RNA Bioscience Initiative- Pilot Grant Programs
Spring 2021

The RNA Bioscience Initiative (RBI) at the University of Colorado Anschutz Medical campus seeks to support RNA biology research and the use of RNA-seq and its analysis to enhance basic science, translational, and clinical studies. Towards that goal, the RBI requests applications for three Pilot Grant Programs available for spring 2021. Pilot Grant Program descriptions, deadlines, and application guidelines are provided below. Questions should be directed to rna.bioscience@cuanschutz.edu.

Spring 2021 Pilot Grant Programs

1. **Single-cell RNA-seq**
2. **Spatial Transcriptomics**
3. **RNA-seq**

To apply for this RFA, you must express your interest using this form by May 31, 2021.

Brief Description of Pilot Grant Programs (detailed information on pages 2 and 3)

1. **Single-cell mRNA-seq Program**
   The single-cell RNA-seq Program aims to support preliminary single-cell RNA-seq experiments to test the feasiblity of novel avenues of research that will support future extramural grant applications. These awards provide funds to carry out single-cell mRNA-seq and bioinformatic analysis. In addition to traditional single-cell mRNA sequencing, we are interested in proposals focused on more advanced applications:

   a. **Combining single-cell RNA-seq with long-read sequencing**
      During the standard 10x Genomics library prep, full-length cDNA from poly(A)+ RNA is generated. This material can be sequenced using long read sequencing platforms, e.g. Oxford Nanopore, to enable integration of full-length transcripts with standard 3' end single-cell data. This approach has been used to characterize mRNA isoform diversity at the single-cell level and could be applied to detect viral or other full length RNAs.

   b. **Multimodal and million-cell single-cell mRNA-seq**
      Current single-cell methods allow investigators to quantify cell surface proteins (CITE-seq) and obtain TCR/BCR sequences for individual cells. In addition, a recent approach enables analysis of up to 1 million cells. The RBI is interested in funding proposals that seek to apply these methods to answer novel questions.

2. **Spatial Transcriptomics Program**
   Assessing gene expression with morphological context is critical to our understanding of biology and the progression of disease. Historically, it has been challenging to spatially interrogate complex heterogeneous tissues in a high-throughput manner, especially without previously generated assumptions about the genes being expressed. Using *Visium Spatial Solutions* researchers can now map the whole transcriptome with morphological context.

3. **Bulk RNA-seq Program**
   The RNA-seq Program aims to support bulk RNA-seq experiments to test the feasiblity of novel avenues of research that will support future extramural grant applications. These awards provide funds to cover library preparation, sequencing and bioinformatic support.

PROGRAM DEADLINES AND AWARDS

Key Dates

Letter of Intent Due:	May 31, 2021
Application Due:	June 15, 2021
Decisions/Results Communicated to Applicant:	July 15, 2021
Funding of Successful Applicants Begins:	August 1, 2021

Eligibility

- Principal Investigators (PIs) for awards must have faculty appointments at the University of Colorado Anschutz Medical Campus and hold the rank of Assistant, Associate or Full Professor, Research Professor or Instructor.
- *Proposal may not describe the same specific research that is funded by other sources during the grant period.*

PROGRAM APPLICATION GUIDELINES

Application Requirements and Procedures

Step 1. All applicants must submit a Letter of Intent using this form by **May 31, 2021**

Step 2. Full applications must be submitted **no later than June 15, 2021** as a single PDF file (file name as follows: *PIname.ProposalTitle.GrantProgramName.pdf*) that includes:

a. A brief cover letter from the PI containing the title of the proposal and describing the value of the project and a statement that all collaborators listed on the application agree with the proposal.
b. A proposal consisting of **no more than 1 page** in standard NIH grant application format. Recommended, but not required, organization for proposals include: specific aims, background and broader impact, and research plan.
c. NIH formatted Biosketch for the PI or PI's

An electronic online submission link will be provided to all applicants that have submitted a Letter of Intent. After your submission is complete, you will receive a confirmation receipt by email.

SINGLE CELL RNA-SEQ PROGRAM

Applications are invited for investigator-initiated pilot projects that will generate preliminary data to test the feasiblity of novel avenues of research and will support future extramural grant applications. Each successful applicant will be **funded to a level that allows analysis of two samples** on the Chromium 10X single-cell RNA-seq system (https://www.10xgenomics.com/single-cell/) purchased by RBI and housed in the Genomics Core. The **awards will cover the costs of cell handling, cDNA library preparation, Illumina sequencing, and data analysis by the RBI Fellows Bioinformatics team.**

To optimize the chances of success and permit evaluation of feasibility, applications should provide details of the number of cells that will be available, bearing in mind that analysis of 500-2000 cells per sample is possible at a reasonable sequencing depth (50,000 - 200,000 reads per cell) within the scale of these pilot projects. Information on the RNA content of the cells to be analyzed (i.e. picograms of RNA/cell) should also be included if it is available.

SPATIAL TRANSCRIPTOMICS PROGRAM

Applications are invited for investigator-initiated pilot projects that will generate preliminary data to test the feasiblity of novel avenues of research and will support future extramural grant applications. Each successful applicant will be **funded to a level that allows analysis of 4 tissue slices** on the 10X Genomics Visium spatial

transcriptomics system (https://www.10xgenomics.com/products/spatial-gene-expression) housed in the Genomics Core. The **awards will cover the costs of tissue sectioning, cDNA library preparation, Illumina sequencing, and data analysis by the RBI Fellows Bioinformatics team.**

To optimize the chances of success tissues must be preserved in a format compatible with the 10x Visium protocol (https://support.10xgenomics.com/spatial-gene-expression). There are ~ 5,000 barcoded regions captured across each 6.5 x 6.5mm tissue section. Depending on tissue coverage in these regions, reasonable sequencing depth (~25,000 - 50,000 reads per spot) is within the scale of these pilot projects.

RNA-SEQ PROGRAM

Applications are invited for investigator-initiated pilot projects that will generate preliminary data to test the feasiblity of novel avenues of research and support future extramural grant applications. **Each successful applicant will be funded to a level to allow analysis of approximately 20 samples, including library construction, Illumina sequencing to a depth of ~30 million reads per sample, and analysis by the RBI Fellows Bioinformatics team.**

Eligibility and appropriate project support will be determined by the RNA Bioscience Bioinformatics Fellows and their faculty supervisor, Jay Hesselberth. The application must have RNA-related research as its focus and currently not be funded by other sources. These grants do not provide monetary budgets.

GRANT RECIPIENT REQUIREMENTS

Those receiving a grant will be expected to become active members of the University of Colorado RNA research community. Both the PIs and those working on funded projects are expected to:

- For all bioinformatics support, include the RBI fellows as authors on publications that result from the award
- Acknowledge RBI Support in publications
- Self-identify as a member of the RBI on all publications emanating from the work supported by this grant
- Use awarded funds solely to support the RNA research described in their proposal
- Provide a progress report 30 days after the end of funding year
- Contribute a presentation on research accomplishments at a future symposium hosted by the RBI
- Participate in the “An Evening with RNA” series held alternatively at the AMC and Boulder Campuses

REVIEW CRITERIA

A peer review panel composed of faculty with a range of expertise will be responsible for award decisions, evaluating eligible applications competitively.

The primary factors in award decisions will be the scientific merit of the proposed research, the likelihood to “seed” eventual R series-level or equivalent extramural funding, and the long-term promise of the proposed research.
No critiques will be provided to applicants.
Applicants will be informed with a review response of “Funded”, “Not funded” or “Not eligible”.

Additional Information or Questions-

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