

# **Multiomic Microsampling using a single drop of blood**

Stanford researchers at the Snyder Lab have developed a method for simultaneously measuring thousands of proteins, lipids, and metabolites from home-collected 10  $\mu$ L blood samples in conjunction with wearable sensors.

The tracking of blood-based molecules has the potential to generate rich mechanistic insight into diseases and identify novel biomarkers, but frequent collection and profiling is currently difficult because of the requirement for an in-clinic blood draw. Stanford scientists have overcome this limitation with the development of a multiomic microsampling method that enables the measurement of lipid, protein, and metabolite biomarkers at home from a single drop of blood. This method generates rich biological data at frequent timepoints, allowing for the measurement of dynamic molecular response to a dietary or drug intervention. By pairing these sampling and measurement technologies with wearable sensors, the method can also predict molecular changes using physiological measurements from wearable devices.

**Stanford News 1/19/23** - "[Stanford Medicine researchers measure thousands of molecules from a single drop of blood](#)"

## **Stage of Development**

Proof of concept

## **Applications**

- **At-home, personalized health monitoring based on diet and medications:**
  - At-home multiomic diagnostics and phenotyping with tiny blood sample
  - Real time prediction of molecular biomarker changes from wearables data
- **Research:**

- Potential for large-scale comprehensive, dynamic molecular and digital biomarker discovery and monitoring as well as health profiling
- Ability to measure DNA, RNA, epigenomes besides, the regular metabolites and proteins

## Advantages

- **Personalized**
- **At-home collection** - Blood sample is collected at home and can be mailed at room temperature
- **Frequent measurement** of molecular changes over time for richer biological insights (1 hour or less between samples)
- **Low cost, tiny sample** - Analyze multiple molecular classes from a single low-cost, tiny sample
- **Predict molecular changes** from wearable signals using molecular data collected

## Publications

- Shen, X., Kellogg, R., Panyard, D.J. et al. ["Multi-omics microsampling for the profiling of lifestyle-associated changes in health."](#) *Nat. Biomed. Eng* (2023).
- Weintraub, Karen. ["A geneticist studied one drop of his blood – and saw things he couldn't from a vial of blood."](#) *USA Today* January, 22, 2023.
- Leggett, Hadley. ["Stanford Medicine researchers measure thousands of molecules from a single drop of blood."](#) *Stanford Medicine News* (2023).

## Patents

- Published Application: [WO2024039873](#)

## Innovators

- Ryan Kellogg
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- Michael Snyder
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