Research Strategy-1: Significance & Innovation

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Significance and Innovation define the importance of your proposed research

Significance — how your proposal will advance your field and fit the NIH mission to improve health through science

Innovation — a new and substantially different way of addressing an important NIH relevant research question

Significance & Innovation are addressed in the Research Strategy Section of your application

The 5 criteria for review of Research grants have been combined into 3 factors


Significance


Innovation

Factor 1 (scored 1–9)
Importance of the Research


Approach

Factor 2 (scored 1–9)
Rigor & Feasibility


Investigators


Environment

Factor 3 (overall impact)
Expertise & Resources

https://grants.nih.gov/policy-and-compliance/policy-topics/peer-review/simplifying-review/framework

The Simplified Review Framework reorganizes the five criteria into *Three Factors*

Factor 1: Importance of the Research
- **Significance, Innovation**
- *Scored 1-9*

Factor 2: Rigor and Feasibility
- Approach
  (also include Inclusions & Study Timeline for clinical trials)
- *Scored 1-9*

Factor 3: Expertise and Resources
- Investigators, Environment
- *Evaluated as appropriate or gaps identified; gaps require explanation*
- *Considered in overall impact; no individual score*

For K awards, Significance & Innovation are assessed as part of the research plan


Candidate


Career Development Plan


Research Plan


Mentors


Environment & Institutional Commitment

→ ***Significance***
→ ***Innovation***
→ **Approach**

These criteria are not changing (yet!)

These sections should be brief & succinct — *recommended distribution of your 12 pages*

Section		R01	K
Candidate & Career Plan		N/A	5 pages
Research Strategy	**Significance**	**1½ page**	**1 page**
	Innovation	**½ page**	
	Approach	10 pages	6 pages

See Examples:
https://www.niaid.nih.gov/grants-contracts/sample-applications

NIH has specific requirements for Significance (R & K grants)

- Explain the **importance of the problem** or critical barrier to progress that the proposed project addresses.
- Describe the strengths and weaknesses in the **rigor of the prior research** that serves as the key support for the proposed project.
- Explain how the proposed project will **improve scientific knowledge, technical capability, and/or clinical practice** in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field **will be changed if the proposed aims are achieved.**

See R & K Instructions: https://grants.nih.gov/grants-process/write-application/how-to-apply-application-guide

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NIH criteria for reviewers on evaluating R grants for Significance . . .

- Evaluate the importance of the proposed research in the context of current scientific challenges and opportunities, either for advancing knowledge within the field, or more broadly. *Assess whether the application addresses an important gap in knowledge in the field, would solve a critical problem, or create a valuable conceptual or technical advance*.
- Evaluate the **rationale** for undertaking the study, the rigor of the scientific background for the work (e.g., prior literature and/or preliminary data) and whether the scientific background justifies the proposed study.

PA-25-301: https://grants.nih.gov/grants/guide/pa-files/PA-25-301.html

For K Awards, reviewers assess Significance as part of the research plan

- **Are the proposed research questions, design, and methodology of significant scientific and technical merit?**
- Is the prior research that serves as the key support for the proposed project rigorous?
- Has the candidate included plans to address weaknesses in the rigor of prior research that serves as the key support for the proposed project?
- Has the candidate presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?
- Has the candidate presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?
- Is the research plan relevant to the candidate's research career objectives?
- Is the research plan appropriate to the candidate's stage of research development and as a vehicle for developing the research skills described in the career development plan?

PA-24-182: https://grants.nih.gov/grants/guide/pa-files/PA-24-182.html

To score high on Significance you must ask an important question

Significance is essential!

You must **convince** and **excite** reviewers about the importance of the problem you are addressing

Answer the questions . . .:

What new knowledge will be gained?

How will the research advance the field or improve human health?

You must define the outcomes of the project!

State explicitly what you will accomplish
— do not let reviewers assume the outcomes

The Significance section sets the stage for your proposal

Increase **the level of detail** from what was provided in the Specific Aims
— show your knowledge of the field
— prepare the reviewer to understand the gap in knowledge that your project will address

Explain why this **gap in knowledge** is important for you to solve

State the **positive effect** that the successful completion of your research project will have in solving an important health-related problem

Your Challenge: *Help your reviewers understand why your proposal is timely, relevant, and important to your field*

You must also address NIH requirements on "Implementing Rigor and Transparency"

Four areas must be addressed:

1. strengths & weaknesses in the **rigor** of the prior research → **In Significance Section of the Research Strategy**
2. **rigorous** experimental design for robust and unbiased results → In Approach Section of the Research Strategy
3. consideration of relevant **biological variables** → In Approach Section of the Research Strategy
4. **authentication** of key biological and/or chemical resources → Attachment: Item 15 Other Research Plan

see: https://grants.nih.gov/policy/reproducibility/index.htm

Describe the "rigor of the prior research"

In the **Significance** section of the Research Plan:

- Describe the strengths and weaknesses in the **rigor of the prior research** (both published and unpublished) that serves as the key support for the proposed project

In the **Approach** section of the Research Plan:

- Describe plans to address weaknesses in the **rigor of the prior research** that serves as the key support for the proposed project

You must critically review and evaluate all data (including preliminary data) that you use to justify your project.

For R Awards see: NIH Notice NOT-OD-18-228

For K Awards see: NIH Notice NOT-OD-18-229

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NIH has specific requirements for *Innovation* (R & K grants)

- Explain how the application challenges and seeks to **shift current research or clinical practice paradigms**.
- Describe any **novel** theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any **refinements, improvements, or new applications** of theoretical concepts, approaches or methodologies, instrumentation, or interventions (R grants only).

See R & K Instructions: https://grants.nih.gov/grants-process/write-application/how-to-apply-application-guide

NIH criteria for reviewers on evaluating R grants for *Innovation . . .*

- Evaluate the extent to which innovation influences the importance of undertaking the proposed research. Note that while technical or conceptual innovation can influence the importance of the proposed research, a project that is not applying novel concepts or approaches may be of critical importance for the field.
- Evaluate whether the proposed work applies novel concepts, methods or technologies or uses existing concepts, methods, technologies in novel ways, to enhance the overall impact of the project.

PA-25-301: https://grants.nih.gov/grants/guide/pa-files/PA-25-301.html#_Section%20IV.%20Application%20and%20Submission%20Information



To score high on Innovation you must generate new knowledge

Your project must be new!

— explore new scientific directions
— test a new hypothesis
— apply a new technique
— not repeat something already done

But you do not need to propose a paradigm shift
— it does not need to be highly innovative

Innovation can have three different flavors . . .

Conceptual

— how will the project outcomes generate new ***thinking*** in your field

Technical/Mechanistic

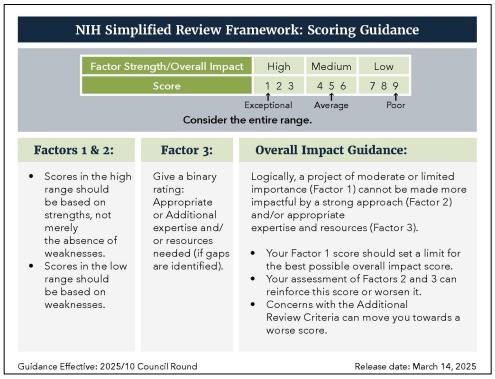
— how will the project outcomes provide new ***experimental approaches***

Translational

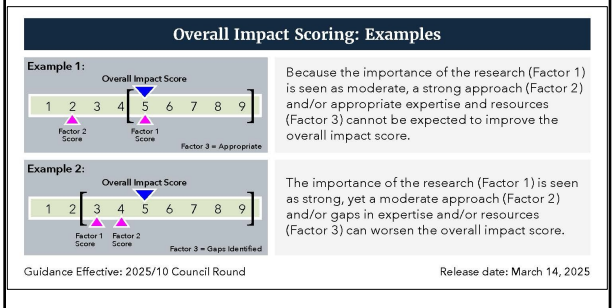
— how will the project outcomes lead to new ***therapies or advance human health***

Your project may have 1, 2, or all of these

The score for Factor 1 sets the limit for the Overall Impact Score



The score for Factor 1 sets the limit for the Overall Impact Score — *examples*



https://grants.nih.gov/sites/default/files/Simplified-Review-Scoring-Guidance.pdf

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