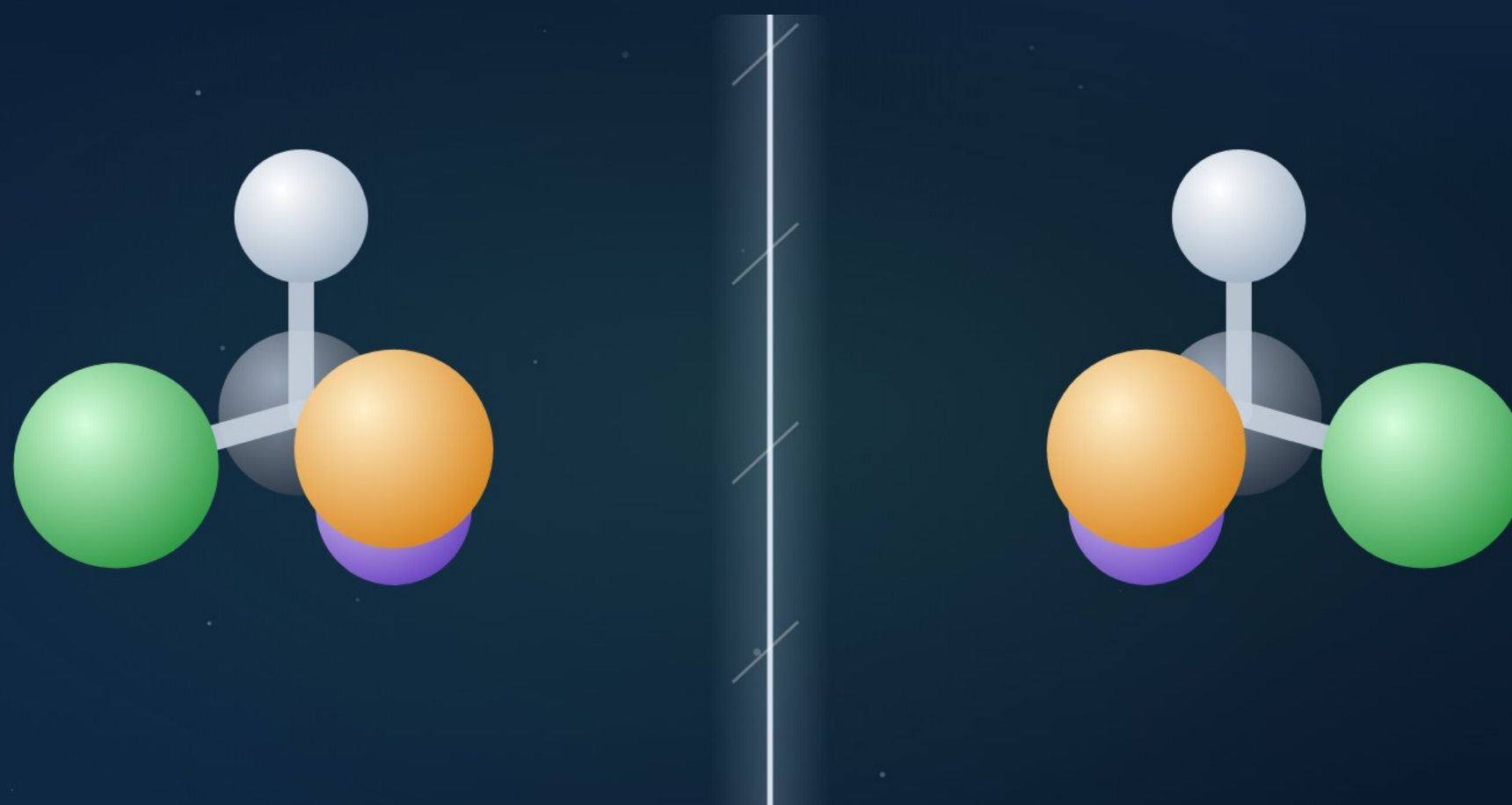


How a tiny excess of one mirror-image molecule grows until it takes over

It helps explain why life uses only one form of its molecules, and how chemists make medicines in the form that works.



Showed how tiny chiral biases take over chemistry

Non-linear effects and autocatalysis in asymmetric synthesis

Université Paris-Saclay and Tokyo University of Science

Fundamental sciences

RESEARCHERS	Henri B. Kagan, Kenso Soai
RESEARCH	1986 to 2026
IMPACT	1986 to 2026
SOURCES	22 in the report
GENERATED	10 October 2026

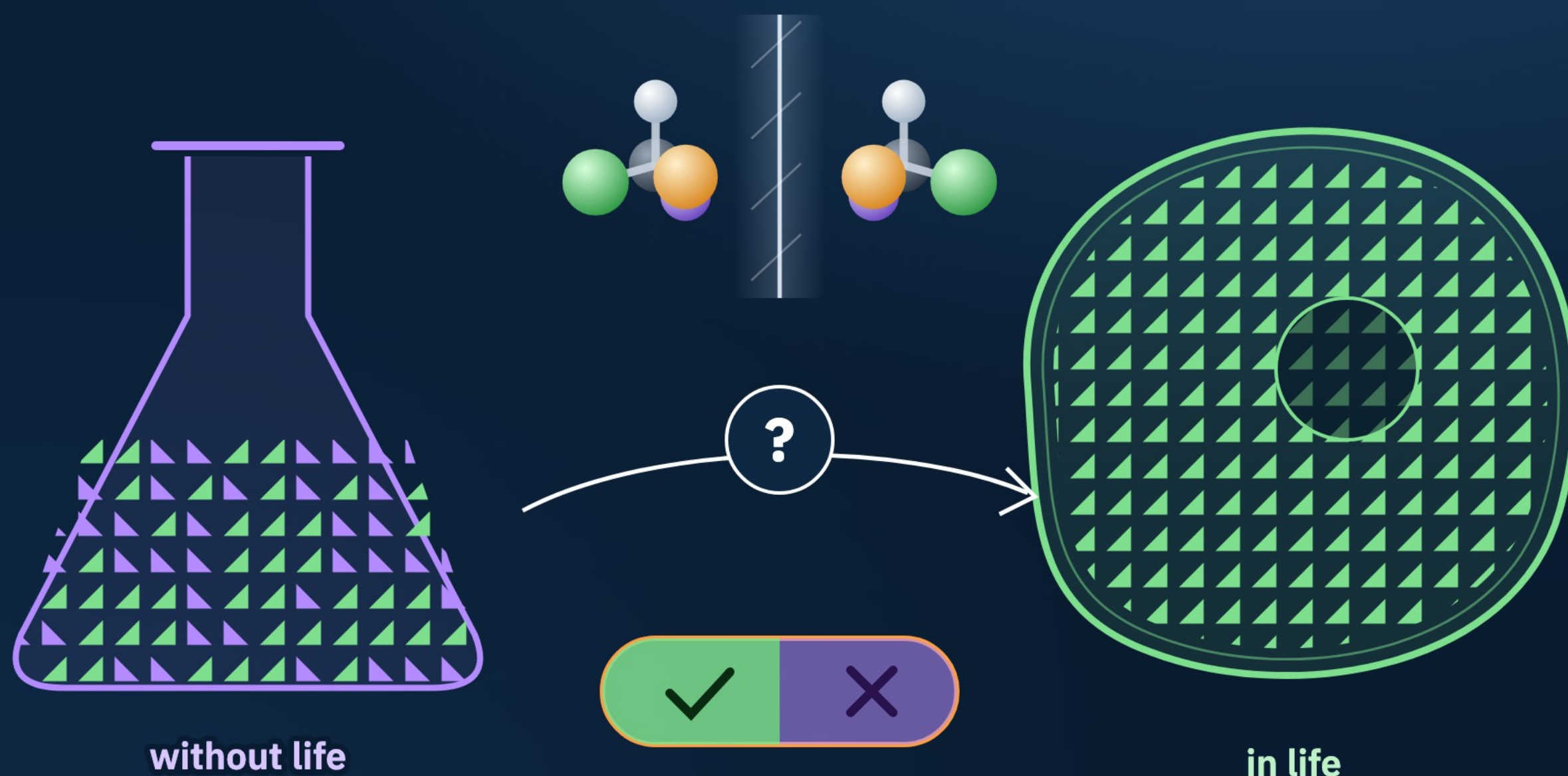
PROBLEM

RESEARCH

IMPACT

PATHWAY

Life uses only one hand of its molecules. Chemistry without life makes both equally.



1. THE CHALLENGE

Life uses **one molecular handedness**, yet abiotic chemistry should make **equal mirror-image mixtures**. Explaining how tiny chiral biases become near single-handedness, and controlling that process for **safer chiral medicines**, was a major gap.

2. THE RESEARCH

Kagan showed that catalyst and product enantiomeric excess need not relate linearly, and Soai created an autocatalytic reaction in which the chiral product catalysed its own formation, letting minute asymmetries be amplified experimentally.

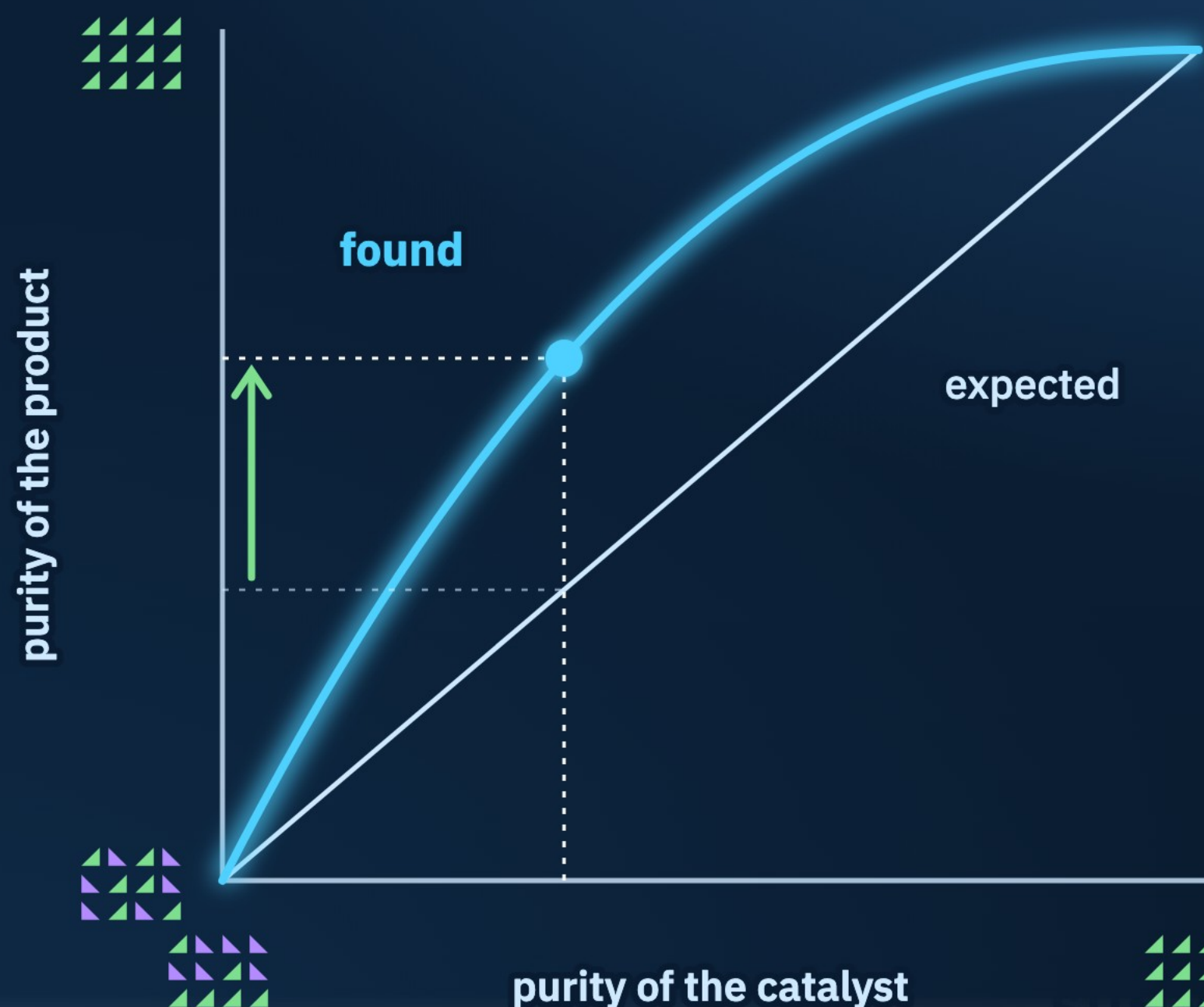
PROBLEM

RESEARCH

IMPACT

PATHWAY

1986: Kagan showed a catalyst can make a purer product than itself



≠



catalyst pairs

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3. IMPACT DELIVERED

The work changed core chemical understanding. Non-linear ee analysis became a standard mechanistic tool, and the Soai reaction provided the benchmark laboratory proof that tiny chiral imbalances can be driven towards near homochirality.

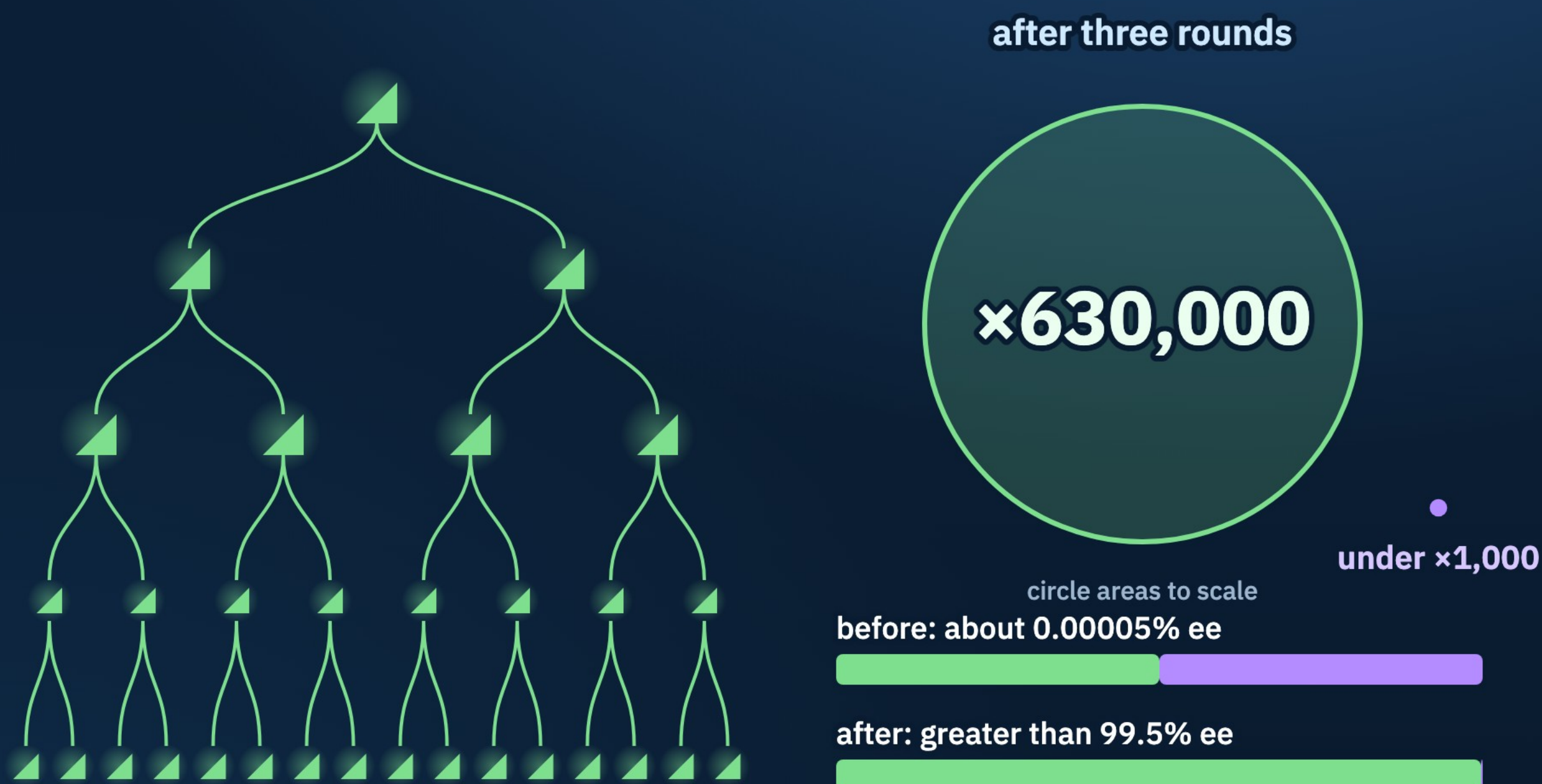
PROBLEM

RESEARCH

IMPACT

PATHWAY

1995: Soai found a molecule that copies itself, and its handedness



SUMMARY

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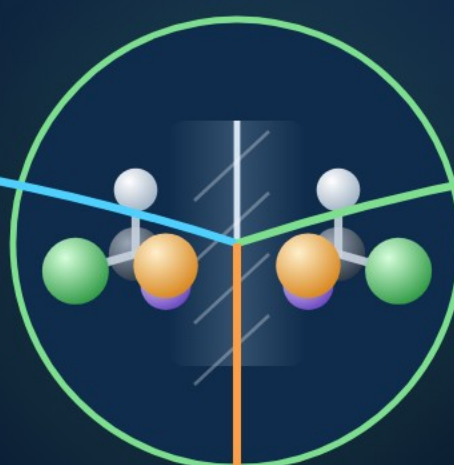
IMPACT

PATHWAY

A standard tool for chemists, and the model for life's single hand



a standard tool for chemists



the model for life's single hand



medicines in the right form

SUMMARY

2. THE RESEARCH

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4. EXPECTED IMPACT

These principles are likely to guide catalyst design, lower catalyst-purity demands in suitable systems, and support the search for simpler autocatalytic networks that could explain homochirality under more plausible early-Earth conditions.

PROBLEM

RESEARCH

IMPACT

PATHWAY

How two discoveries became part of how chemistry works



VALUE DELIVERED



TECHNOLOGICAL

- Soai experiments amplified chirality to greater than



EDUCATIONAL

- Reviews turned the field into teachable frameworks for



WORKFORCE AND CAPABILITY

- Four JSPS awards sustained



REPUTATION

- 2026 Nobel Prize recognised a field-changing discovery

All of it on one page: the impact infographic

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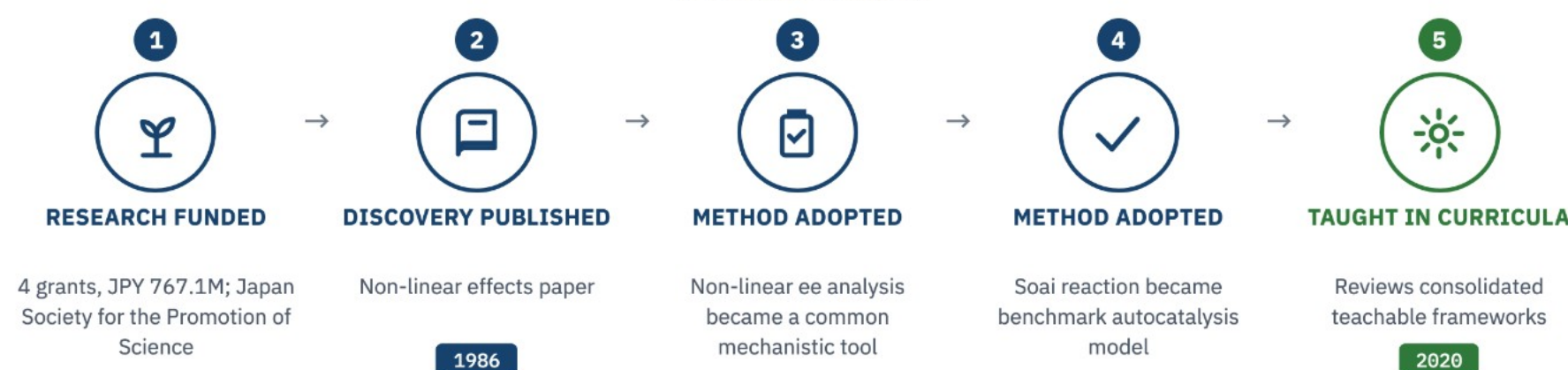
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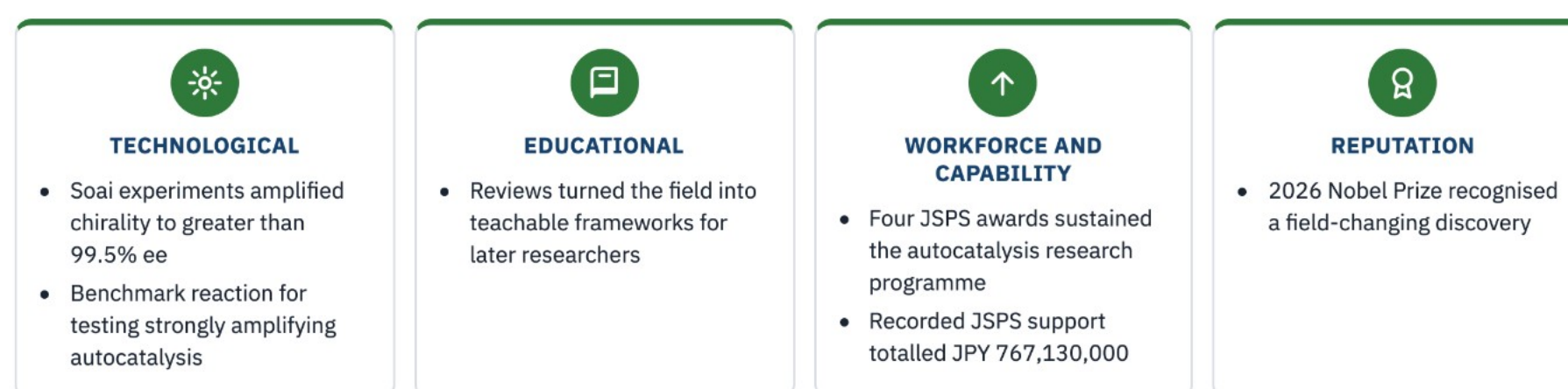
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PATH TO IMPACT

The translation pathway



VALUE DELIVERED



RESEARCH IMPACT AT A GLANCE

99.5% ee
Soai chirality amplification
Soai-reaction experiments, 2003

JPY 767.1M
Recorded JSPS funding
Verified funding record

22
Attributed publications
Indicative analysis as at 9 October 2026

4.9k
Attributed citations
Indicative analysis as at 9 October 2026