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CASE STUDY · MARLUC SYNOPSIS

Exscientia: DSP-1181, the first AI-designed drug in human trials, stopped after phase 1

IMPLEMENTED 2020–2024 · HEALTH AND LIFE SCIENCES · UK · BAND E · PARTLY PROVED

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Exscientia and Sumitomo Dainippon Pharma took DSP-1181, described as the first AI-designed drug to enter human trials, into phase 1 in 2020. Sumitomo stopped development in January 2022 after the study did not reach its expected criteria. Exscientia later cut back its own pipeline and combined with Recursion in 2024.

ABOUT THIS SYNOPSIS

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NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

No measurable effect: tested, no effect.

Frontier case: AI used for a scientific, medical or engineering breakthrough. The transformation is potential and unproven; MarLuc grades what has changed in practice so far.

AI-native company: built around AI from the start and attempting transformational change. It claims band A; MarLuc grades it on what is evidenced.

AI used: AI-driven small-molecule design platform (Exscientia's Centaur Chemist), used with a pharmaceutical partner's chemists.

Implemented: 2020–2024. Grade: band E, No measurable effect, Partly proved.

Headline result, as reported: Exscientia announced the first AI-designed drug to enter human trials in January 2020; partner Sumitomo Dainippon Pharma stopped its development after phase 1 two years later

1 · The case

The facts, as reported by the 5 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

Exscientia, with Sumitomo Dainippon Pharma (now Sumitomo Pharma). Oxford-based AI drug design company founded around its own design platform, combined with Recursion in 2024. Partner Sumitomo Dainippon Pharma is a Japanese pharmaceutical company, renamed Sumitomo Pharma in 2022. Staff numbers: Not reported in the sources used. Canvas block: 1. Strategy and value. Also 6. Data and technology, 4. Operations and process.

Business challenge

The challenge. Drug discovery is slow and costly; Exscientia said a typical project takes about five years and 2,500 synthesised compounds to find a candidate, per pharmaphorum.

How it was addressed. Exscientia and Sumitomo Dainippon Pharma designed DSP-1181, a long-acting serotonin 5-HT1A receptor agonist for obsessive-compulsive disorder, using Exscientia's Centaur Chemist technology and Sumitomo's receptor chemistry experience. It entered clinical trials in January 2020. Exscientia went on to put other AI-designed candidates into trials, including EXS21546 for cancer, before narrowing its pipeline in October 2023. [1] [2] [3] [4] [5]

Who implemented it

In-house (In-house): Exscientia: Built the AI design platform and co-designed the molecule.. Sumitomo Dainippon Pharma (now Sumitomo Pharma) (Industry partner): Contributed drug discovery expertise, took the drug into its pipeline and stopped development after phase 1.. Exscientia combined with Recursion in 2024, per GEN.

Technology (SEAM pillar E)

SEAM types: T5 Custom / fine-tuned models, T8 Predictive / ML models. Deployment: Not reported. Vendors and products: Centaur Chemist.

Where it was built in: Exscientia's design technology was combined with Sumitomo Dainippon Pharma's experience in monoamine G protein-coupled receptor drug discovery to design DSP-1181, which then went through conventional clinical testing in Japan.

What changed

Before: no drug described as AI-designed had entered human trials, per the 2020 coverage. After: DSP-1181 entered and then left development after phase 1; the speed claim of 12 months to a candidate was made, but the drug did not progress. Exscientia's later in-house trial candidate EXS21546 was also wound down, and the company combined with Recursion. [1] [2] [3] [4] [5]

What it cost

Cost of the DSP-1181 programme: Not reported. Exscientia held almost $509 million in cash in mid-2023, per pharmaphorum, and Recursion's combination with Exscientia was valued at $630.1 million, per GEN.

What it saved

By Exscientia's account, design took 12 months instead of the usual five years and needed 350 synthesised compounds instead of the typical 2,500. No independent check of these figures in the sources used. [1] [2] [3] [4] [5]

Governance and control

The drug went through a phase 1 study, and Sumitomo Dainippon Pharma reported stopping development in its quarterly results presentation. Accountable owner and AI-specific controls: Not reported.

S2 · Accountable owner · Not reported
Not reported. Sumitomo Dainippon Pharma reported the decision to stop development in its own results presentation, and Exscientia's chief executive announced the trial start. [1] [2]

A1 · Safe use · Not reported
Not reported.

A2 · Human in the loop · Claimed
By the companies' account the drug was created by combining Sumitomo Dainippon Pharma's drug discovery experience with Exscientia's technology, per pharmaphorum. [1]

A3 · Monitoring and assurance · Evidenced
A phase 1 study tested DSP-1181 in people, and Sumitomo Dainippon Pharma discontinued development when the study did not reach its expected criteria. [2]

A4 · Vendor AI · Not reported
Not reported. Exscientia supplied the AI technology to its partner; terms and controls are not described.

A5 · Agent controls · Not reported
No agents described.

A6 · Standards and regulation · Not reported
No regulator, court or other outside body is reported acting on the drug or the AI claims.

What worked, what did not, what is unproven

WORKED

– The design phase was quick by the company's account: 12 months and 350 synthesised compounds to a clinical candidate.

– The molecule reached human trials, which the head of the Institute of Cancer Research called the first example of a new drug created by scientists using AI in a major way, per pharmaphorum.

DID NOT

– DSP-1181 did not reach its expected criteria in phase 1, and Sumitomo Dainippon Pharma discontinued development in Japan.

– GEN later reported that Sumitomo quietly ended development after disappointing phase 1 results.

– In October 2023 Exscientia wound down its phase 1/2 trial of EXS21546, saying it would be challenging to reach a suitable therapeutic index.

UNPROVEN

– Detailed phase 1 results for DSP-1181: Not reported in the sources used.

– Whether the faster design phase saved money or time over the whole development path: no independent check in the sources used.

Timeline

Jan 2020 Exscientia claims a world first as DSP-1181, designed with Sumitomo Dainippon Pharma, enters clinical trials for obsessive-compulsive disorder [1]

Jan 2022 Sumitomo Dainippon Pharma reports it has discontinued DSP-1181 in Japan because the phase 1 study did not reach expected criteria [2]

Feb 2023 GEN reports two Exscientia candidates in phase I/II trials and that Sumitomo quietly ended DSP-1181 [3]

Oct 2023 Exscientia narrows its in-house work to CDK7 and LSD1 cancer programmes and winds down the EXS21546 trial [4]

2024 Exscientia combines with Recursion; GEN reports a deal value of $630.1 million [5]

Nov 2025 The Exscientia-designed CDK7 inhibitor, now REC-617, shows one confirmed partial response among 29 treated patients [5]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: A. Grade: E, No measurable effect. Proof: Partly proved. Level of change: Not graded.

No level assessed: band E, the AI-designed drug was tested in people and development stopped without a measurable benefit. Claimed A: Exscientia described a new era of AI-driven drug discovery. That is potential and unproven.

Graded E. The AI-designed drug reached a phase 1 study and its partner stopped development when the study did not reach its expected criteria, so no measurable benefit followed. No harm, sanction or write-off is reported for this drug, and Exscientia was combined with another company, not wound up, so MarLuc does not grade F. Exscientia said the approach could herald a new era of AI-driven drug discovery; MarLuc treats that as potential and unproven.

The SEAM view and lessons learnt

The AI's part was the early design step, which the company says it shortened; the drug was then stopped by the phase 1 result, where AI played no part. The sources do not show whether the faster start saved anything over the whole programme. Before copying the approach, a leadership team should ask how it will measure AI's effect on the full cost and success rate of a programme, and who will publish results when a candidate fails.

1. Measure AI drug design by later trial outcomes, not by speed to a candidate.
2. Publish failed results alongside first-in-class claims.
3. Plan the pipeline on the assumption that most early candidates fail.

Evidence

Score 2 of 4. Mixed: the discontinuation comes from the partner's own results presentation; the claims and context come from pharmaphorum and GEN; no peer-reviewed trial result.

Evaluation method. Company disclosures (Exscientia announcement relayed by pharmaphorum; Sumitomo Dainippon Pharma results presentation) plus independent trade press. No published phase 1 data or regulator finding.

Sources disagree. Exscientia and an outside scientist described DSP-1181 in 2020 as a world first and a milestone; Sumitomo's 2022 presentation states only that the phase 1 study did not reach expected criteria, and GEN describes the end of development as quiet, after disappointing phase 1 results.

Status. Closed for DSP-1181: development discontinued in January 2022. Exscientia is now part of Recursion.

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/exscientia-dsp-1181-first-ai-designed-drug

[1] pharmaphorum: Exscientia claims world first as AI-created drug enters clinic (30 January 2020)
https://pharmaphorum.com/news/exscientia-claims-world-first-as-ai-created-drug-enters-clinic

[2] Sumitomo Dainippon Pharma: Q3 FY2021 conference call presentation (31 January 2022)
https://d145j8vag8dpyh.cloudfront.net/ir/library/presentation/assets/pdf/eir20220131.pdf

[3] GEN: BMS collaboration paying off for Exscientia (7 February 2023)
https://www.genengnews.com/topics/artificial-intelligence/bms-collaboration-paying-off-for-exscientia/

[4] pharmaphorum: Exscientia trims pipeline to focus on top cancer prospects (3 October 2023)
https://pharmaphorum.com/news/exscientia-trims-pipeline-focus-top-cancer-prospects

[5] GEN: StockWatch: Recursion Slides on Data Update as New CEO Named (9 November 2025)
https://www.genengnews.com/topics/artificial-intelligence/stockwatch-recursion-slides-on-data-update-as-new-ceo-named/

Exscientia, with Sumitomo Dainippon Pharma (now Sumitomo Pharma) website: https://www.recursion.com

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