



JAGIELLONIAN UNIVERSITY
IN KRAKOW

ERC grant within your reach

in NCN and ERC the rules are similar

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Jagiellonian University





The classical ERC grants

European Commission



Average success rate: 10.6%

Starting Grants

starters
(2-7 years after PhD) up to €
2.0 Mio
for 5 years

Consolidator Grants

consolidators
(7-12 years after PhD) up to
€ 2.75 Mio
for 5 years

Advanced Grants

track-record of significant
research achievements in
the last 10 years
up to € 3.5 Mio
for 5 years

Proof-of-Concept

bridging gap between research - earliest stage of marketable innovation
up to €150,000 for ERC grant holders



You write for the reviewers



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

- * good ideas and evidence of scientific reasoning
- * formulating hypothesis and designing experiments to test them
- * evidence of productivity and knowledge of proposed techniques
- * focused writing

- Make sure your writing reflects this.



a grant is not an idea - it is a plan



General rules in research project



- 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** (*better you than reviewers...*)
 - * discuss **alternative approaches**
- Provide **preliminary results** (both published and unpublished)



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."



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

"This is a hypothesis-driven science"

- Hypothesis driven proposal is a gold-standard in science

- * Observation

- * Hypothesis

- * Test the hypothesis
(experiments and proper controls)



Cats are liquid. "Liquids ... take the shape of the container while maintaining a constant volume". That's it. So cats are liquid.



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:

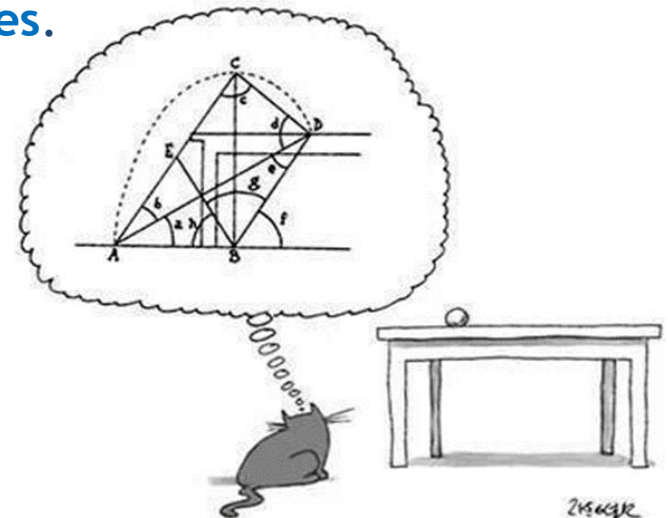
Easily understood

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

- Project should be designed 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**.





Specificity of project writing



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Strict length constraints:

Brevity rewarded

Accessible language:

Easily understood

- **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

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Sponsor goals:

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Project-centered:

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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

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 writers must use language that can be understood by a diverse group of readers.
- Fewer words with greater clarity.

Follow the KISS

(**K**ee**P** **I**t **S**imple and **S**uccinct)





Reviewer —→ Good Reviewer



- Reviewers have usually 20-30 projects for evaluation or ranking with short deadlines.
- They are over-committed, 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**



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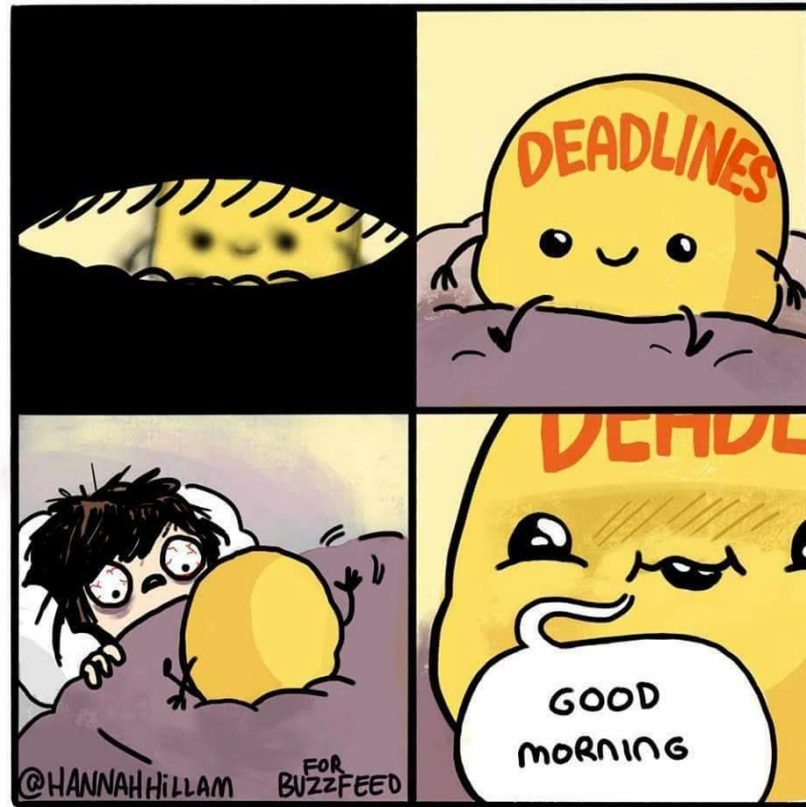


Three most important rules



- 1. Read the application instructions carefully**
- 2. Read the application instructions carefully**
- 3. Read the application instructions carefully**

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”



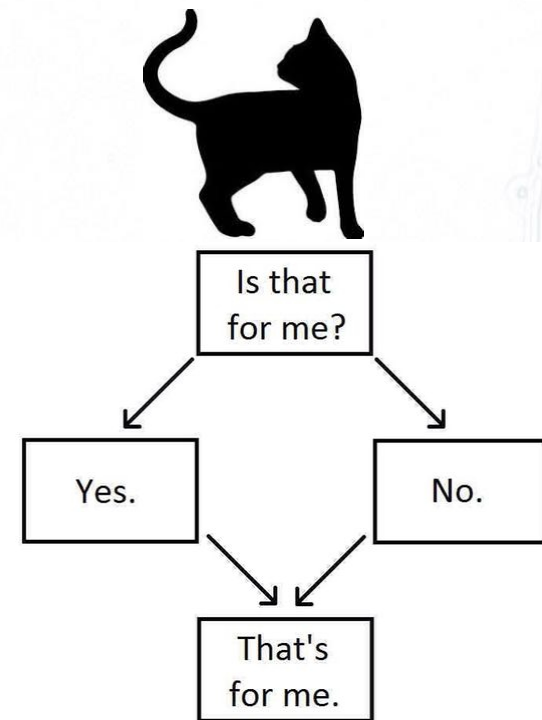


Abstract



- Abstract should include:

- * a brief background of the project (What we know and **where is a gap**)
- * **specific aims, objectives, and hypotheses**
- * the unique features and innovation of the project
- * the methodology (action steps) to be used
- * 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.

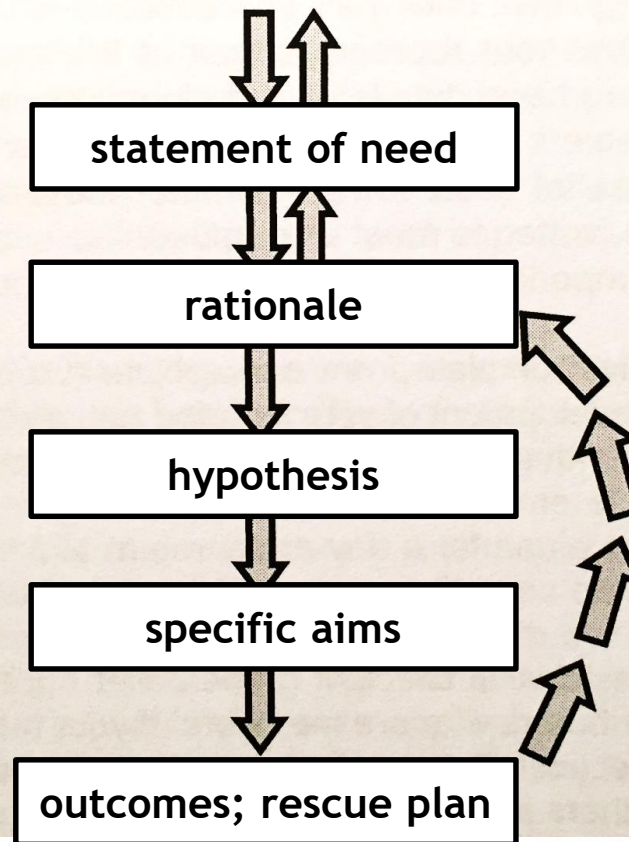
- Indicate the question.
- Why is the answer important?
- What is new?



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

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

LINEAR PROGRESSION FOR A STRONG SPECIFIC AIMS SECTION GAP IN KNOWLEDGE / LACK OF SOMETHING





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 interdependent

- Another fatal flaw: grant is not focused.

the specific aims are not related



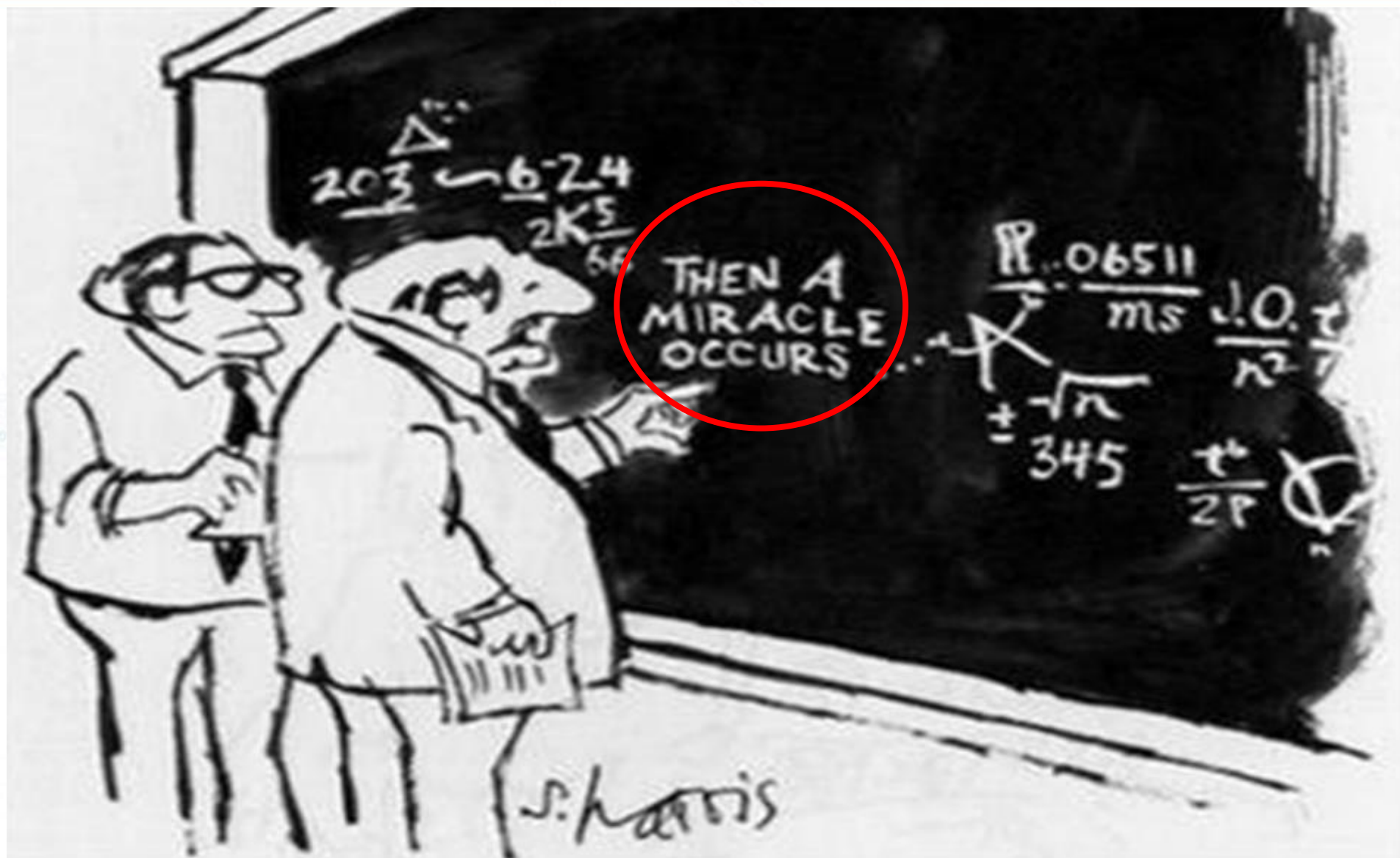


Be aware that:



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

Research plan



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

- * What do you intend to do?
- * Why is this worth doing?
- * What will this new work add to the field of knowledge?
- * How will the research be accomplished:
 - # Which methods?
 - # Where?

* **avoid excessive experimental detail**



- **Suggestion:**

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

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).

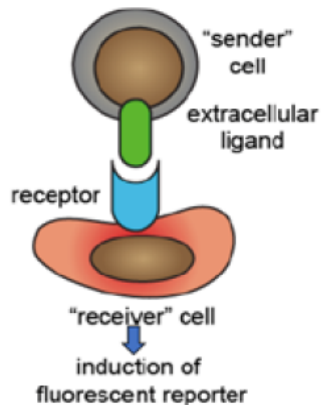


Fig. 3. Principle of cell-cell contact detection.

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.

Experimental strategy. In our model (details and schemes provided in the full version), the sender cell is modified with inducible transgene coding for the extracellular form of GFP (eGFP), which is both a fluorescent marker and membrane-anchored ligand. The receiver cell is modified with transgene coding for the synthetic Notch (synNotch) receptor^[26], which possesses the core of Notch receptor, but has been designed to recognize eGFP as a ligand. Upon ligand binding, the conformation of intracellular part changes to allow cleavage of engineered internal domain by endogenous γ -secretase. For the current project we have designed two systems: **i) "Real-time" monitoring of actively contacting cells.** We propose the synNotch receptor that releases the Gal4-VP64 artificial transcription factor from the internal domain. Gal4-VP64 will drive the expression of tdTomato, a fluorescent reporter protein. This system is expected to provide a real-time detection of contacting cells, limited only by the time needed to induce the expression of reporter gene and the life-time of reporter protein. **ii) Lineage tracing of cells that underwent the specific cell-cell contact.** We propose the synNotch receptor that releases the flippase (Flp) from the internal domain. This recombinase will permanently remove the STOP signal to trigger the expression of tdTomato. The system is expected to allow for clonal tracing of cells that have contacted the studied population together with all progeny of these cells.

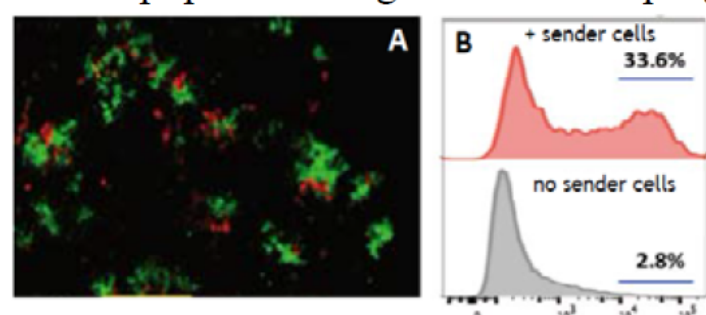


Fig. 4. A: synNotch⁺ receiver cells formed monolayer. Then eGFP⁺ sender cells were added (at 10:1 ratio). Expression of tdTomato in receivers was induced by cell-cell contact. **B:** FACS demonstrating the induction of reporter in presence of senders and low background when senders are absent.

While the synNotch receptors were shown to work *in-vitro* and were used for *ex-vivo* cell modifications^[26,39], till now there are **no mouse models that utilize this technology**. As a part of preparatory work, we generated all needed constructs and verified their functionality in cells cultured *in-vitro* (Fig. 4) or implanted *in-vivo* (data in the full version). Furthermore, **we obtained first mice** with eGFP reporter gene introduced at *rosa26* locus. Similarly, zygotes transduced with synNotch receptor introduced by attP sites to *H11* locus, were implanted to foster mothers. First pups were born and females are pregnant.



Just an example

4. *Determining the role of mesenchymal compartment in aging of ECs in hematopoietic niche.*

Rationale. Aged endothelium is sufficient to impart hematopoietic aging on young HSCs^[20]. But it is not known, *whether aging of endothelial cells is an autonomous, intrinsic process or, maybe, it can be modulated by external signals from the mesenchymal compartment.* We will use the ossicle model to answer this question and check whether young MSCs can improve function of endothelial cells in perivascular niche.

Experimental strategy. We will implant young and old MSCs to the same mouse to form two separate ossicles. Thereby, in young animals we will generate the niche with young ECs interacting with old or young mesenchymal compartment. Similar scheme will be used in old animals. Here, old endothelium will interact in the ectopic niche with old or young mesenchymal compartment. We will investigate the phenotype and localization of ECs. Function of the niche will be assessed by analysis of subpopulation profile of hematopoietic cells. Also, we will analyze the HSC cell cycle (fraction of cells at G₀ phase)^[46] and their metabolic status (ATP and ROS levels)^[47] – two features deregulated in aged HSCs. The differentiation potential and putative myeloid bias will be measured using colony forming assay or – if reasonable – by transplantation assay, like in in our earlier studies. If we demonstrate that MSC affect the phenotype of endothelium we will investigate the underlying pathways using modified MSCs. Gene of interests will be overexpressed (using lentiviral vectors) or knocked out (using Crispr/Cas9)^[44].



Editing - simple but important

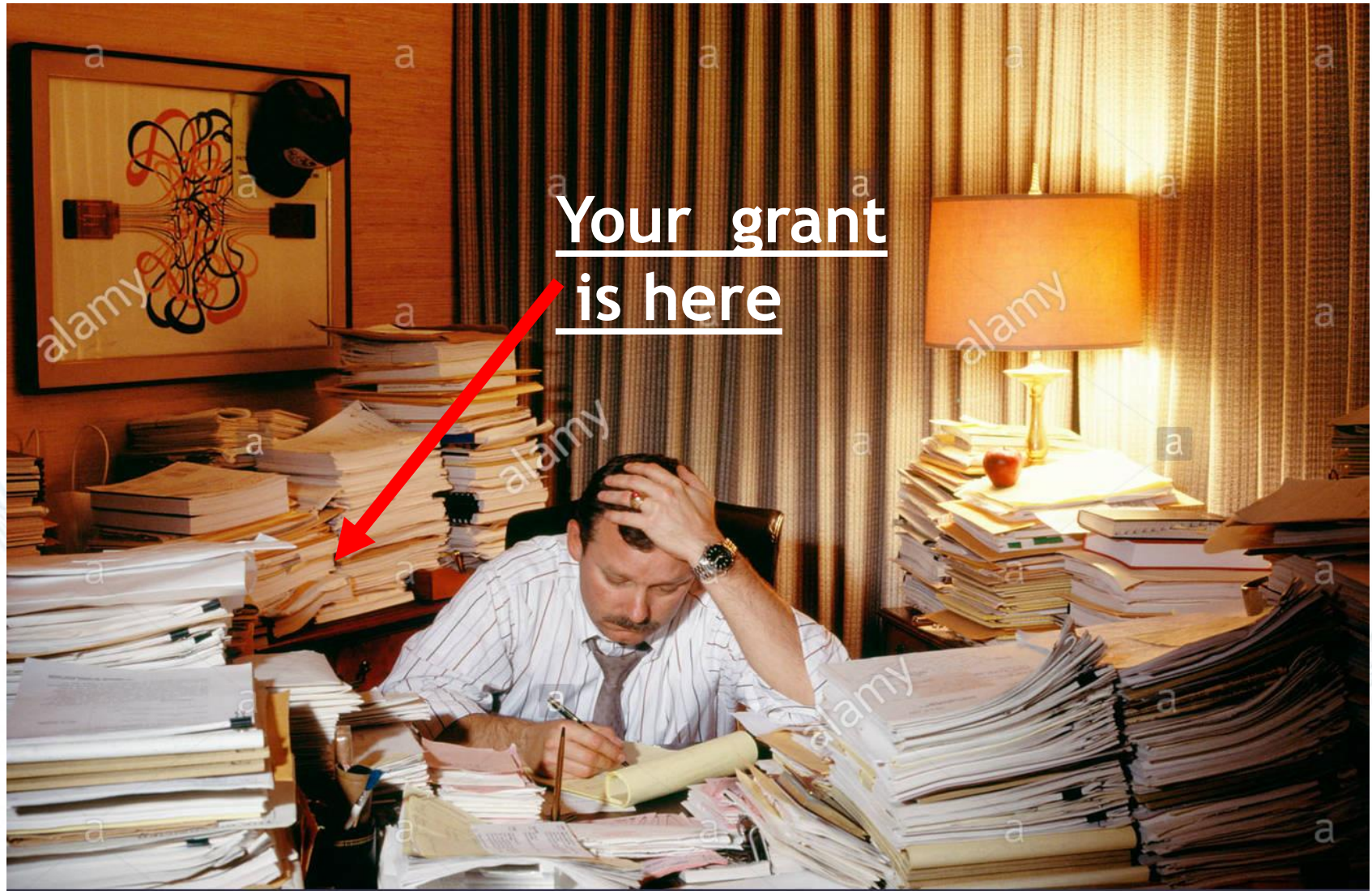


- Editing process is enforced (and monitored ☹) by the computer systems
- Use **consistent layout**, aided by headings, subheadings. Headings should be informative.
- Use bold, underline and italics (the same scheme throughout the text)
- Less is more: remove all unnecessary words
- Arial 11 font is 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



Your grant
is here

Help your reviewer...



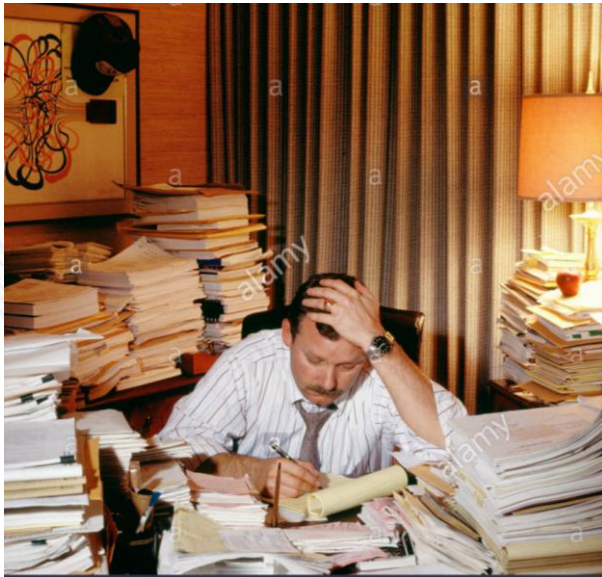
Kicia the Cat cooks

nice book for
3 years old

(personal opinion of
young parents from
our team😊)



Help your reviewer...



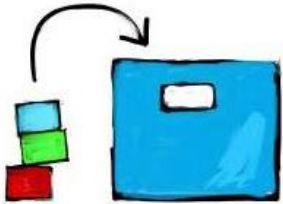
The reviewer's
brain after reading
15 grant
applications night
before deadline

≈

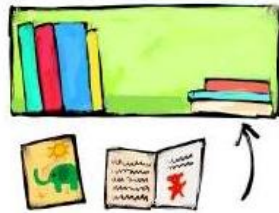
The brain of
3-years old



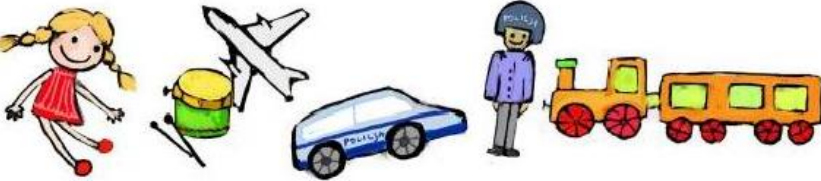
Przed pracą w kuchni:



Kicia Kocia wrzuciła klocki do klockowego pudełka.



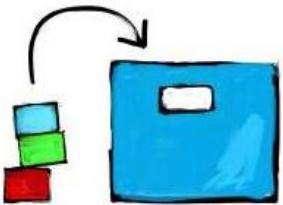
Kicia Kocia odłożyła książki na książkową półkę.



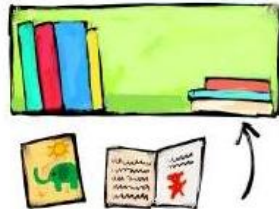
Kicia Kocia poskładała wszystkie zabawki.
Kicia Kocia pięknie posprzątała!



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!

~~Kicia Kocia umieściła służące zabawie, proste - niemniej mogące podlegać różnym kreatywnym i nowatorskim wariantom składania elementy, w dedykowanym do tego celu pudełku.~~

~~Ta samica kota domowego odłożyła książki na specjalną półkę służącą do przechowywania dzieł literackich.~~

~~Ta przedstawicielka gatunku, który jak się wydaje, może robić „mrrrrrr” i „miau”, uporządkowała dostępną przestrzeń, wprowadzając ład i znacząco zwiększając estetykę otoczenia.~~

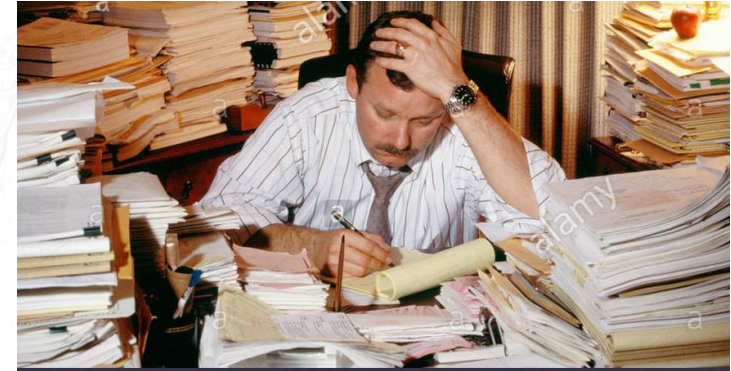
Help your reviewer...

“The growing body of evidence suggests that...”

Please, please don't use it in your grants...

We conducted an investigation of it.

We investigated it. *conducted >> empty verb*



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.

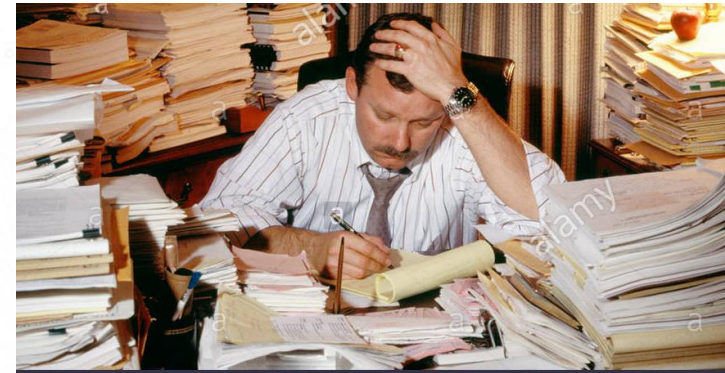
Help your reviewer...

- **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.



Final hint: leave enough time

Noland's Law:

One hour before the grant needs to go out,
the computer will break.

Excellence of the Research Project

- ✓ Ground-breaking nature
- ✓ Potential impact
- ✓ Scientific approach

Excellence of the Principal Investigator

- ✓ Intellectual capacity
- ✓ Creativity
- ✓ Scientific expertise and capacity to execute the project



**The Host Institution is not an evaluation criterion –
quality of PI's past, current or future institution is not evaluated**

Project layout

Research proposal [Part B1]

*(Part B1 is evaluated both in Step 1 and Step 2,
Part B2 is evaluated in Step 2 only)*

SUMMARY (half of page)

Section a: Extended Synopsis of the scientific proposal

(5 pages)



References Part B1



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:



Section b: Curriculum vitae (max. 2 pages)

PERSONAL INFORMATION

EDUCATION

CURRENT POSITIONS

PREVIOUS POSITIONS

FELLOWSHIPS AND AWARDS

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

TEACHING ACTIVITIES

ORGANISATION OF SCIENTIFIC MEETINGS

INSTITUTIONAL RESPONSIBILITIES

REVIEWING ACTIVITIES

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

MAJOR COLLABORATIONS

CAREER BREAKS



Appendix: All on-going grants and submitted grants applications of the PI (Funding ID)

<i>Project Title</i>	<i>Funding source</i>	<i>Amount (Euros)</i>	<i>Period</i>	<i>Role of the PI</i>	<i>Relation to current ERC proposal²</i>
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Section c: Ten years track-record (max. 2 pages)



Individual Evaluation Report - step 1

Criterion 2 - PRINCIPAL INVESTIGATOR

Intellectual capacity, creativity and commitment

Your score: ... of 5

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

Your score:

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

Your score:



Gravity is optional



Individual Evaluation Report - step 1



Expertise missing

To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?

Your score:

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

Your score:

Comments:

Scientific approach

To what extent is the proposed research methodology appropriate to achieve the goals of the project?

....

To what extent does the proposal involve the development of novel methodology?

....

To what extent are the proposed timescales and resources necessary and properly justified?

....

Comments:



Don't make things too complicated

Criterion 2 - PRINCIPAL INVESTIGATOR

To what extent does the PI demonstrate the level of commitment to the project necessary for its execution and the willingness to devote a significant amount of time to the project (min 30% of the total working time on it and min 50% in an EU Member State or Associated Country)?

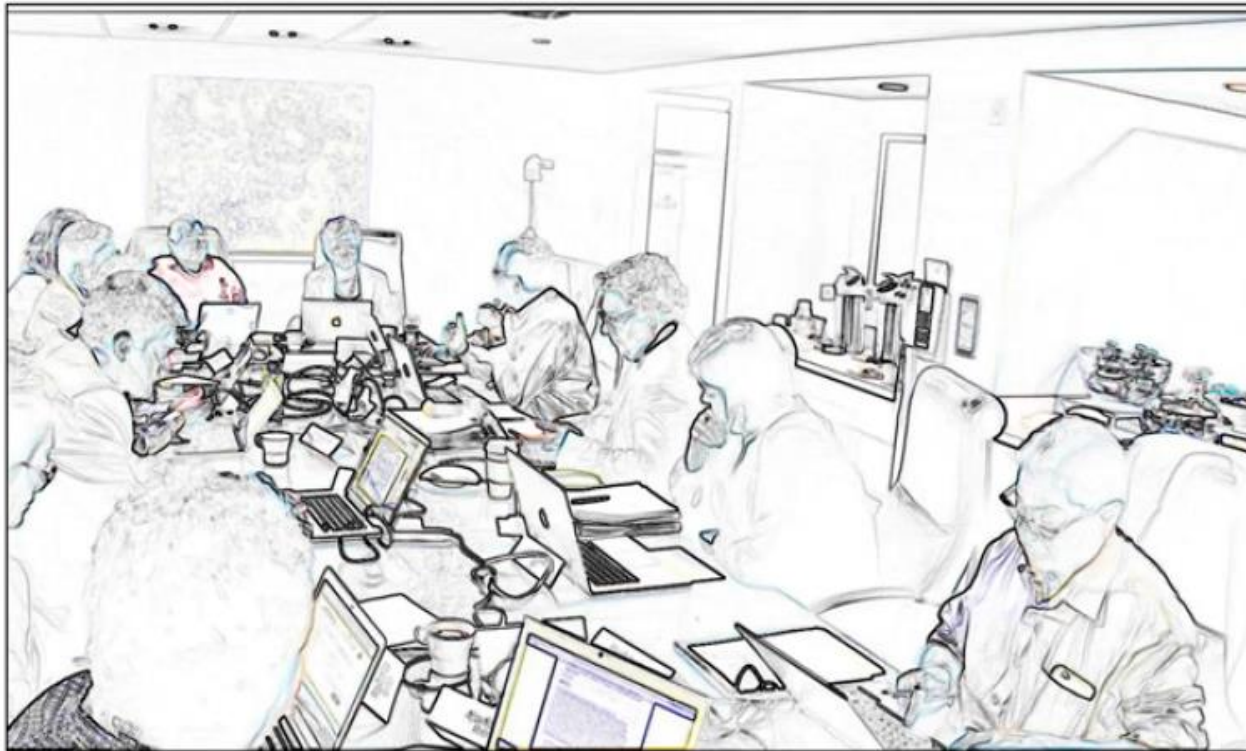
Your score:

Comments:



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



Current grant system: evaluation panels

1. Research Project	2. Principal Investigator	Total score
1.5	1.5	3.0
1.0	2.0	3.0
1.5	1.0	2.5
2.0	2.0	4.0
1.5	1.6	3.1

2. Principal Investigator					1.5
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?					X
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?				X	
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?				X	

2. Principal Investigator					2.0
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?				X	
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?				X	
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?				X	

2. Principal Investigator					1.0
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?					X
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?					X
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?					X



Current grant system: evaluation panels

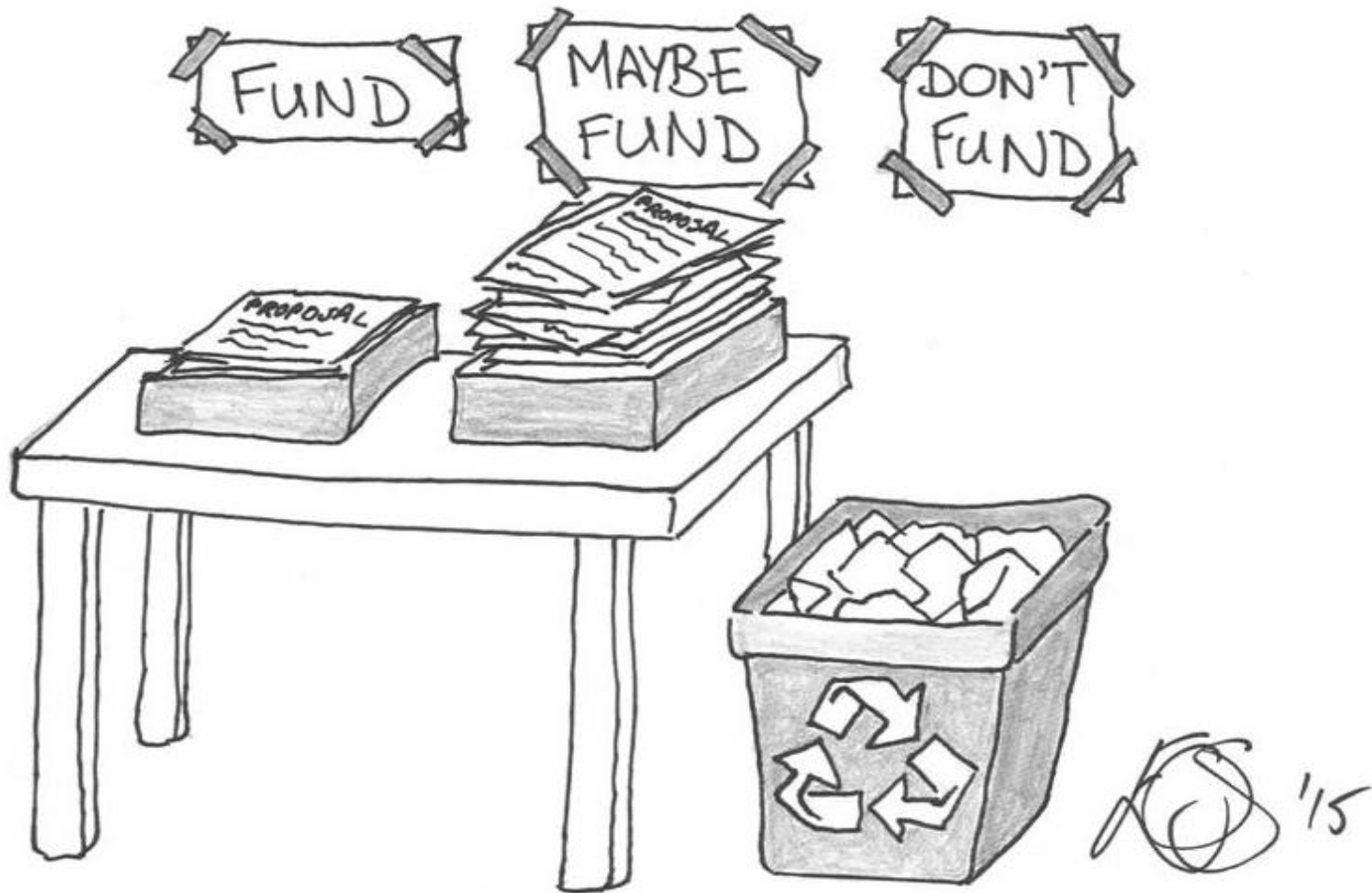
1. Research Project	2. Principal Investigator	Total score
4.5	5.0	9.5
4.5	5.0	9.5
3.5	5.0	8.5
4.5	5.0	9.5
4.2	5.0	9.3

2. Principal Investigator					5.0
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?	X				
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?	X				
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?	X				

2. Principal Investigator					5.0
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?	X				
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?	X				
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?		X			

2. Principal Investigator					5.0
	Exceptional	Excellent	Very good	Good	Non-competitive
To what extent has the PI demonstrated the ability to conduct ground-breaking research?	X				
To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?	X				
To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?	X				

Review panel categories (universal)



Be confident...

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www.nicheworks.eu

