

AI IN MEDICINE:
IMPROVING CANCER DIAGNOSIS

RCSI

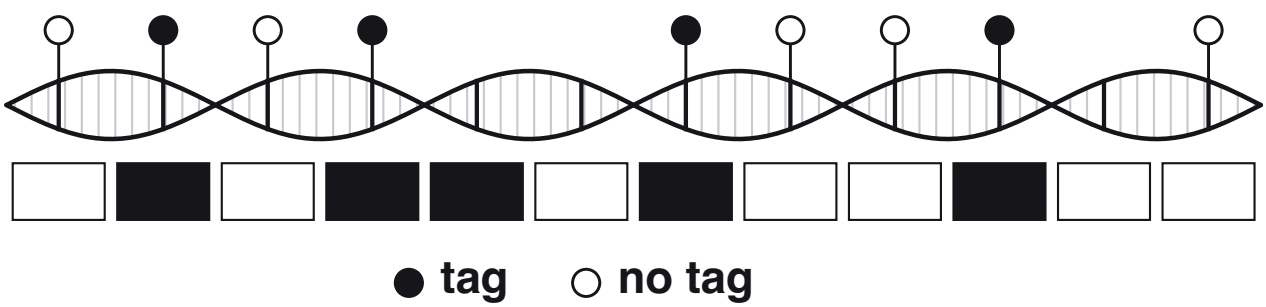
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- Rare tumours of the nose and skull base
- Several look identical under a microscope
- Diagnosis decides the treatment
- DNA reveals the difference

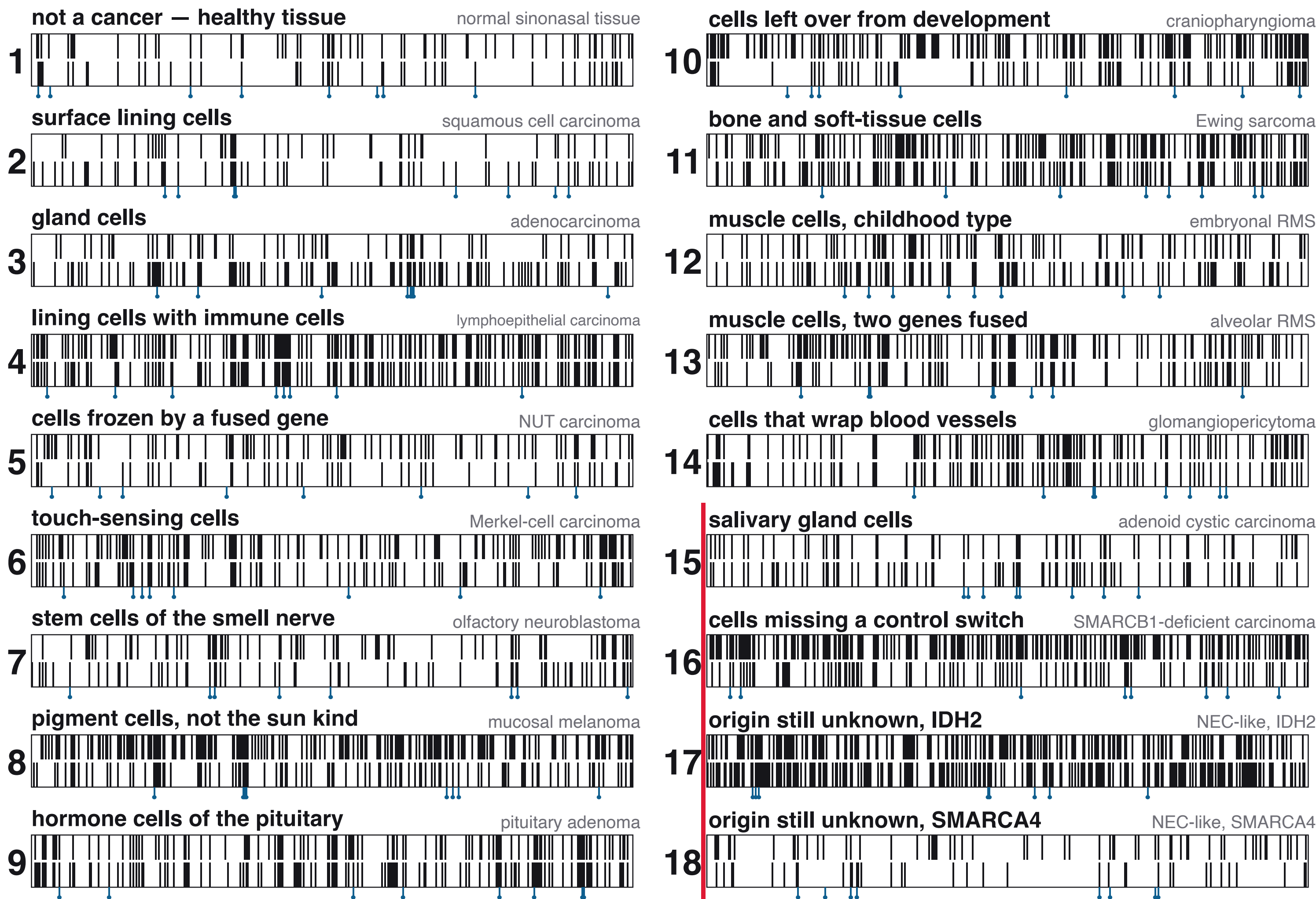
take a card

Every cell has tags on its DNA



Tag pattern forms a signature

Tumour signatures of cancers found in the nose and sinus



Red: four tumours difficult to diagnose

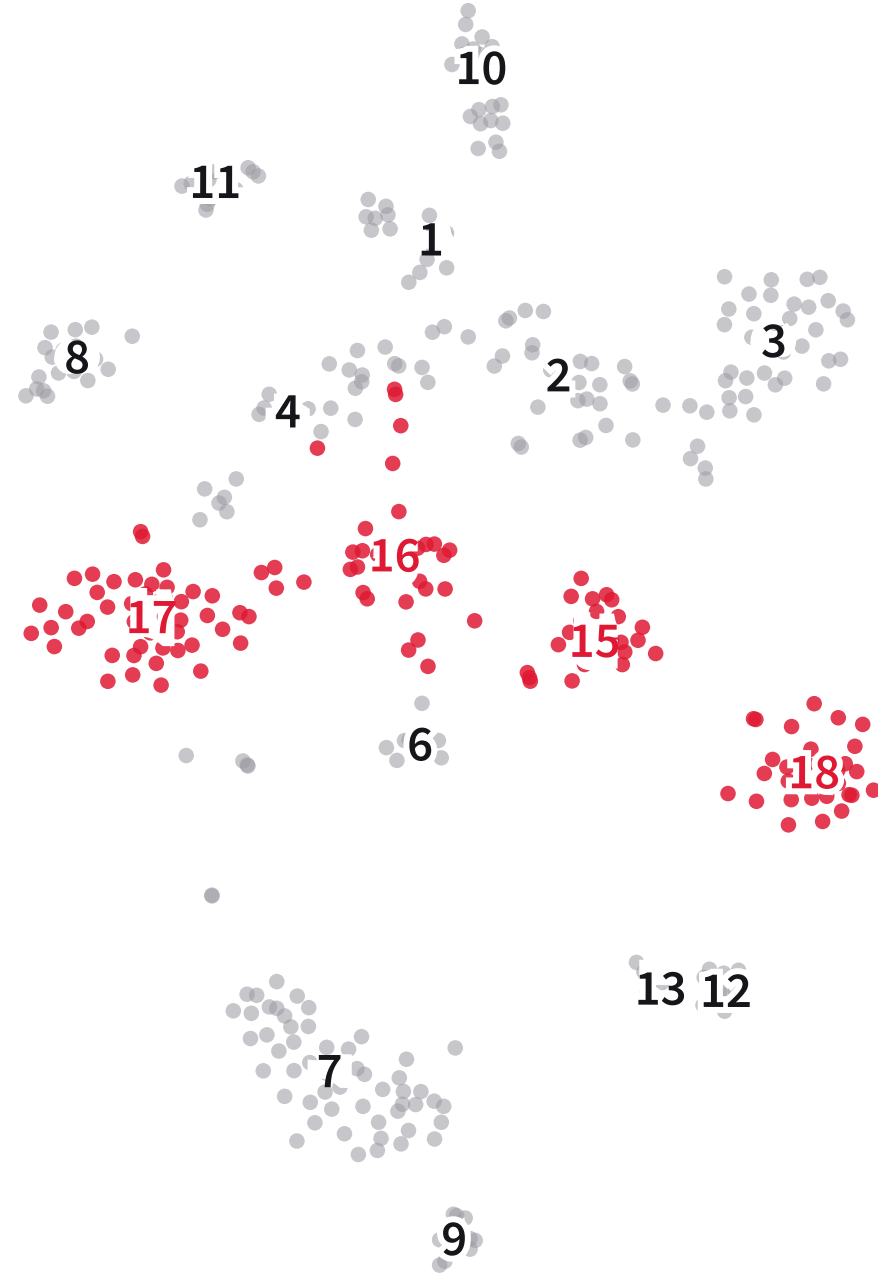
935,000

chemical marks a machine can read on a tumour

<0.05%

of mark locations in a cell are shown here

Atlas of cancer types



395 tumours, mapped by their marks.

Cancer types 17 and 18 look identical. Signature analysis can separate them using sites where they differ.



- A real type-17 sample matches the top row at 19 of these 24 sites, and the bottom row at 6

Curing the AI model’s “imposter syndrome”



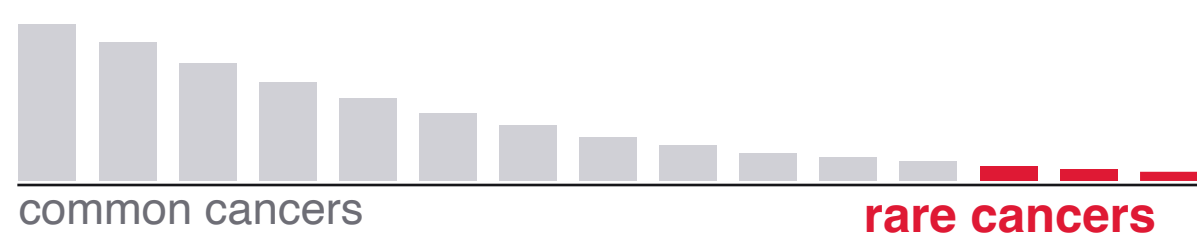
- No change in accuracy, only reported confidence changes. I make that number mean something

Signature analysis is highly accurate



What this is for

Rare tumours have the least evidence



Small numbers deserve creative solutions

AI that works for everyone



Ensuring the AI works everywhere

What I am working on next



the signature comes from both in unknown proportion

Separating effects improves diagnosis.

Tumours and atlas	Jurmeister P et al. DNA methylation-based classification of sinonasal tumors. Nat Commun 2022;13:7148
The brain tumour	Capper D et al. DNA methylation-based classification of central nervous system tumours. Nature 2018;555:469–474
Classifier (crossNN)	Yuan D et al. crossNN is an explainable framework for cross-platform DNA methylation-based classification of tumors. Nat Cancer 2025;6:1283–1294

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scan for more
clstacy.github.io



With thanks to the patients who consented to their tumours being studied.