



NATIONAL SCIENCE FOUNDATION  
2415 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22314

**NSF 23-121**

## Dear Colleague Letter: Tool Development for Molecular and Cell Biology (Tools4Cells)

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June 16, 2023

Dear Colleagues:

Opening new frontiers in molecular and cellular biosciences depends heavily on technological innovation; therefore, continued development of new tools and methods is critical, especially using interdisciplinary approaches that leverage advances in other fields of research. Technological breakthroughs have had a profound and catalytic influence on molecular and cell biology – through application of existing tools to study molecular and cellular processes in new and creative ways, or through development of novel tools to study areas that were previously inaccessible. Recent examples include novel gene-editing technologies; single-cell multi-omics; single-cell and single-molecule imaging of dynamic processes; cryo-EM and x-ray free electron lasers to study macromolecular dynamics at atomic resolution; and molecular dynamics simulations at increasing spatiotemporal scales and complexity.

The purpose of this Dear Colleague Letter (DCL) is to encourage submission of proposals to develop novel tools and methods that improve scientists' abilities to measure, analyze, manipulate, or control critical aspects of cellular properties and functions in order to continue to push boundaries and open new avenues of inquiry in molecular and cellular biosciences.

### **SUMMARY OF OPPORTUNITY**

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We encourage forward-thinking ideas from the community for new tools or methods development in molecular and cell biology. Proposals should be submitted to one of the following two Divisions in the Directorate for Biological Sciences (BIO), depending on the range of applicability of the tool or method and its connection to a specific research question or to a more general topic or research direction, as detailed below:

- *Any Core Program* in the Division of Molecular and Cellular Biology (MCB) – if the proposed tool or method addresses a specific research question or hypothesis defined by and to be used primarily by an individual user or group of researchers. Such a project

would be evaluated on the **importance of the research question or hypothesis** and the **potential of the tool** or method to improve scientists' ability to investigate molecular and cellular mechanisms related to this question. In addition, researchers are encouraged to take risks in exploring new tools or methods if there is potential for paradigm shifts in our understanding of how cells work.

- *Infrastructure Innovation for Biological Research (Innovation) Program* in the Division of Biological Infrastructure (DBI) – if the proposed tool or method is applicable to a broad class of biological research questions or topics and will meet the needs of a well-defined community of researchers. Such a project would be evaluated on its **responsiveness to a broadly applicable research question in BIO, the specific BIO-funded research community that would benefit**, a clear **demonstration of how the innovation represents an advance over currently available tools or methods**, and the quality of the **requisite project management description**. Although this DCL is encouraging proposal submissions related to molecular and cell biology, this program and all other DBI programs invite proposals on any area of biology that fit within its guidelines.

#### INSTRUCTIONS FOR SUBMISSION:

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Proposals responsive to this DCL should be submitted as follows based on the above criteria:

- [Division of Molecular and Cellular Biosciences](#) via full proposals to any program in the MCB core solicitation (currently [NSF 23-548](#)). As an alternate to full proposals, for exploratory projects that are "high-risk/high-payoff", investigators should consider the EARly-concept Grants for Exploratory Research (EAGER) type of proposal for up to \$300,000 (including indirect costs) over two years. Specific instructions for preparation and submission of EAGER proposals can be found in Chapter II.F.3 of the NSF Proposal and Award Policies and Procedures Guide (PAPPG; currently [NSF 23-1](#)). For EAGER inquiries, please submit a Concept Outline of the proposed work to the NSF Program Suitability & Proposal Concept Tool at <https://suitability.nsf.gov>. Be sure to select the Molecular and Cellular Biosciences Division as the relevant NSF unit.
- [Division of Biological Infrastructure](#) via proposals to the [Infrastructure Innovation for Biological Research \(Innovation\) Program](#) via the IIBR solicitation (currently [NSF 23-578](#)).

The title of any proposal submitted to either division in response to this DCL should begin with "Tools4Cells:". Proposals may be submitted at any time.

#### POINTS OF CONTACT:

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## MCB Core Programs

- Cellular Dynamics and Function (CDF) – [mcb-cdf@nsf.gov](mailto:mcb-cdf@nsf.gov)
- Genetic Mechanisms (GM) – [mcb-gm@nsf.gov](mailto:mcb-gm@nsf.gov)
- Molecular Biophysics (MB) – [mcb-mb@nsf.gov](mailto:mcb-mb@nsf.gov)
- Systems and Synthetic Biology (SSB) – [mcb-ssb@nsf.gov](mailto:mcb-ssb@nsf.gov)

## DBI IIBR Program

- [innovation@nsf.gov](mailto:innovation@nsf.gov)

Sincerely,

Simon Malcomber  
Acting Assistant Director  
Directorate for Biological Sciences