LLMs for personal genomics?

Bridging promise and reality

16 June 2026
Futura Camp, Berlin

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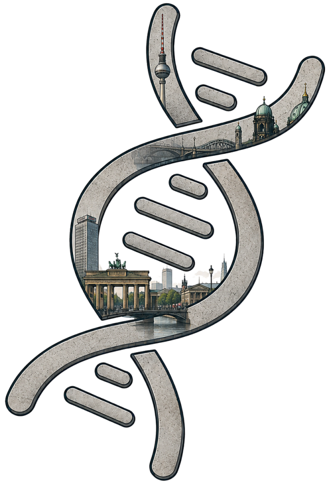
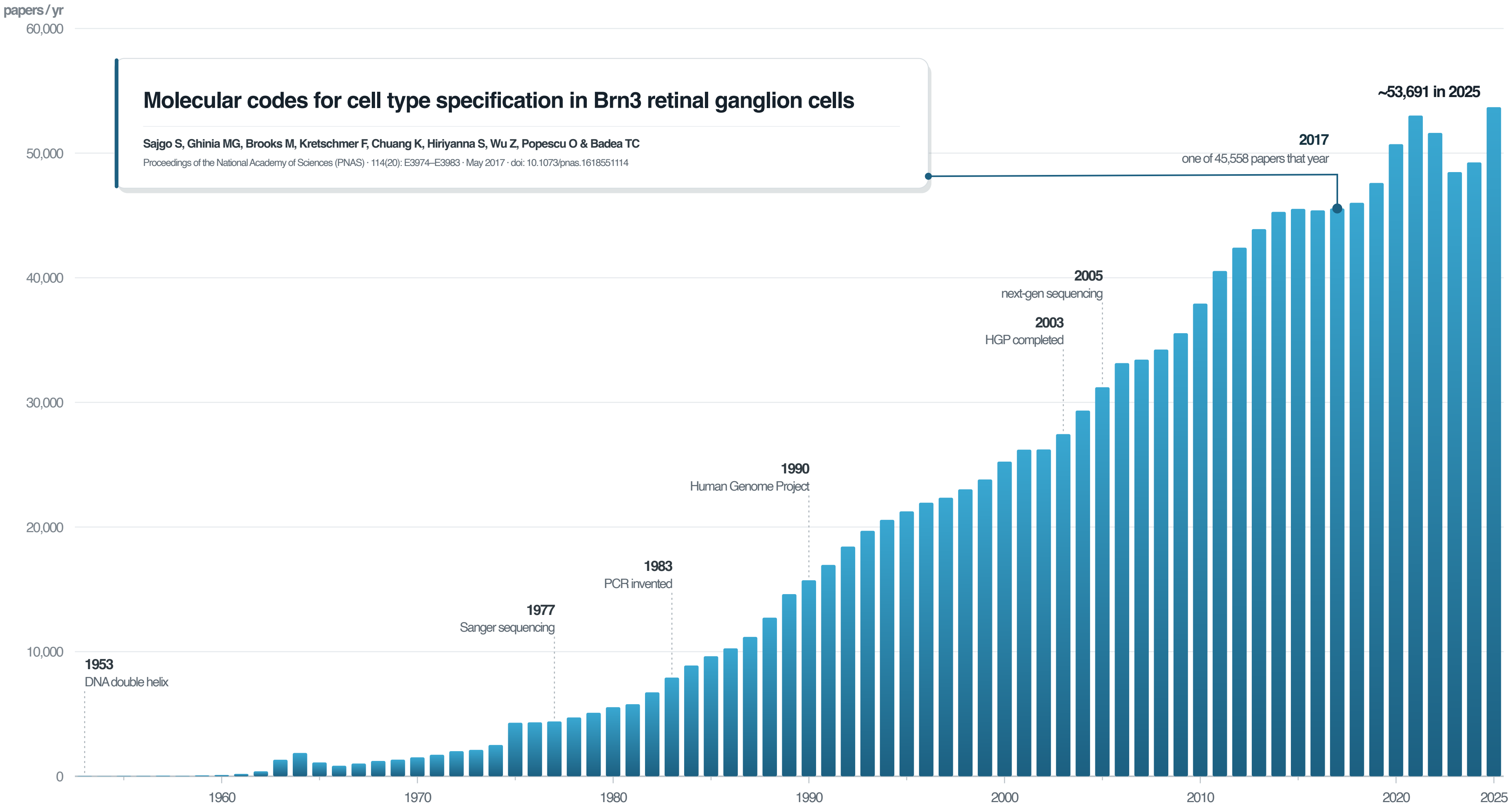
Dark Bio Founder



Exploding breadth and depth



Molecular codes for cell type specification in Brn3 retinal ganglion cells

Sajgo S, Ghinia MG, Brooks M, Kretschmer F, Chuang K, Hiriyanna S, Wu Z, Popescu O & Badea TC

Proceedings of the National Academy of Sciences (PNAS) · 114(20): E3974–E3983 · May 2017 · doi: 10.1073/pnas.1618551114

Source: PubMed / MEDLINE via NCBI E-utilities, queried 2026-06-10 · papers per year with “DNA” in title or abstract.

The promise

"Hey Claude, write a genetic analysis for alcohol tolerance!" **~Me, ETHPrague hackathon**

Tolerance:

- **rs671** – how fast you metabolize acetaldehyde (alcohol gunk)
- **rs1229984** – how fast you turn alcohol into acetaldehyde (Asia)
- **rs2066702** – how fast you turn alcohol into acetaldehyde (Africa)

Pleasure:

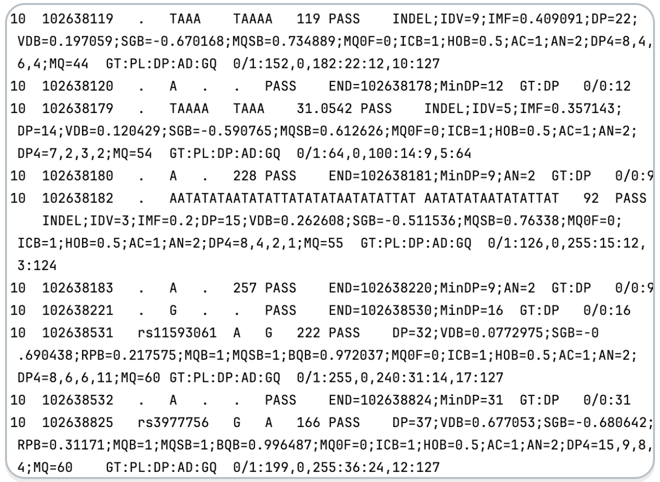
- **rs1799971** – higher endorphin sensitivity
- **rs1800497** – lower dopamine sensitivity
- **rs279858** – elevated calming effect

The reality

- Bug #1 – Mixed up the two DNA strands (dataset vs. literature)
- Bug #2 – One marker's position was off by 25K bases
- Bug #3 – Interpreted the mutation as the issue, not what it was
- Bug #4 – Missing data interpreted as all is good
- Bug #5 – Uncertain data interpreted as all is good
- Bug #6 – Multiple-data points collapsed into first
- Bug #7 – Loaded multi-letter sequence, computed on first

I only caught these because results "looked" weird...

Problem: Complex inputs, no feedback loop



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```

Your genome variants · **1.45GB**

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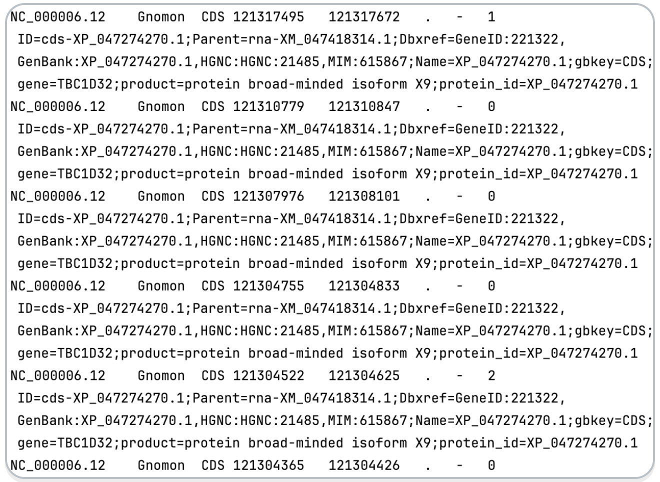
Reference genome · **3.34GB**



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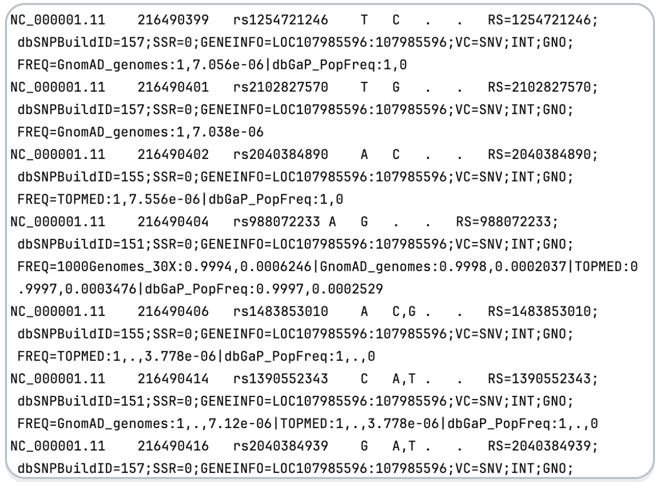
Gene annotations · **1.6GB**



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Known variant database · **213.78GB**

Solution: Deterministic foundations, expert feedback loops

LLMs are a *last-mile* technology

- Good at combining horizontals, bad at cross-cutting verticals
- Any layer can be built, if everything below is deterministic

LLMs are hallucinating slop-machines

- Extremely capable, but always slightly inaccurate
- Error correction needs *some* feedback loop

Thank you

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Dark Bio Founder
https://dark.bio/whitepaper