The NIH Common Fund High-Risk High-Reward Research Program

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The National Institutes of Health
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To provide the framework for trans-NIH coordination of initiatives, the NIH Roadmap was created in 2003.

In 2006, the Roadmap was formalized into the Common Fund.

The Common Fund is administered by the Office of Strategic Coordination in the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI), in the Office of the Director, NIH.
Vision for the Common Fund:

• Serve as a “test bed” for high-risk, enabling programs to overcome significant obstacles to scientific progress and capitalize on emerging scientific opportunities

• Limited-term investment to accelerate the pace of discovery and improve the translation of research findings into medical and health interventions
Common Fund Enables a Different Approach to Science and Science Management

**Transformative:** Programs are expected to have exceptionally high and broadly applicable impact.

**Catalytic, Short Term and Goal-driven:** Programs must achieve - not just work toward - a goal. They have deliverables - data sets, tools, technologies, approaches, or fundamental principles of biology, etc – that can be achieved within 5-10 years.

**Synergistic /Enabling:** Programs should be valued-added to the ICs, with the output enabling the mission of multiple ICs.

**Cross-cutting:** CF programs should address complex issues that require trans-NIH teams, insights and perspectives to design and manage.

**Novel:** Programs should provide new solutions to specific challenges.
**Current Common Fund Programs**

- NIH Center for Regenerative Medicine
- Enhancing the Diversity of the NIH-Funded Workforce
- Genotype-Tissue Expression (GTEX)
- Regulatory Science
- Gabriella Miller Kids First Pediatric Research Program
- Extracellular RNA Communication
- Glycoscience
- 4D Nucleome
- Undiagnosed Diseases Program
- Protein Capture Reagents
- Human Microbiome
- Transformative High Resolution CryoEM
- Science of Behavior Change
- Library of Integrated Network-Based Cellular Signatures (LINCS)
- High Risk Research
- Epigenomics
- Molecular Transducers of Physical Activity
- Metabolomics
- Health Economics
- Illuminating the Druggable Genome
- Knockout Mouse Phenotyping
- HCS Research Collaboratory
- Human Biomolecular Atlas Platform (HuBMAP)
- Big Data to Knowledge (BD2K)

**NIH Common Fund**

- Pioneer Awards
- New Innovator Awards
- Transformative Research Awards
- Early Independence Awards
- Stimulating Peripheral Activity to Relieve Conditions (SPARC)
- Global Health
- 4D Nucleome
- Undiagnosed Diseases Program
- Protein Capture Reagents
- Human Microbiome
- Transformative High Resolution CryoEM
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- High Risk Research
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High-Risk High-Reward Initiatives of the NIH Common Fund

(Common Fund program for “investigator-initiated” HR HR research)
NIH Common Fund High-Risk High-Reward Working Group

**Chair:**  
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Director, DPCPSI; Deputy Director, NIH  
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Pioneer Award Initiative

• Started in 2004

• Any qualified investigator

• Individual scientists of exceptional creativity who propose pioneering and possibly transforming approaches to addressing major biomedical or behavioral challenges

• $500k DC/year for five years
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$700k (for awards beginning in FY16)

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Origins of the NIH Director’s Pioneer Awards

- Dr. Zerhouni becomes NIH Director in 2002
- Surveys biomedical research committee about research funding and NIH
  In responses, sometimes too conservative nature of review is prominent theme
- Because of the conservative nature, opportunities for making leaps in sciences are lost
- Dr. Zerhouni initiates Pioneer Award program, part of the NIH Roadmap
- First awards made in 2004, awards made annually since then
Fundamental characteristics of the Pioneer Award program

- Person-focused
- Allow unusual flexibility (Pioneer awardee may change direction of research)
- Provide generous resources
To implement the Pioneer Award program, wanted to make it very distinctive from the major NIH grant Program (R01):

Application format:

Review:

Program administration:
**Pioneer Award Application format:**

**R01:** 25 pages research strategy including detailed experimental plan and preliminary data

- **Pioneer:** 3-5 page essay
  - Scientific problem, significance, and pioneering approach
  - Evidence for innovativeness
  - How is research direction different from ongoing?
  - Why Pioneer Award mechanism?

**R01:** Biographical sketch limit 4 pages

- **Pioneer:** Biographical Sketch - 2 pages

**R01:** Budget, animal, human subject information – details required

- **Pioneer:** No detailed budget, other information brief

**R01:** letters of collaboration encouraged

- **Pioneer:** letters of collaboration not allowed
Pioneer Award Application format (continued):

Components of Pioneer application not present for R01 application

- Statement of suitability of proposal for Pioneer - research must be different from established research projects in the applicant’s laboratory
- Statement of commitment of at least 51% research effort to project
- Three letters of reference

Pioneer application format designed to focus on person and scientific vision
Pioneer Award Review process:

**R01 review:**

Review by a single panel

Review by topic experts

Asked to consider: significance/impact, innovation, approach, investigator, and environment

Focus tends to be on approach and feasibility

**Pioneer review:**

Review through 2 phase review (2 panels)

Reviewers *not* assigned by specific topic expertise

Asked to consider: innovation/impact, investigator, and suitability for award

Involves in-person interviews
Overall Pioneer Review Process

Electronic review of all applications

Phase I (electronic panel)

Identify 25 for interview

Phase II (interview panel)

Interview 25

Provide scores

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Pioneer Award Review – 1st phase

- Electronic review of all applications
  - Phase I
    - (electronic panel)

- No attempt to closely match reviewer expertise to proposal topic – 1 reviewer must be outside broad science area

- Use 3 Pioneer-specific review criteria
  - Proposal
  - Investigator
  - Suitability for Pioneer program

- Reviewers provide only scores and brief comments

- No discussion of applications/scores
Pioneer Award Review – 2\textsuperscript{nd} phase

- Identify 25 for interview
- Interview 25

Guided by first review phase results, interview panel selects 25 applicants

25 applicants interviewed in person in Bethesda

Panelists provide individual scores from which overall priority score is calculated
Pioneer Awards – Program Administration

- Pioneer project must represent at least 51% of the awardees research effort (first 3 years, reduced to 33% and 25% in 4th and 5th years, respectively)

- Pioneer Awardee allowed to change course of research direction, to follow most promising path as the science evolves

- Acknowledgment that not all projects will succeed as proposed
Pioneer Awards – Comparison Evaluation

- Evaluation of Pioneer supported research

- Conducted by independent entity (Science and Technology Policy Institute of the Institute for Defense Analysis)

- Compared research outcomes of Pioneers (first three cohorts) to comparison groups (similarly qualified R01 investigators, random R01 sets, and HHMI investigators)

- Used both bibliometric and expert analysis to assess scientific impact and innovation

- Concluded that Pioneer research is more impactful than similarly qualified R01 investigators and random R01s and about as impactful as HHMI investigators. Also, more innovative than similarly qualified R01 investigators and about as innovative as HHMI investigators.

- Evaluation available on our website (search for “Pioneer Outcomes Evaluation 2004-2006 NIH”)

New Innovator Award Program

- Started in 2007 (in response to concerns that young investigators had difficulty in being funded)

- Must be Early Career Stage Investigator at time of award (<10 years from Ph.D./clinical residency with no significant NIH support as PI)

- Up to $300K DC/year for five years (MYF at $1.5M)

- Highly innovative research ideas

- Investigators must have track record of exceptional creativity and have outstanding promise
New Innovator Awards program implementation:

- Very similar in spirit to the Pioneer Awards
- Focuses on the individual
- Limited to Early Career Stage Investigators
- Application is longer (10 page essay, preliminary data allowed but not required)
- Review criteria very similar
- Review process also has two phases but the second does not include interviews
- Outcomes evaluation also conducted for New Innovator Award Program
Transformative Research Award Program

• Started in 2009
• Arose from NIH Innovation workshop and Enhancing Peer Review process
• Individuals or teams with a project to overturn or create a fundamental paradigm
• Focus is more on the idea than the individual(s)
• “Outside-the-box” ideas
• “No limit” budget
Transformative Research Award Program - implementation

- Focuses more on the project than the individual(s)

- Encourage teams of investigators to apply

- Application was shorter than standard R01, but now uses standard format

- Application directs individuals to address program specific aspects, such as challenge, impact, innovation, suitability

- Review process uses “Editorial Board” model
  - Editorial Board screens all applications to identify most exciting subset (assignments not made on close topic expertise)
  - Most exciting subset sent forward for technical review by experts
  - Editorial Board uses technical review to discuss and score
Early Independence Award Program

- Started in 2011
- Started because of extraordinary length of time typically taken for an investigator to get first NIH R01 grant (~42 years old)
- Graduate students and clinicians within ~one year of degree or clinical residency who wish to “skip” the post-doc
- Cannot be functionally independent at time of application
- Talented young scientists who have the intellect, scientific creativity, drive and maturity to flourish independently without the need for traditional post-doctoral training
- Up to $250k DC/year for 5 years
Early Independence Award Program - implementation

• Each institution is allowed to submit up to only 2 applications

• Uses standard R01 application packet, but with applicants focusing on program specific topics

Three to five letters of recommendation required

Review process is similar to that of Pioneer
- All applications sent for technical review
- Panel selects ~30 of these for in-person interview

Site visit first year to awardees’ institutions

Since still an experimental program, all awards remain as “OD” awards
On a five-year mission ... to boldly go where no scientist has gone before!
Annual NIH Common Find High-Risk, High-Reward Symposium
Do you have any wild and crazy ideas?

http://www.scheduleonce.com/ravibasavappa

(Anticipate having receipt dates in Sept. 2018)
https://commonfund.nih.gov/highrisk

http://www.scheduleonce.com/ravibasavappa