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Dr. Matthias Stahl - 27/03/2019

UNRAVELLING THE SECRETS OF LEUKEMIA



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UNRAVELLING THE SECRETS OF LEUKEMIA

My previous Life

IT ALL STARTED WITH...

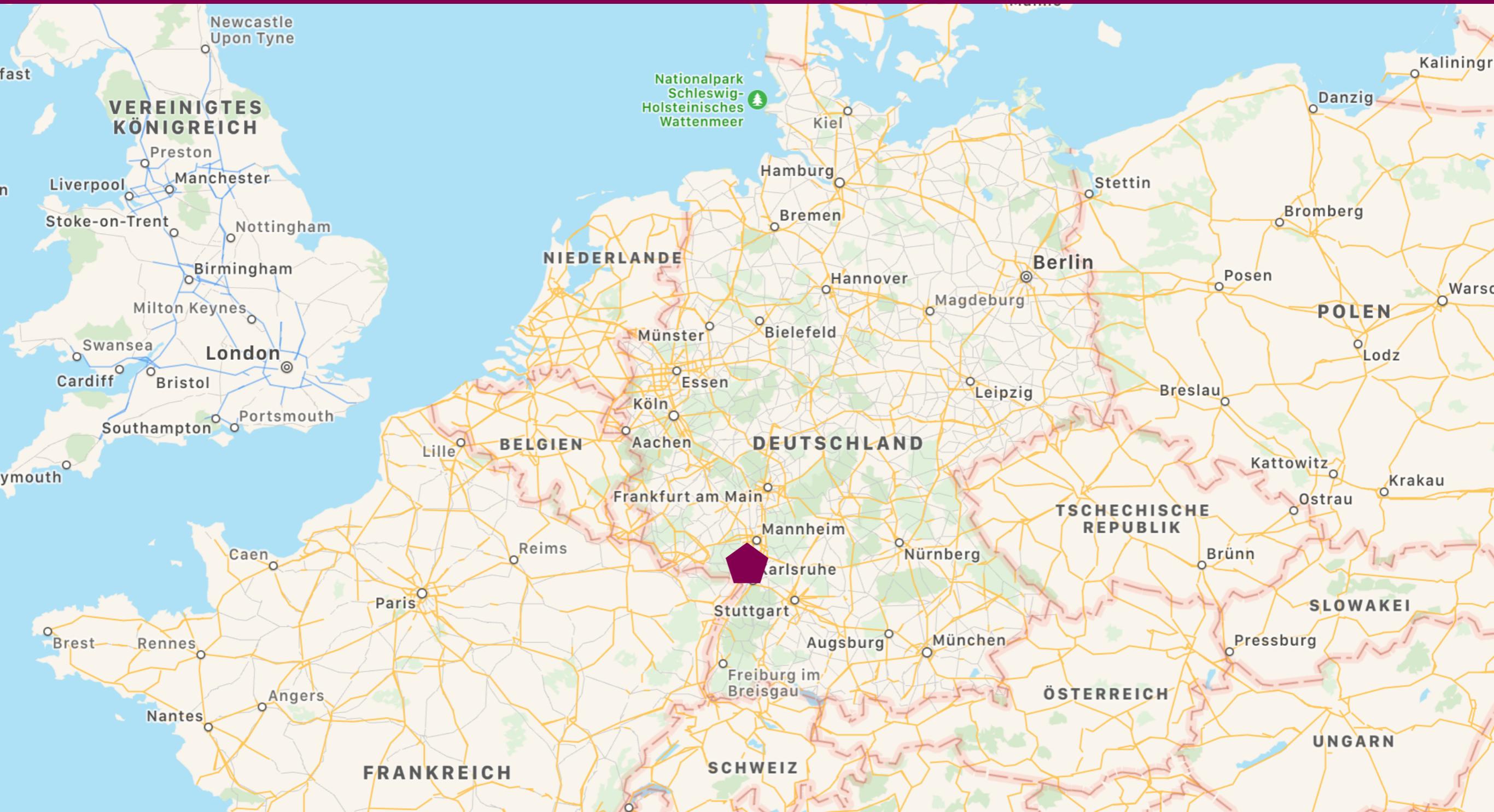
My previous Life

IT ALL STARTED WITH...



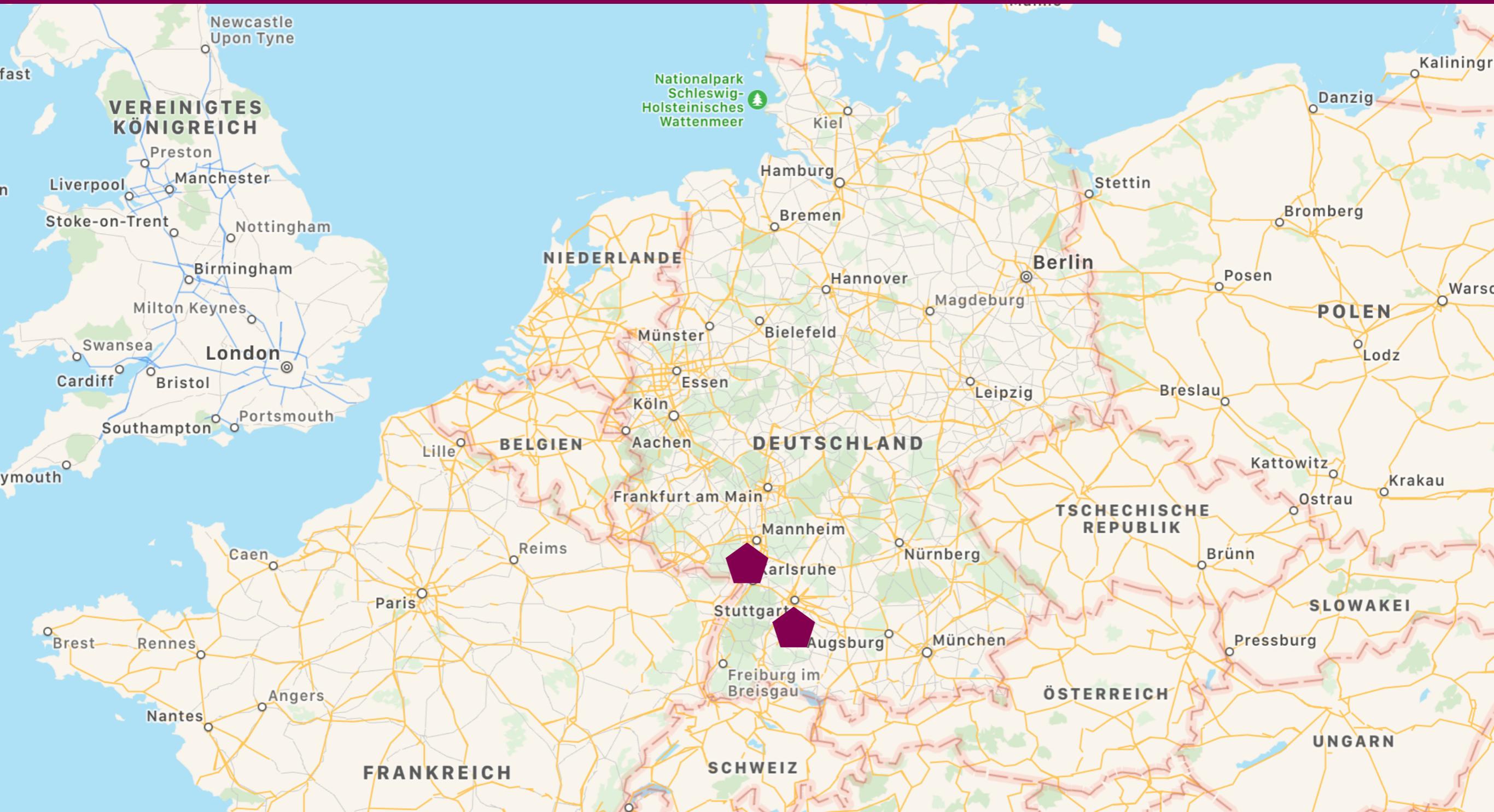
My previous Life

SCHOOL IN GERMANY



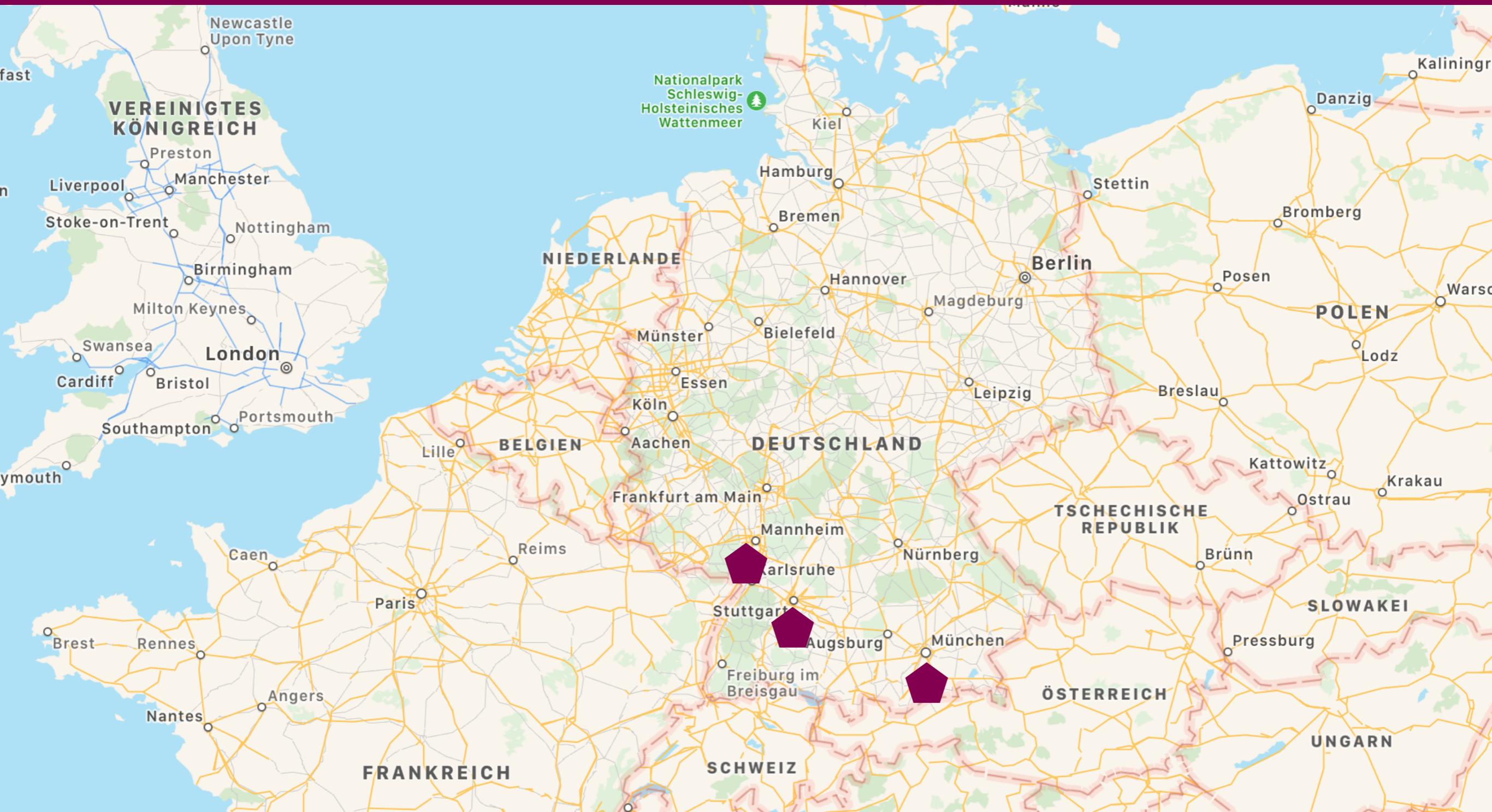
My previous Life

INTERNSHIP, DECISION MAKING



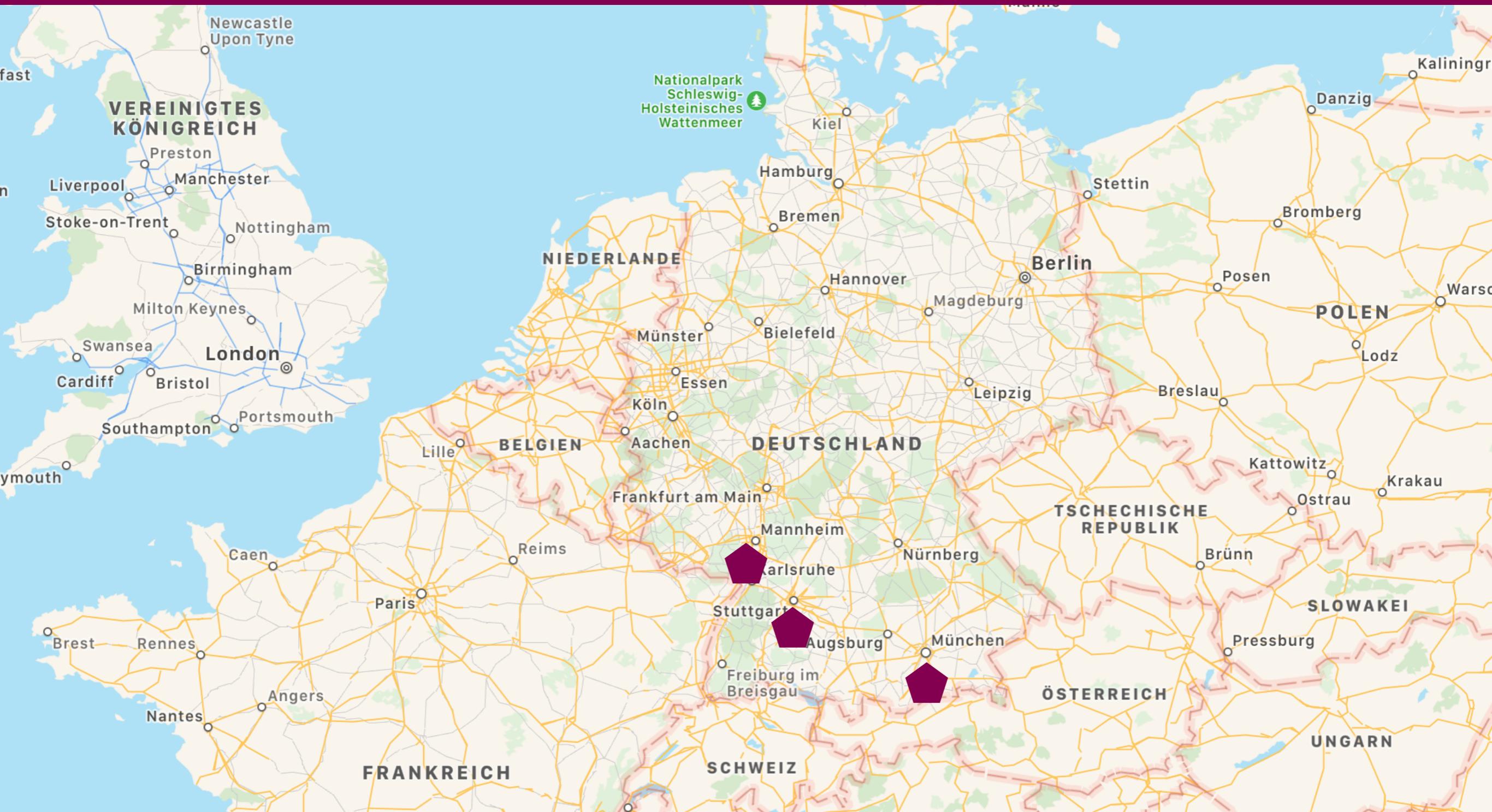
My previous Life

BIOCHEMISTRY STUDIES



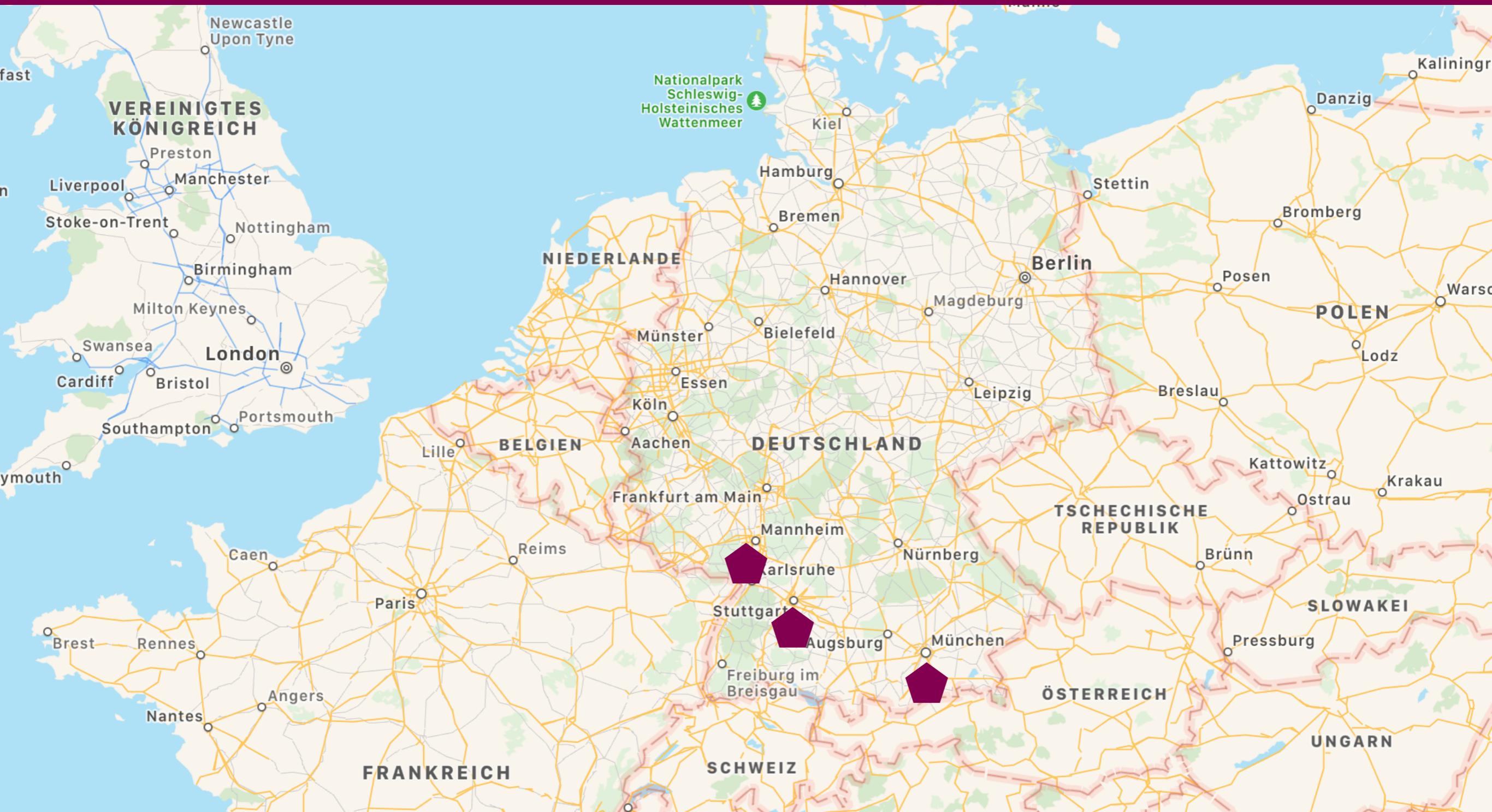
My previous Life

BIOCHEMISTRY PHD



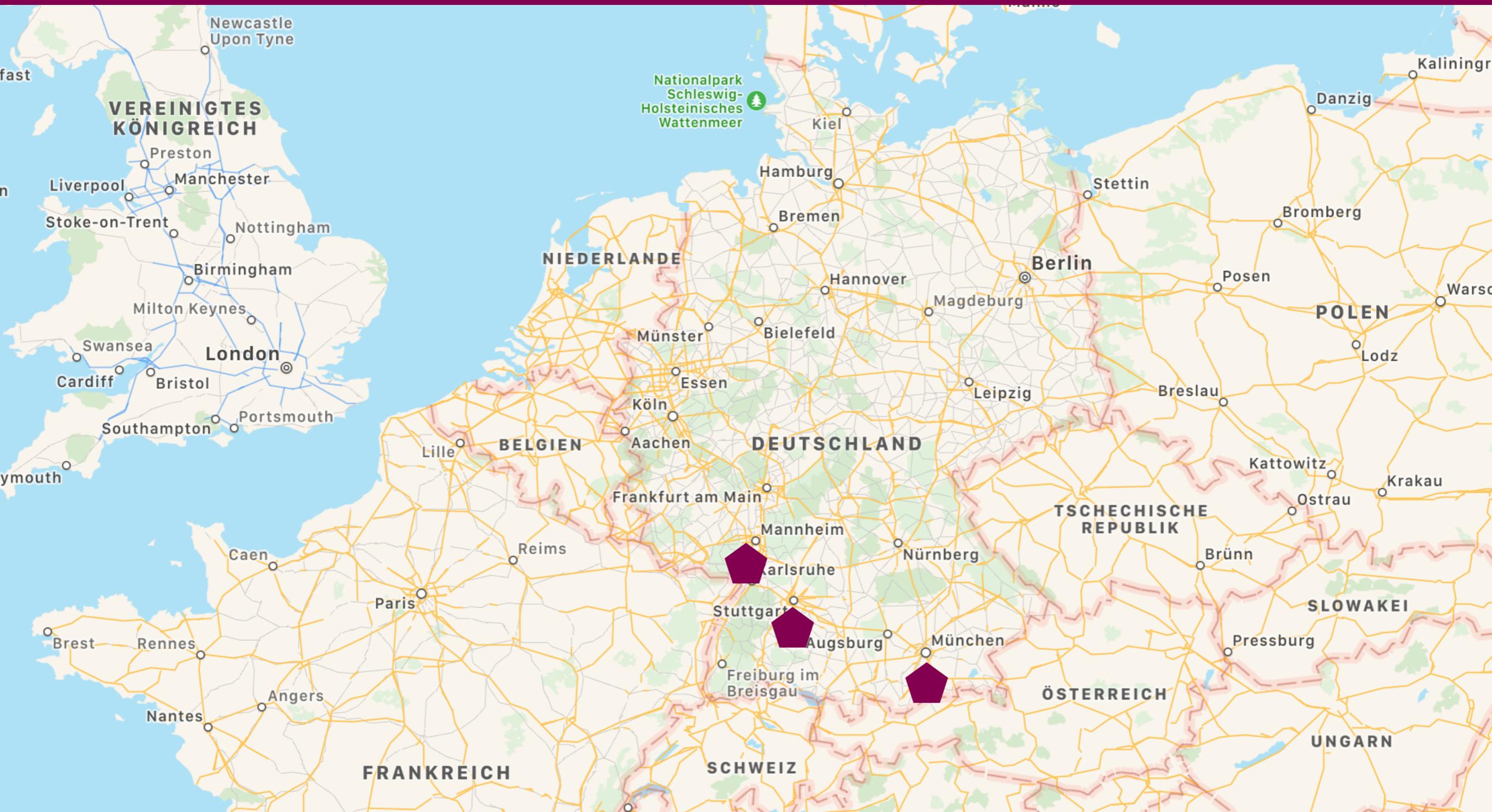
My previous Life

BIOCHEMISTRY PHD



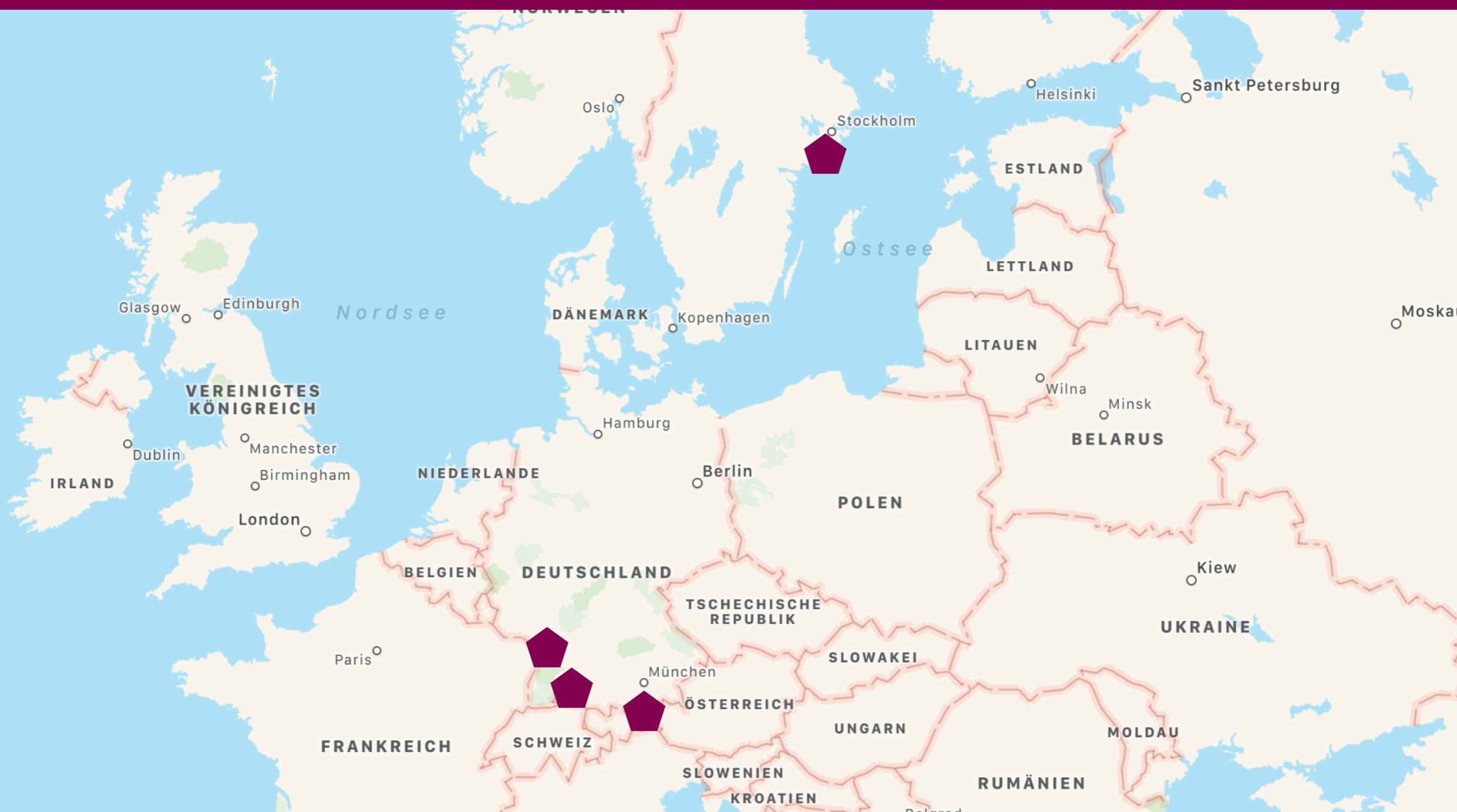
My previous Life

BIOCHEMISTRY PHD INFORMATICS



My current Life

BIOINFORMATICS POSTDOC



CLINICAL PROTEOMICS MASS SPECTROMETRY



CLINICAL PROTEOMICS MASS SPECTROMETRY

CLINICAL PROTEOMICS MASS SPECTROMETRY

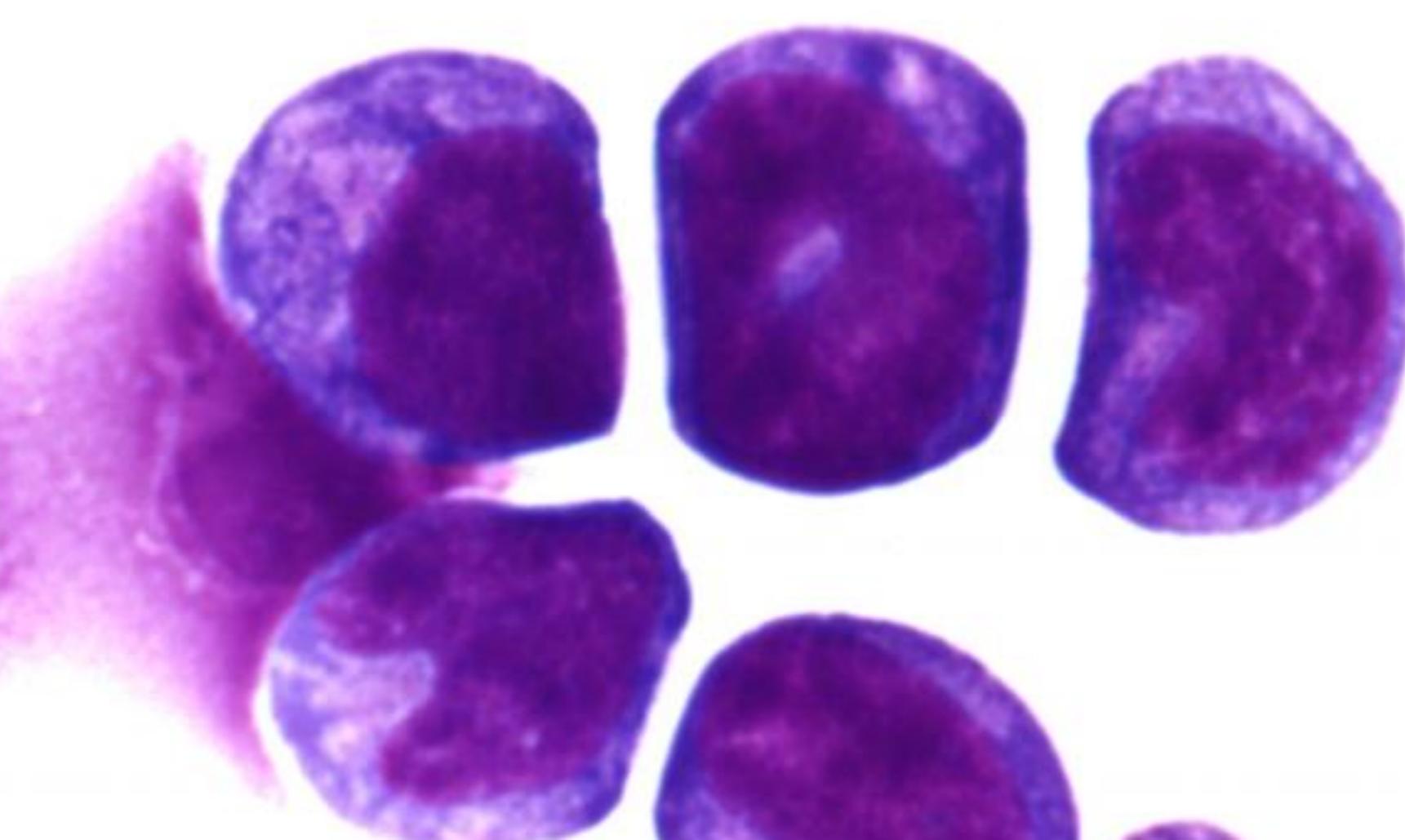
<http://lehtiolab.se>

ACUTE LYMPHOBLASTIC LEUKEMIA (ALL)

IN CHILDREN

ACUTE LYMPHOBLASTIC LEUKEMIA

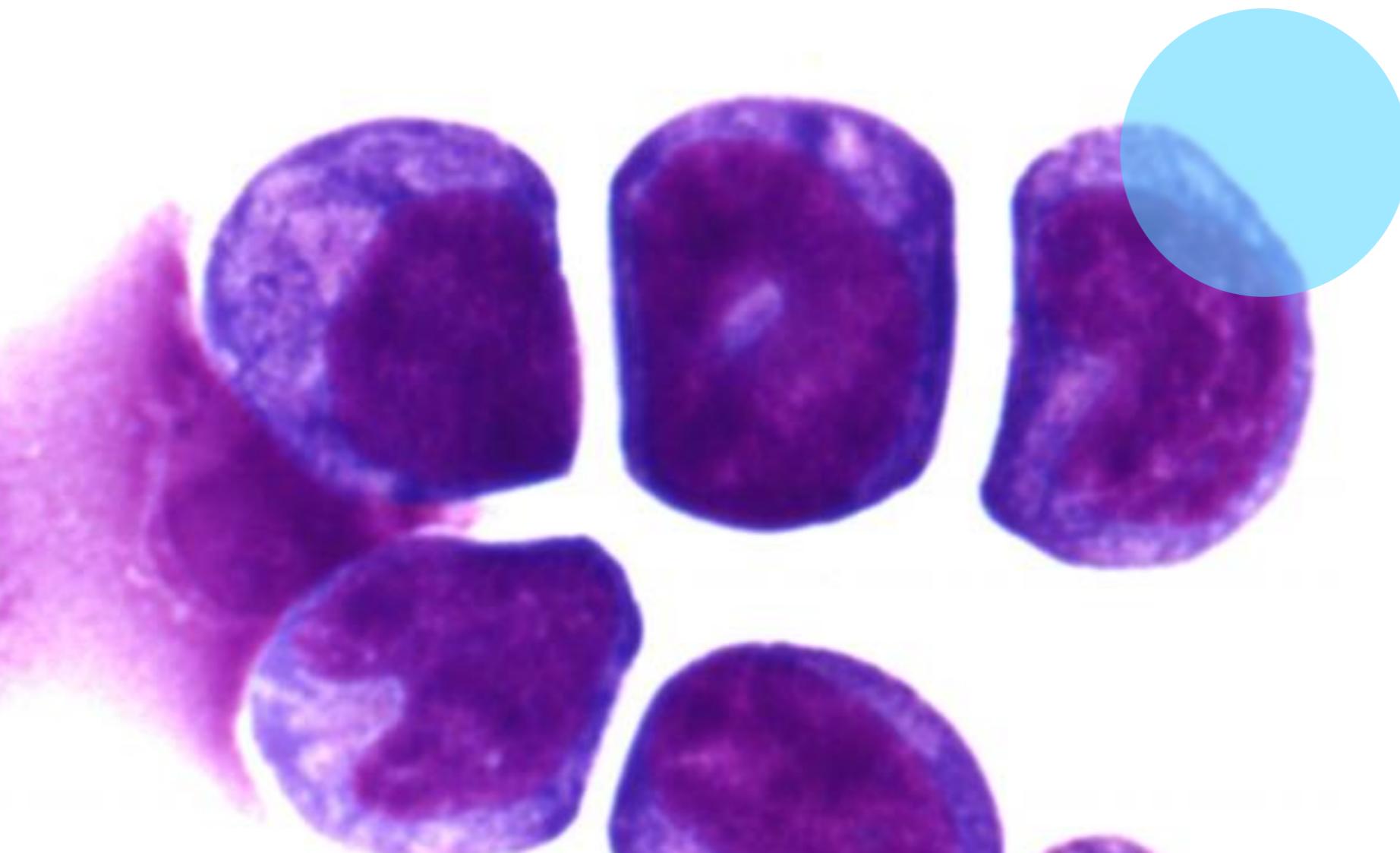
What is so special about these cells?



ACUTE LYMPHOBLASTIC LEUKEMIA

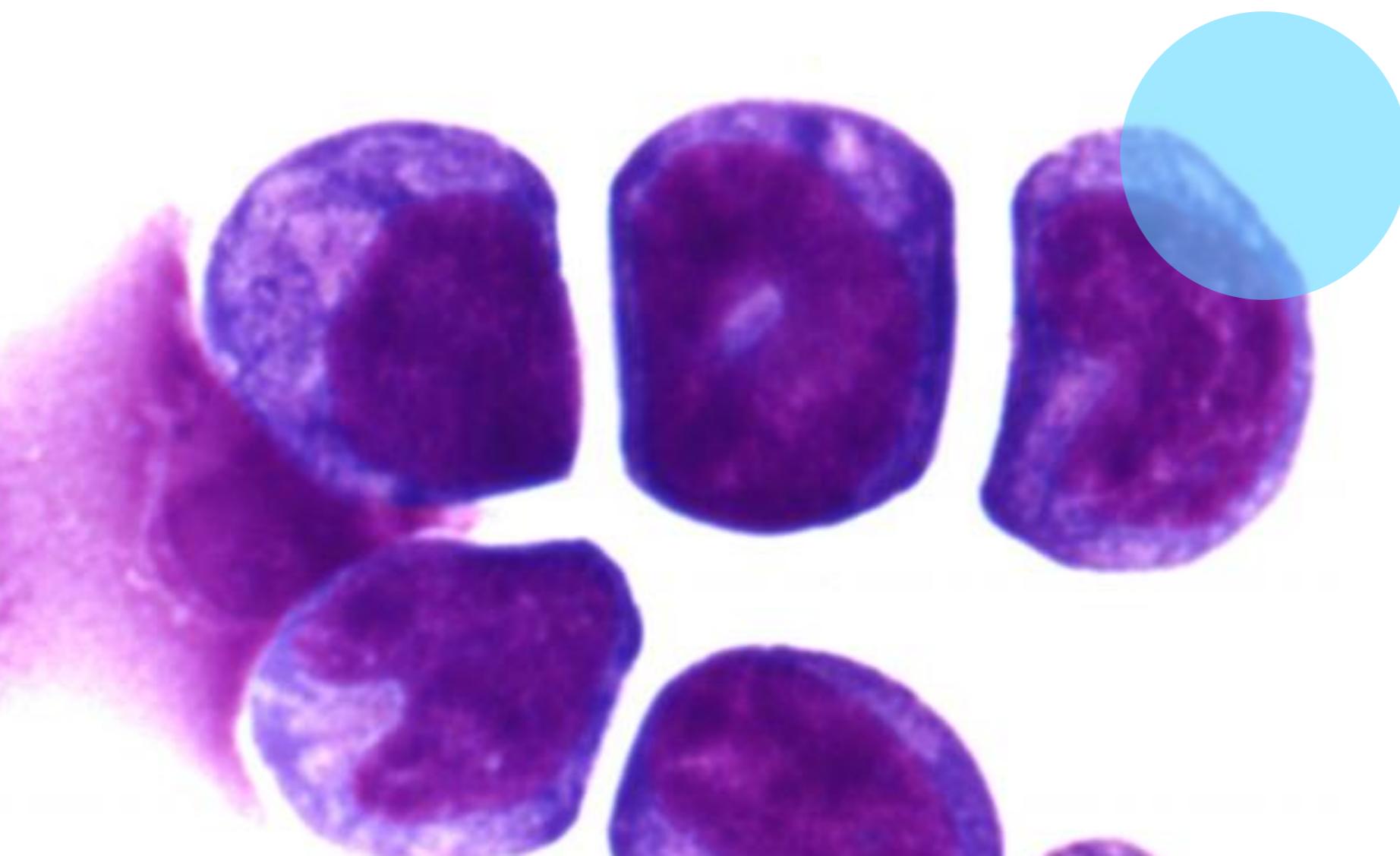
What is so special about these cells?

understand the biology



ACUTE LYMPHOBLASTIC LEUKEMIA

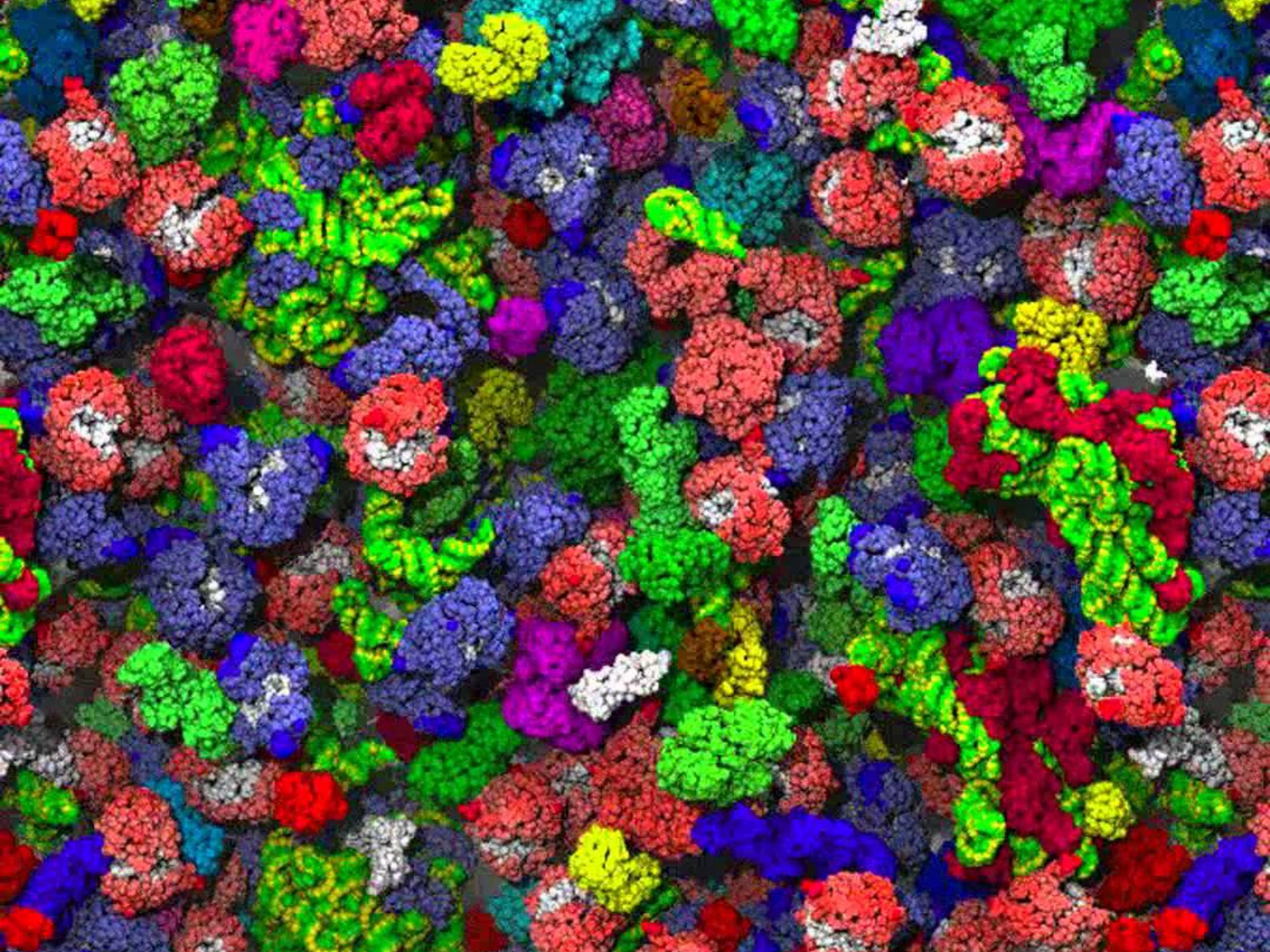
What is so special about these cells?

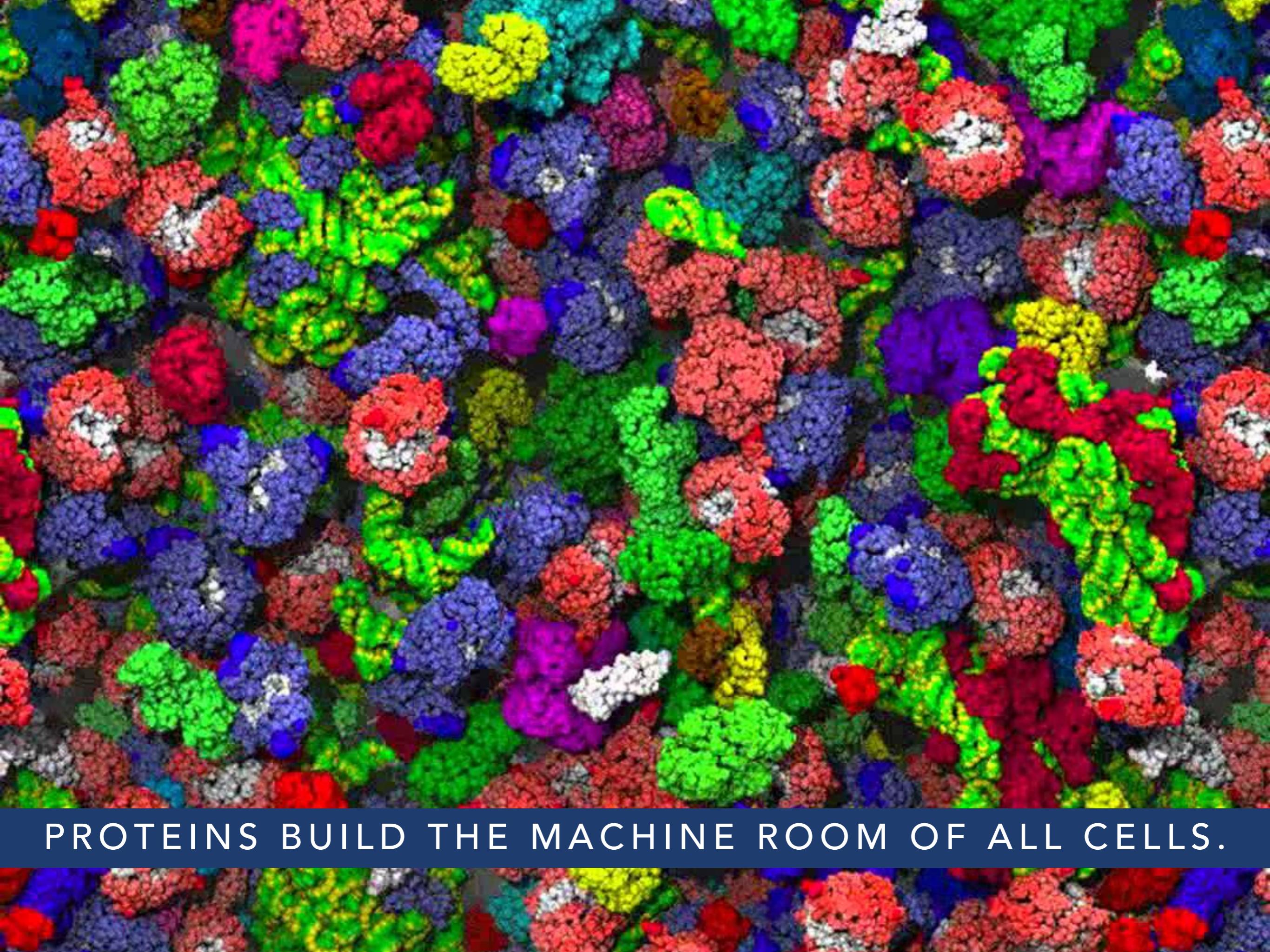


understand the biology



develop drugs





PROTEINS BUILD THE MACHINE ROOM OF ALL CELLS.



Protein

MASS SPECTROMETER



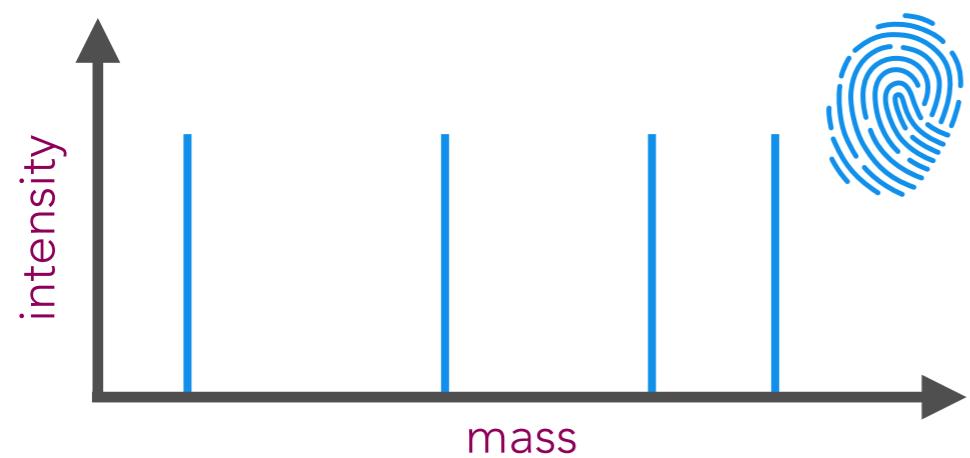
MASS SPECTROMETER



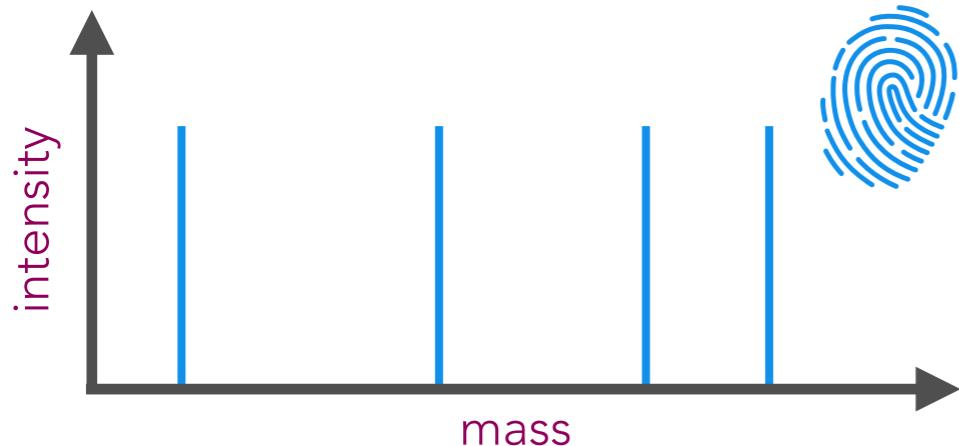
MASS SPECTROMETER



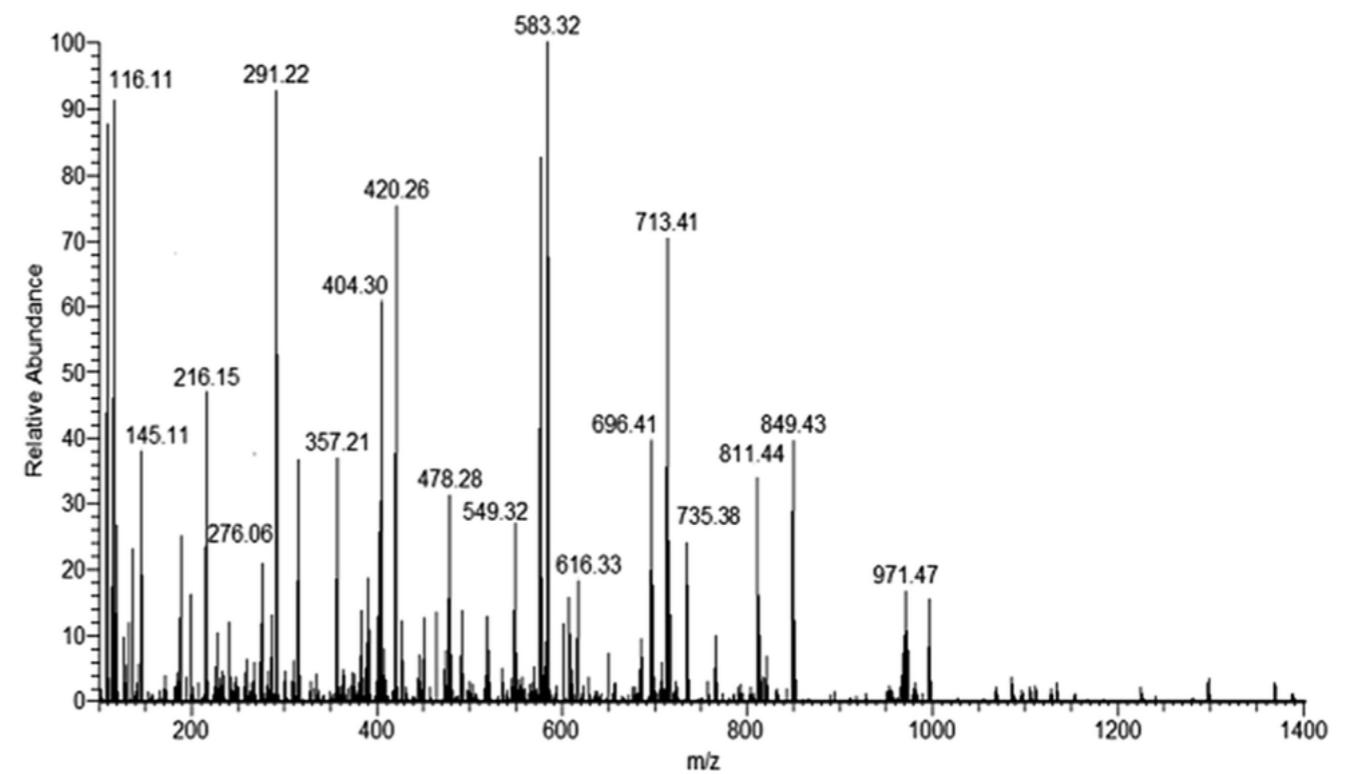
A mass spectrometer produces millions of spectra



A mass spectrometer produces millions of spectra



real world example





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proudly presents:





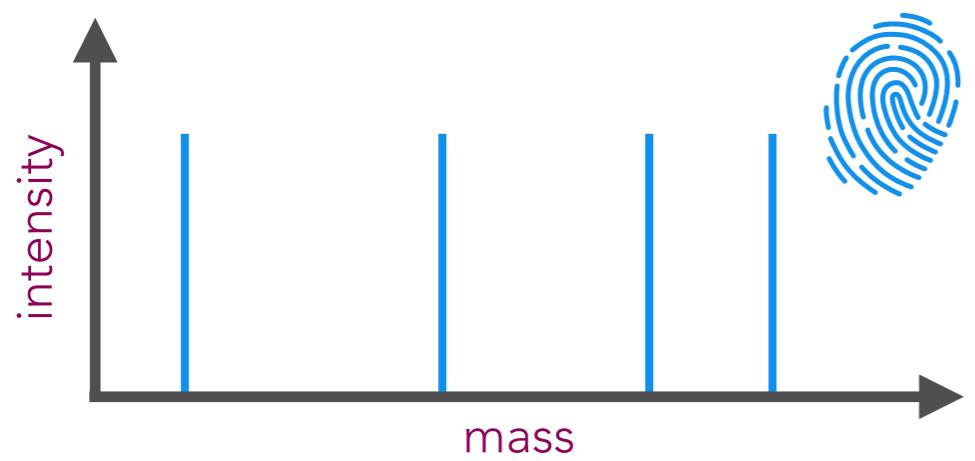
Karolinska
Institutet

proudly presents:

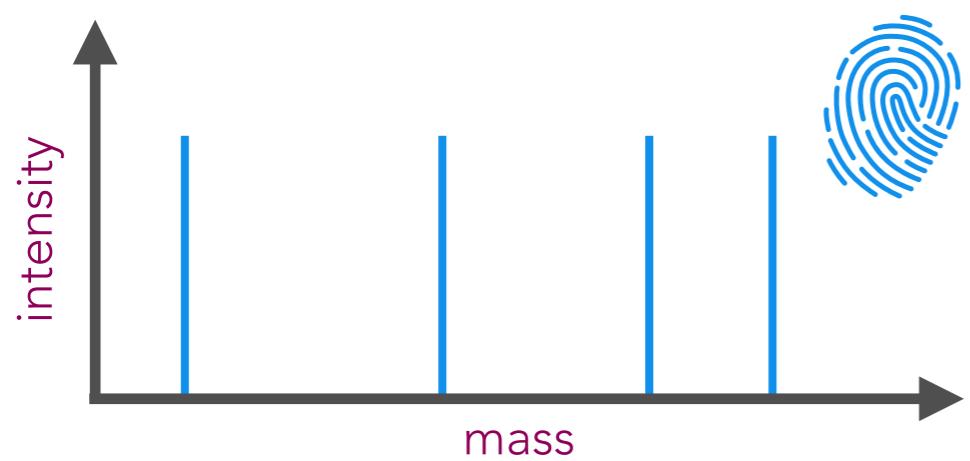


The Big Dater: Proteomics Tinder

Proteomics Tinder

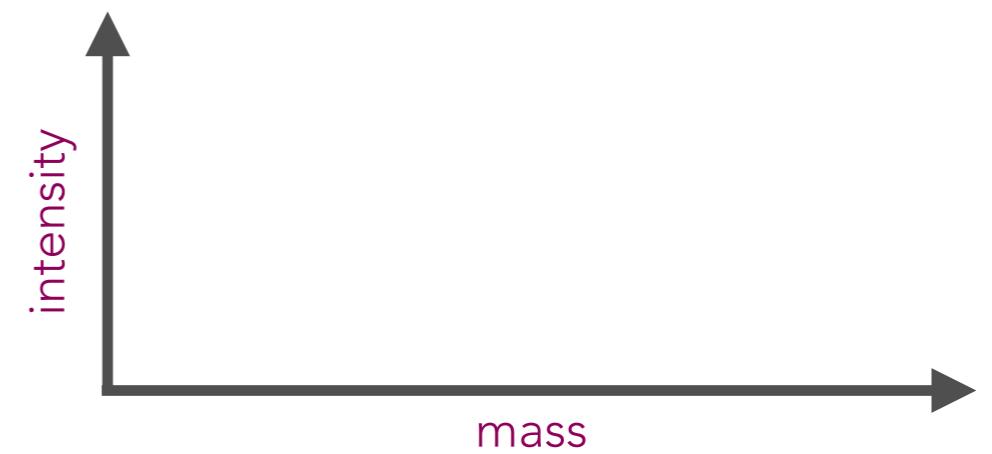
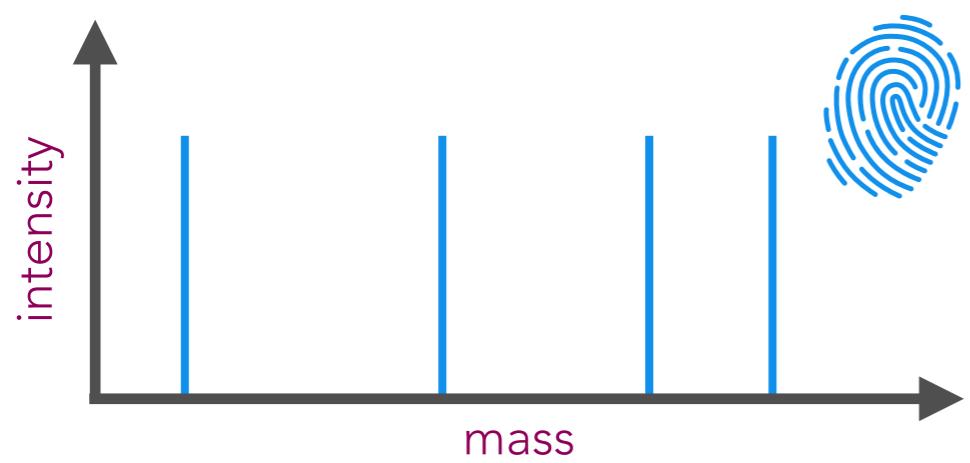


Proteomics Tinder



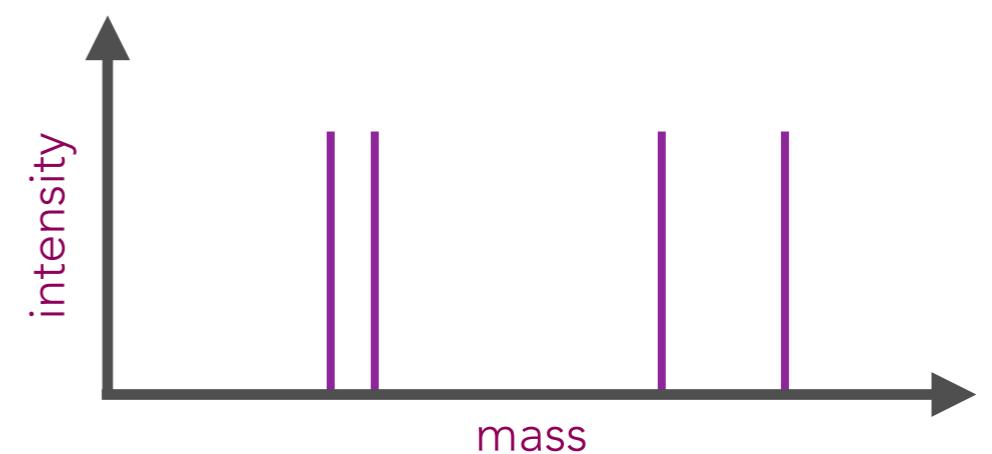
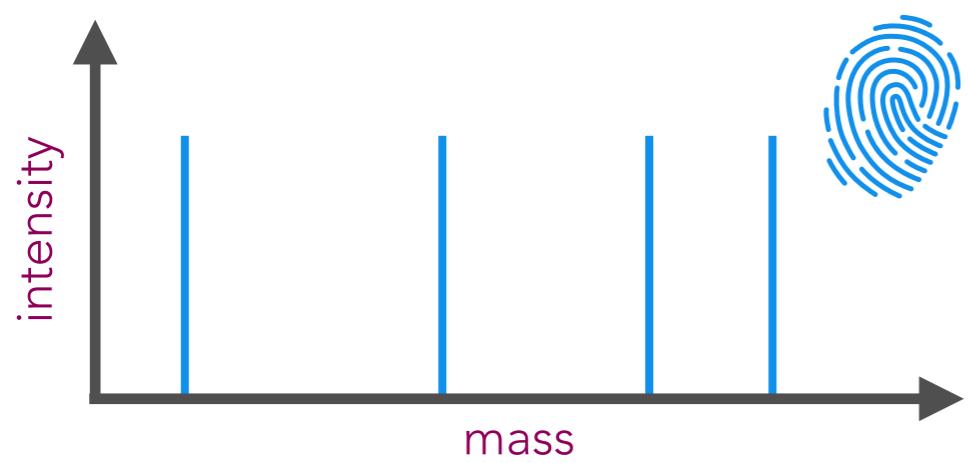
Database of known spectra

Proteomics Tinder



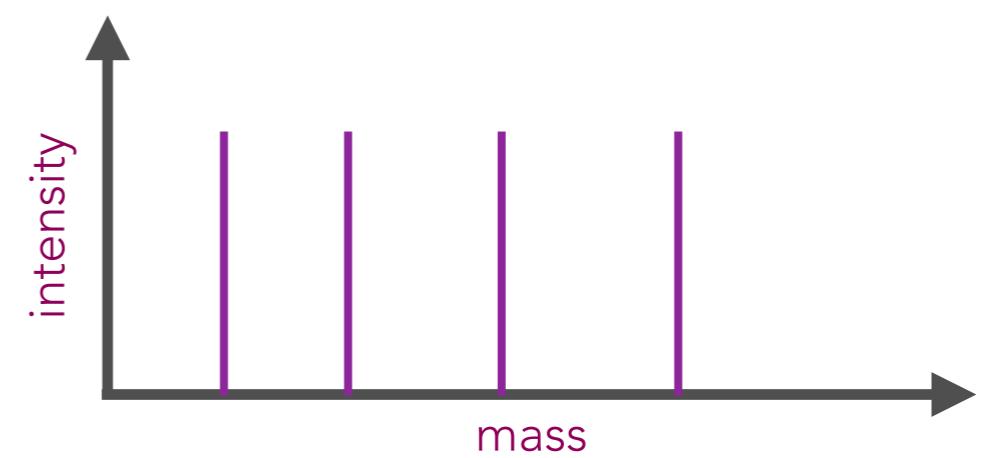
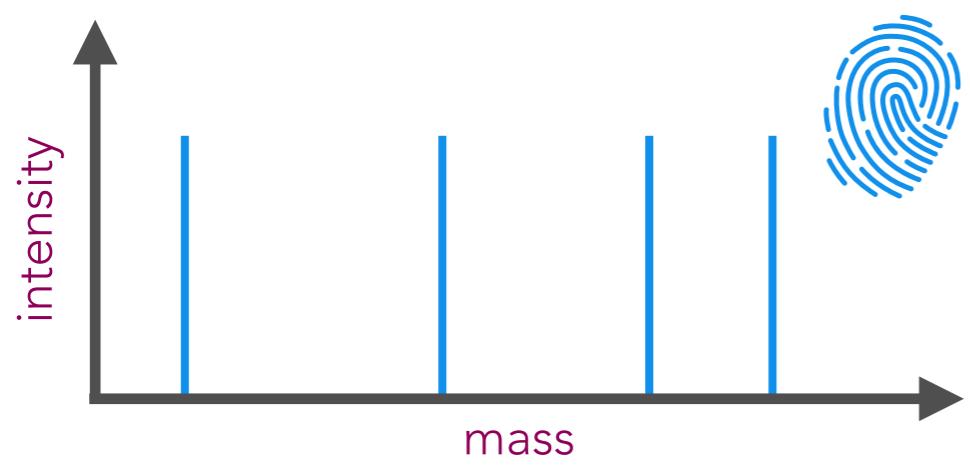
Database of known spectra

Proteomics Tinder



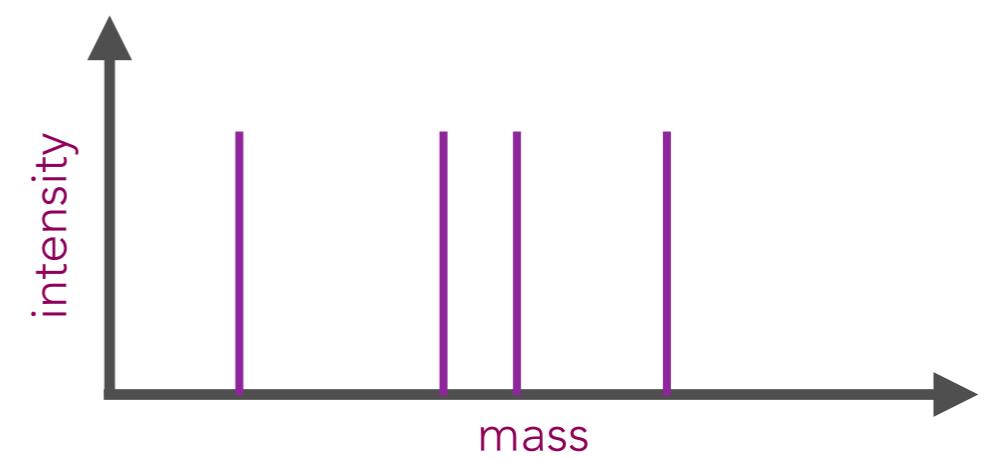
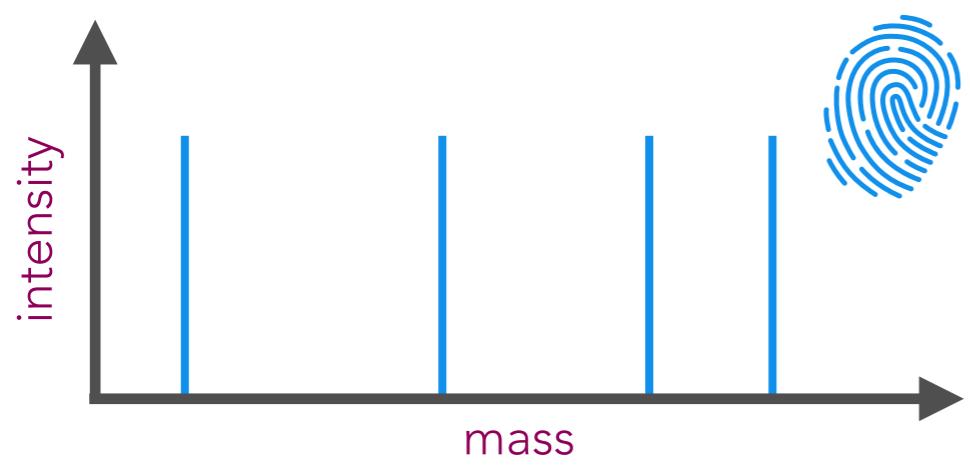
Database of known spectra

Proteomics Tinder



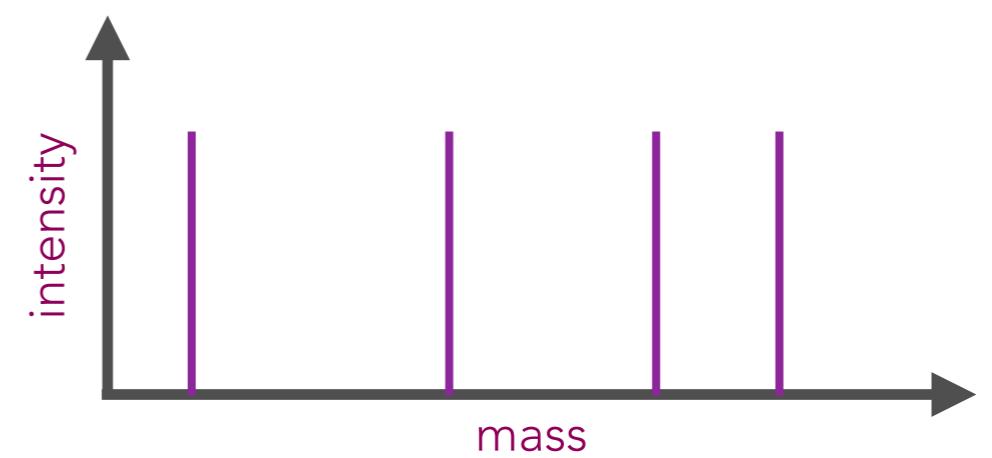
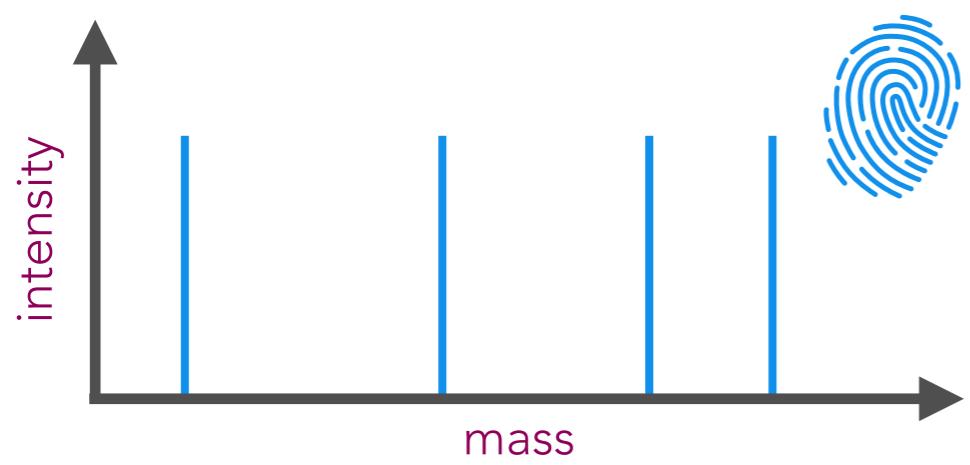
Database of known spectra

Proteomics Tinder



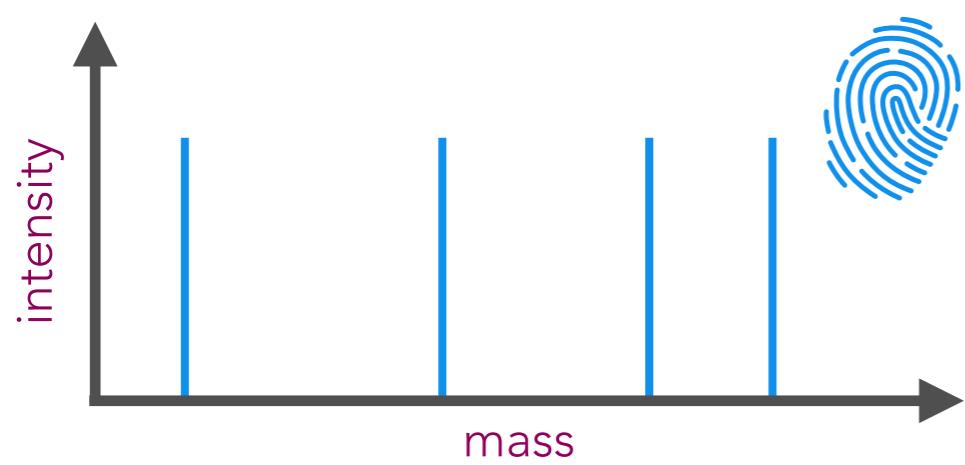
Database of known spectra

Proteomics Tinder

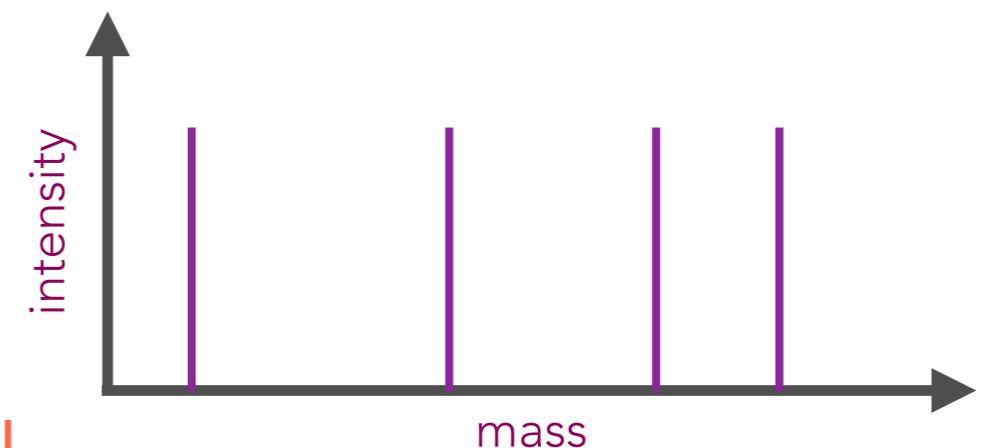


Database of known spectra

Proteomics Tinder

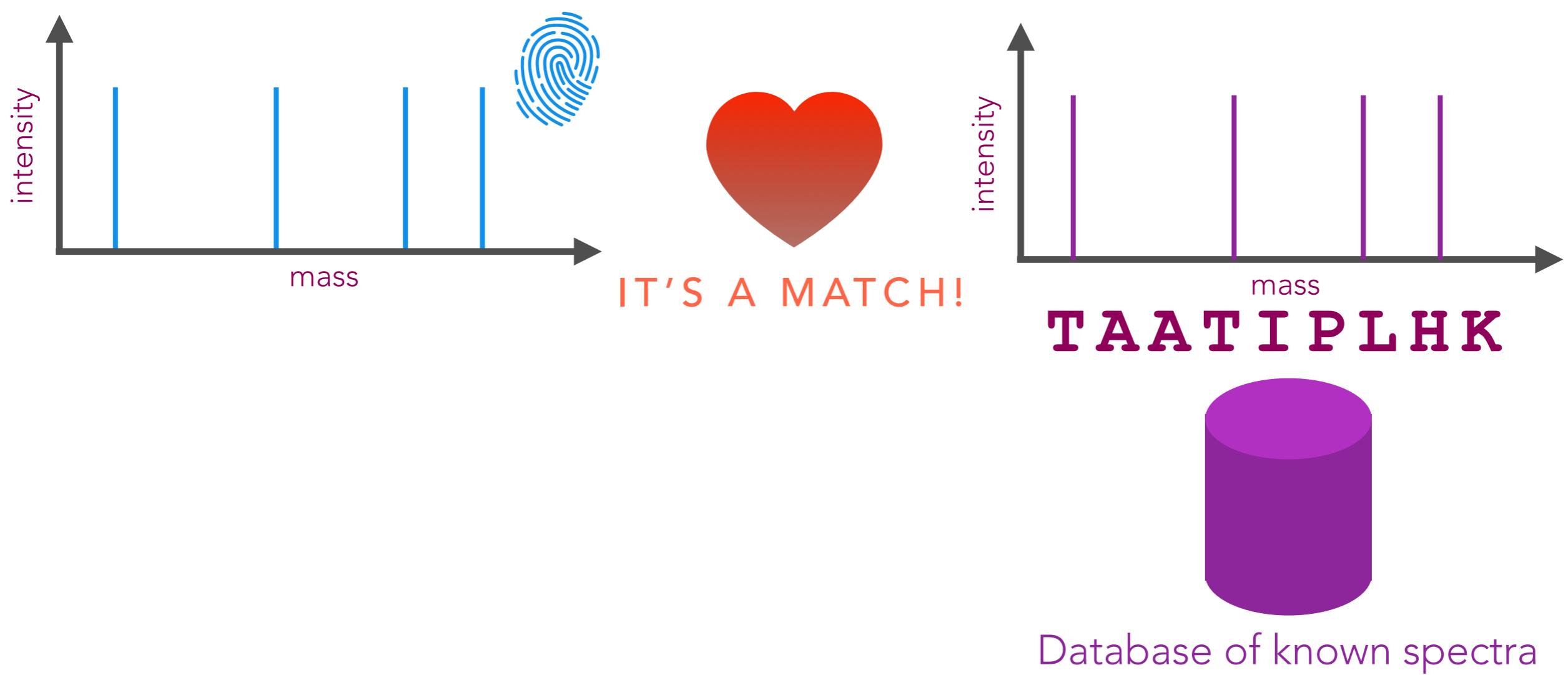


IT'S A MATCH!

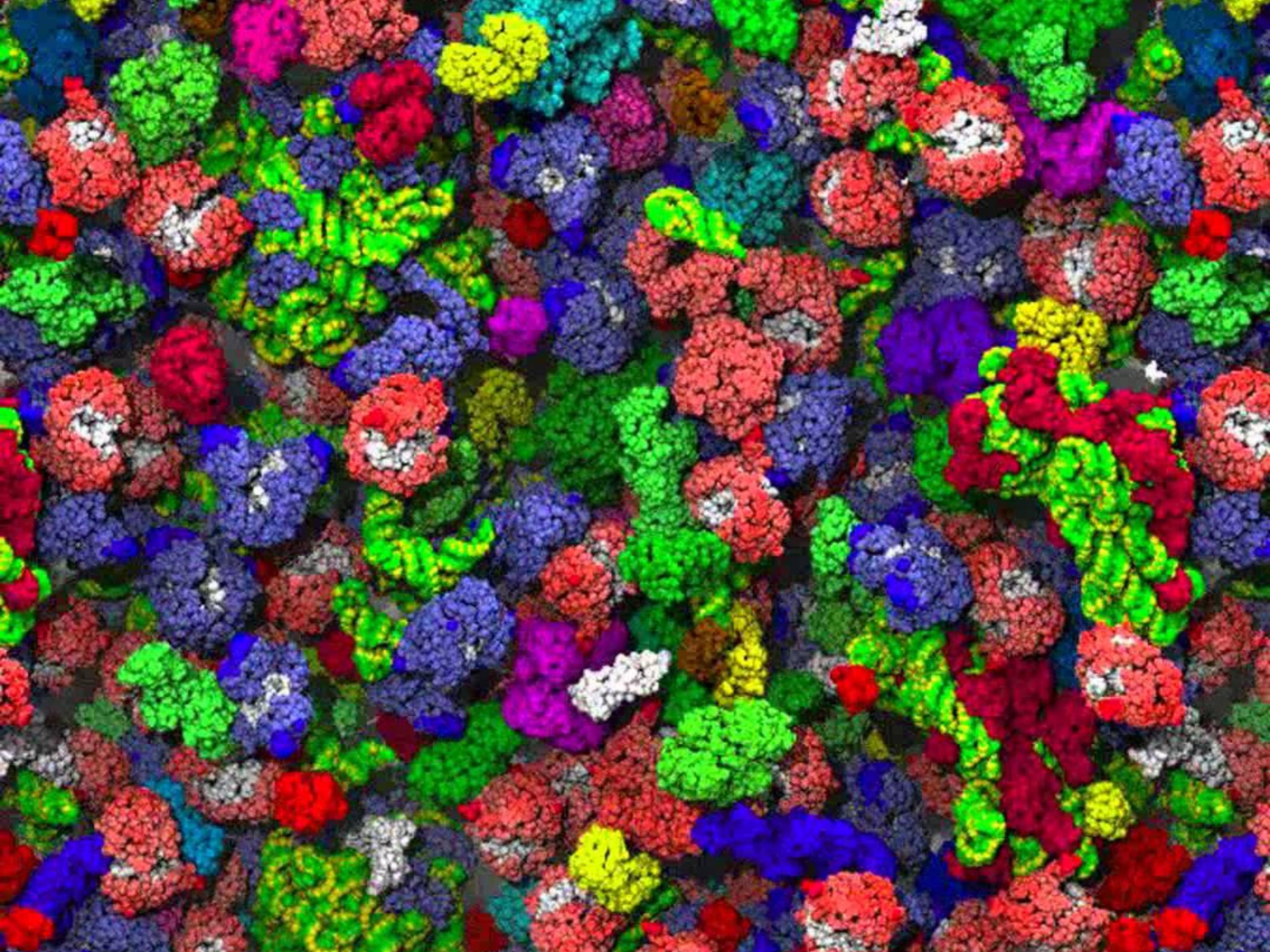


Database of known spectra

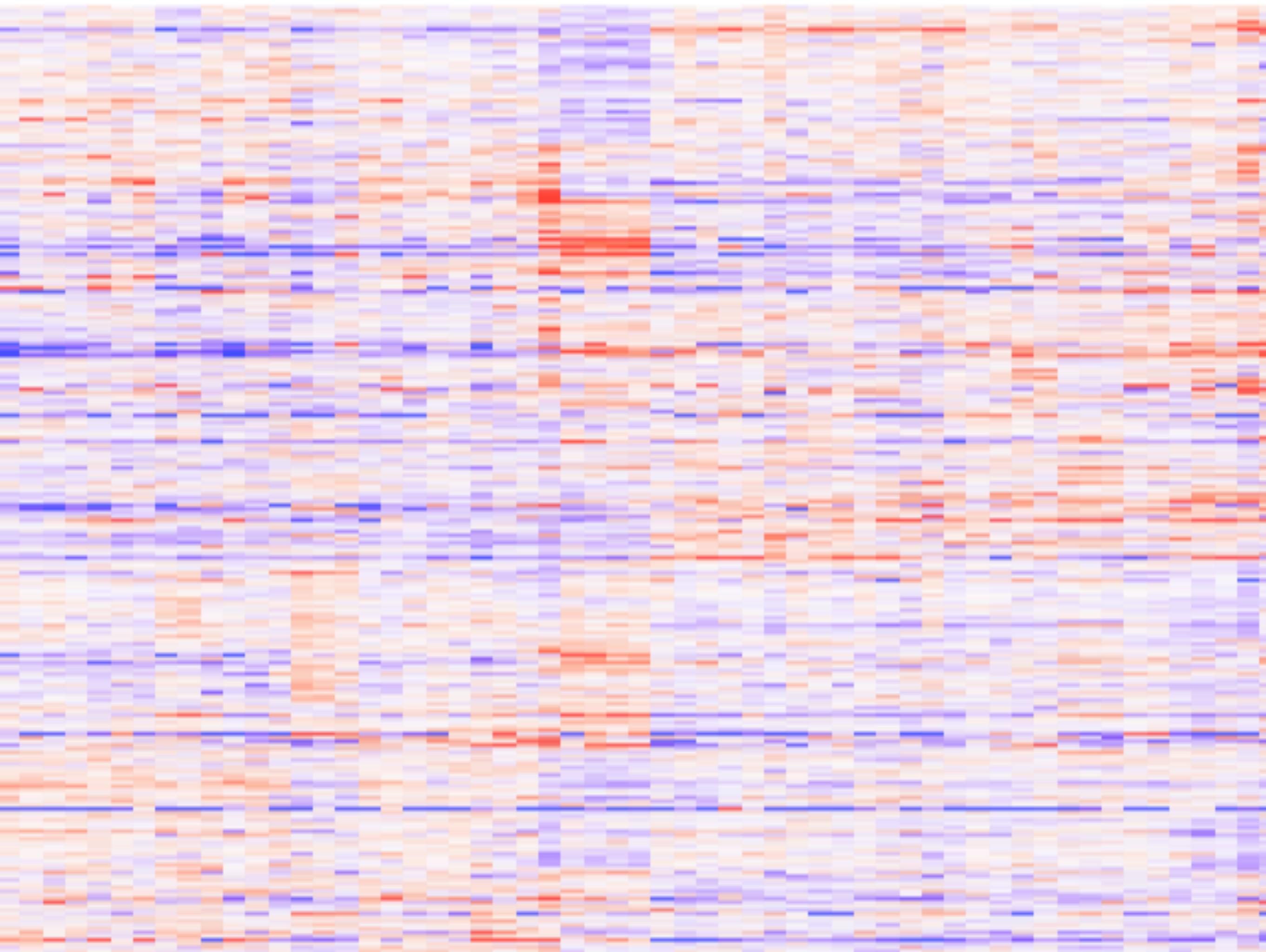
Proteomics Tinder



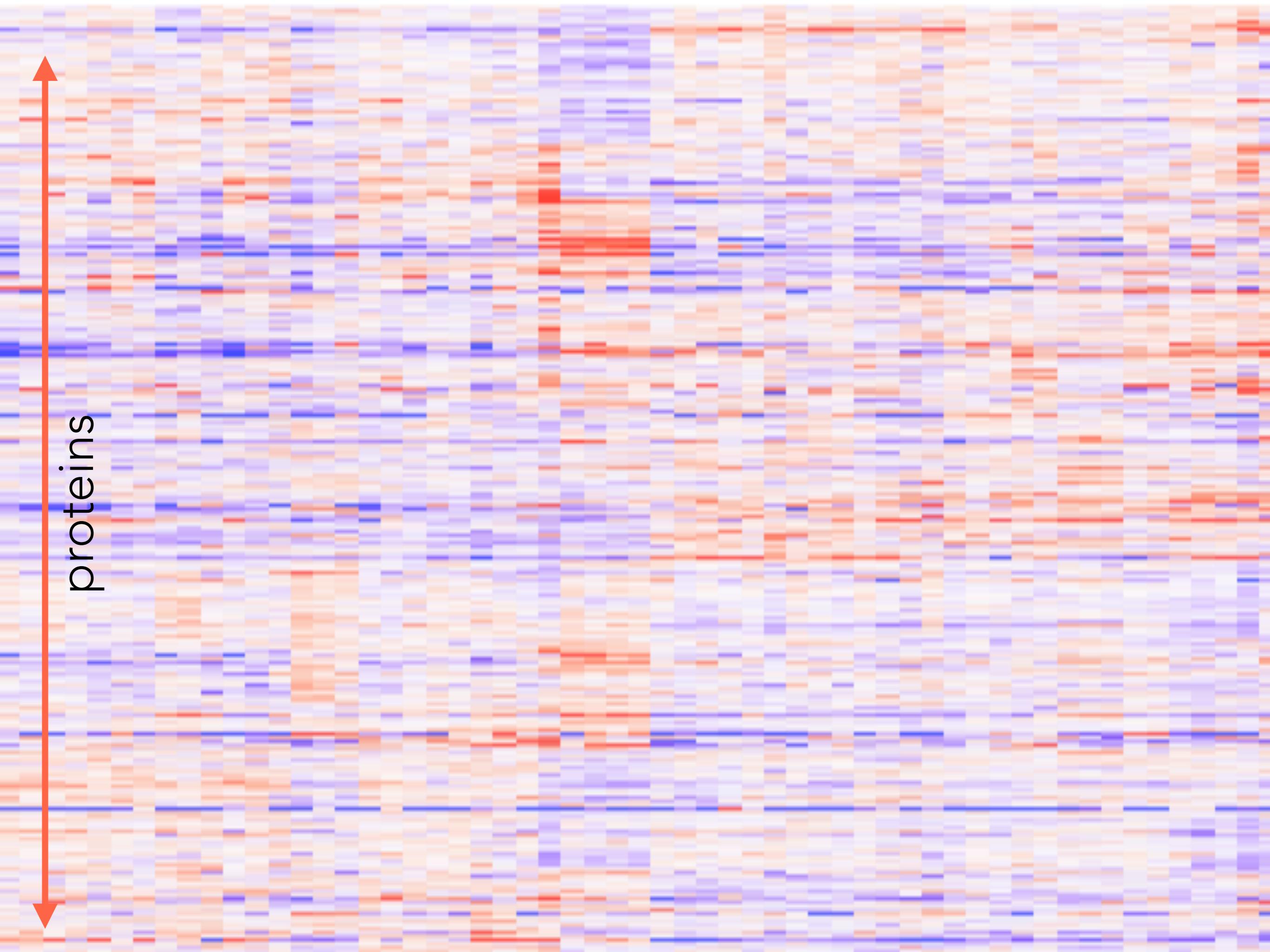
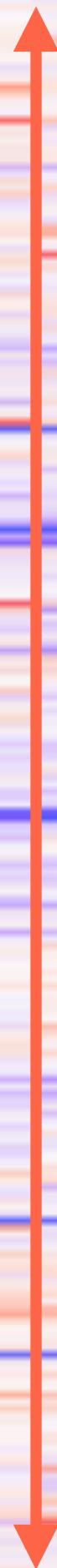


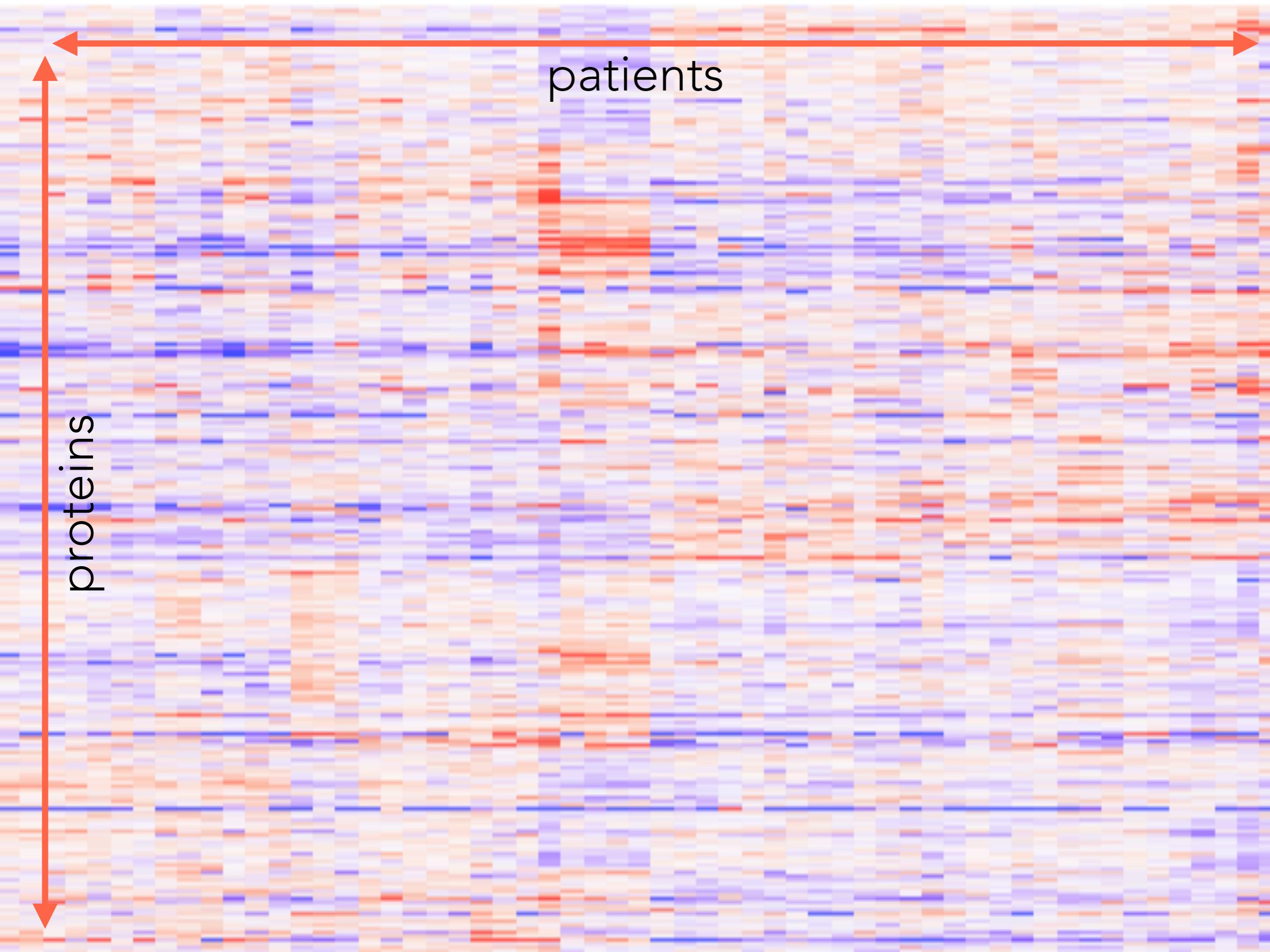


We have information about
the identity of ca. **10,000** proteins and their **abundance**.



proteins





A heatmap visualization showing protein expression levels across a group of patients. The vertical axis on the left is labeled "proteins" and the horizontal axis at the top is labeled "patients". The heatmap uses a color scale from light purple (low expression) to orange-red (high expression). A prominent red double-headed arrow is positioned vertically along the left side of the heatmap, indicating the direction of the protein axis. A second red double-headed arrow is positioned horizontally across the top of the heatmap, indicating the direction of the patient axis.

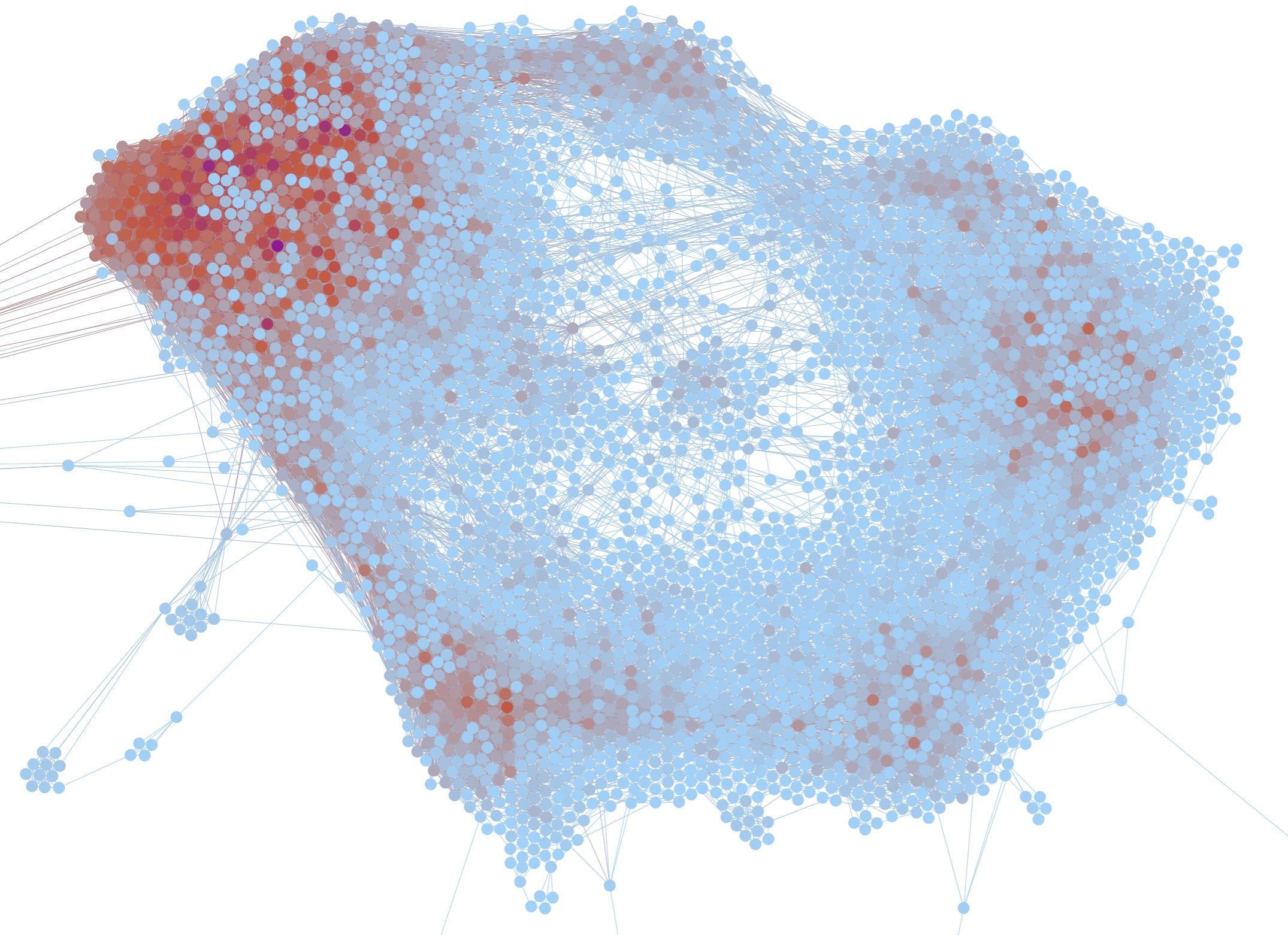
patients

proteins

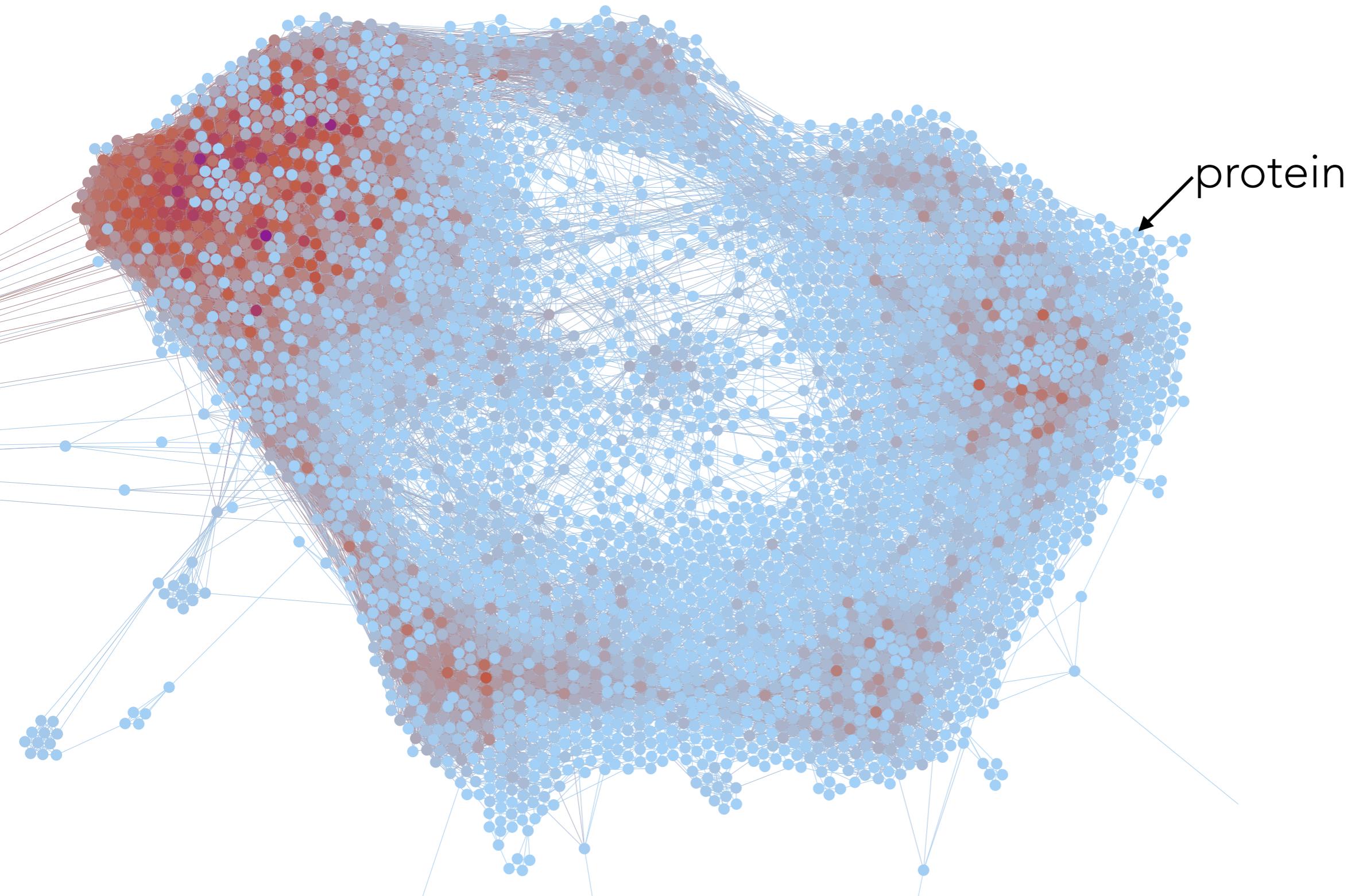
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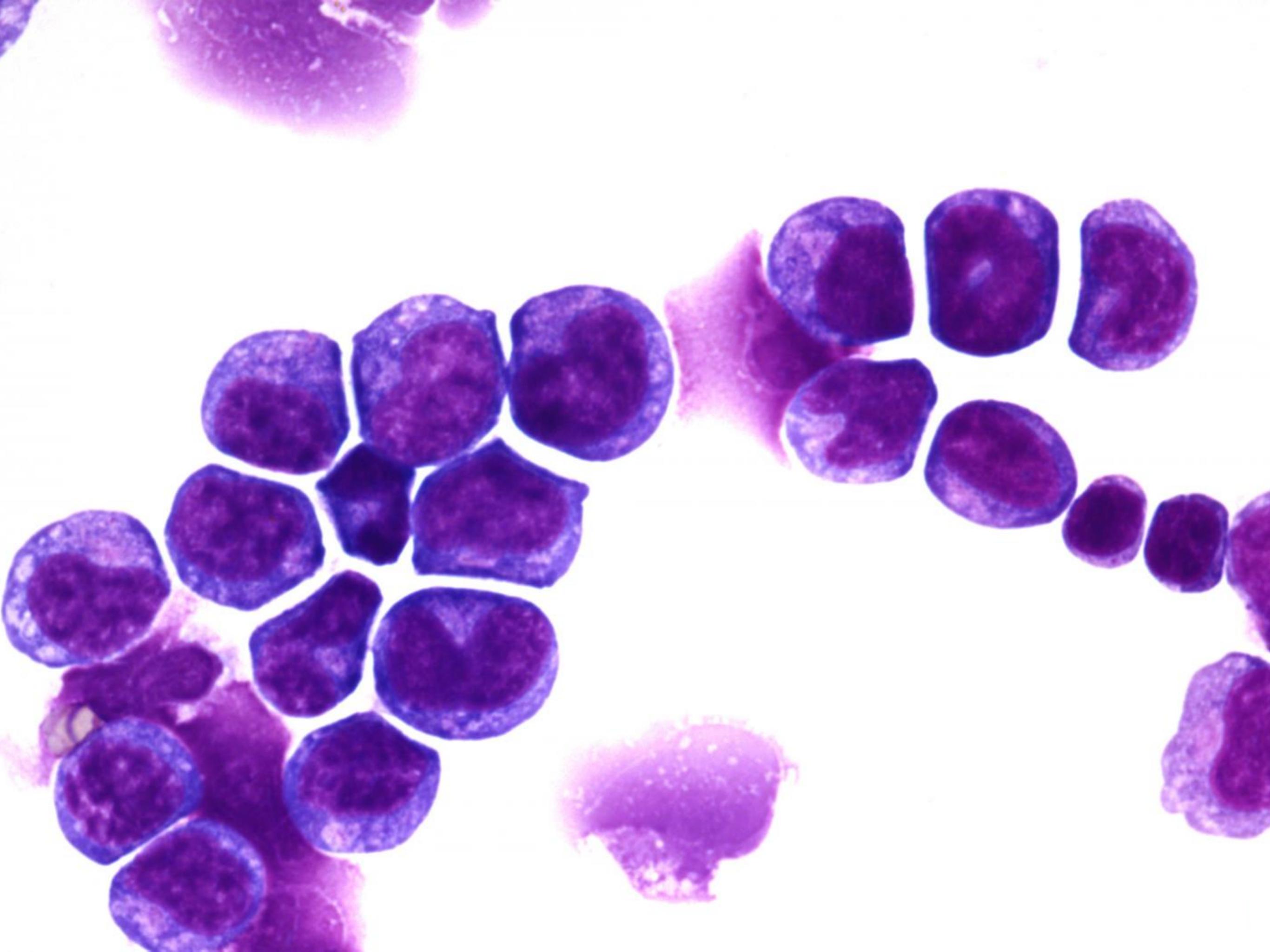
THESE PATIENTS HAVE A SPECIAL GENE FUSION.

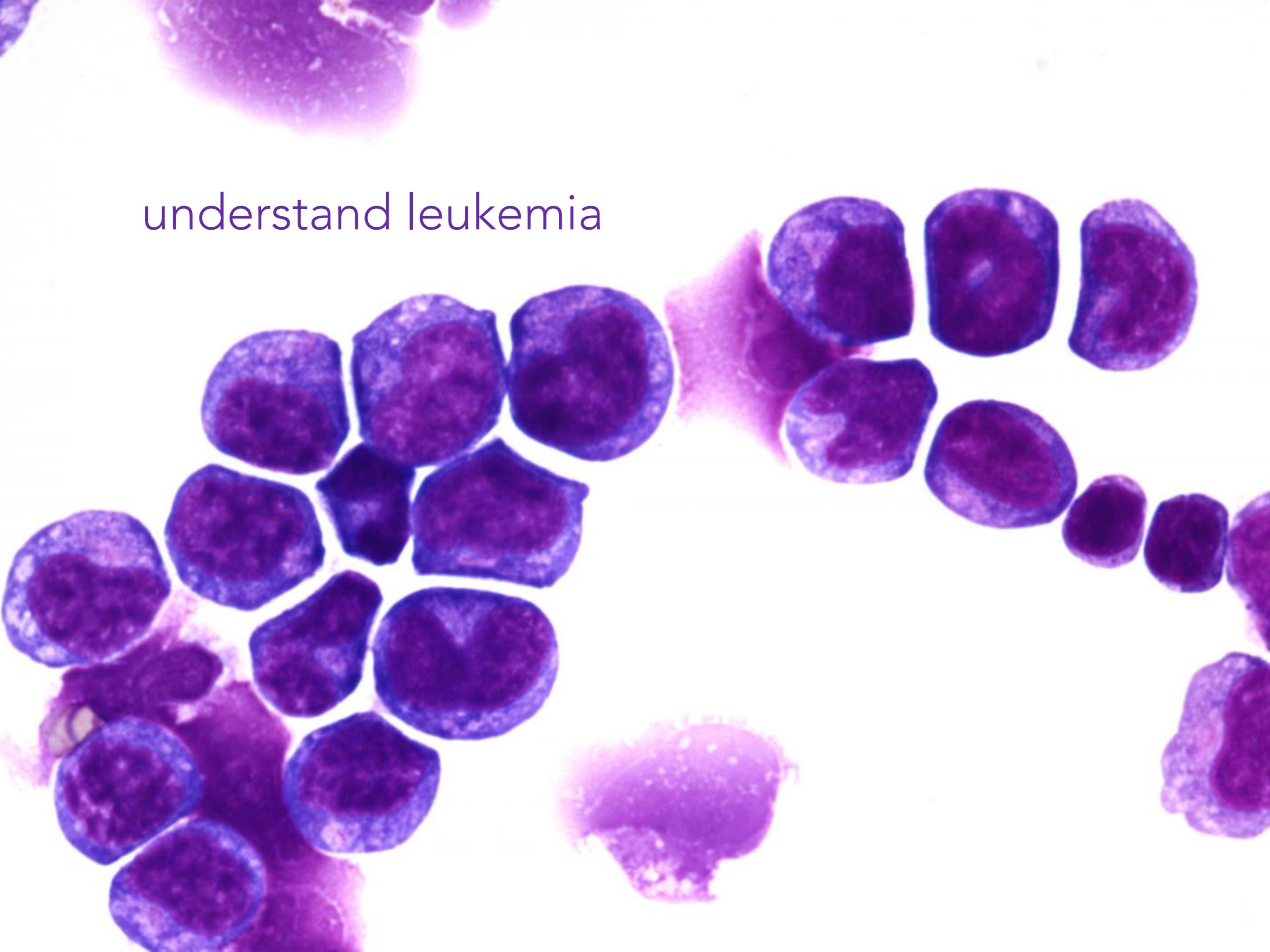
'MACHINE LEARNING' CAN REVEAL PROTEIN COMPLEXES



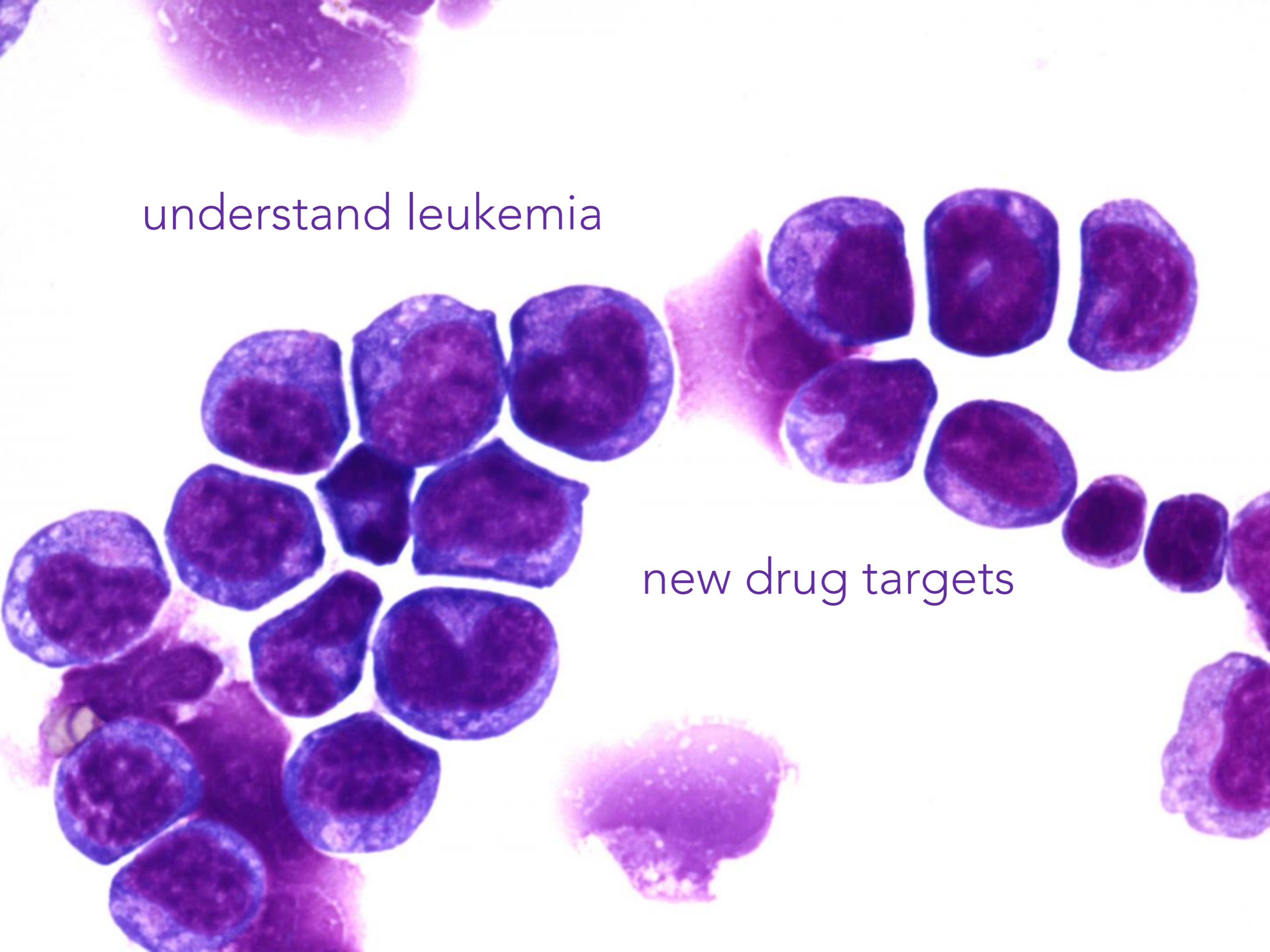
'MACHINE LEARNING' CAN REVEAL PROTEIN COMPLEXES





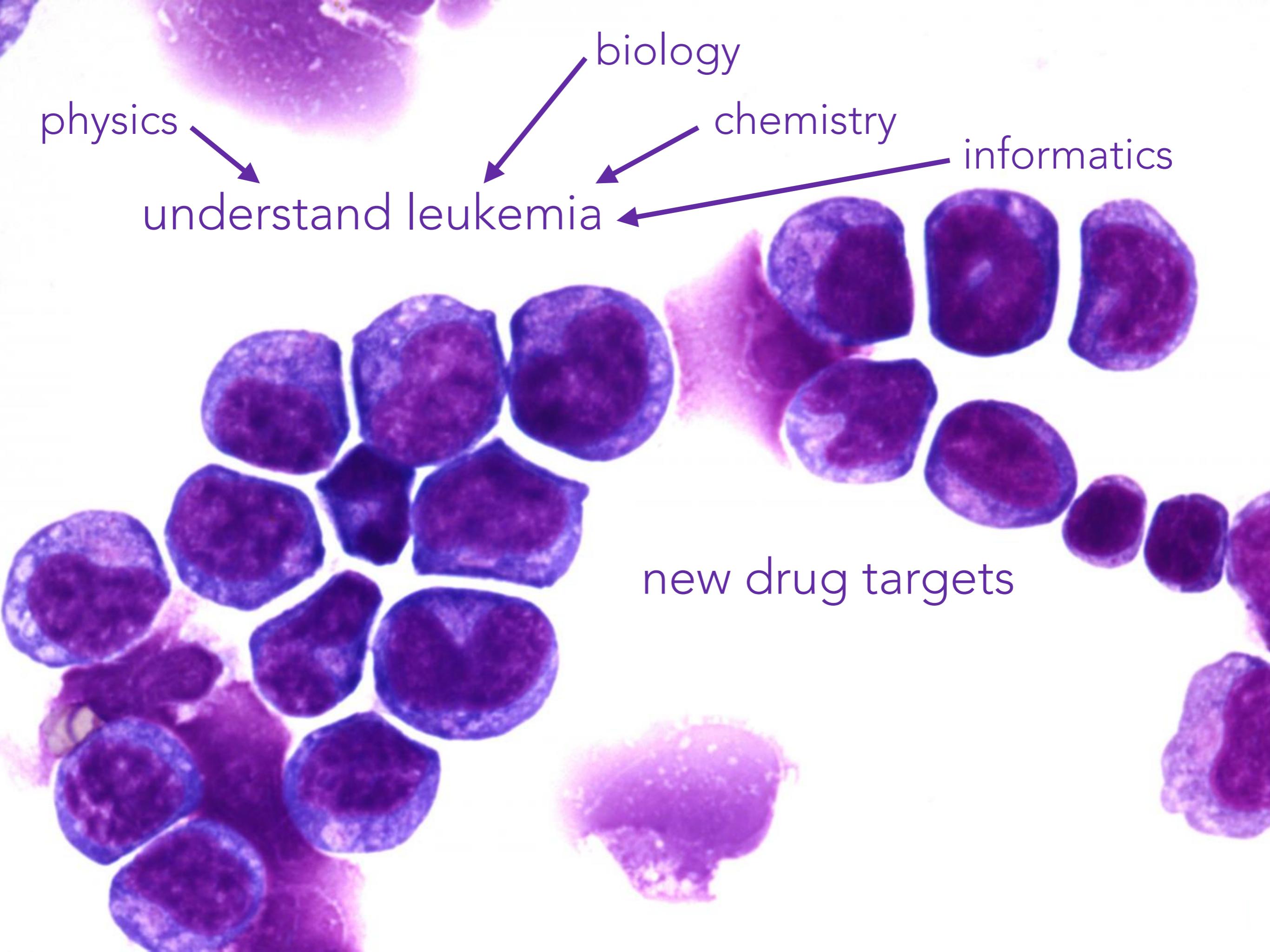
A microscopic image showing several clusters of leukemic cells. These cells are large, irregularly shaped, and have a dark purple, granular cytoplasm. Some cells appear to be in close proximity, suggesting they are part of a larger tumor mass. The background is white, typical of a stained histological section.

understand leukemia

A microscopic image showing several clusters of leukemic cells. These cells are large, irregularly shaped, and have a dark purple, granular cytoplasm. Some cells appear to be in contact with each other or with a pink-stained extracellular matrix. The overall texture is somewhat mottled and lacks normal tissue organization.

understand leukemia

new drug targets



physics

biology

chemistry

informatics

understand leukemia

new drug targets



Tack så mycket!

Vielen Dank!