Where Should I Start? Building a Research Proposal

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New Jersey Alliance for Clinical and Translational Science
Workforce Development Core

NIH NRSA Fellowships

National
Research
Service
Award

What are NRSA Fellowships?

Awards to support the training of biomedical, behavioral, and clinical researchers through predoctoral and postdoctoral fellowships.

What is the Purpose of NRSA Fellowships?

Train a diverse pool of well-trained scientists and clinicians to advance nationwide biomedical, behavioral, and clinical research goals.

27 NIH Institutes and Centers

NIH NRSA Fellowships

INDIVIDUAL

- Individual Predoctoral Fellowships (F30, F31)
- Individual Postdoctoral Fellowships (F32)
- Individual Transition Award (F99/K00)*

INSTITUTIONAL

- Institutional Training Grants (e.g., T32, T35)

*** Transition from Predoc to Postdoc – only few institutes participate (different requirements than standard fellowships) but often the same due dates**

NRSA Eligibility and Requirements

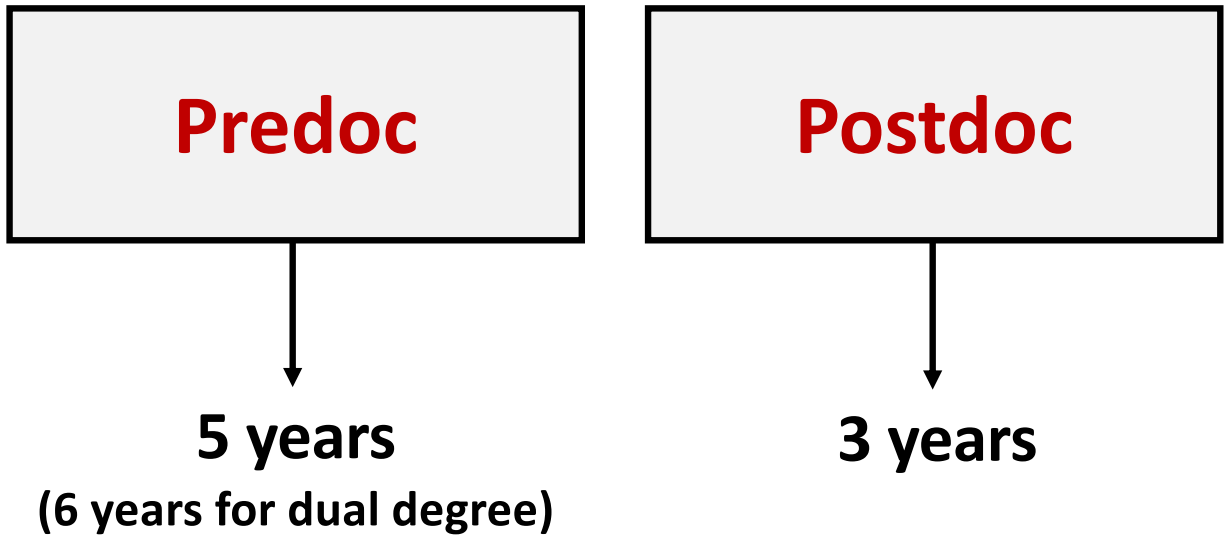
Citizenship

- Must be U.S. citizens, non-citizen nationals, or lawfully admitted for permanent residence

Degree Requirements

- **Predoctoral:**
  - Baccalaureate degree
  - Enrolled in doctoral program leading to PhD or equivalent, or dual doctorates such as MD/PhD
- **Postdoctoral:**
  - PhD or MD or doctoral degree from an accredited domestic or foreign institution

Length of NRSA Support



Any combination from individual F and/or institutional T awards

What Does the Fellowship Provide?

- **Stipend –** Salary allowance for living expenses

- **Tuition & Fees –** Full needs requested; NIH allowance is 60% of costs up to:
  - $16,000 (predoc),
  - $21,000 (dual degree predoc)
  - $4,500 (postdoc)

- **Training-related expenses –** Health insurance, staff, consultants, research supplies

Current Limits: https://grants.nih.gov/grants/guide/notice-files/NOT-OD-24-104.html

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Funding Opportunity Announcement

Program Announcement

Department of Health and Human Services
Part 1. Overview Information

Participating Organization(s)	National Institutes of Health (NIH)
Components of Participating Organizations	National Center for Complementary and Integrative Health (NCCIH) National Cancer Institute (NCI) National Eye Institute (NEI) National Human Genome Research Institute (NHGRI) National Heart, Lung and Blood Institute (NHLBI) National Institute on Aging (NIA) National Institute on Alcohol Abuse and Alcoholism (NIAAA) National Institute of Allergy and Infectious Diseases (NIAID) National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) National Institute of Biomedical Imaging and Bioengineering (NIBIB) Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) National Institute on Deafness and Other Communication Disorders (NIDCD) National Institute of Dental and Craniofacial Research (NIDCR) National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) National Institute of Environmental Health Sciences (NIEHS) National Institute of General Medical Sciences (NIGMS) National Institute of Mental Health (NIMH) National Institute of Nursing Research (NINR) National Institute on Drug Abuse (NIDA) National Institute on Minority Health and Health Disparities (NIMHD) Special Note: Not all NIH Institutes and Centers participate in Parent Announcements. Applicants should carefully note which ICs participate in this announcement and view their respective areas of research interest and requirements at the Table of IC-Specific Information, Requirements, and Staff Contacts website. ICs that do not participate in this announcement will not consider applications for funding. Consultation with NIH staff before submitting an application is strongly encouraged.
Funding Opportunity Title	Ruth L. Kirschstein National Research Service Award (NRSA) Individual Postdoctoral Fellowship (Parent F32)

Who was Ruth L. Kirschstein, MD?

- Director of the National Institute of General Medical Sciences
- Deputy director of NIH in the 1990s
- Acting director of NIH in 1993 and 2000-2002

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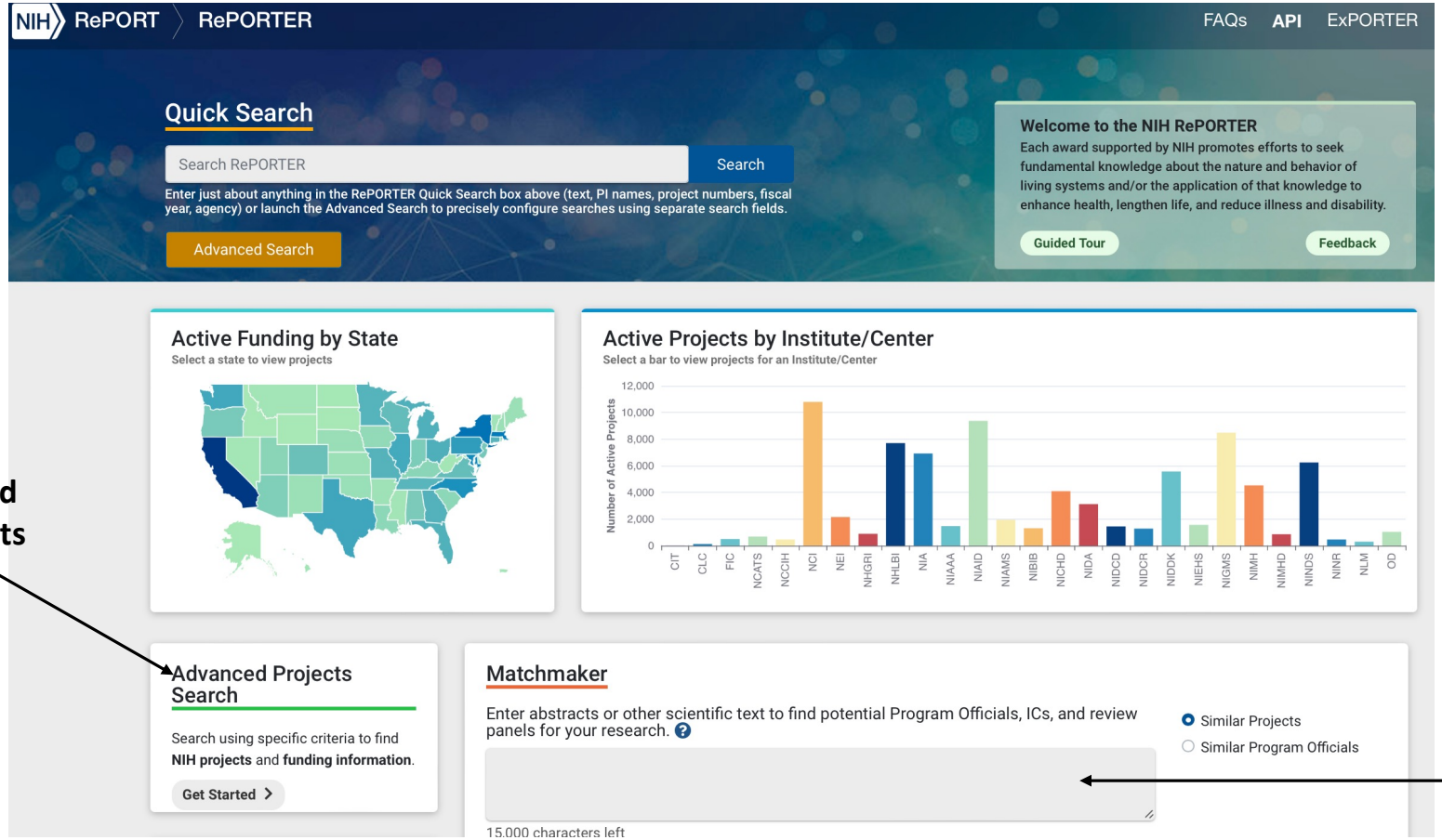
reporter.nih.gov

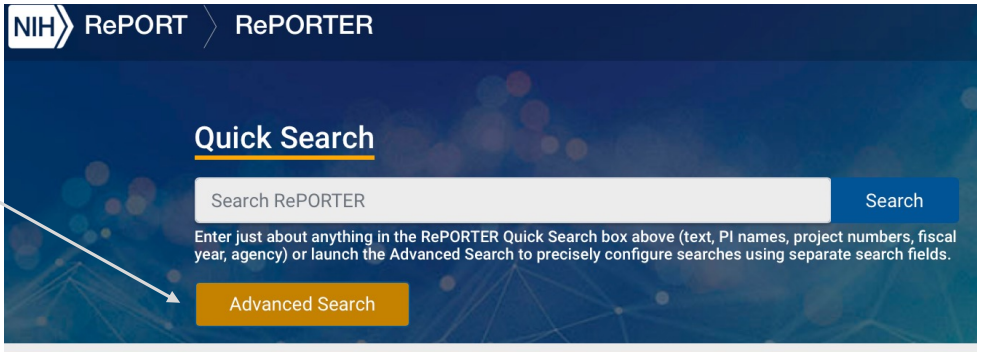


Funded Projects

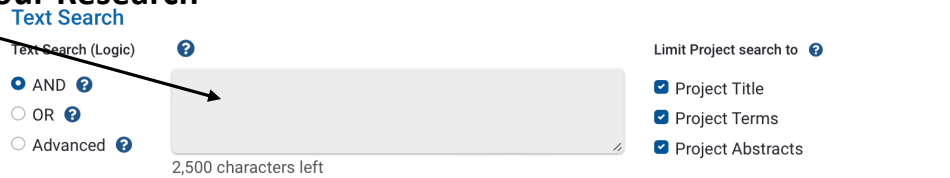
Match Maker

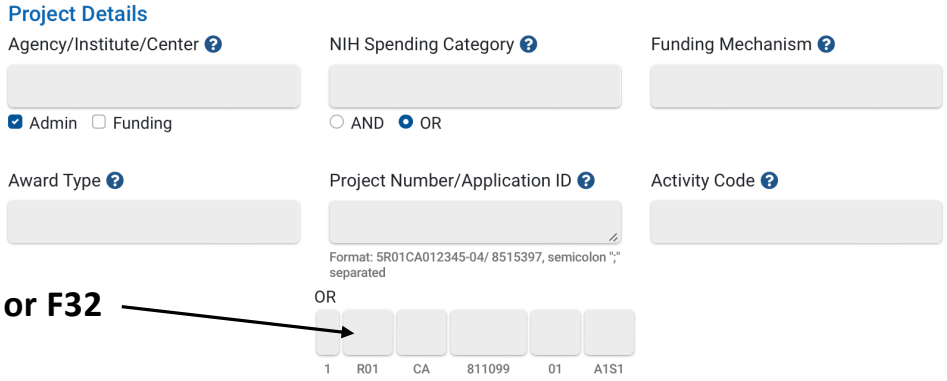
Go to: reporter.nih.gov

1. Click Here



2. Put in Keywords for Your Research





3. Type in F31 or F32

4. Hit Search

Key Parts of NIH Fellowship Application – Forms I

Project Abstract
1/2 page

Project Narrative
3 sentences

Biosketchs
5 pages each

3-5 Letters of Recommendation

Candidate's Goals, Preparedness, and Potential
3 pages

Research Training Project Strategy
6 pages

Sponsor Commitment
6 pages

Training Activities and Timelines
3 page

Research Training Project Specific Aims
1 page

Responsible Conduct of Research
1 page

Other Components: Bibliography, Facilities & Other Resources, Equipment, Vertebrate Animals, Human Subjects Select Agent Research, Letters of Support, Resource Sharing Plan, Authentication of Key Biological and/or Chemical Resources, Budget and Justification

Candidate's Goals, Preparedness, and Potential
3 pages

Overall Training Goals

Candidate's Preparedness

Candidate's Self-Assessment

Scientific Perspective

Candidate's Goals, Preparedness, and Potential
3 pages

Overall Training Goals

- Goals for the proposed research training plan and the long-term goals for a career in the biomedical research workforce.
- Relate the fellowship goals to the long-term career goals.
- Describe the motivation for pursuing a career in biomedical research.

* Some redundancy with biosketch

Candidate's Preparedness

- How relevant activities have contributed to the candidate's scientific development and preparation for the current research training plan.
  - Examples: coursework, research experiences, conferences, internships, and employment.
- Additional activities that demonstrate an interest and commitment to a career in biomedical research.
  - Examples: seeking opportunities for skill development or engaging in leadership, service, teaching, or outreach activities.

Candidate's Goals, Preparedness, and Potential
3 pages

Candidate's Self-Assessment

- Two to four current characteristics that are likely to contribute to achieving the research training.
- Two to four specific areas of development during the fellowship to attain the stated research training and career goals.

Scientific Perspective

- Why this field of science is important and the ways the chosen research training project will advance the field.
- A broader, unresolved scientific question in the chosen scientific field, the importance of the problem, and the ways biomedical research might advance the scientific field.

Training Activities and Timeline
3 pages

- The research training plan activities should be individually tailored and well-integrated.
- Planned activities should address the candidate's goals and identified areas for development.
- Application should describe the collaborative process between the candidate and the sponsor(s) in the development, writing, review, and editing of the research training plan, including the research training project aims and strategy.

* Make sure trainings match research proposed

* Give examples of how the proposed training will facilitate transition to the next career stage

* Match trainings to self-assessment competency gaps

(F) Fall | (W) Winter
(Sp) Spring | (Sm)Summer

Proposed Activities Under F31 Fellowship	Career Development Plan					
	2020	2021		2022		2023
	F | W	Sp | Sm	F | W	Sp | Sm	F | W	Sp | Sm
Mentored Training:						
ICP-MS Analytical Chemistry (Dr. Buckley)	x	x	x			
Immunohistochemsitry (Dr. Aleksunes)		x	x			
Placental morphologic Analysis via Cytation 5 (Dr. Aleksunes)		x	x			
MALDI and ICP-MS imaging (ImaBiotech)		x	x	x	x	
Mouse and Human Placental Pathology (Dr. Goedken, Dr. Salafia)	x		x	x	x	
Statistics (Dr. Ohman-Strickland)	x		x		x	
Placenta Working Group	x	x	x	x	x	x
Research Plan and Manuscript Preparation:						
Study 1.1 a-f | Aim1	x	x	x			
Study 2.1 a-d | Aim2			x	x	x	x
Ph.D. Development:						
Thesis Committee Meeting		x	x		x	x
Thesis Preparation & Defense					x	x
Meetings, Presentations, Coursework, and Continuing Education:						
Communicating Science Course				x		
Reproductive and Developmental Toxicology Course			x			
Ethical Scientific Conduct Refresher Course						x
Rutgers Student Seminar	x		x		x	
Society of Toxicology (SOT) = Presentations, Meetings, and Continuing Education courses		x		x		x
Frontiers in Reproduction Course, Chicago IL		x				
American College of Toxicology (ACT) and Society of Toxicological Pathology (STP) = Pathology Relevant Courses				x		

Research Strategy

Significance	1/2 - 2/3 page
Preliminary Data	1/2 - 2/3 page
Innovation	3 – 5 sentences
Approach • Aim 1 Studies/Rationale • Aim 1 Rigor • Aim 1 Expected Outcomes • Aim 1 Pitfalls/Alternative Strategies • Repeat for Aim 2	3.5 - 4.5 pages
Conclusion	1/3 page

Write this Last

Write this First

Write this Second

- Does your plan flow logically from the literature review and prior studies?
- How will each hypothesis be tested?
- Do your measures capture the variables needed to test hypotheses?
- Why did you choose those measures?

Significance & Innovation

SIGNIFICANCE

- "So What" part of the grant
- Connects to the rest of field
- Scientific questions are novel, important, and a logical next step in research
- Highlights critical gaps that will be addressed by the proposed research

INNOVATION

- Unique conceptual or technical innovation:
  - Research refines, improves, or develops a new application of an existing concept or method, or
  - Research would shift a current scientific paradigm

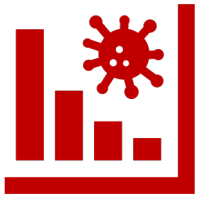
Preliminary Data

Strengthens likelihood of research success if funded

Availability of key resources, familiarity with methods and approach to interpreting results

Evidence that the project is feasible and has potential impact

Qualitative, quantitative and/or from prior trainee or collaborator



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Approach – Rigor & Reproducibility

Element of Rigor	Section of Application	Criterion Score	Additional Review Consideration	Contribute to Overall Impact?
Rigor of the Prior Research	Research Strategy	Significance	NA	Yes
Rigor of the Prior Research	Research Strategy	Approach	NA	Yes
Scientific Rigor	Research Strategy	Approach	NA	Yes
Consideration of Relevant Biological Variables Such as Sex	Research Strategy	Approach	NA	Yes
Authentication of Key Biological and/or Chemical Resources	Attachment	NA	Acceptable or Unacceptable	No

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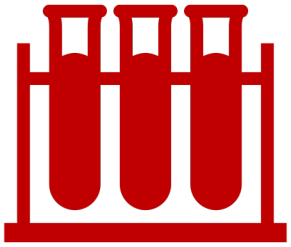
Approach – Rigor & Reproducibility

- ✓ Appropriate sample sizes
- ✓ Randomization and blinding
- ✓ Adequate positive and negative controls – for the experiment and endpoints



- ✓ Appropriate statistical tests – based on the type of data being generated
- ✓ Consideration of relevant biological variables – sex, age, etc
- ✓ Authentication of key resources – you have what you say you have

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Key NIH People

SCIENTIFIC REVIEW ADMINISTRATOR

- Identify peer reviewers
- Coordinator study section review
- Provide summary back to applicants

PROGRAM OFFICER

- Oversee and manage grants, contracts, and cooperative agreements
- Identify scientific areas for investment
- Report on scientific progress and program accomplishments

Good to Chat with 2 Months Before Submission – Provide Well-Crafted Aims Page Before Meeting

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NIH Fellowship Calendar

	Cycle I-Winter	Cycle II-Spring	Cycle III-Fall
Fellowship Due Dates:	April 8	August 8	December 8
Scientific Merit Review	June – July	October – November	February - March
Advisory Council Round	October	January	May
Earliest Start Date	December	April	July

http://grants.nih.gov/grants/funding/submissionschedule.htm

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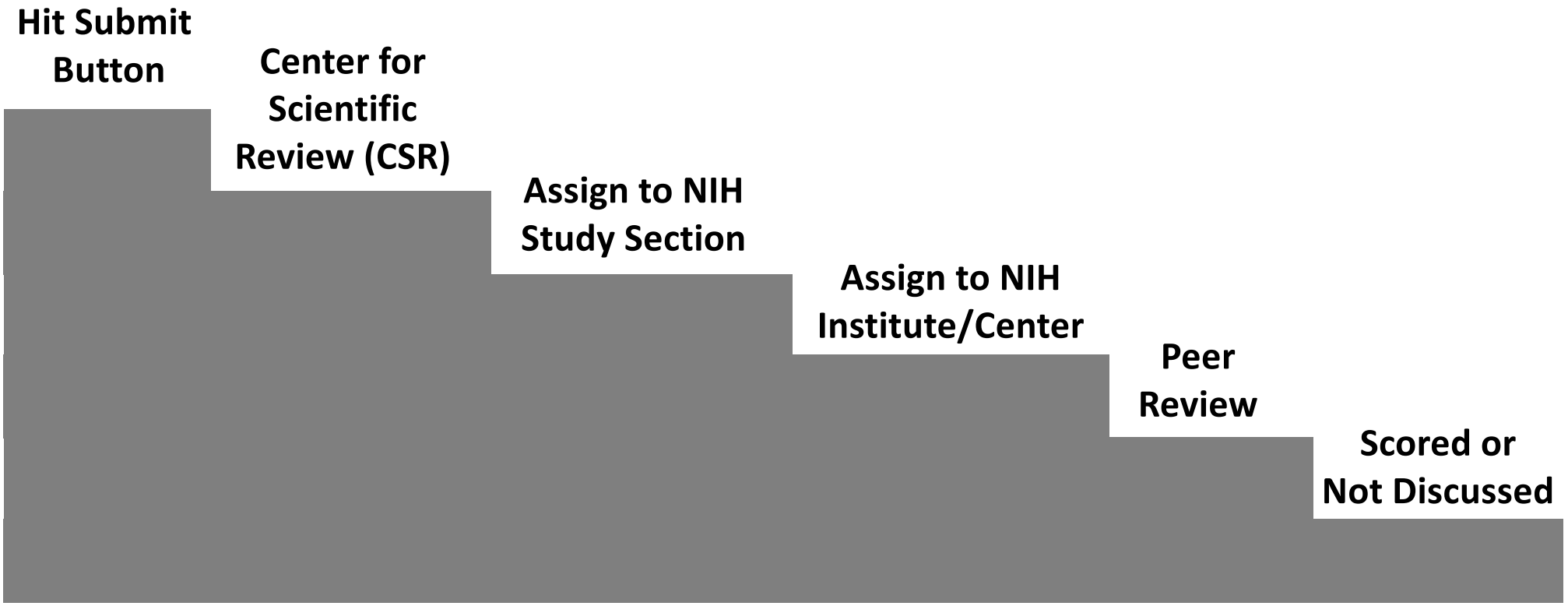
What Happens When I Submit My Application?



Review of Fellowship Applications

Two-stage review:

Initial Review Group

- Fellowship Study Sections
- Institute/Center-based Study sections

Second Level Review

- Institute/Center Program Staff/Council

https://public.csr.nih.gov/StudySections/Fellowship

What Study Section Aligns with Your Research?

Study Section ^	Study Section Description	Scientific Review Officer
F01A	Fellowships: Brain Disorders and Related Neurosciences	
F01B	Fellowships: Learning and Memory, Language, Communication and Related Neurosciences	Dr. Amy Wernimont
F02A	Fellowships: Behavioral Neuroscience	Dr. John Morgan
F02B	Fellowships: Sensory and Motor Neurosciences, Cognition and Perception	Dr. Melanie Pina
F03A	Fellowships: Neurodevelopment, Oxidative Stress and Synaptic Plasticity	Dr. Steven Ripp
F03B	Fellowships: Biophysical, Physiological, Pharmacological and Bioengineering Neuroscience	Dr. Angela Boutte

https://public.csr.nih.gov/StudySections/Fellowship

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Meeting of Study Section Reviewers

Meeting of Study Section Reviewers

- 3 Reviewers for Each Application
  - Experts & Non-Experts
- Preliminary Score Before Meeting
- Top Applications Discussed
- Final Impact Score By All Members

Make sure your application is readable for the Non-Expert!

General Review Criteria

Scored Review Criteria:

- Candidate's Preparedness and Potential
- Research Training Plan
- Commitment to Candidate

Additional Review Criteria:

- Protection for Human Subjects
- Inclusion of Women, Minorities, and Children
- Vertebrate Animals
- Biohazards
- Resubmission

Additional Review Considerations:

- Training in the Responsible Conduct of Research (RCR)
- Select Agents Research
- Resource Sharing Plans
- Budget & Period of Support

Check Funding Announcement for Current Details

NIH Scoring of Grant Applications

Impact	Score	Descriptor	Additional Guidance
High	1	Exceptional	Exceptionally strong with essentially no weaknesses
	2	Outstanding	Extremely strong with negligible weaknesses
	3	Excellent	Very strong with only some minor weaknesses
Medium	4	Very Good	Strong but with numerous minor weaknesses
	5	Good	Strong but with at least one moderate weakness
	6	Satisfactory	Some strengths but also some moderate weaknesses
Low	7	Fair	Some strengths but with at least one major weakness
	8	Marginal	A few strengths and a few major weaknesses
	9	Poor	Very few strengths and numerous major weaknesses

Average Score x 10 = Score You Receive

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High Impact Applications

Impact	Score	Descriptor
High	1	Exceptional
	2	Outstanding
	3	Excellent
Medium	4	Very Good
	5	Good
	6	Satisfactory
Low	7	Fair
	8	Marginal
	9	Poor

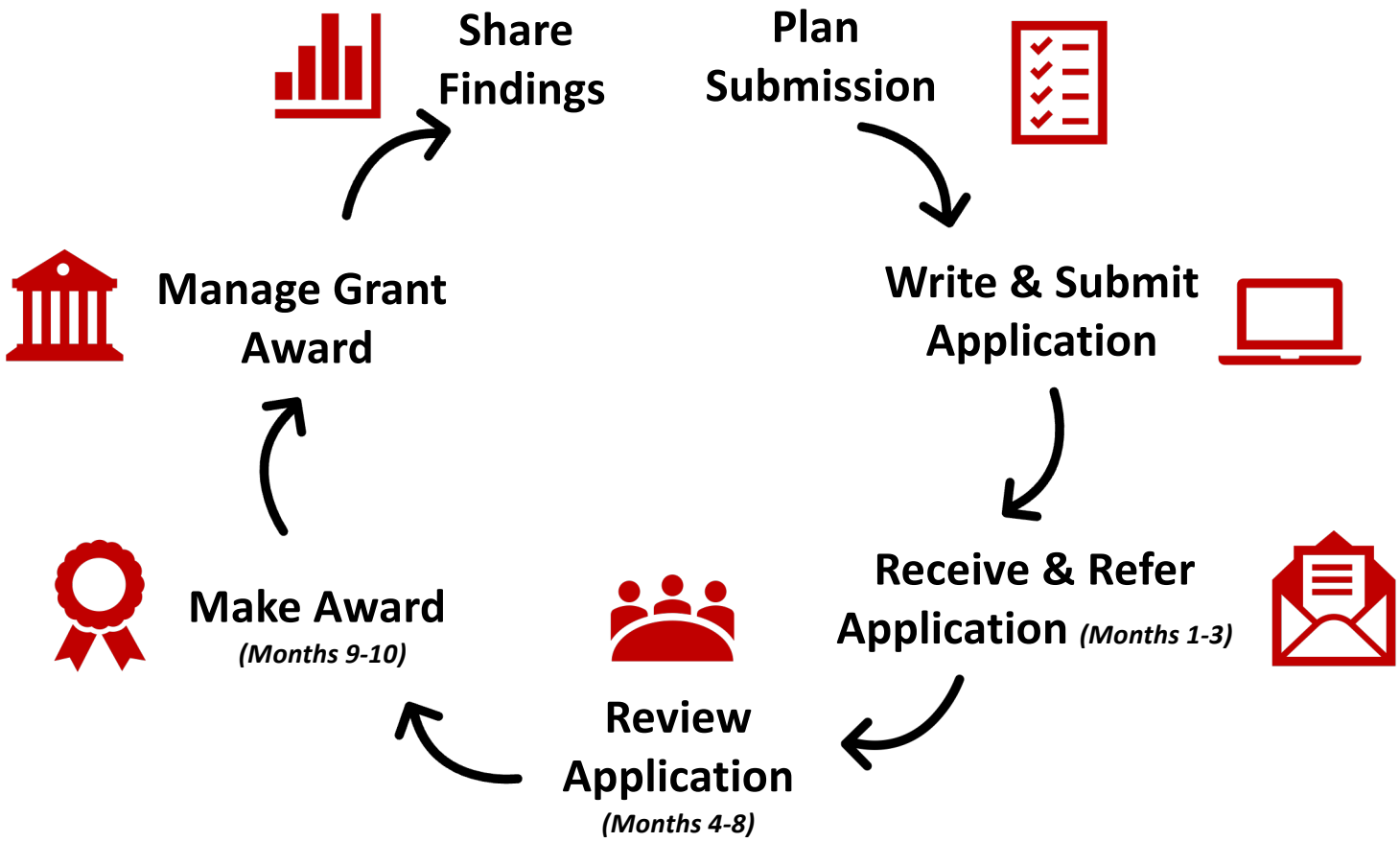
- Important problem in public health: HIGH IMPACT
- Conceptual and technical novelty and innovation
- Strong track record of applicant and mentor team
- Well-aligned research and training plans
- Clear rationale
- Preliminary data
- Clear and focused approach
- Careful attention to details

Low Impact Applications

Impact	Score	Descriptor
High	1	Exceptional
	2	Outstanding
	3	Excellent
Medium	4	Very Good
	5	Good
	6	Satisfactory
Low	7	Fair
	8	Marginal
	9	Poor

- Limited impact – avoid ‘descriptive’ or ‘incremental’ projects
- Too ambitious, lacking focus, too many unrelated aims, aim dependency
- Unclear hypothesis or rationale
- Applicant lacks appropriate expertise
- No evidence of feasibility
- Approach flawed
- No discussion of pitfalls and alternative approaches
- Poor writing and typographical errors
- Small figures and densely packed text

From Start to Finish

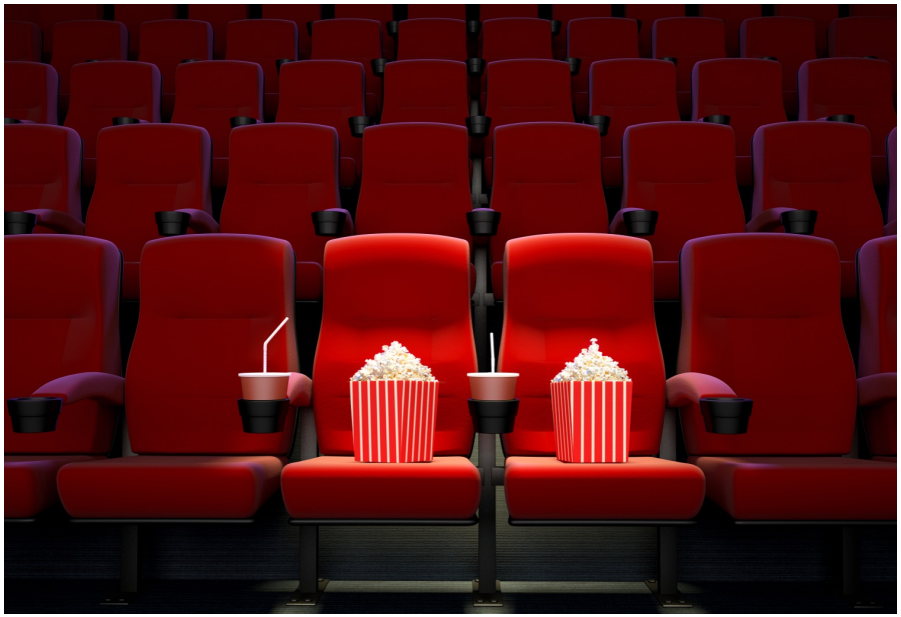


How to Get Ahead

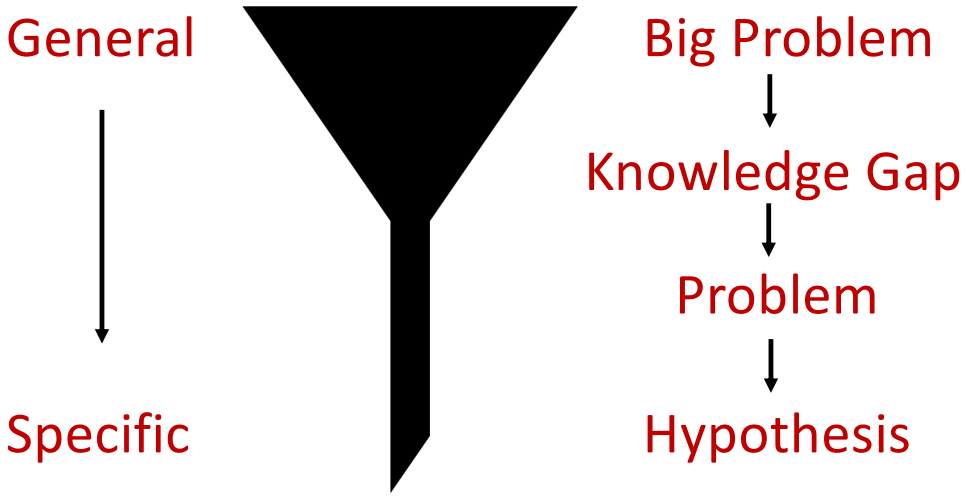
- Read successful grants as examples
- Sit in on mock reviews
- Clear and tight writing
- Strategic use of **bolding**, <u>underlining</u>, and *italics*
- No typographical errors
- Develop Career Plan in parallel with Research Plan
- Involve mentor, co-investigators, biostatistician early (6 months)

Make Reviewers Want to Advocate For Your Proposal

SPECIFIC AIMS PAGE



Opening Paragraph(s)



Specific Aims.

The prevalence of U.S. newborns born small for their gestational age (SGA) increased by 30% from 2002 to 2011. SGA arises in part from fetal growth restriction (FGR), a critical disease that contributes significantly to infant mortality and morbidity. Although the etiology of FGR is poorly understood, environmental and occupational exposures have been implicated in its pathogenesis. Measurable levels of the environmental toxicant cadmium (Cd) have been found in >99% of pregnant women. This widespread exposure is important as Cd has been shown to induce FGR in rodents and linked to FGR in human epidemiological studies. Cd specifically targets the placenta where it induces cellular stress and perturbs nutrient homeostasis leading to FGR. Therefore, there is an urgent need to identify critical protective pathways within the placenta that can reduce the risk of FGR.

The placenta critically regulates nutrient exchange between the maternal and fetal circulation while at the same time restricts the transfer of toxicants. Efflux pumps, including the breast cancer resistance protein (Bcrp), are highly expressed on the maternal-facing membrane of placentas and thus aid in fetal protection by lowering placental (and fetal) xenobiotic concentrations. By restricting transfer of chemicals, BCRP plays an important role in placental and fetal health. In humans, placenta BCRP expression varies 14-fold due to a common loss-of-function polymorphism (Q141K) that lowers protein levels by 50%. Our laboratory has demonstrated that in vitro overexpression of the human BCRP gene lowers intracellular Cd concentrations and confers resistance against Cd cellular stress and toxicity. However, it is unknown whether Bcrp in the placenta can regulate Cd toxicity in vivo.

To begin to address this question, I have developed a model of Cd-induced FGR in wild-type mice. Preliminary data reveal a decrease in fetal weights that is accompanied by a ~30% decline in glucose levels following $CdCl_2$ treatment. Prior studies suggest that glucose transporters are molecular targets of Cd-induced FGR. Therefore, **my central hypothesis is that placentas with a complete loss or reduction in Bcrp transporter function are at a heightened risk of Cd accumulation which leads to impaired glucose transfer and utilization and severe fetal growth restriction**. I will utilize two transgenic mouse lines to test this hypothesis: 1) Bcrp-/- mice that have no Bcrp expression and 2) Bcrp-Q140K mice, a CRISPR model similar to the human Q141K variant. I will treat pregnant Bcrp+/+, Bcrp-/-, and Bcrp-Q140K mice with $CdCl_2$. I anticipate that placentas from Bcrp-/- and Bcrp-Q140K mice will be more sensitive to Cd accumulation and toxicity compared to wild-type (Bcrp+/+) mice. This will be tested in two specific aims:

Aim 1. Determine cadmium accumulation and histopathological changes in placentas and fetuses with reduced or null Bcrp expression. *Hypothesis: Fetal and placental concentrations of Cd as well as the severity of placental pathology will be exacerbated in mice with reduced or null Bcrp expression compared to wild-type Bcrp.* ICP-MS will be used to quantify total tissue Cd and be compared to LA-ICP-MS imaging for spatial visualization of regional Cd accumulation throughout the placentas. Morphometrics of placental changes in trophoblast zonation will be determined using an automated Cytation 5 imager. These results will be compared to histopathology and molecular profiling of genes involved in trophoblast stress.

Aim 2. Define glucose transfer, catabolism, and storage in placentas with reduced or null Bcrp expression following cadmium administration. *Hypothesis: Glucose, its metabolites, and glucose transporter levels in mouse placentas and fetuses will be decreased in Cd-treated mice with reduced or null Bcrp expression.* qPCR and immunohistochemistry will be used to determine Cd-induced changes in glucose-related genes and transporter levels. Accumulation and localization of glucose and its metabolites will be analyzed using histochemical staining and MALDI MS imaging, respectively. Glucose transporter activity will also be assessed by administering fluorescently-labeled glucose to dams prior to tissue collection.

The proposed research interrogates the impact of the placental barrier on Cd-mediated fetal hypoglycemia and growth restriction. Innovative and translational approaches, including LA-ICP/MS and MALDI MSI along with two transgenic rodent lines, will be used to test this relationship. Completion of the proposed studies and training under this fellowship will fill knowledge gaps in the fields of reproductive toxicology, transporter biology, and perinatal development in relation to maternal exposure to environmental toxicants, as well as advance understanding of alterations in placental development leading to perturbed fetal health.

Opening Paragraph(s)

First Sentence/Hook

What is topic?
Why is it Important?

Gap in Knowledge

What is not known?

Known Information

Short overview of field

Critical Need

Why fund this grant?

Preliminary Data

Concise justification

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Opening Paragraph(s)

The prevalence of U.S. newborns born small for their gestational age (SGA) increased by 30% from 2002 to 2011. SGA arises in part from fetal growth restriction (FGR), a critical disease that contributes significantly to infant mortality and morbidity. Although the etiology of FGR is poorly understood, environmental and occupational exposures have been implicated in its pathogenesis. Measurable levels of the environmental toxicant cadmium (Cd) have been found in >99% of pregnant women. This widespread exposure is important as Cd has been shown to induce FGR in rodents and linked to FGR in human epidemiological studies. Cd specifically targets the placenta where it induces cellular stress and perturbs nutrient homeostasis leading to FGR. Therefore, there is an urgent need to identify critical protective pathways within the placenta that can reduce the risk of FGR.

Color Key: Hook Known Information Preliminary Data

Gap in Knowledge Critical Need

Opening Paragraph(s)

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Gap in Knowledge Critical Need

Opening Paragraph(s)

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Gap in Knowledge Critical Need

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Color Key: Hook Known Information Preliminary Data Gap in Knowledge Critical Need

Central Paragraph(s)

What will you do to fill this gap in knowledge?

Need to address:

- What do you want to do?
- Why are you doing it?
- How do you want to do it?

Long-Term Goal/ Objectives

Write this in general terms

Central Hypothesis

Concrete outcome you anticipate

Must be testable

Rationale

Reason for your hypothesis

Preliminary Data/ Qualifications

Concise justification

Central Paragraph(s)

To begin to address this question, I have developed a model of Cd-induced FGR in wild-type mice. Preliminary data reveal a decrease in fetal weights that is accompanied by a ~30% decline in glucose levels following CdCl2 treatment. Prior studies suggest that glucose transporters are molecular targets of Cd-induced FGR. Therefore, **my central hypothesis is that placentas with a complete loss or reduction in Bcrp transporter function are at a heightened risk of Cd accumulation which leads to impaired glucose transfer and utilization and severe fetal growth restriction**. I will utilize two transgenic mouse lines to test this hypothesis: 1) Bcrp-/- mice that have no Bcrp expression and 2) Bcrp-Q140K mice, a CRISPR model similar to the human Q141K variant. I will treat pregnant Bcrp+/+, Bcrp-/-, and Bcrp-Q140K mice with CdCl2. I anticipate that placentas from Bcrp-/- and Bcrp-Q140K mice will be more sensitive to Cd accumulation and toxicity compared to wild-type (Bcrp+/+) mice. This will be tested in two specific aims:

Color Key: Long-term Goal Proposal Objective Preliminary Data Rationale/Approach Central Hypothesis

Central Paragraph

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Color Key: Long-term Goal Proposal Objective Preliminary Data Rationale/Approach Central Hypothesis

Aims

Aim Objective

Independent but related aims
Use active terms --- Limit to 2 Aims

Hypothesis

Focused prediction for each aim

Experimental Strategy

Basic overview of
study design/outcomes

Pro-Tip: Use bolding/italics/ bullets
to draw attention to Aims

Aims

Aim 1. Determine cadmium accumulation and histopathological changes in placentas and fetuses with reduced or null Bcrp expression. *Hypothesis: Fetal and placental concentrations of Cd as well as the severity of placental pathology will be exacerbated in mice with reduced or null Bcrp expression compared to wild-type Bcrp.* ICP-MS will be used to quantify total tissue Cd and be compared to LA-ICP-MS imaging for spatial visualization of regional Cd accumulation throughout the placentas. Morphometrics of placental changes in trophoblast zonation will be determined using an automated Cytation 5 imager. These results will be compared to histopathology and molecular profiling of genes involved in trophoblast stress.

Aim 2. Define glucose transfer, catabolism, and storage in placentas with reduced or null Bcrp expression following cadmium administration. *Hypothesis: Glucose, its metabolites, and glucose transporter levels in mouse placentas and fetuses will be decreased in Cd-treated mice with reduced or null Bcrp expression.* qPCR and immunohistochemistry will be used to determine Cd-induced changes in glucose-related genes and transporter levels. Accumulation and localization of glucose and its metabolites will be analyzed using histochemical staining and MALDI MS imaging, respectively. Glucose transporter activity will also be assessed by administering fluorescently-labeled glucose to dams prior to tissue collection.

Color Key: Aim Objective Hypothesis Experimental Strategy

Aims

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Color Key: Aim Objective Hypothesis Experimental Strategy

Closing Paragraph

Innovation

Clearly identify novelty

Expected Outcomes

Plain language explanation

Think Impact!

Impact/Payoff

How will you help human health?
Briefly mention training

NJ acts

Closing Paragraph

The proposed research interrogates the impact of the placental barrier on Cd-mediated fetal hypoglycemia and growth restriction. Innovative and translational approaches, including LA-ICP/MS and MALDI MSI along with two transgenic rodent lines, will be used to test this relationship. Completion of the proposed studies and training under this fellowship will fill knowledge gaps in the fields of reproductive toxicology, transporter biology, and perinatal development in relation to maternal exposure to environmental toxicants, as well as advance understanding of alterations in placental development leading to perturbed fetal health.

Color Key: Innovation Expected Outcomes Impact/Pay-off

Closing Paragraph

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Color Key: Innovation Expected Outcomes Impact/Pay-off

Aims Page Considerations

Should I include a diagram/figure on the Aims Page?

What if I am not sure what outcome will be observed?

Should I include references on the Aims page?

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Checklist for Specific Aims

- ❑ One page limit
- ❑ Two related, but independent, Aims
- ❑ Identified a critical knowledge gap
- ❑ Significance to science/health are clear
- ❑ Rationale for proposed work
- ❑ Tie preliminary data to Aims
- ❑ Only the most important background info
- ❑ Explicit central hypothesis states
- ❑ Aims test the hypothesis
- ❑ Limit jargon and abbreviations
- ❑ Mention novelty/innovation
- ❑ Use strong verbs

Strong verbs: *isolate, determine, identify, define, discover, elucidate, ascertain*

Weak verbs*: examine, explore, evaluate, study, investigate*

Self Paced Fellowship Guide on Canvas

- Step-by-step guide on how to identify fellowships and grants,
- How to develop a plan to integrate applying for fellowships and grants into your graduate career
- How to begin to develop and draft application essays.

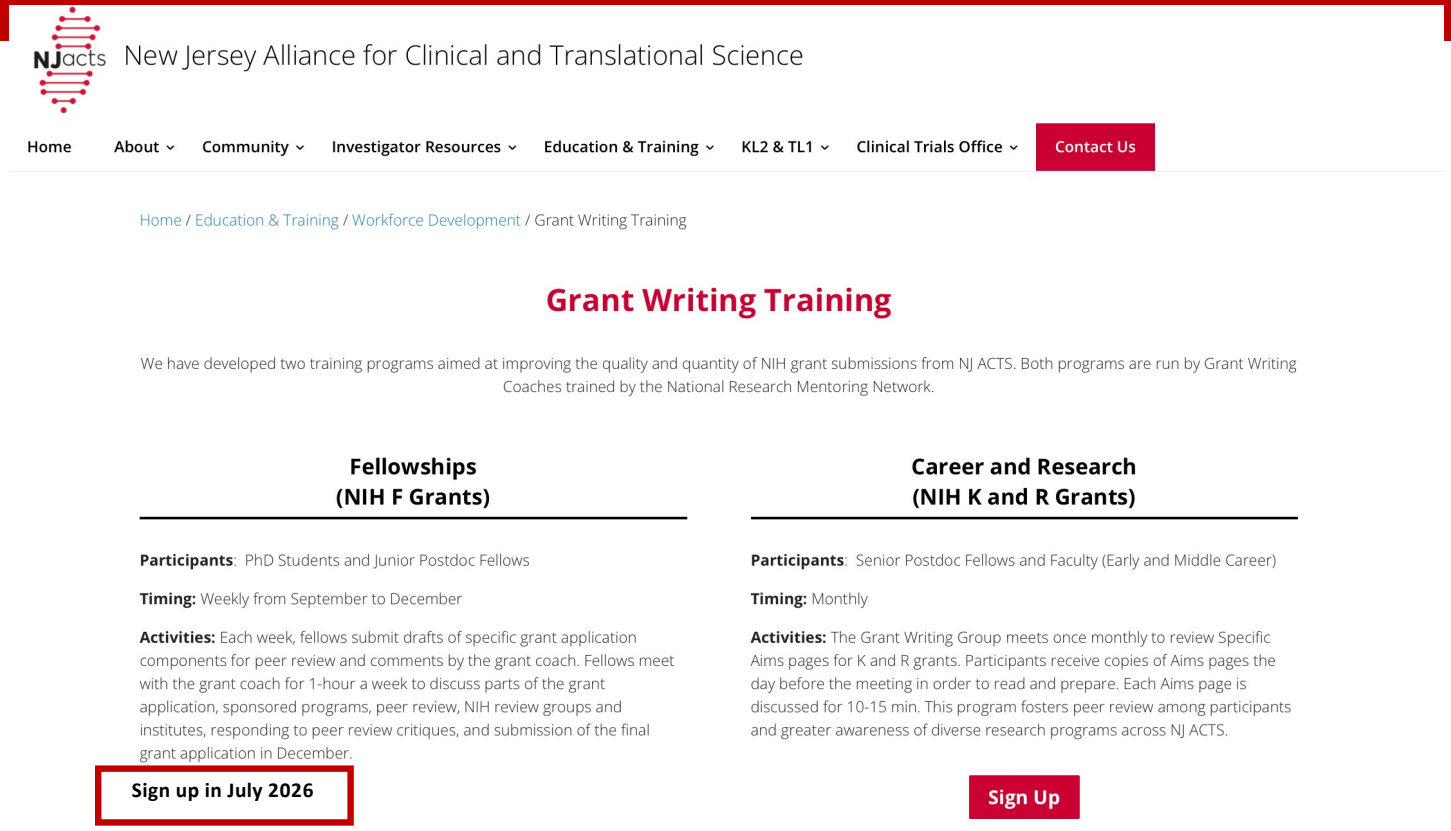
All SGS students and the faculty and staff who work with them are encouraged to enroll in the course through this link: https://rutgers.instructure.com/enroll/6T9G48

GradFund | Fellowship Advising through Peer Mentoring

Students with questions about GradFund services or how to apply for externally funded fellowship and grants are encouraged to reach out to the GradFund fellowship advising team at fellowship_advisor@gradfund.rutgers.edu

CANVAS

Fall 2026 Fellowship Writing Group



New Jersey Alliance for Clinical and Translational Science

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Home / Education & Training / Workforce Development / Grant Writing Training

Grant Writing Training

We have developed two training programs aimed at improving the quality and quantity of NIH grant submissions from NJ ACTS. Both programs are run by Grant Writing Coaches trained by the National Research Mentoring Network.

Fellowships (NIH F Grants)

Participants: PhD Students and Junior Postdoc Fellows

Timing: Weekly from September to December

Activities: Each week, fellows submit drafts of specific grant application components for peer review and comments by the grant coach. Fellows meet with the grant coach for 1-hour a week to discuss parts of the grant application, sponsored programs, peer review, NIH review groups and institutes, responding to peer review critiques, and submission of the final grant application in December.

Sign up in July 2026

Career and Research (NIH K and R Grants)

Participants: Senior Postdoc Fellows and Faculty (Early and Middle Career)

Timing: Monthly

Activities: The Grant Writing Group meets once monthly to review Specific Aims pages for K and R grants. Participants receive copies of Aims pages the day before the meeting in order to read and prepare. Each Aims page is discussed for 10-15 min. This program fosters peer review among participants and greater awareness of diverse research programs across NJ ACTS.

Sign Up

Starts Sept and runs weekly

NIH GRANTS & FUNDING
NIH Central Resource for Grants and Funding Information

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Home » About Grants » How to Apply - Application Guide

How to Apply - Application Guide

Use the application instructions found on this page along with the guidance in the funding opportunity announcement to submit grant applications to NIH, the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Agency for Healthcare Research and Quality.

Prepare to Apply

- Systems and Roles
- Register
- Understand Funding Opportunities
- Types of Applications
- Submission Options
- Obtain Software

Write Application

- Write Your Application
- How to Find Forms
- Develop Your Budget
- Format Attachments
- Rules for Text Fields
- Page Limits
- Data Tables
- Reference Letters
- Biosketches

Submit

- Submit, Track, and View
- How We Check for Completeness
- Changed/Corrected Applications
- Standard Due Dates
- Submission Policies
- Dealing with System Issues

FAQs

grants.nih.gov/grants/how-to-apply-application-guide.html

References and Resources

- https://www.biosciencewriters.com/NIH-Grant-Applications-The-Anatomy-of-a-Specific-Aims-Page.aspx
- https://www.niaid.nih.gov/grants-contracts/draft-specific-aims
- https://grad.uw.edu/wp-content/uploads/2019/06/NIHGrantWorkshop2013.pdf
- https://nexus.od.nih.gov/all/2021/03/24/understanding-nrsa-fellowship-f-and-training-t-grants-a-video-guide/
- https://www3.mdanderson.org/library/education/pdf/crafting-strong-specific-aims-handout.pdf

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