THE HUMAN PROTEIN ATLAS

A new version of the Human Protein Atlas is launched today mapping the blood profiles in 59 diseases and healthy individuals

[October 9th, 2025] **An international team of 111 co-authors has created the first comprehensive Human Disease Blood Atlas, mapping how thousands of proteins in our blood shift across 59 diseases and healthy life stages. The study is published today in Science and at the same time the largest pan disease blood proteomics resource to date is made publicly available on Human Protein Atlas, enabling immediate use by the global scientific community.**

In the article **"A human pan-disease blood atlas of the circulating proteome,"** 8,262 people and up to 5,416 proteins were profiled, revealing that each disease leaves a distinct molecular "fingerprint" in blood, and that many conditions also share common signatures of inflammation and tissue injury. The full, interactive dataset is live now on the Human Protein Atlas, an open portal used by roughly half a million scientists each month, positioning the resource for immediate impact across labs worldwide.

Key findings

- **Distinct disease fingerprints and shared biology**
  Each of the 59 diseases showed characteristic protein profiles. Many proteins that rise in cancer or autoimmunity also rise in infections, reflecting shared inflammatory pathways, while other patterns clustered by organ systems (for example, liver related conditions). This dual view helps focus on truly disease specific markers.
- **AI separates universal from disease specific signals**
  Machine learning models run across all diseases at once highlight which proteins are broad "distress" signals and which uniquely define a given illness, information critical for building panels that won't misclassify patients in real world settings.
- **Your baseline matters**
  Longitudinal profiling in healthy adults showed that each person has a stable, individual blood protein baseline over years, a molecular fingerprint of wellness that future healthcare could compare against to flag early deviations.
- **Puberty reshapes the blood proteome**
  Tracking the same 100 individuals at ages 4, 8, 16, and 24, the team observed dramatic, sex specific shifts during puberty before levels stabilize in adulthood, creating one of the most detailed maps to date of how development rewires the circulating proteome.
- **Biological age, and intriguing outliers**
  Models predicting age from blood proteins performed strongly. Individuals whose predicted "biological age" diverged from chronological age stood out as outliers, an observation the authors note is interesting and merits further study, not a clinical conclusion.

- **Signals relevant to early cancer detection**
  In independent, population-based data, some protein signatures, notably for lung cancer, showed promising performance years before diagnosis, underscoring the potential of blood proteomics for screening that still requires rigorous validation.

Additional information:

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The Human Disease Blood Atlas is available inside the Human Protein Atlas portal (https://www.proteinatlas.org/humanproteome/blood)

Publication
Bueno Álvez *et al* “A human pan disease blood atlas of the circulating proteome”, *Science*, October 9, 2025. (https://doi.org/10.1126/science.adx2678)

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