



Single Cell Analysis



Many biological experiments are performed on groups of cells, under the assumption that all cells of a particular “type” are identical. However, recent evidence shows that this assumption is incorrect. Individual cells within the same population may differ dramatically, and these differences can have important consequences for human health and disease.

Experimental approaches that examine only cell population characteristics can obscure these crucial differences. New approaches to single cell analyses are needed to uncover fundamental biological principles and ultimately to improve the detection and treatment of disease.

The Single Cell Analysis program currently supports the following efforts:

- › Centers that are examining the transcriptional signatures of individual human cells to measure and analyze cellular heterogeneity and define specific cell types and/or cell “states” in a given population
- › Individual high-risk/high-impact research projects that focus on the early-stage development of exceptionally innovative tools to enable and improve single cell analysis

- › Individual research projects that accelerate the integration and translation of technologies to characterize single cells

Program Goals

The overall goal of the Single Cell Analysis program is to accelerate the discovery, development, and translation of cross-cutting, innovative approaches to analyzing the heterogeneity of biologically relevant populations of cells *in situ*. Specifically, the program aims to achieve the following:

- › Address key roadblocks in analyzing single cells by supporting cross-cutting, transformative research
- › Catalyze the emerging field of single cell research by building a synergistic program of unique initiatives
- › Coordinate NIH efforts to advance the next generation of technologies for single cell analysis, which will improve our ability to characterize cells and understand the biological significance of heterogeneity

Program Initiatives

A number of initiatives will move NIH efforts toward the program’s goals:

- › Studies to evaluate cellular heterogeneity using transcriptional profiling of single cells
- › Exceptionally innovative tools and technologies for single cell analysis
- › Accelerating the integration and translation of technologies to characterize biological processes at the single cell level
- › Single Cell Analysis workshops and meetings
- › Single Cell Analysis Challenges



NIH

Follow that cell

SINGLE CELL
ANALYSIS PROGRAM

\$500,000 Prize
Deadline: December 15, 2014

“Follow that Cell” Challenge

The NIH is seeking novel, robust methods for analyzing individual cells—methods that can detect and assess changes in cell behavior and function over time either as a result of natural state changes or when perturbed (e.g., by a drug, biological stimulus, infectious agent, pathological lesion, or mechanical forces). It is hoped that such methods will yield creative and new, yet feasible, solutions for following a single cell over time in a complex multicellular environment to detect changing cell properties, preferably using multiple integrated measures.

We welcome solutions from individuals, teams, and entities from all U.S. sources, including the public sector, private sector, and nonprofit groups.

This \$500,000 Challenge is structured in two linked phases: Phase 1 is Theoretical, and Phase 2 is a Reduction to Practice of the Phase 1 Solution. Submissions to the Phase 1 Challenge must be received by 11:59 p.m. (U.S. Eastern Standard Time) on December 15, 2014. Specific eligibility requirements state that federal grantees and federal contractors may not use federal funds to develop Challenge submissions. Complete eligibility requirements, exclusions, and criteria can be found in the *Federal Register* Notice (<https://federalregister.gov/a/2014-18870>).

Learn more about the “Follow that Cell” Challenge here:
<http://commonfund.nih.gov/singlecell/challenge>.

Contact Information

For more information about NIH-supported single cell analysis research, ongoing funding opportunities, and future activities by the NIH Common Fund Single Cell Analysis program, please visit the program website and join our mailing list at: <http://commonfund.nih.gov/singlecell/>.

Contact the NIH Single Cell Analysis program staff by emailing:
single_cell@mail.nih.gov.

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