Exploring the Relationships between Mechanical Behavior and Internal Ordering on T Cells through Integrative Single-Cell Analyses

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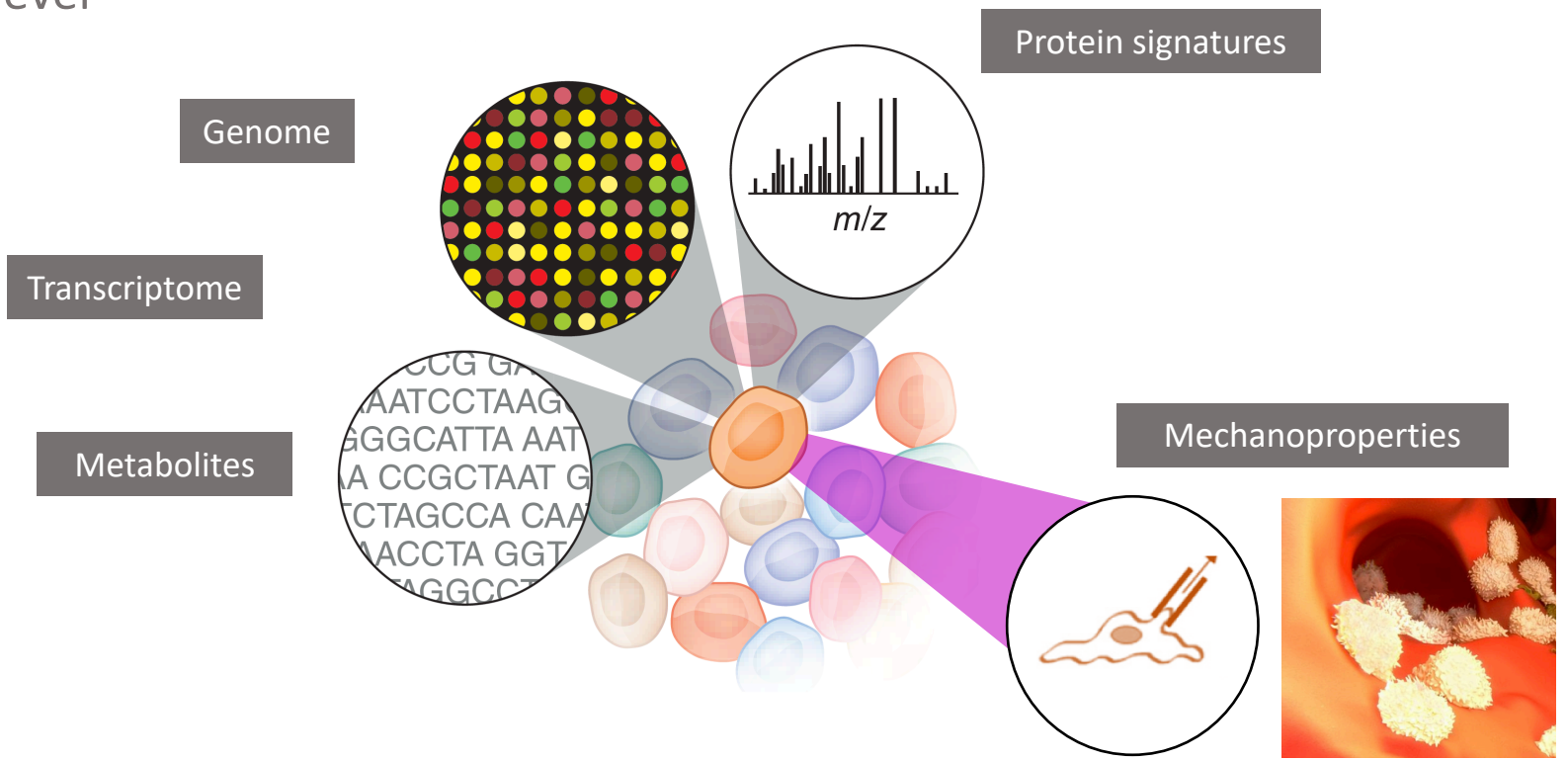
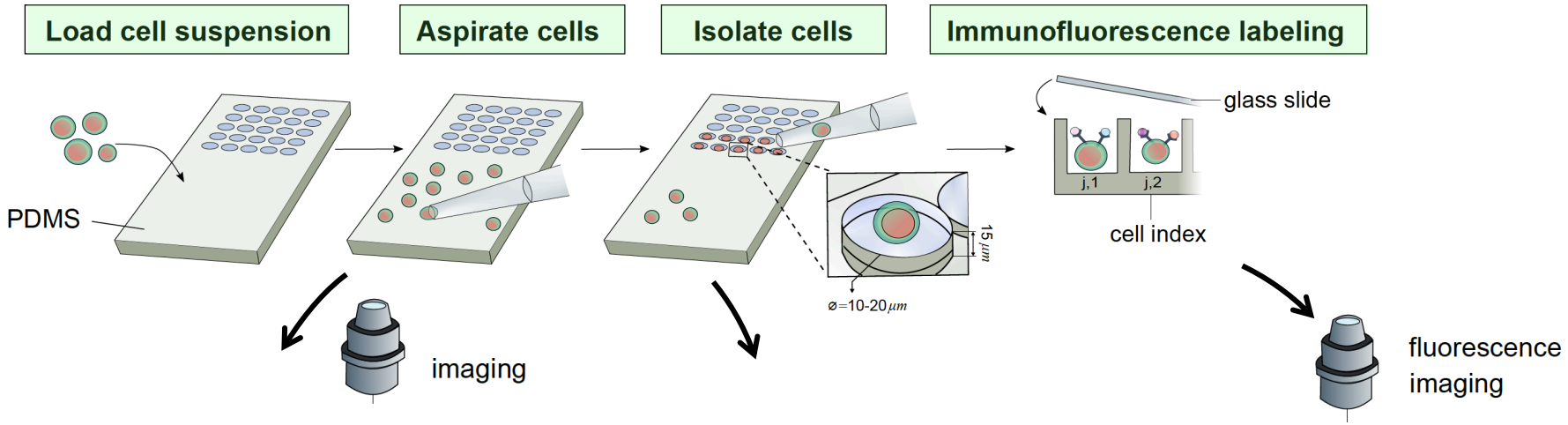
INTRODUCTION

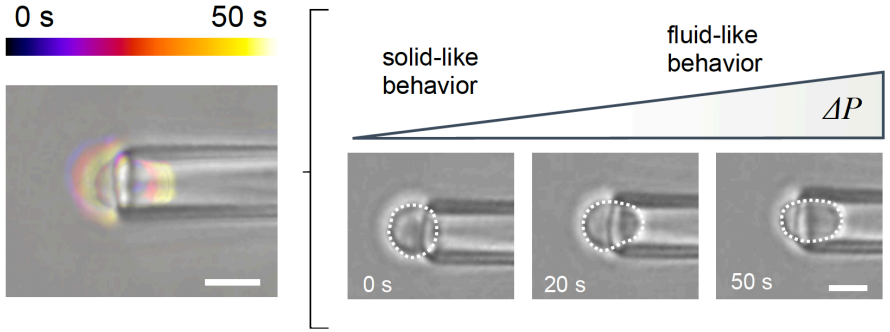
Bulk measurements hide immune diversity
at the single-cell level



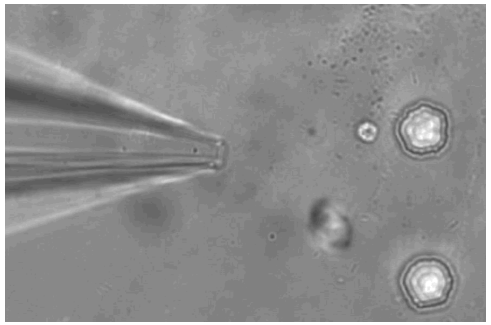
Souza, N. *de. Nat. Methods* (2012)

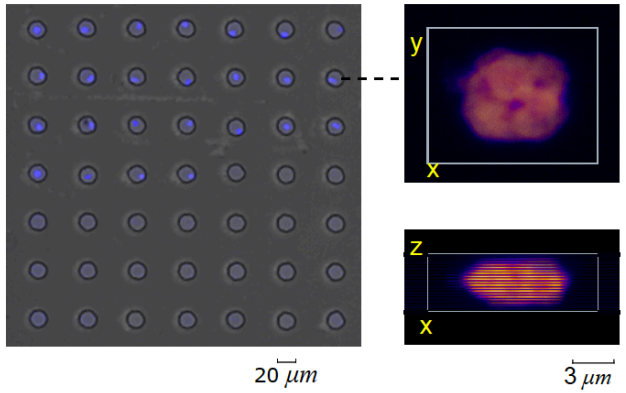
Single-cell approach coupling
deformability and internal ordering





Estimation of cell mechanical properties





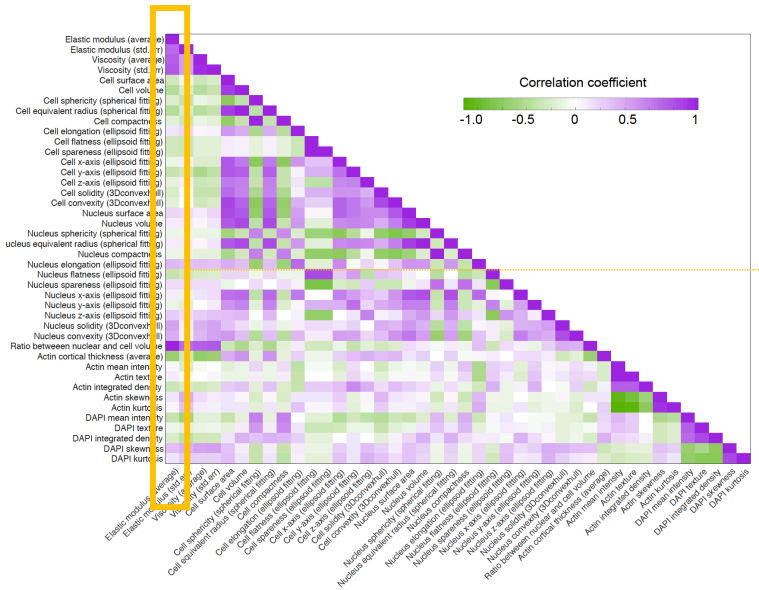
Estimation of > 30 cell architecture features

Linking cell deformability—microstructure

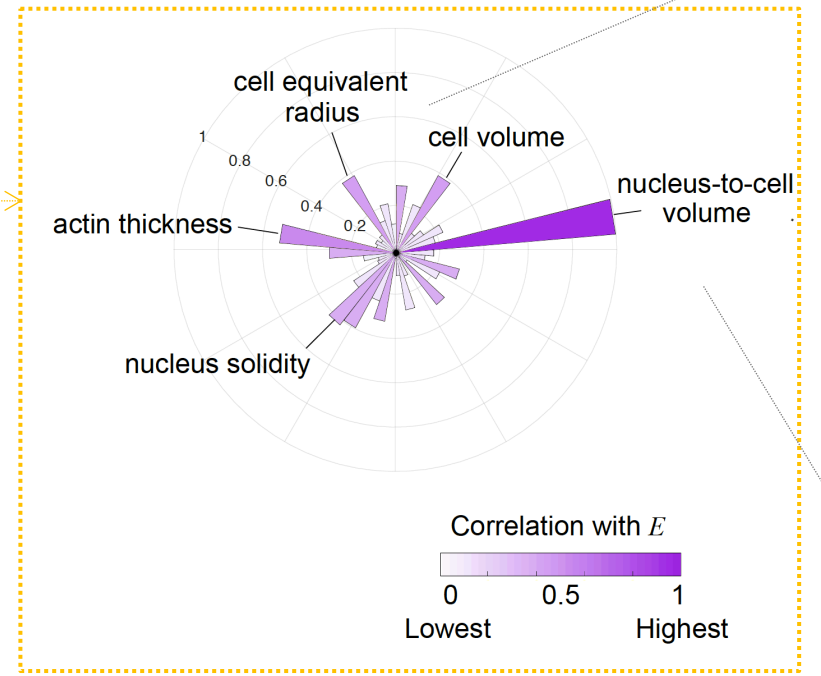
Relative size of the nucleus

RESULTS AND DISCUSSION

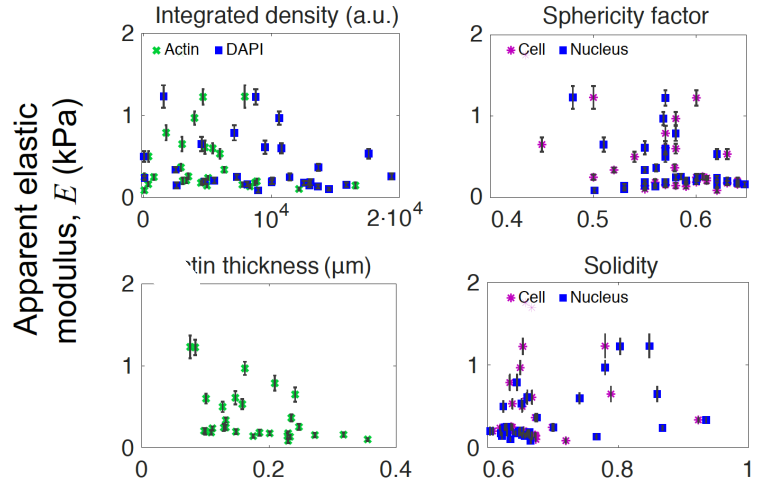
Absolute Spearman's correlation coefficients



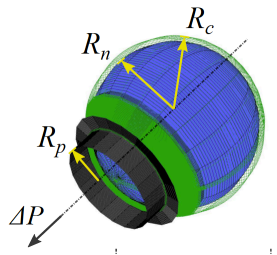
n = 30

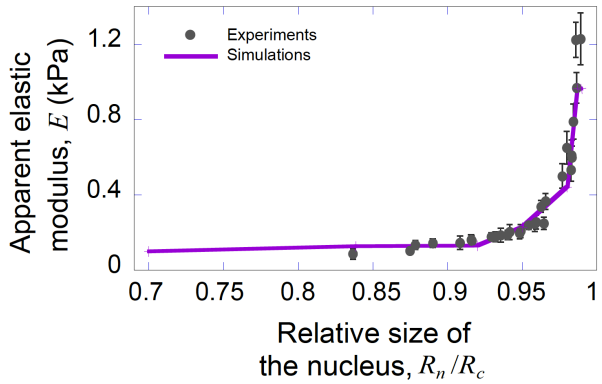


Low correlations with bulk elastic modulus



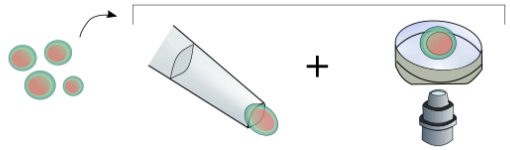
Highest correlation with bulk elastic modulus



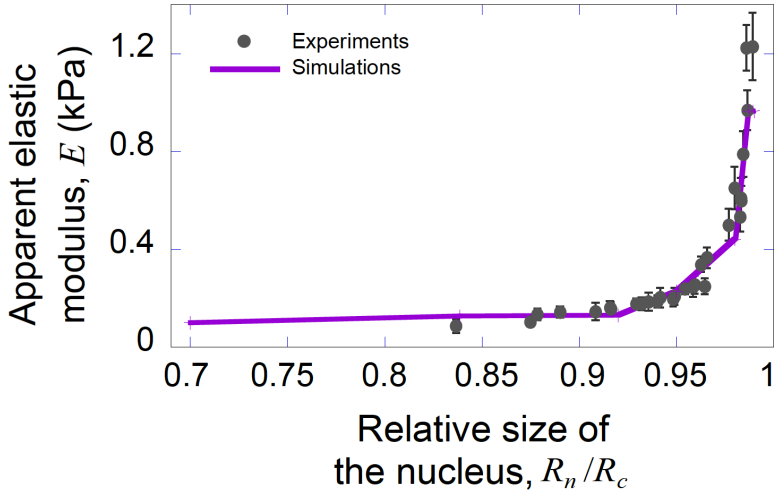


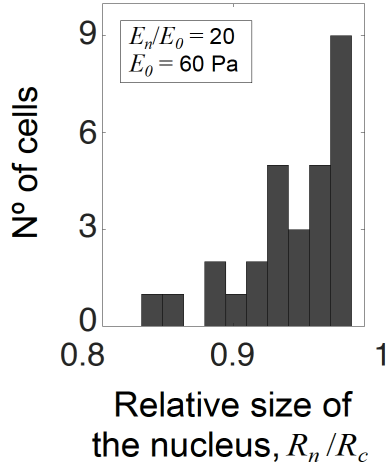
CONCLUSIONS

- **Linking mechanical and internal ordering**



  - **The relative size of the nucleus** displayed the strongest correlation with the **apparent elastic modulus,** as predicted by the mechanical model.





  - A **population of T cells can be characterized** by the curve defined by the apparent elastic modulus as a function of the relative size of the nucleus, or alternatively by **two moduli** and the **distribution of nuclear relative sizes** .

- Future work: additional measurements