JAGIELLONIAN UNIVERSITY
IN KRAKOW

ERC grant within your reach:

in NCN and ERC the rules are the same

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NICHE WORKS

Sine qua non condition

First and most of all - **your grant needs to be based on good science!**

Writing style and structure of your grant are essential for final success:

<u>Possible outcomes based on science and writing of your grant:</u>

1. Poor science – poorly written – PROBABILITY OF FUNDING >> **VERY LOW**

2. Good science – poorly written – PROBABILITY OF FUNDING >> **LOW**

3. Poor science – well written - PROBABILITY OF FUNDING >> **LOW (should be low…)**
   (but unfortunately still possible…)

4. Good science – well writen – PROBABILITY OF FUNDING >> **HIGHER ☺**
   (but unfortunately still failure likely…)

You write for the reviewers

- Get inside the reviewer's head. What reviewers *really* look for?

  * evidence of scientific reasoning

  * formulating hypothesis and designing experiments to test them

  * good ideas

  * focused writing

  * evidence of productivity and knowledge of proposed techniques

- Make sure your writing reflects this.

a grant is not an idea – it is a plan

General rules

- Do pursue **original science**.

- **Topic**: need to be **narrow** enough to be feasible and to make a significant contribution, but **broad** enough to have societal relevance (important for a field).

- Do provide a well **focused research plan**.

- Do not let your ideas wander from the main theme.

- Do not propose too much (?): it will not seem feasible.

- Provide a critical approach to project:
  * discuss potential problem areas
  * discuss alternative approaches

(better you than reviewers…)

- Complete the project narrative following the format as outlined in the application instructions and address each section with a heading.

Criteria of funding decisions

- Aim is clearly identified and substantiated by preliminary data

- Solution to the problems and methodology is clearly described and correct

- Research strategy and schedule of experiments are well designed

- Good roadmap, with explanation of plan and layout

- PI and team have documented experience in similar studies or have a documented cooperation with external experts.

- Budged is reasonable.

*So, try to develop a concept that **FITS**:*

* ***F**ills a gap in knowledge*
* ***I**mportant*
* ***T**est a hypothesis*
* ***S**hort-term investment that will lead to long-term gain for field (AKA ”miracle”)*

Weaknesses pointed by reviewers

- Missing the overall hypothesis/objectives/purpose/questions.

- Missing final paragraph that states the significance, innovation, and impact.

- Diffuse, superficial, unfocused plan

- The specific aims depend on results from previous aims.

- The proposal is overly ambitious.

- It's not clear the investigator can do the proposed experiments (too "innovative"=risky).

- Preliminary data are lacking.

- Uncritical approach

General rules in reserch project

Be focused: Don’t go on a fishing trip!

”In addition to proposing a research desing that is a fishing expedition, the applicant also proposes to use every type of bait and piece of tackle known to mindkind.”

General rules in reserch project

- **One of the best things to hear from the reviewers:**

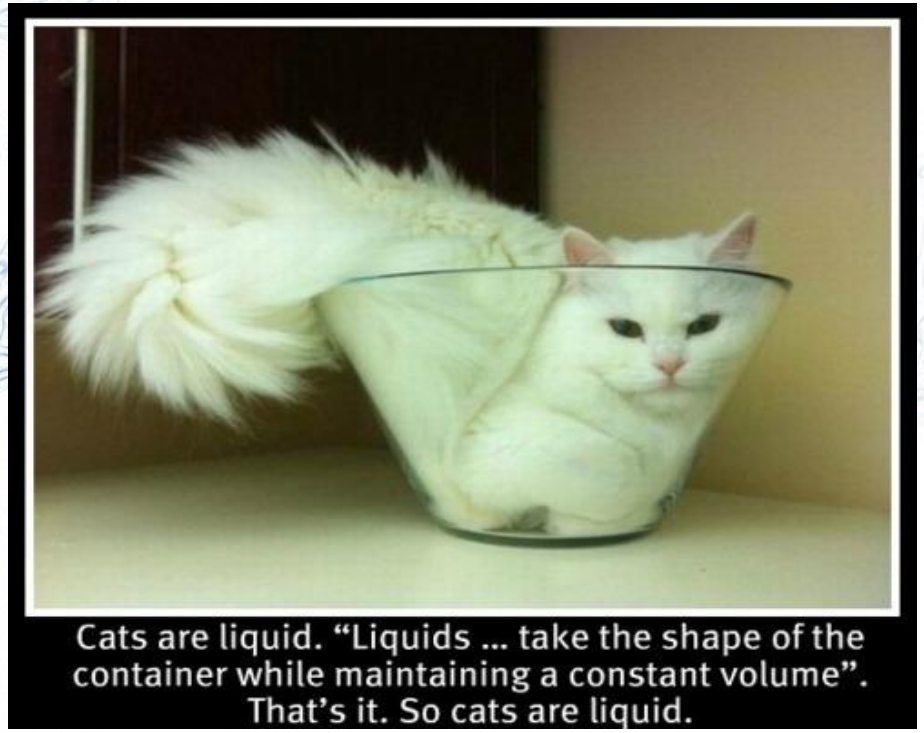
”This is hypothesis-driven science”

- Hypothesis driven proposal is a gold-standard in science

  * Observation

  * Hypothesis

  * Test the hypothesis
    (experiments and proper controls)



Specificity of project writing

Grant Writing
Sponsor goals:
Service attitude
Future oriented:
Work that should be done
Project-centered:
Objectives and activities
Persuasive rhetoric:
"Selling" the reader
Personal tone:
Conveys excitement
Team-focused:
Feedback needed
Strict length constraints:
Brevity rewarded
Accessible language:
Easily understood

- Grant writing is a **world of action**, not only world of idea.

- Project should be desigend to make a **significant contribution** to a discipline.

- Project **must be a plan** how to use funding to accomplish goals.

- Project should indicate the **expected outcomes**.

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- **Language** of a grant can be **stronger** than language of research article.

- The writer has to **convince** the reviewer that the proposed research is **worth doing**.

- Effort should be geared toward building **a convincing argument**.

Specificity of project writing

Grant Writing
Sponsor goals: *Service attitude*
Future oriented: *Work that should be done*
Project-centered: *Objectives and activities*
Persuasive rhetoric: *"Selling" the reader*
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Team-focused: *Feedback needed*
Strict length constraints: *Brevity rewarded*
Accessible language: *Easily understood*

- Academic style usually prefers impersonal tone, with writer's persona hidden from view.

- You as a grant writer are expected to **convince the reviewer that you can perform valuable study**

  * active voice

  * more energetic phrasing

  * direct references to the author in the first person

But: do not exaggerate…

Be confident without boasting

Specificity of project writing

Grant Writing
Sponsor goals:
Service attitude
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- Grant writers must use language that can be understood by a diverse group of readers.

- Fewer words with greater clarity.

Follow the KISS
(Keep It Simple and Succinct)

Reviewer ⟶ Good Reviewer

- Rewiewers have usually 20-30 projects for evaluation or ranking with short deadlines.

- They are over-commited, over-worked, and tired. And they work late at night.

Make the reviewers' job easier:

- Make it easy for them to **understand** thing

- Make them easy for them to **find** thinks

- Make it easy for them **to be your advocate**

- **Prepare a well-organized, clearly written prose**

Three most important rules

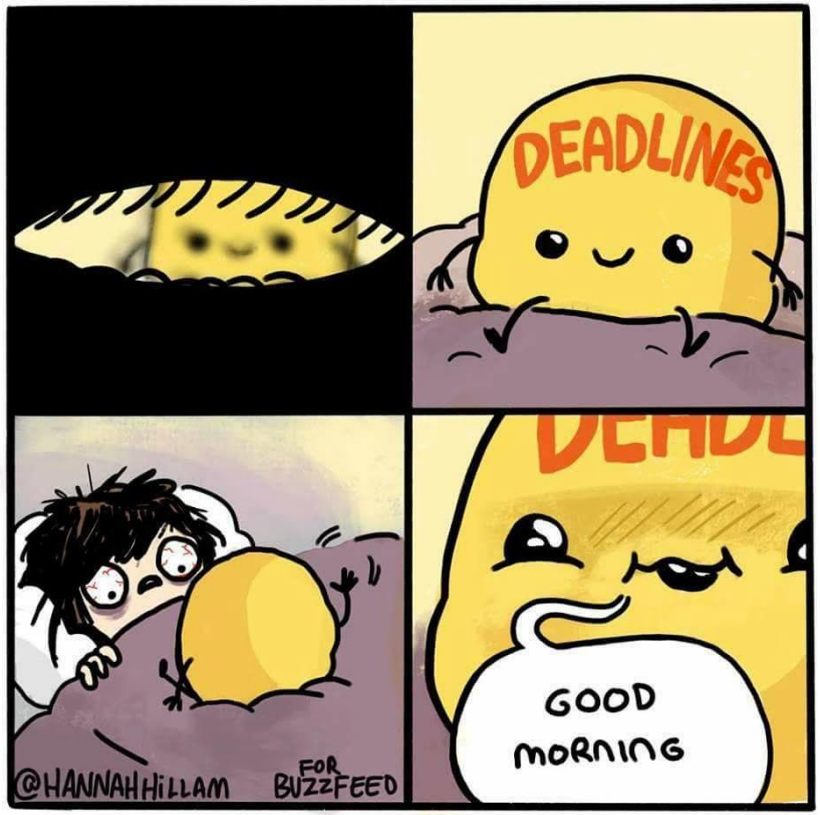
1. Read the application instructions carefully

2. Read the application instructions carefully

3. Read the application instructions carefully

My personal experience

Writing always takes longer than you expect



Title: first but not least

- **Grant title should:**

  * be clear and descriptive

  * accurately describe the content, focus, or concept of your proposal

  * understandable

  * interesting

- It is often used to assign review groups

- **Avoid:**
  * jargon
  * overstatement
  * humor and being “Cute”

Abstract

- Abstract should include:

  * a self-contained description of the project

  * a brief background of the project (What we know and **where is a gap**)

  * **specific aims, objectives, and hypotheses**

  * significance of the proposed research

  * the unique features and innovation of the project

  * the methodology (action steps) to be used

  * expected results – how the results will affect research area

My last abstract – first paragraph

Research project objectives: Endothelial cells (ECs) are a critical component of a hematopoietic niche in the bone marrow, that protects hematopoietic stem cells (HSCs) from premature exhaustion. It is still not clear, however, which cells compose the niche and which are the conductors orchestrating the niche function. There are many indications that quiescent HSCs are harbored by arterioles or transitional capillaries containing type H endothelium, but direct imaging shows that quiescent HSCs are adherent to sinusoidal venules. *How to explain such a discrepancy?* Based on our initial data, **we hypothesize that sinusoids contain distinct endothelial subpopulations, not recognized so far, that constitute HSC niche and regulate HSC outcomes.** Our proposal is designed to characterize such putative subsets.

Specific Aims

- Indicate the question.

- Why is the answer important?

- What is innovative?

(Most successful applications have 2-4 specific aims).

Try to get the reviewers excited about your science.
Be focused.

Specific Aims Page

- Fatal flaw (aka, the kiss of death): success of a specific aim depends on success of a previous specific aim.

the aims are dependent

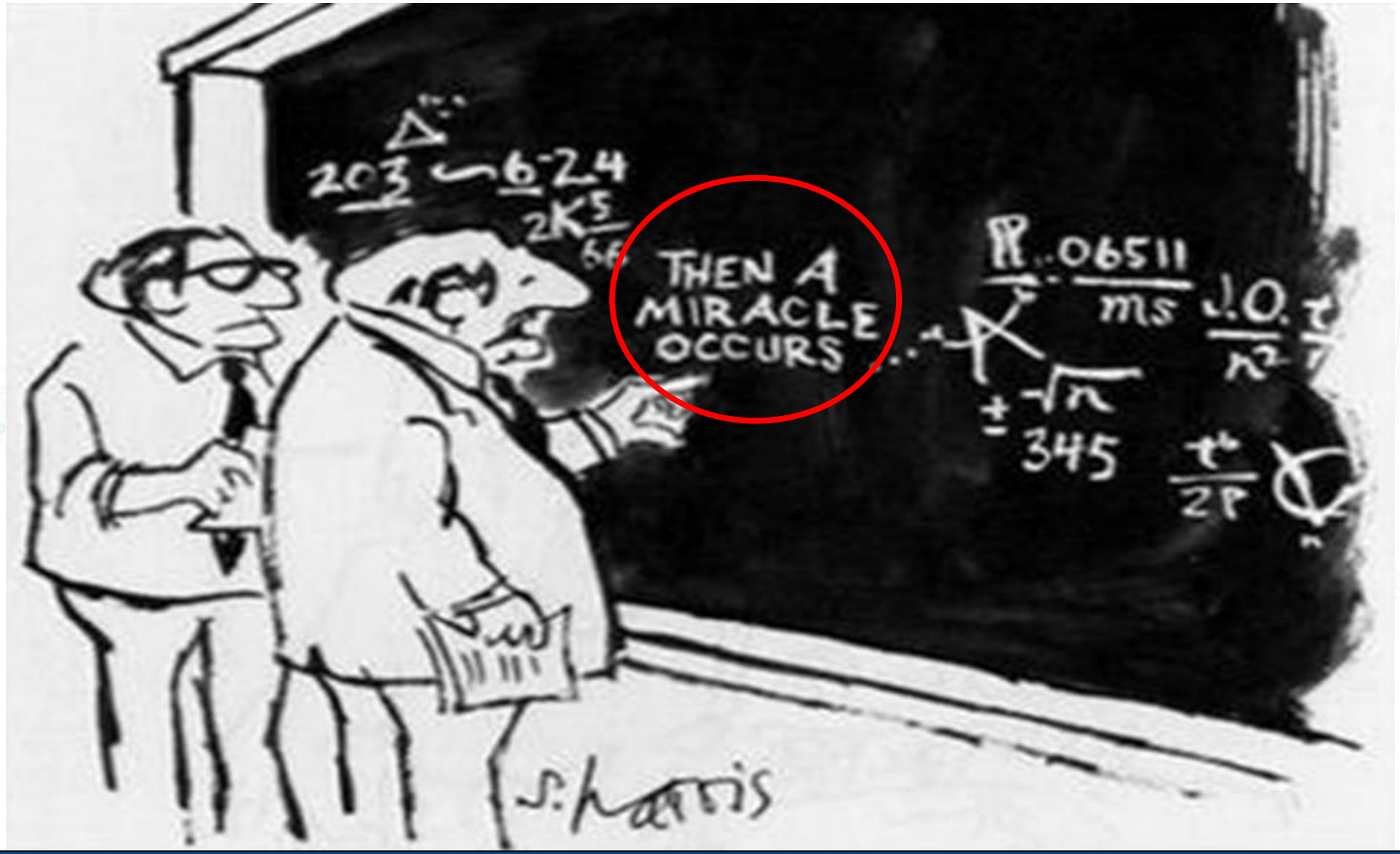
- Another fatal flaw: grant is not focused.

the specific aims are not related

Be aware that:

If the reviewers aren't interested by the time they reach the end of the Specific Aims page, you have a problem.

Research plan



Research strategy

- **The Research Strategy should answer the following questions:**

  * What do you intend to do?

  * Why is this worth doing or what is significance of the research?

  * What will this new work add to the field of knowledge?

  * How will the research be accoplished:
    # Who?
    # What?
    # Which methods?
    # When?
    # Where?

- **Suggestions:**

  * make sure all sections are internally consistent and that they dovetail each other

  * emphasize how some **combination of novel hypothesis** (**supported by preliminary data**) **and new experimental approach** will enable important progress to be made

Research plan

Suggestions:

* preliminary data may be included before the specific aims or can be integrated with methods description for each specific aim

* **avoid excessive experimental detail**

* if relevant, explain why one method or approach will be used in preference to others – this establishes that alternatives were not simply overlooked

* if difficult methods are planned – show familiarity with experimental practice

Avoid:

"the PI will take appropriate measures to seek appropriate levels of support for the delivery of appropriate services."

Just an example

1: Identification of cells within the hematopoietic niche directly contacting the HSCs: development of a new research model.

Rationale. There are no *in-vivo* models to identify, isolate and characterize the cells directly involved in cell-cell contact. Therefore, we propose our original *in-vivo* mouse system where one cell population (sender cells; e.g., stem cells) is modified to express the specific cell surface ligand, while the second cell population (receiver cells; e.g., niche cells) is modified to express the receptor for this ligand. Binding of the ligand triggers the expression of fluorescent reporter protein in the recipient cells. The system will be flexible and easily adapted for needs of particular research schemes (Fig. 3).

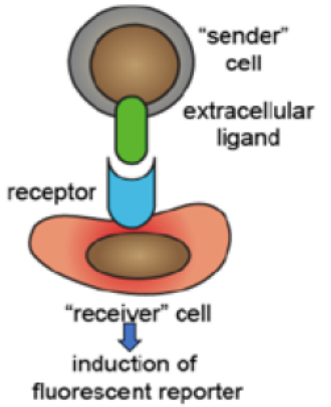


Fig. 3. Principle of cell-cell contact detection.

Within the project, we will visualize the fluorescent receiver cells *in-situ* in the cleared bone marrow tissue using confocal microscopy, phenotype them using flow cytometry or collect them by FACS-sorting to perform functional assays and transcriptome profiling at the single cell level. We will employ bioinformatics tools to measure cell-to-cell heterogeneity and to classify the responses triggered by the direct contact of stem cell with the niche cell. These data will be used to indicate the putative molecular mediators of EC-HSC contact.

CV and your research record

- **Reviewers will look for answers:**

* Are the investigators appropriatel trained and well suited to carry this work?

* Is the work proposed appropriate to the experience level of the PI and other researchers?

* Does the investigative team bring complementary and integrated expertise to the project?

Editing – simple but important

- Editing process is enforced (and monitored ☹) by the computer systems

- Use **consistent layout**, aided by headings, subheadings. Headings should be informative.

- Use bold, underline and italics (the same scheme throughout the text)

- Less is more: remove all unnecessary words

- Arial 11 font is the smallest that you should use (12 font is better)

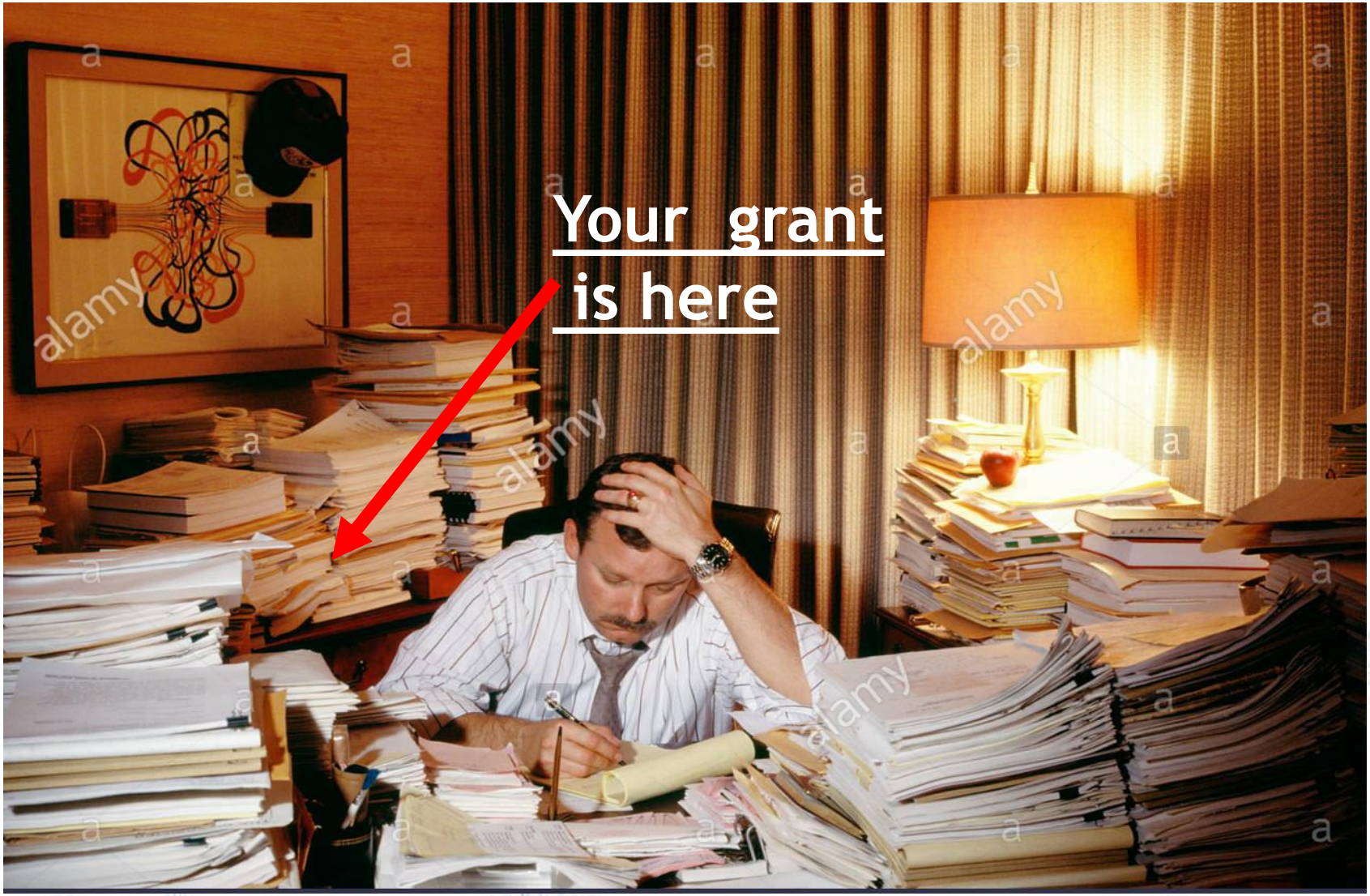
- Keep margins and white space

- No typos (at least not in every sentence)

- So: revise, revise again, and again, (….), and again.

Sloppy writing - sloppy research

Your reviewer at work



Help your reviewer…

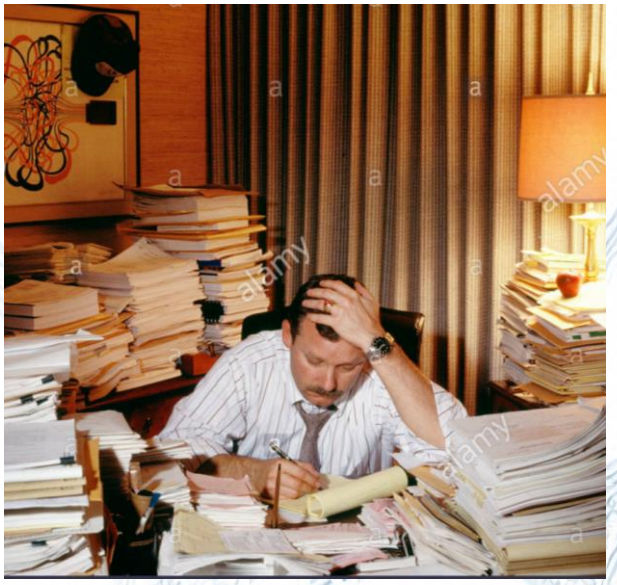
Roadblocks in your text: **Do you really need synonyms**

Kicia the Cat cooks

nice book for
3 years old
(personal opinion of young parents from our team☺)

Help your reviewer…

Roadblocks in your text: **Do you really need synonyms**



The reviewer's brain after reading 15 grant applications night before deadline

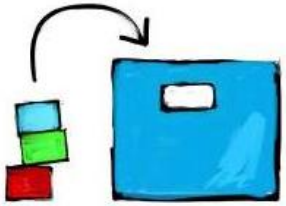
≈

The brain of 3-years old

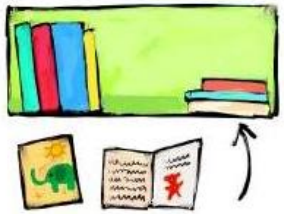
Help your reviewer…

Roadblocks in your text: <u>Do you realy need synonyms</u>

Przed pracą w kuchni:



Kicia Kocia wrzuciła klocki do klockowego pudełka.



Kicia Kocia odłożyła książki na książkową półkę.

Kicia Kocia poskładała wszystkie zabawki.
Kicia Kocia pięknie posprzątała!
Potem umyła ręce. Babcia mówi, że to bardzo ważne.
Gotować należy czystymi rękami.

Help your reviewer…

Roadblocks in your text: **Do you realy need synonyms**

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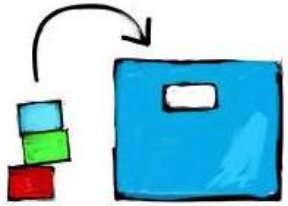

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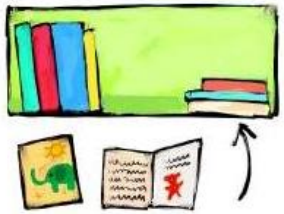

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Potem umyła ręce. Babcia mówi, że to bardzo ważne.
Gotować należy czystymi rękami.

Kicia the Cat put the toys to the box. **Kicia the Cat** put the books on the shelf. **Kicia the Cat** beautifully clean up all the mess!

Kicia the Cat put the toys to the box. This **feline creature** place the books in the storage on the wall. **This animal who makes "purrr"** beautifully clean up all the mess!

Help your reviewer…

Roadblocks in your text: **Do you really need synonyms**

Kicia the Cat put the toys to the box. **Kicia the Cat** put the books on the shelf. **Kicia the Cat** beautifully clean up all the mess!

~~**Kicia the Cat** put the toys to the box. This **feline creature** place the books in the storage on the wall. **This animal who makes "purrr"** beautifully clean up all the mess!~~

Help your reviewer…

Roadblocks in your text: **Do you really need synonyms**

Bravo Kicia the Cat!

Don’t be afraid of repetitions ☺

Help your reviewer…

"*The growing body of evidences suggests that*…"
Please, please don't use it in your grants...

We conducted an investigation of it. *conducted >> empty verb*
We investigated it.

Our drug *induces mobilization of* cells from the bone marrow. *induce >> vague verb*
Our drug mobilizes cells from the bone marrow. *mobilizes >> strong verb*

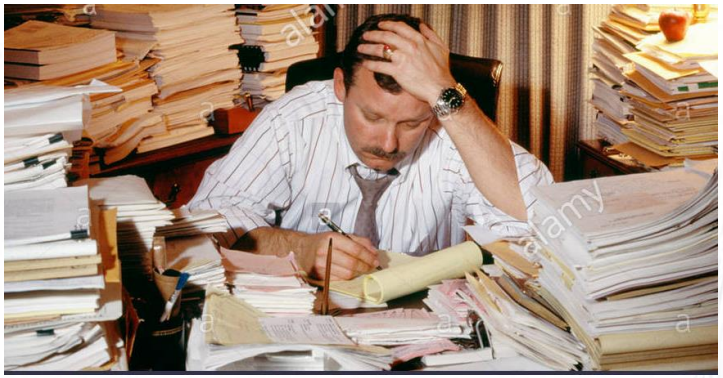
There was considerable erosion of the land from the floods. *erosion >> noun*
The floods considerably eroded the land. *erode >> strong verb*

Use strong verb, avoid vague and empty verbs. This will make your text concise and dynamic.

Help your reviewer…

- **Be like Agatha Christie** – don't put everything upfront – make story and at least local uncertainty

- Don't make your text boring – this guy is bored enough…



Ways to grab attention:

- Negative sentence first:

The hematopoietic stem cells are not necessary to protect patient early after transplant. Instead, they do provide long-term, life-lasting blood production after transplant.

- Direct question in the text:

While we know that stem cells produce blood cells, the question remains: will transplantation of stem cells rescue the leukemic patients?

- Pejorative expressions like: *historically, traditionally*

Historically, it was thought that stem cells produce all blood cells. In contrast, we demonstrated that most of the blood cells are produced by progenitor cells.

Individual Evaluation Report – step 1

Criterion 1 - RESEARCH PROJECT

Your score: ... of 5

Ground-breaking nature and potential impact of the research project

To what extent does the proposed research address important challenges?

To what extent are the objectives ambitious and beyond the state of the art (e.g. novel concepts and approaches or development across disciplines)?

To what extent is the proposed research high risk/high gain?

Comments:

Scientific Approach

To what extent is the outlined scientific approach feasible bearing in mind the extent that the proposed research is high risk/high gain (based on the Extended Synopsis)?

Comments:

Individual Evaluation Report - step 1

Criterion 2 - PRINCIPAL INVESTIGATOR

Intellectual capacity, creativity and commitment

The questions below can have one of the following four responses: Outstanding/Excellent/Very good/Non-competitive

Your score: ... of 5.

To what extent has the PI demonstrated the ability to propose and conduct ground-breaking research?

Your score: ....

To what extent does the PI provide evidence of creative independent thinking?

Individual Evaluation Report – step 1

To what extent have the achievements of the PI typically gone beyond the state of the art?

Your score: ....

To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?

Your score: ....

Comments:

"Spare a dollar for some lab consumables, buddy?"

Current grant system: evaluation panels

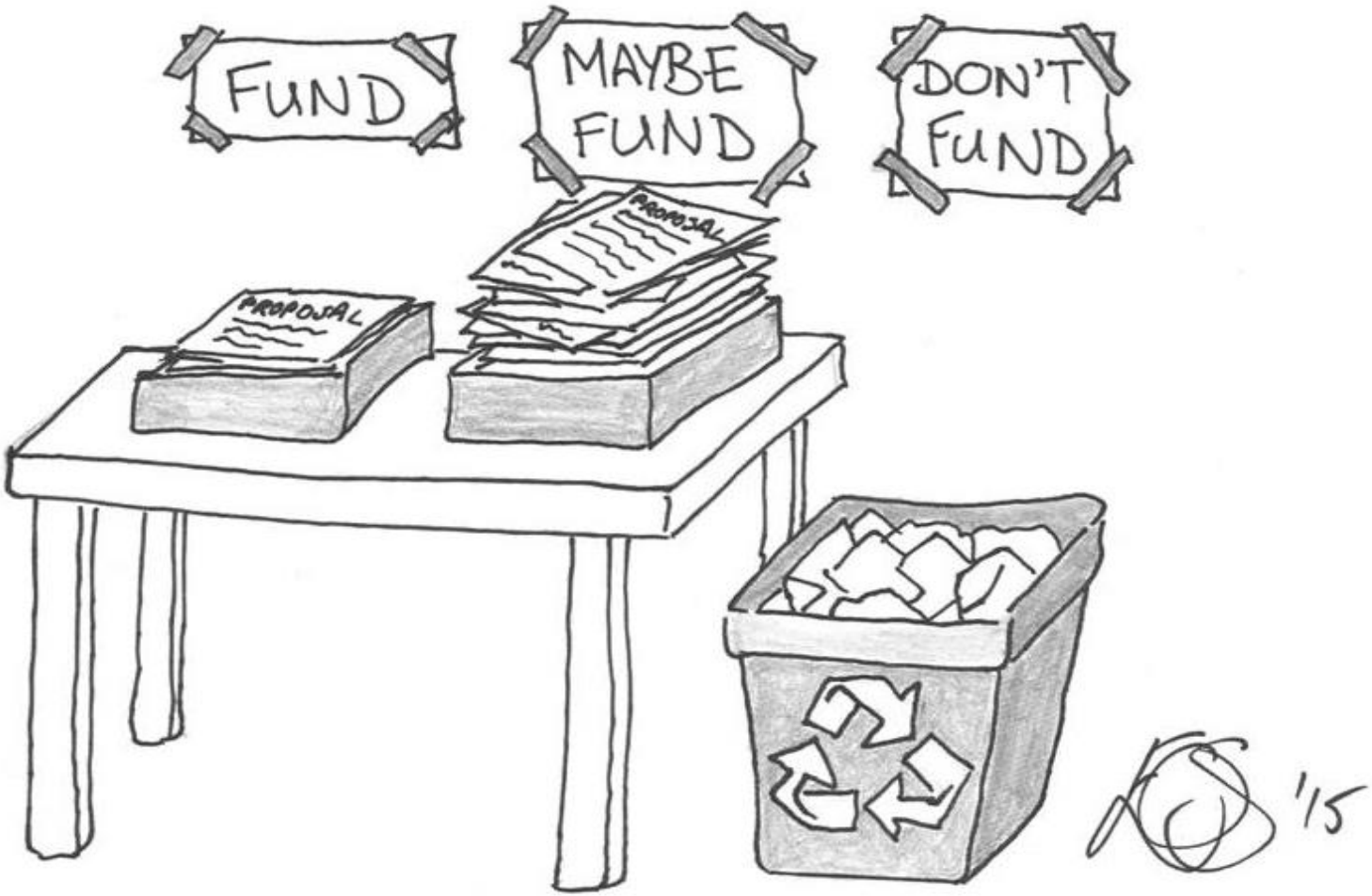
Most review panels select a subset of panelists to serve as primary, secondary, and tertiary reviewers for each application.

* All members of a grant review panel should have the opportunity to read the grant application and participate in the discussion and scoring.

Deidentified image from peer-review panel meetings

Liaw et al. Circ res 2017; Pier et al. PNAS 2018

Review panel categories (universal)



You can do that!

Be confident…

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www.nicheworks.eu