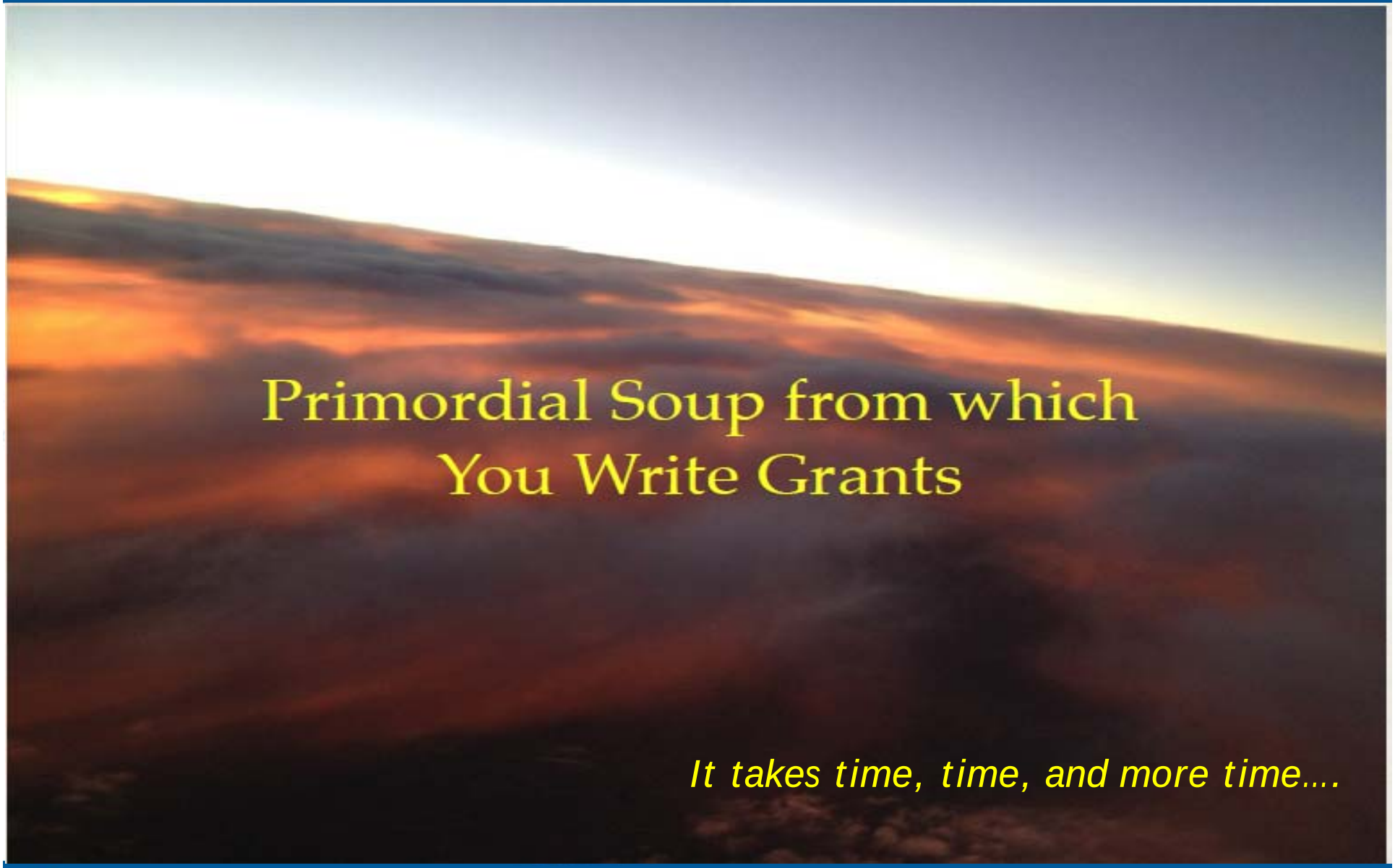
JAGIELLONIAN UNIVERSITY
IN KRAKOW

How to write a good project: tips and traps

Alicja Józkowicz

Department of Medical Biotechnology,
Faculty of Biochemistry, Biophysics and Biotechnology,
Jagiellonian University

Starting the grant writing



Starting the grant writing

Załącznik nr 1 do Regulaminu postępowania w zakresie przygotowania oraz realizacji w Uniwersytecie Jagiellońskim projektów finansowanych ze źródeł zewnętrznych

Data wpływu		Podpis pracownika Działu obsługującego fundusze zewnętrzne	

FORMULARZ ZGŁOSZENIA ZAPOTRZEBOWANIA NA PROJEKT		
1.	**IMIĘ I NAZWISKO OSOBY ZGŁASZAJĄCEJ:**	Alicja Józkowicz
	TEL.:	12 664 6411
	E-MAIL:	alicja.jozkowicz@uj.edu.pl
	JEDNOSTKA UJ *(np. wydział, jednostka pozawydziałowa, międzywydziałowa, jednostka administracji ogólnouczelnianej)* **JEDNOSTKA ZGŁASZAJĄCA ZAPOTRZEBOWANIE NA PROJEKT** *(np. instytut, katedra, zakład)*	Zakład Biotechnologii Medycznej, Wydział Biochemii, Biofizyki i Biotechnologii
2.	**KRÓTKI OPIS PLANOWANEGO PRZEDSIĘWZIĘCIA** Proszę wyjaśnić na czym polega przedsięwzięcie, które chcą Państwo sfinansować	projekt ma za zadanie określenie cech charakterystycznych chłoniaków pozawęzłowych (w porównaniu do lokalizacji węzłowej) oraz zbadania na ile fenotyp komórek uważanych za komórki inicjujące odzwierciedla ich potencjał metastatyczny
3.	**RODZAJ I WYSOKOŚĆ KOSZTÓW** Proszę określić, jeśli to możliwe na tym etapie, rodzaje wydatków, jakie będą do poniesienia oraz ich szacunkowe kwoty (np. wynagrodzenia, usługi, aparatura, inwestycja, inne)	wynagrodzenia: 406 000 zł (etat dla postdoka, 50% etatu technika, umowa zlecenia dla dwóch techników) odczynniki/zwierzęta: 565 000 zł koszty konferencji: 16 000 zł koszty publikacji (open access): 18 000 zł aparatura: brak łącznie koszty bezpośrednie: 1 005 000 zł koszty pośrednie: 201 000 zł całość: 1 206 000 zł
4.	**PRZEWIDYWANY CZAS REALIZACJI** Proszę wskazać planowany okres realizacji przedsięwzięcia	5 lat (np. styczeń 2016 - grudzień 2020)
5.	**STAN PRZYGOTOWANIA** Proszę określić etap prac przygotowawczych (np. czy zostały już opracowane dokumenty dla przedsięwzięcia, w tym np. dokumentacja techniczna)	przygotowywanie ostatecznej wersji projektu, zakończone planowanie zakresu badań i harmonogramu prac
6.	**UWAGI** Proszę podać inne istotne uwagi i informacje nieujęte w Formularzu	wypełnianie tego typu Formularzy wpływa negatywnie na proces merytorycznego opracowywania projektów badawczych

Starting the grant writing

Załącznik nr 2 do Regulaminu postępowania w zakresie przygotowania oraz realizacji w Uniwersytecie Jagiellońskim projektów finansowanych ze źródeł zewnętrznych

Data wpływu		Podpis pracownika Działu obsługującego fundusze zewnętrzne	

FORMULARZ ZGŁOSZENIA PROJEKTU

CZĘŚĆ A. PODSTAWOWE INFORMACJE O PROJEKCIE
WYPEŁNIA AUTOR PROJEKTU

1.	**TYTUŁ PROJEKTU**	Molekularne, biologiczne i fizyczne cechy agresywnych chłoniaków węzłowych i pozawęzłowych dużego limfocyta B
2.	**NAZWA PROGRAMU**	Symfonia
3.	**NAZWA KONKURSU**	Symfonia-3
4.	**DATA ZAMKNIĘCIA KONKURSU**	12/03/2015
5.	**JEDNOSTKA UJ** *(np. wydział, jednostka pozawydziałowa, międzywydziałowa, jednostka administracji ogólnouczelnianej)*	Wydział Biochemii, Biofizyki i Biotechnologii
6.	**JEDNOSTKA REALIZUJĄCA PROJEKT** *(np. katedra, instytut, zakład)*	Zakład Biotechnologii Medycznej
7.	**AUTOR PROJEKTU**	tytuł, imię i nazwisko: prof. dr hab. Alicja Józkowicz
		tel.: 12 664 6411
		e-mail: alicja.jozkowicz@uj.edu.pl
8.	**OSOBA DO KONTAKTU** *(jeśli inna niż wskazana w pkt 7 Formularza)*	tytuł, imię i nazwisko: jak wyżej
		tel.:
		e-mail:
9.	**RODZAJ PROJEKTU**	a. badawczy X; b. edukacyjny ☐
		c. inwestycyjny ☐; d. inny ☐
10.	**OPIS CELU/CELÓW PROJEKTU**	Zbadanie wpływu specyficzności tkankowej niszy na profil ekspresji genów, fenotyp chłoniaków pozawęzłowych Zbadanie interakcji komórek chłoniaków pozawęzłowych z komórkami śródbłonka z niszy Zbadanie na ile fenotyp typowy dla komórek LIC (inicjujących) określa faktyczny potencjał matastatyczny
11.	**PLANOWANE REZULTATY PROJEKTU** *(proszę wymienić)*	zrozumienie badanych zagadnień i przedstawienie uzyskanych wyników w publikacjach
12.	**OKRES REALIZACJI PROJEKTU**	np. od 1/01/2016-1/31.12.2018
13.	**PROJEKT REALIZOWANY W KONSORCJUM**	Tak X; Nie ☐
14.	**ROLA UJ W PROJEKCIE***	a. lider ☐; b. partner X
15.	**PLANOWANA CAŁKOWITA WARTOŚĆ PROJEKTU**	ok. 5 000 000 zł
16.	**KWOTA I POZIOM FINANSOWANIA PROJEKTU ZE ŹRÓDEŁ ZEWNĘTRZNYCH**	a. kwota finansowania: ok. 5 000 000 zł b. poziom finansowania: 100%
17.	**KWOTA I POZIOM FINANSOWANIA CZĘŚCI PROJEKTU REALIZOWANEJ PRZEZ UJ W RAMACH KONSORCJUM**	a. kwota finansowania: 1 206 000 zł (koszty bezpośrednie: 1 005 000 zł) b. poziom finansowania: 100% c. nie dotyczy ☐
18.	**WKŁAD WŁASNY UJ**	Tak ☐; a. procentowo: b. kwotowo: c. źródło finansowania: Nie X
19.	**DEKLAROWANE WYKORZYSTANIE WŁASNYCH ZASOBÓW**	a. pomieszczenia X; b. urządzenia X; c. osoby X; d. inne ☐; e. nie dotyczy ☐
20.	**KOSZTY NIEKWALIFIKOWANE**	a. kwotowo: ; b. źródło finansowania: ; c. nie dotyczy X

1

Starting the grant writing

Załącznik nr 2 do Regulaminu postępowania w zakresie przygotowania oraz realizacji w Uniwersytecie Jagiellońskim projektów finansowanych ze źródeł zewnętrznych

21.	ŹRÓDŁO PREFINANSOWANIA WYDATKÓW PROJEKTU (TRYB REFUNDACYJNY)		nie dotyczy X	
22.	ŹRÓDŁO KREDYTOWANIA WYDATKÓW PROJEKTU**	nie dotyczy		
23.	KOSZTY POŚREDNIE/OGÓLNE	a. procentowo: 20 %	b. kwotowo: 201 000 zł	c. nie dotyczy ☐
24.	SPOSÓB ROZLICZANIA PROJEKTU	a. zaliczka: X	b. refundacja: ☐	

*jeśli dotyczy
**dotyczy zaliczkowego trybu finansowania Projektu ze źródeł zewnętrznych w sytuacjach w których konieczne jest, na zasadzie wyjątku, tymczasowe zapewnienie środków finansowych dla bieżącej obsługi Projektu

CZĘŚĆ B. OCENA KWALIFIKOWALNOŚCI PODATKU VAT W PROJEKCIE WYPEŁNIA AUTOR PROJEKTU			
	PYTANIE	TAK	NIE
1.	Czy w wyniku Projektu powstaną publikacje naukowe?	X	☐
2.	Czy w wyniku Projektu powstaną publikacje, które będą udostępniane odpłatnie?	☐	X
3.	Czy w wyniku Projektu planowane jest uzyskanie tytułów naukowych?	☐	X
4.	Czy rezultaty Projektu będą służyć bezpośrednio działalności dydaktycznej?	X	☐
5.	Czy w wyniku Projektu planowane jest uzyskanie patentu (zgłoszenie patentowe)?	☐	X
6.	Czy w ramach Projektu udzielane będą stypendia?	☐	X
7.	Czy planowane jest odpłatne udostępnienie wyników Projektu, np. w formie udzielenia licencji do wyników badań, poprzez wdrożenie przemysłowe lub w inny sposób?	☐	X
8.	Czy majątek zakupiony/wytworzony w Projekcie będzie wynajmowany lub odpłatnie udostępniany w inny sposób?	☐	X
9.	Czy majątek zakupiony/wytworzony w Projekcie będzie wykorzystywany do świadczenia odpłatnych usług zamawianych np. przez przedsiębiorstwa lub inne uczelnie?	☐	X
10.	Czy w ramach Projektu lub w jego wyniku UJ będzie świadczył odpłatne usługi szkoleniowe?	☐	X
11.	Czy istnieje zidentyfikowany odbiorca, który zainteresowany jest zakupem rezultatów Projektu?	☐	X
12.	Czy UJ będzie jedynym właścicielem rezultatów Projektu, np. uzyskanego patentu?	☐	X

Data i podpis Autora projektu	

Wyrażam zgodę na przygotowanie i realizację Projektu:

Data, podpis i pieczęć Kierownika Jednostki realizującej projekt *(dyrektor instytutu/kierownik katedry/kierownik zakładu)*	

Starting the grant writing

Załącznik nr 2 do Regulaminu postępowania w zakresie przygotowania
oraz realizacji w Uniwersytecie Jagiellońskim projektów finansowanych ze źródeł zewnętrznych

Data, podpis i pieczęć Kierownika jednostki UJ *(dziekan, kierownik jednostki międzywydziałowej/ pozawydziałowej/jednostki administracji ogólnouczelnianej)*	

CZĘŚĆ C. WERYFIKACJA ZAŁOŻEŃ PROJEKTU WYPEŁNIA PRACOWNIK DZIAŁU OBSŁUGUJĄCEGO FUNDUSZE ZEWNĘTRZNE				
	PYTANIE	TAK	NIE	NIE DOTYCZY
1.	Uczelnia wyższa może aplikować w Konkursie	☐	☐	☐
2.	Uczelnia wyższa może aplikować w ramach Konsorcjum	☐	☐	☐
3.	Prawidłowo określona rola UJ (partner/lider) w ramach Konsorcjum	☐	☐	☐
4.	Projekt zgodny z celami Konkursu/Programu	☐	☐	☐
5.	Prawidłowo określona wartość budżetu	☐	☐	☐
6.	Prawidłowo określony poziom finansowania ze źródeł zewnętrznych	☐	☐	☐
7.	Prawidłowo określony Wkład własny	☐	☐	☐
8.	Czy Formularz zgłoszenia projektu wpłynął w terminie wskazanym w Regulaminie?	☐	☐	
Uwagi do Formularza zgłoszenia projektu:				

Sprawdził pod względem formalnym:	
Imię i nazwisko pracownika Działu obsługującego fundusze zewnętrzne	
Data i podpis pracownika Działu obsługującego fundusze zewnętrzne	
Zatwierdził pod względem formalnym:	
Data, podpis i pieczęć Kierownika Działu obsługującego fundusze zewnętrzne	
Ocena kwalifikowalności podatku VAT: kwalifikowany/niekwalifikowany/rozliczany wg struktury sprzedaży**	
Data, podpis i pieczęć pracownika jednostki właściwej ds. podatków	
Sprawdził pod względem finansowym***	
Data, podpis i pieczęć Kwestora UJ	

**właściwe podkreślić

Starting the grant writing

Załącznik nr 3 do Regulaminu postępowania w zakresie przygotowania oraz realizacji w Uniwersytecie Jagiellońskim projektów finansowanych ze źródeł zewnętrznych

Formularz oceny ryzyka ex ante w projekcie (wypełnia Autor projektu)

Tytuł Projektu: Molekularne, biologiczne i fizyczne cechy agresywnych cłoniaków węzłowych i pozawęzłowych dużego limfocyta B

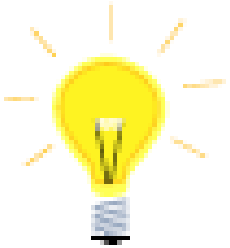
Jednostka realizująca projekt: Zakład Biotechnologii Medycznej, Wydział Biochemii, Biofizyki i Biotechnologii

Autor projektu: prof. dr hab. Alicja Józkowicz

1	2		3	4		5	6
Lp.	**Czynnik ryzyka**		**Wartość czynnika ryzyka**	**Charakterystyka poziomu ryzyka warunkowanego prawdopodobieństwem i skutkiem wystąpienia danego czynnika ryzyka (skala 0-4)**	**Poziom ryzyka (skala 1-4) - do wypełnienia**	**Działania zaradcze ograniczające poziom ryzyka - do wypełnienia**	**Proponowane działania zaradcze ograniczające poziom ryzyka**
1	Rzeczowa realizacja Projektu	Uczestnictwo Konsorcjantów w Projekcie, w tym Konsorcjantów zagranicznych (liczba)	0 1-2 3-5 >5	Brak podmiotów – brak ryzyka (0) 1-2 podmiotów – niski (1) 3-5 podmiotów – średni (2) >5 podmiotów – wysoki (3)	2	Odpowiednio przygotowana Umowa konsorcjum.	Odpowiednio przygotowana Umowa konsorcjum. Powoływanie doświadczonych Zespołów projektowych. Szczegółowe zaplanowanie działań monitorujących postęp prac (np. okresowych sprawozdań i rozliczeń projektowych). Organizacja regularnych spotkań projektowych.
2		Wewnętrzni partnerzy Projektu (Jednostki UJ/Jednostki wewnętrzne jednostek UJ)	0 1-2 3-5 >5	Brak partnerów – brak ryzyka (0) 1-2 partnerów – niski (1) 3-5 partnerów – średni (2) >5 partnerów – wysoki (3)	0	-	Powoływanie doświadczonych zespołów projektowych. Szczegółowe zaplanowanie działań monitorujących postęp prac (np. okresowych sprawozdań i rozliczeń projektowych). Organizacja regularnych spotkań projektowych.
3		Rola Uniwersytetu Jagiellońskiego	Samodzielna realizacja Podwykonawca Parter Lider	Samodzielna realizacja - brak ryzyka (0) Podwykonawca - niski (1) Partner – średni (2) Lider – wysoki (3)	2	Odpowiednio przygotowana Umowa konsorcjum.	Odpowiednio przygotowana Umowa konsorcjum. Opracowanie szczegółowego harmonogramu prac. Opracowanie szczegółowego zakresu obowiązków Konsorcjantów.
4		Tematyka Projektu pokrywa się z podstawową działalnością Jednostki realizującej projekt	Pokrywa się Nie pokrywa się	Pokrywa się – niski (1) Nie pokrywa się - wysoki (3)	1	Zaangażowanie w realizację projektu osób merytorycznie przygotowanych do pracy	Przygotowanie szczegółowego harmonogramu prac. Opracowanie alternatywnych postępowań w sytuacjach kryzysowych. Zaangażowanie w realizację projektu osób merytorycznie przygotowanych do pracy, w tym ekspertów zewnętrznych.
5		W Projekcie realizowane są prace budowlane	Nie Tak, modernizacyjno-remontowe Tak, budowlane	Nie są realizowane - brak ryzyka (0) Tak, modernizacyjno-remontowe - wysoki (3) Tak, budowlane - bardzo wysoki (4)	0	-	Prawidłowe przygotowanie inwestycyjnych Dokumentów projektowych. Opracowanie szczegółowego harmonogramu prac i podziału zadań. Szczegółowe zaplanowanie działań monitorujących postęp prac. Zaangażowanie w realizację Projektu osób merytorycznie przygotowanych do pracy.
6		Udział osób i instytucji objętych pomocą w ramach Projektu (liczba)	0 1-50 51-200 >200	0 - brak ryzyka (0) 1 – 50 korzystających - niski (1) 50 – 200 korzystających - średni (2) >200 korzystających - wysoki (3)	0	-	Powołanie doświadczonego Zespołu projektowego, w tym specjalisty ds. rekrutacji i monitoringu. Opracowanie precyzyjnego regulaminu uczestnictwa w Projekcie. Opracowanie kompleksowego planu promocji.
7		Liczba planowanych projektowych postępowań przetargowych	0 1-4 5-9 10-20 >20	0 postępowań – brak ryzyka (0) 1-4 postępowań - niski (1) 5-9 postępowań - średni (2) 10-19 postępowań - wysoki (3) >20 postępowań – bardzo wysoki (4)	0	-	Przygotowanie harmonogramu postępowań przetargowych. Profesjonalne opracowywanie SIWZ. Prawidłowy dobór członków komisji przetargowych.
8	Okres realizacji projektu	Czas trwania Projektu (w miesiącach)	<12 13-24 25-36 >36	<12 miesięcy – niski (1) 13-24 miesiące - średni (2) 25-36 miesięcy - wysoki (3) >36 miesięcy - bardzo wysoki (4)	3	Odpowiednie planowanie prac projektowych	Odpowiednie planowanie prac projektowych, uwzględniające okresy rozliczeniowe, czasową kumulację zadań, okresy urlopowe.

General rules

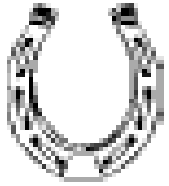
Elements of Grant Success



Good Ideas

Good Reviewers

Good Timing



Good Luck

Good Presentations

Good Grantsmanship

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.

General rules

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

Persue original science!

"This application is characterized by ideas that are both original and scientifically important. Unfortunately, the ideas that are scientifically important are not original and ideas that are original are not scientifically important"

Follow the KISS (Keep It Simple and Succinct)

General rules

Don't make things too complicated

Style:

- Clarity is a priority

- Sentences usually shorter than in article

- Key phrases are underlined or bolded to make them stand out

Specificity of project writing

Work plan

We aim to investigate to which extent and through which mechanism(s) the melanoma cells with high level of HO-1 can gain or maintain the features typical for MIC. We will focus on three major aspects: i) effect of HO-1 on formation of MIC; ii) effect of HO-1 on function of MIC, and iii) effect of HO-1 on vascular mimicry in melanoma.

1. Effect of HO-1 on formation of MIC.

a) Rationale and preliminary data

Relatively high proportion of melanoma cells was shown to be tumorigenic and capable of unlimited proliferation. Thus, if CSC are defined as a distinct, fixed, hierarchical subpopulation, then melanoma does not conform to the classical CSC model. It seems also that tumorigenic surface markers, typical for MIC, can to be reversibly expressed by melanoma cells [Girouard & Murphy 2011]. We suppose, that the important factor influencing their expression is the upregulation of HO-1. Our preliminary results suggest that some murine melanoma cells express the Sca-1 antigen and that Sca-1$^+$ subpopulation is more numerous in HO-1 overexpressing cells, especially under hypoxic conditions (2% O_2), which are known to promote less differentiated phenotype in melanoma [Cheli et al. 2012]. Similarly, HO-1 leads to increase in number of ALDH$^+$ cells in hypoxia (Fig. 1).

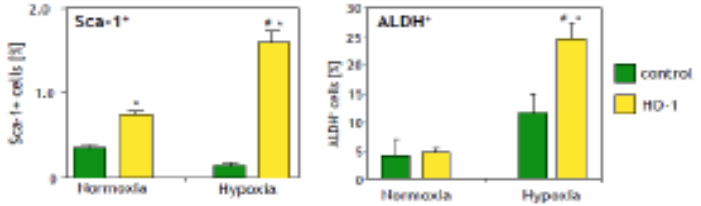


Fig. 1. Effect of HO-1 overexpression on population of Sca-1$^+$ and ALDH$^+$ B16(F10) murine melanoma cells. Flow cytometry. H. Was (Krakow) and K. Weglarczyk (Orleans).

b) Research strategy

Experiments will be performed in murine melanoma cells with normal (B16(F10)) and elevated expression of HO-1 (B16-F10)-HO1). If effect of HO-1 is found, we will check whether it can be reversed by HO-1 inhibition. We plan to use the siRNA and pharmacological inhibitor: tin protoporphyrin (SnPPIX) or pegylated zinc mesoporphyrin (ZnMPIX-PEG). SnPPIX is commonly used *in vitro* and is effective also *in vivo* (Fig. 2A). ZnMPIX-PEG has similar activities but because of pharmacokinetic properties can be more suitable for *in vivo* application. We do not want to propose those porphyrins as a potential drugs, but we plan to use them to prove a concept of feasibility of HO-1 inhibition.

We plan to carry out the following analyzes:

1/1. Comparison of frequency of MIC defined by different markers (Sca-1, ABCB5, ABCB1, ALDH activity, CD44, CD133, CD24 and their combination) in B16(F10) cells with normal and elevated expression of HO-1. Cells will be cultured in normoxia and hypoxia. Subpopulations will be analyzed using flow cytometry phenotyping.

1/2. Analysis of expression of major melanoma differentiation markers (Mart-1 and gp100) in the subpopulations studied. These markers are well-characterized and have been used as

Style:

- Sentences are shorter

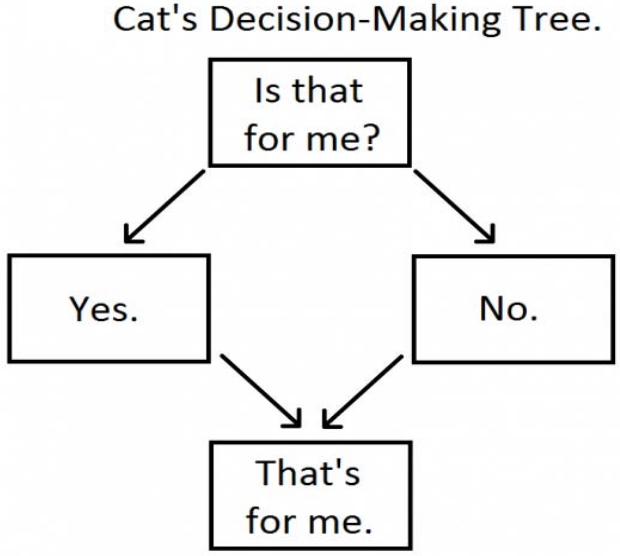
- Key phrases are underlined or bolded to make them stand out

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*

Sponsor goals:

- Devote a good deal of time highlitining passages that express **what the sponsors want to accomplish**.



"Grant programs do not exist to make me successful, but rather my job is to make those programs successful".

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 must be a plan how to use funding to accomplish goals.

- Project should indicate the expected outcomes.

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

- **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
Personal tone:
Conveys excitement
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.

- Grant writers are expected to convince the reviewer that they 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 proposal usually describes plans for a reseach group, not solitary scientist.

- Large multi-investigator proposals are divided for work-packages (often with independent funding and PI). They are written (and rewritten ☺) by several researchers and edited by the lead writer.

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 reviewers have limited time and deadly deadlines.

- If the proposal does not intrigue them by the very first page, they will not read carefully any further (to prepare the revision they will quicly look for the reasons to justify rejection)

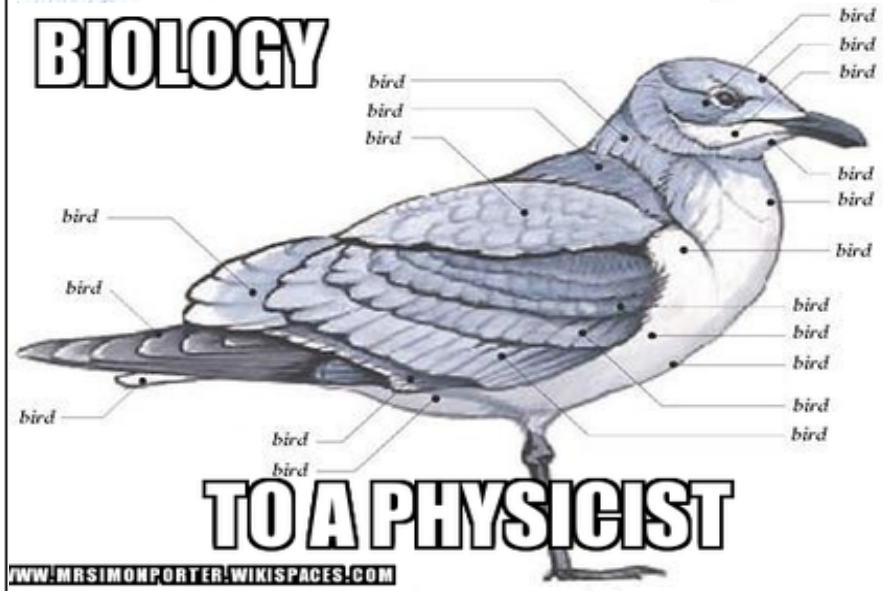
- **Your writing must be clear and concise**.

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.



Example of hints for reviewers

CRITERIA FOR RATING OF NIH GRANT APPLICATIONS

Each review must address and score (1-7 integer scale) each of the following:

Significance [impact]

- address an important problem?
- will scientific knowledge be advanced?
- effect on concepts or methods in this field?

Approach

- experimental design and methods appropriate to aims?
- acknowledge problem areas and consider alternative tactics?

Innovation

- employ novel concepts, approaches or methods?
- challenge existing paradigms or develop new methodologies?

Investigator

- appropriately trained to carry out work?
- appropriate work for experience of P.I. and collaborators?

Environment

- contribute to the probability of success?
- evidence of institutional support?

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

Weaknesses pointed by reviewers

- The studies are more descriptive or correlative than mechanistic.

- The Background section is missing key publications and experimental findings.

- Alternative approaches or interpretation of data are inadequately described.

- Experimental details are lacking or have not been adequately described.

- This is not the appropriate grant mechanism.

Search in the right places…

General rule in reserch project

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

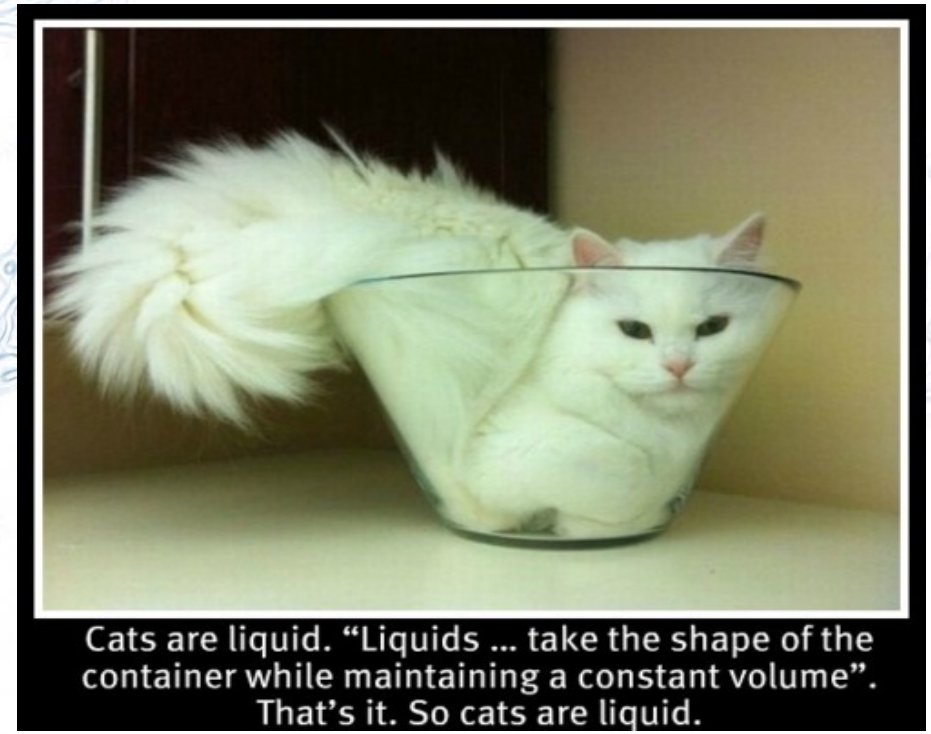
”This is hypothesis-driven science”

- Hypothesis driven proposal is a gold-standard in science

  * Observation

  * Hypothesis

  * Test the hypothesis
    (experiments and proper controls)



General assessment

- Reviewers will provide an **overall score** to reflect their assessment whether the research is worth doing, and probability that experiments will be successful.

Score	Descriptor	Additional Guidance on Strengths/Weaknesses
1	Exceptional	Exceptionally strong; essentially no weaknesses
2	Outstanding	Extremely strong; negligible weaknesses
3	Excellent	Very strong; only some minor weaknesses
4	Very Good	Strong but numerous minor weaknesses
5	Good	Strong but at least one moderate weakness
6	Satisfactory	Some strengths; some moderate weaknesses
7	Fair	Some strengths but at least one major weakness
8	Marginal	A few strengths; a few major weaknesses
9	Poor	Very few strengths; numerous major weaknesses

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 it easy for them to **find** things

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

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

Style of writing

- **Concise:** reviewers have little time to read your grant proposal

- **Clear:** reviewers have to sell your proposal to the review panel, so reviewer need to understand your proposal quickly (and correctly)

- **Don't try to snow reviewers – they can see right through that.**

Three most important rules

1. Read the application instructions carefully

2. Read the application instructions carefully

3. Read the application instructions carefully

Start writing

You need a good idea. But it is more than that.

Suggestion: Draft an outline.

- It is a simple thing to say, but not so ofen used. Can help and save time.

- **Start with the grant guidelines**, and sketch out what the funding agency wants in each section and subsection and in what order.

- Go back and **fill in the information** and ideas you want to include in each part of the grant.

- You will end up with an outline that can serve as a rough draft of your proposal tailored precisely to the call.

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

Presents the big picture....

.... concisely.

Abstract

- **Abstract should include:**

  * a self-contained description of the project

  * a brief background of the project

  * 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

Abstract

- **Suggestions:**

  * be complete but brief

  * use all the space alloted

  * avoid describing past accomplishments

  * write the abstract last so that it reflects the entire application
      # should be able to stand alone (it may be all the reviewers read…)

  * abstract can be used for purposes other than the review
      # provide a brief descriptiopn of the grant in annual reports,
      # presentations,
      # dissemination to the public

Abstract in the Preludium call

Abstract (1 page)

1. **Research project objectives/ Research hypothesis**
2. **Research project Methodology**
3. **Expected impact of the research project on the development of science, civilization and society**

Heme oxygenase-1 and progression of melanoma: role in cancer initiating cells

Research project objectives:

Heme oxygenase-1 (HO-1) is an antioxidative enzyme, upregulated in tumors, especially in response to chemotherapies or radiotherapies. We have shown, that increased expression of HO-1 significantly facilitates progression of melanoma and rhabdomyosarcoma, but not several other cancers. However, although in all cells HO-1 acts as an cytoprotective factor, its actual effect on tumor growth strictly depends on the cell type. This suggests a contribution of some other mechanism(s), independent of cytoprotection, which determine the role of HO-1 in progression of tumors. We hypothesize that the most important factor is the influence of HO-1 on cell differentiation, and that inhibition of melanoma cell differentiation by upregulated HO-1 is an important mechanism facilitating growth and metastasis of this cancer. **The aim of the project is to investigate the role of HO-1 in differentiation of melanomas and in formation and function of melanoma initiating cells (MIC).**

Research methodology:

Experiments will be performed in B16(F10) murine melanona cell lines with normal and increased expression of HO-1, cultured under normoxic or hypoxic conditions. We will investigate to which extent and through which mechanisms the melanoma cells overexpressing HO-1 acquire or maintain the features typical for MIC. Analyzes will be performed in general populations and on the sorted subpopulations of MIC and MC (bulk cells). We will examine the effect of HO-1 on expression of differentiation markers, the tumorigenic and angiogenic potential of cells, ability for vasculogenic mimicry, and influence on the tumor infiltrating immune cells. The most important aim is elucidation of the mechanisms responsible for the observed effects. To clarify them we will apply incubation of cells with HO-1 products or with inhibitors/activators of kinases and transcription factors, overexpression/silencing the genes, and delivery/inhibition of miRNA. Experiments in animal models will be carried out in syngeneic C57Bl/6J mice including those with stable expression of GFP to facilitate discriminating the tumor-forming cells of cancer- and host-origin. We will employ the *in vivo* imaging methods to monitor the growth, structure and vascularization of tumors.

Research project impact:

It is thought that radio- or chemotherapies affecting rapidly-dividing tumor cells do not destroy CSC. However, there is still not clear whether melanoma development relies on CSC. Our project will provide information on protumorigenic and provasculogenic function of MIC and melanoma bulk cells. The study will elucidate the mechanisms by which HO-1 facilitates the progression of melanoma and will verify whether inhibition of HO-1 may be proposed as target for supplementary anticancer therapy.

Inhibition of HO-1 by pharmacological inhibitors, such as SnPPIX and SnMPIX have been already used in clinic for the prevention of severe jaundice in infants. There are also some commonly used drugs, which – apart from their well-known activities – can decrease HO-1 expression. Therefore potential inhibition of HO-1 pathway is achievable. The results will be useful for oncologists (characterization of MIC) and for the researches interested in oxidative stress and angiogenesis (role of HO-1 in growth of tumor and vasculogenic mimicry).

Abstract in the Preludium call

1. Research project objectives/Research hypothesis

Research project objectives:

Heme oxygenase-1 (HO-1) is an antioxidative enzyme, upregulated in tumors, especially in response to chemotherapies or radiotherapies. We have shown, that increased expression of HO-1 significantly facilitates progression of melanoma and rhabdomyosarcoma, but not several other cancers. However, although in all cells HO-1 acts as an cytoprotective factor, its actual effect on tumor growth strictly depends on the cell type. This suggests a contribution of some other mechanism(s), independent of cytoprotection, which determine the role of HO-1 in progression of tumors. We hypothesize that the most important factor is the influence of HO-1 on cell differentiation, and that inhibition of melanoma cell differentiation by upregulated HO-1 is an important mechanism facilitating growth and metastasis of this cancer. **The aim of the project is to investigate the role of HO-1 in differentiation of melanomas and in formation and function of melanoma initiating cells (MIC).**

Abstract in the Preludium call

1. Research project objectives/Research hypothesis

Research project objectives:

Heme oxygenase-1 (HO-1) is an antioxidative enzyme, upregulated in tumors, especially in response to chemotherapies or radiotherapies. **We have shown, that increased expression of HO-1 significantly facilitates progression of melanoma and rhabdomyosarcoma, but not several other cancers. However, although in all cells HO-1 acts as an cytoprotective factor, its actual effect on tumor growth strictly depends on the cell type. This suggests a contribution of some other mechanism(s), independent of cytoprotection, which determine the role of HO-1 in progression of tumors.** We hypothesize that the most important factor is the influence of HO-1 on cell differentiation, and that inhibition of melanoma cell differentiation by upregulated HO-1 is an important mechanism facilitating growth and metastasis of this cancer. **The aim of the project is to investigate the role of HO-1 in differentiation of melanomas and in formation and function of melanoma initiating cells (MIC).**

Abstract in the Preludium call

1. Research project objectives/Research hypothesis

Research project objectives:

Heme oxygenase-1 (HO-1) is an antioxidative enzyme, upregulated in tumors, especially in response to chemotherapies or radiotherapies. We have shown, that increased expression of HO-1 significantly facilitates progression of melanoma and rhabdomyosarcoma, but not several other cancers. However, although in all cells HO-1 acts as an cytoprotective factor, its actual effect on tumor growth strictly depends on the cell type. This suggests a contribution of some other mechanism(s), independent of cytoprotection, which determine the role of HO-1 in progression of tumors. **We hypothesize that the most important factor is the influence of HO-1 on cell differentiation, and that inhibition of melanoma cell differentiation by upregulated HO-1 is an important mechanism facilitating growth and metastasis of this cancer. The aim of the project is to investigate the role of HO-1 in differentiation of melanomas and in formation and function of melanoma initiating cells (MIC).**

Abstract in the Preludium call

1. Research project objectives/Research hypothesis

Research project objectives:

Heme oxygenase-1 (HO-1) is an antioxidative enzyme, upregulated in tumors, especially in response to chemotherapies or radiotherapies. We have shown, that increased expression of HO-1 significantly facilitates progression of melanoma and rhabdomyosarcoma, but not several other cancers. However, although in all cells HO-1 acts as an cytoprotective factor, its actual effect on tumor growth strictly depends on the cell type. This suggests a contribution of some other mechanism(s), independent of cytoprotection, which determine the role of HO-1 in progression of tumors. We hypothesize that the most important factor is the influence of HO-1 on cell differentiation, and that inhibition of melanoma cell differentiation by upregulated HO-1 is an important mechanism facilitating growth and metastasis of this cancer. **The aim of the project is to investigate the role of HO-1 in differentiation of melanomas and in formation and function of melanoma initiating cells (MIC).**

Abstract in the Preludium call

2. Research methodology

Experiments will be performed in B16(F10) murine melanona cell lines with normal and increased expression of HO-1, cultured under normoxic or hypoxic conditions. We will investigate to which extent and through which mechanisms the melanoma cells overexpressing HO-1 acquire or maintain the features typical for MIC. Analyzes will be performed in general populations and on the sorted subpopulations of MIC and MC (bulk cells). We will examine the effect of HO-1 on expression of differentiation markers, the tumorigenic and angiogenic potential of cells, ability for vasculogenic mimicry, and influence on the tumor infiltrating immune cells. The most important aim is elucidation of the mechanisms responsible for the observed effects. To clarify them we will apply incubation of cells with HO-1 products or with inhibitors/activators of kinases and transcription factors, overexpression/silencing the genes, and delivery/inhibition of miRNA. Experiments in animal models will be carried out in syngeneic C57Bl/6J mice including those with stable expression of GFP to facilitate discriminating the tumor-forming cells of cancer- and host-origin. We will employ the *in vivo* imaging methods to monitor the growth, structure and vascularization of tumors.

Abstract in the Preludium call

2. Research methodology

Experiments will be performed in B16(F10) murine melanona cell lines with normal and increased expression of HO-1, cultured under normoxic or hypoxic conditions. **We will investigate to which extent and through which mechanisms the melanoma cells overexpressing HO-1 acquire or maintain the features typical for MIC. Analyzes will be performed in general populations and on the sorted subpopulations of MIC and MC (bulk cells). We will examine the effect of HO-1 on expression of differentiation markers, the tumorigenic and angiogenic potential of cells, ability for vasculogenic mimicry, and influence on the tumor infiltrating immune cells.** The most important aim is elucidation of the mechanisms responsible for the observed effects. To clarify them we will apply incubation of cells with HO-1 products or with inhibitors/activators of kinases and transcription factors, overexpression/silencing the genes, and delivery/inhibition of miRNA. Experiments in animal models will be carried out in syngeneic C57Bl/6J mice including those with stable expression of GFP to facilitate discriminating the tumor-forming cells of cancer- and host-origin. We will employ the *in vivo* imaging methods to monitor the growth, structure and vascularization of tumors.

Abstract in the Preludium call

2. Research methodology

Experiments will be performed in B16(F10) murine melanona cell lines with normal and increased expression of HO-1, cultured under normoxic or hypoxic conditions. We will investigate to which extent and through which mechanisms the melanoma cells overexpressing HO-1 acquire or maintain the features typical for MIC. Analyzes will be performed in general populations and on the sorted subpopulations of MIC and MC (bulk cells). We will examine the effect of HO-1 on expression of differentiation markers, the tumorigenic and angiogenic potential of cells, ability for vasculogenic mimicry, and influence on the tumor infiltrating immune cells. **The most important aim is elucidation of the mechanisms responsible for the observed effects. To clarify them we will apply incubation of cells with HO-1 products or with inhibitors/activators of kinases and transcription factors, overexpression/silencing the genes, and delivery/inhibition of miRNA.** Experiments in animal models will be carried out in syngeneic C57Bl/6J mice including those with stable expression of GFP to facilitate discriminating the tumor-forming cells of cancer- and host-origin. We will employ the *in vivo* imaging methods to monitor the growth, structure and vascularization of tumors.

Abstract in the Preludium call

2. Research methodology

Experiments will be performed in B16(F10) murine melanona cell lines with normal and increased expression of HO-1, cultured under normoxic or hypoxic conditions. We will investigate to which extent and through which mechanisms the melanoma cells overexpressing HO-1 acquire or maintain the features typical for MIC. Analyzes will be performed in general populations and on the sorted subpopulations of MIC and MC (bulk cells). We will examine the effect of HO-1 on expression of differentiation markers, the tumorigenic and angiogenic potential of cells, ability for vasculogenic mimicry, and influence on the tumor infiltrating immune cells. The most important aim is elucidation of the mechanisms responsible for the observed effects. To clarify them we will apply incubation of cells with HO-1 products or with inhibitors/activators of kinases and transcription factors, overexpression/silencing the genes, and delivery/inhibition of miRNA. **Experiments in animal models will be carried out in syngeneic C57Bl/6J mice including those with stable expression of GFP to facilitate discriminating the tumor-forming cells of cancer- and host-origin. We will employ the *in vivo* imaging methods to monitor the growth, structure and vascularization of tumors.**

Overview and background

Purpose:

- show the state of existing knowledge, including highlights of relevant data

- rationale of the proposed research

- explain the gaps that the project is intended to fill

- potential contribution of this research to the scientific fields

Overview and background

Suggestions:

- Provide a thorough (but with clear direction) synthesis of literature search
- Be sure you have found key references
- **Think about your potential reviewers**
  * what they have published recently – cite if this fits to the proposal
- Do literature searches of committee members (especially before interview!)
- Highlight success of your related grants
- Stress innovation in experimental methods (new research strategies, new interventions)
- Avoid too risky strategies

Specific Aims

- **Purpose:**

  * describe concisely and realistically goals of the proposed research

  * describe the hypothesis to be tested and specific objectives

  * summarize the expected outcomes and influence on the fields involved

- **Suggestions**

  * make sure your specific objectives and hypothesis are clearly stated and testable

  * be as brief and precise as possible

  * for clarity each aim should consist only one sentence (you can use a brief paragraph under each aim to provide more details)

  * most successful applications have 2-4 specific aims

  * focus on aims where you have good supporting preliminary data and scientific expertise

  * a small, focused project is generally better received than a diffuse, multifacete project

Specific Aims

- Do not overly ambitious.

- Project the realistic amount of work.

- Be focused.

Specific Aims Page

Practical hints:

- Use subtitled heading for each topic

- **Aims:** one paragraph each, 3-4 sentences, 30 words or less. Subaims are OK.

  * The first (two) aims should be air-tight; the last aim can be (a little) more speculative.

- Finish with: "This study is significant because…"

- A well thought-out project usually will have
  * two to four goals
  * several objectives related to the goals
  * many methodological steps (complementary methods) to achieve each objective

- If possible, state each aim as hypothesis.

- Aims should be linked, but independent. If one Aim depends on another, make absolutely sure the first one will work (that's what preliminary studies are for).

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

Specific Aims Page extreme examples

Specific Aims

Specific Aim # 1. To conduct a randomized double blinded trial of the efficacy of 3 agents, naltrexone, dextromethorphan and triamcinolone to prevent neurological deficits in rats acutely poisoned with the sarin analogue diisopropylfluorophosphate (DFP).

Specific Aim #2. To conduct a randomized double blinded trial of the efficacy of naltrexone, dextromethorphan and triamcinolone to reverse the neurological deficits induced by acute poisoning with DFP.

SPECIFIC AIMS.

Chlorine (Cl_2) is a highly irritant and reactive gas produced in large quantities throughout the world. When inhaled, Cl_2 hydrolyzes to hypochlorous acid (HOCl) and its conjugate base (OCl^-) that react with components of the epithelial lining fluid and epithelial cells. Products of these reactions (chloramines, lipid hydroperoxides) have considerable toxicity resulting in the formation of additional toxic intermediates and activation of inflammatory cells that mediate the injurious effects of Cl_2/HOCl/OCl^- to biological targets (reviewed in (37, 48)). When inhaled at concentrations exceeding 300 ppm, Cl_2 molecules cause severe reactive airway disease (35), pulmonary edema and even death from respiratory failure (4, 5, 26, 27, 36, 44, 49, 50). In addition, exposure of rats to Cl_2 causes systemic injury characterized by inflammation and endothelial dysfunction due in part to the inactivation of endothelial nitric oxide synthase an event linked to atherosclerosis and hypertension (21).

Existing preliminary data generated by the laboratories of the two PIs (Drs. Pittet and Matalon) show that exposure of mice to Cl_2 concentrations that either associated with significant morbidity but no mortality (400 ppm for 30 min) or 40% mortality within 24 h post exposure (600 ppm for 45 min) result in activation of **coagulation in the distal lung spaces and in the plasma, as indicated by the appearance of thrombin-antithrombin complexes in the BAL fluid and plasma, and in secondary activation of fibrinolysis in the plasma that causes hypocoagulation, as shown by a significant prolongation of clotting time.** Thrombin is a well-known mediator of acute lung injury resulting in increased lung vascular permeability (18) and compromised vectorial sodium transport and alveolar fluid clearance (41). In addition, it may act synergistically with reactive intermediates to activate the small GTPase RhoA and suppress Rac1 that also contribute to increased alveolar permeability and pulmonary edema (6, 10, 19). **Thus, we will test the central hypothesis that exposure to Cl_2 gas causes the intraalveolar and systemic activation of the coagulation cascade that plays an important role in the development of lung and other end-organ injury.** *We hypothesize that Cl_2 damages lung epithelial, endothelial and inflammatory cells leading to the release of tissue factor and procoagulant microparticles, as well as the shedding of thrombomodulin and endothelial protein C receptors (EPCR) via a metalloprotease-dependent mechanism (45). This results in airspace thrombin production leading to increased alveolar and microvascular permeability to plasma proteins and pulmonary edema that contribute to death from respiratory failure. Furthermore, we hypothesize that Cl_2 intermediates upregulate the expression of tissue factor on endothelial cells and monocytes causing the release of circulating procoagulant microparticles via a myeloperoxidase (MPO)-dependent mechanism (38) that results in the systemic activation of the coagulation cascade and the development of a secondary hyperfibrinolysis. Finally, we propose that post-exposure administration of activated protein C (aPC) or one of its mutant forms which either lacks anticoagulant (5) or cytoprotective (c) activity will decrease lung epithelial and vascular permeability, development of pulmonary edema and mortality. By using these mutant forms of mouse aPC, we will determine whether the protective effect of aPC depends on its anticoagulant effect or on its cytoprotective properties via the activation of the sphingosine-1-phosphate pathway in the lung endothelium (17, 46) and alveolar epithelium (34) and by direct engagement of CD11b on alveolar macrophages (9).* We thus propose the following two specific aims:

Specific Aim 1. To identify the mechanisms by which Cl_2 activates the alveolar and systemic coagulation cascades. Wild-type or MPO null C57BL/6 mice will be exposed to Cl_2 gas (600 ppm for 45 min) and returned them to room air. At various intervals post-exposure, we will measure levels of tissue factor, procoagulant microparticles, thrombin-antithrombin complexes, tissue plasminogen activator, fibrin split products formation, soluble thrombomodulin and EPCR, protein C and aPC in the BAL fluid and plasma and levels of RhoA and Rac1 in lung tissues. Activation of blood coagulation and development of secondary fibrinolysis will be measured by thromboelastometry. These measurements will be correlated with physiological indices of injury including levels of cytokines, plasma proteins in the BAL fluid (as an index of alveolar permeability), sodium-driven alveolar fluid clearance and lung wet to dry weight ratio and protein permeability (as indices of lung vascular permeability).

Specific Aim 2. To determine the mechanisms by which post-exposure of activated protein C decreases Cl_2-mediated activation of the coagulation cascade, lung endothelial and epithelial permeability and apoptosis and mortality of mice exposed to Cl_2. *For the in vitro studies*, using primary cultures of rat microvascular lung endothelial and alveolar epithelial cells, we will determine the role of a wild type and two mouse aPC mutants (3K3A mutant with severely reduced anticoagulant properties and a hyperantithrombotic Glu149Ala mutant without anti-inflammatory properties) in modulating Cl_2-induced lung endothelial and epithelial permeability, inhibition of vectorial epithelial ion transport, apoptosis and activation of alveolar macrophages. *For the in vivo studies*, wild-type or CD11b null C57BL/6 mice will be injected intramuscularly with the wild type or one of the mutant forms of aPC within 30-45 min post exposure. We will then measure survival during the next 72h and repeat the measurements outlined in Specific Aim #1.

Specific Aims: not a good example

Specific Aim 1. To define the role of ---------- (CCH) in complement regulation on xxxxxxxxxxx. The specificity of an Ab determines its activity; anti-CCH Ab appear less effective than Ab against membrane antigens such as ABC in depositing C on the bacterial surface. Further, recruitment and amplification of the AP is important to kill xxxxxxxxx; CCH regulates the human AP, which could further undermine vaccine efficacy. **a) To elucidate differences in classical complement pathway (CP) activation mediated by anti-CCH and anti-fim mAbs.** Anti-CCH IgM mAbs fix less C than similar amounts of an anti-ABC IgM mAb, suggesting that the site of complement activation could determine bactericidal activity of an Ab. Efficient C binding may require C activation proximate to xxxxxxxxxx C acceptors such as ABC and obtusity protein. We will compare the ability of anti-CCH mAbs to activate C and deposit C on bacteria with that of a mAb directed against fim. We will construct chimeric mAbs containing human IgG1 Fc to symmetrically compare mAb activity and function. Human Fc is relevant for studies that use human complement interacting with an exclusively human pathogen. **b) To define the molecular basis of regulation of human alternative pathway (AP) activation by CCH.** Preliminary studies have shown that CCH regulates the human AP. We will further elucidate the molecular basis of AP regulation by CCH by examining interactions between CCH and the various components of the AP. **c) To characterize the interactions between non-human AP and CCH to understand the basis of human-specific AP regulation by CCH**. CCH expression regulates the human, but not the rabbit, AP. Assembly of rabbit AP on xxxxxxxxxx will be examined to highlight differences with the human system thereby providing a better understanding of the human-specificity of AP regulation by xxxxxxxxx. These studies have implications for evaluation of vaccine Ab and developing animal models for xxxxxxxxxxx disease.

….and that's just Aim 1!

Specific Aims: a good example

Aim 1. Test the hypothesis that disruption of MHC class II antigen presentation is a major mechanism of *M. tuberculosis* evasion of $CD4^+$ T cells in vivo.

A. Test the hypothesis that *M. tuberculosis* diminishes MHC class II antigen presentation by infected lung cells.

B. Test the hypothesis that diminished MHC class II antigen presentation is associated with reduced activation of *M. tuberculosis*-specific $CD4^+$ effector T cells in the lungs.

Aim 2. Quantitate the contribution of Ag85B downregulation as a mechanism for defective activation of Ag85B-specific $CD4^+$ T cells in vivo.

A. Determine the correlation between Ag85B downregulation and reduced stimulation of Ag85B-specific $CD4^+$ T cells in the lungs.

B. Determine whether forced expression of Ag85B after the onset of adaptive immunity improves activation of Ag85B-specific $CD4^+$ T cells and causes T cell-dependent attenuation of *M. tuberculosis* in vivo.

Aim 3. Test the hypothesis that direct recognition of individual *M. tuberculosis*-infected cells by $CD4^+$ T cells is essential for optimal immune control of infection.

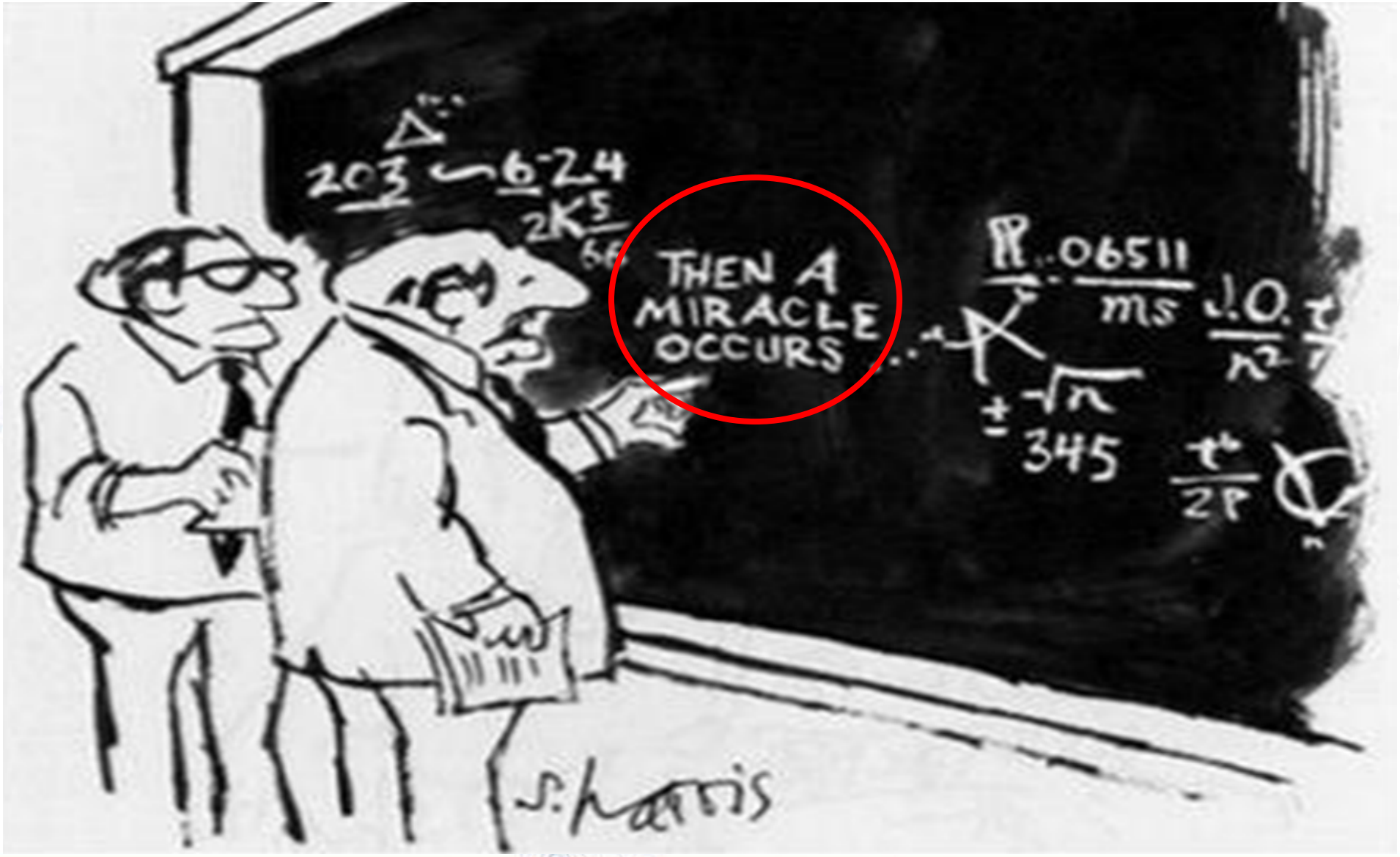
A. Determine whether control of *M. tuberculosis* depends on direct recognition of infected cells by $CD4^+$ T cells in the lungs, by using mixed bone marrow chimeric mice in which half of the infected cells lack expression of MHC class II.

B. Determine the frequency of stable contact between *M. tuberculosis*-infected macrophages and dendritic cells with $CD4^+$ T cells in lungs of infected mice at specific stages of infection.

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

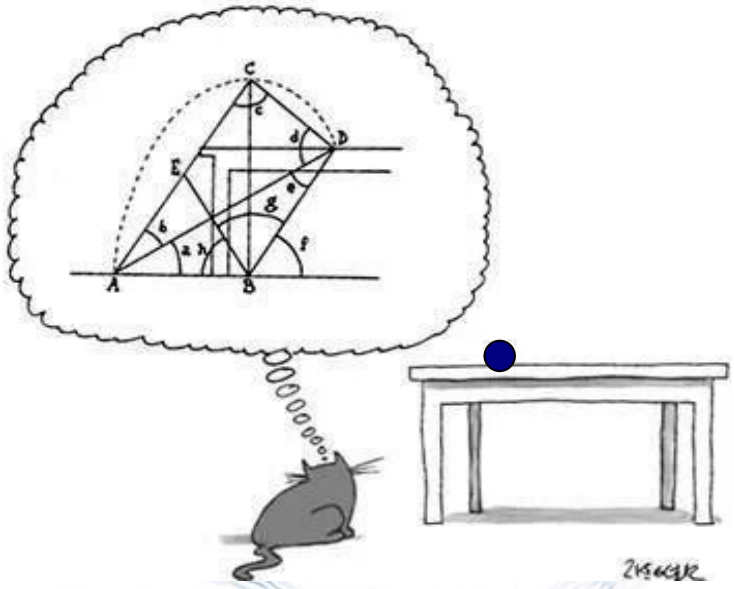
- **The Research Strategy should answer the following questions:**

  * 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."

Research strategy

Practical hints

1st paragraph:

- Briefly remind the reviewers of your proposal's uniqueness (e.g. *"Our approach is based on the novel discovery that prolonged mechanical ventilation of preterm lambs leads to epigenetic changes in the lung*."). Briefly means 1 paragraph, 3-4 sentences, no more than 30 words.

2nd paragraph:

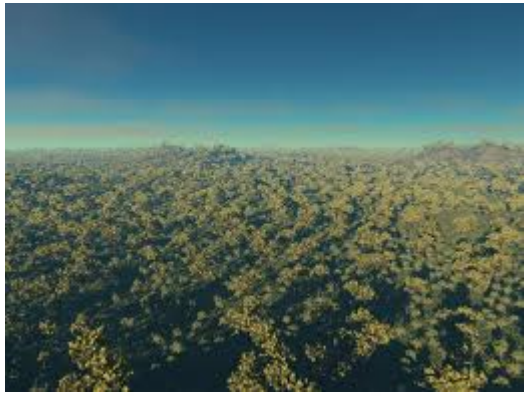
- "Copy-and-paste" the Specific Aims from the Specific Aims page.

Research strategy

Practical hints

3rd paragraph:

- Provide a table/flow chart of the Specific Aims to give reviewers a big-picture view of study design (let reviewers see the forest ☺).



4th paragraph:

- If human subject are involved, add a paragraph about recruitment, selection, inclusion, and exclusion criteria. Or: describe the model used, e.g. *in vitro* culture of cell lines, transgenic animals, etc. (let them look at tree ☺)

Research strategy

Practical hints

5th, 6th, (7th) paragraphs:

- **Specific aim 1:**

  * Approach: may place preliminary data here to demonstrate feasibility

  * Statitics

  * Expected results

  * Describe: pitfalls, limitations, alternative approaches

- **Subsequent Specific Aims**:

  * repeat the outline

Research strategy

Practical hints

n^{th} paragraph:

- Detailed methods

  * If you or coaplicants have published the methods, so state (with citations) and move on

  * If methods are new for your team, describe them in details or

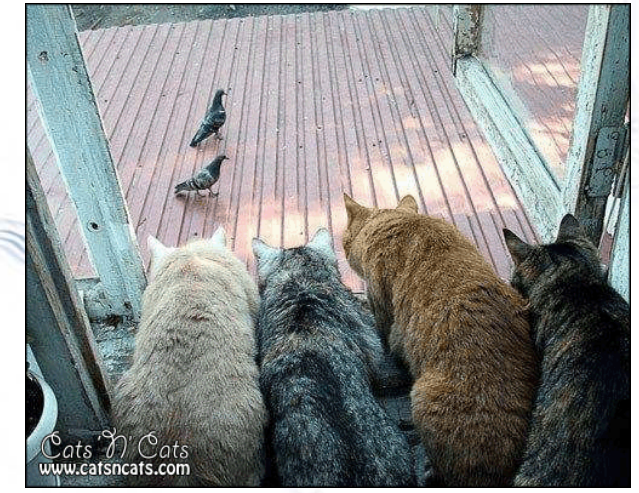
  * do secure collaborators for areas in which you lack experience (cite the co-authored or their publications) and move on

Next-to-final paragraph

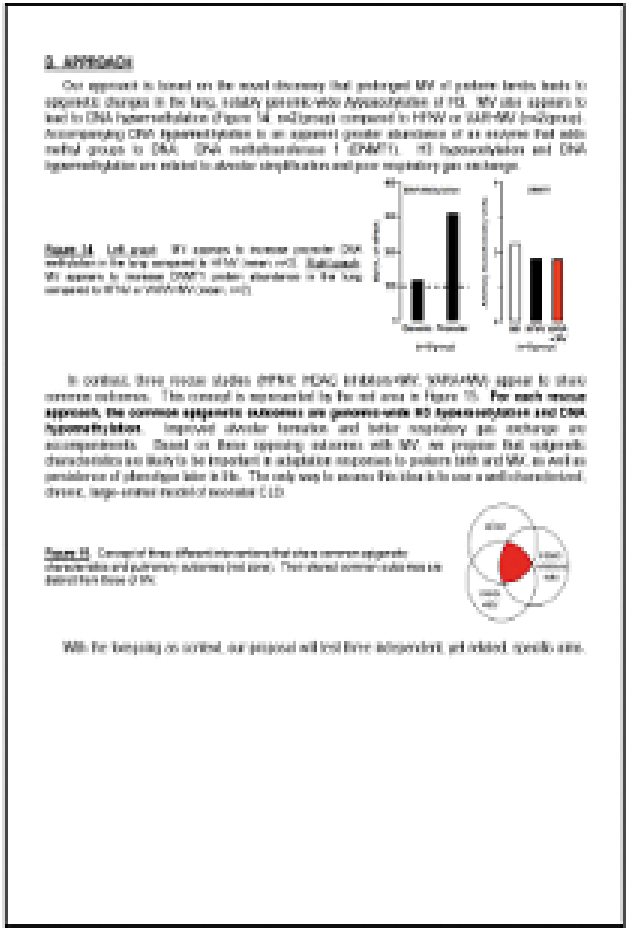
- Timeline (graphic or words)

Final paragraph

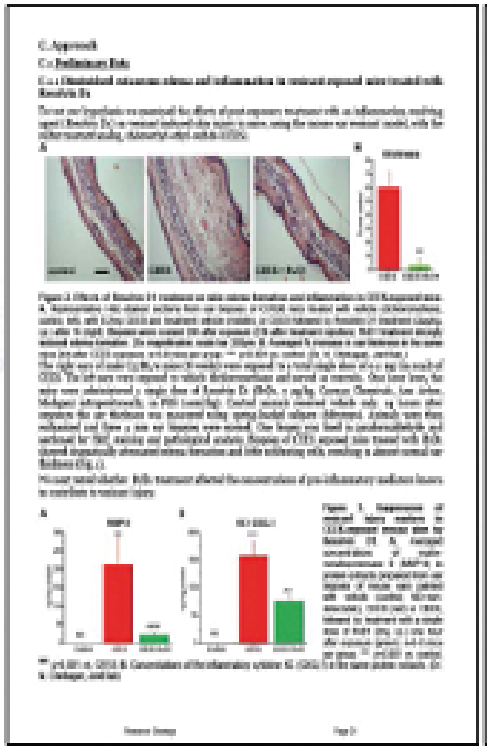
- End on a positive note about feasibility and impact

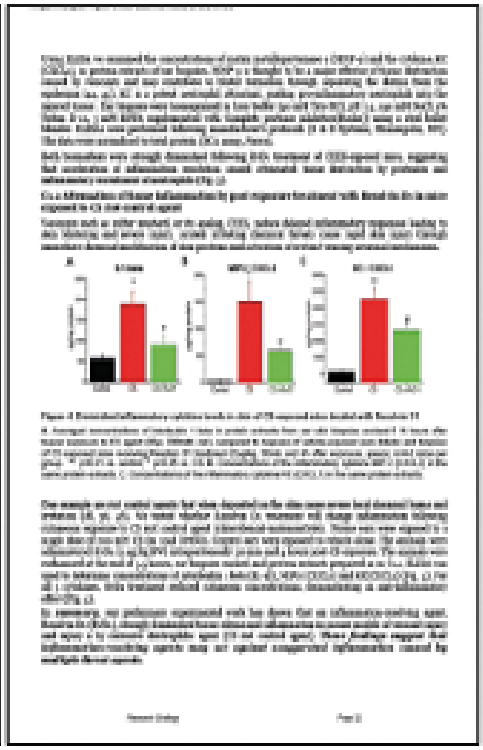


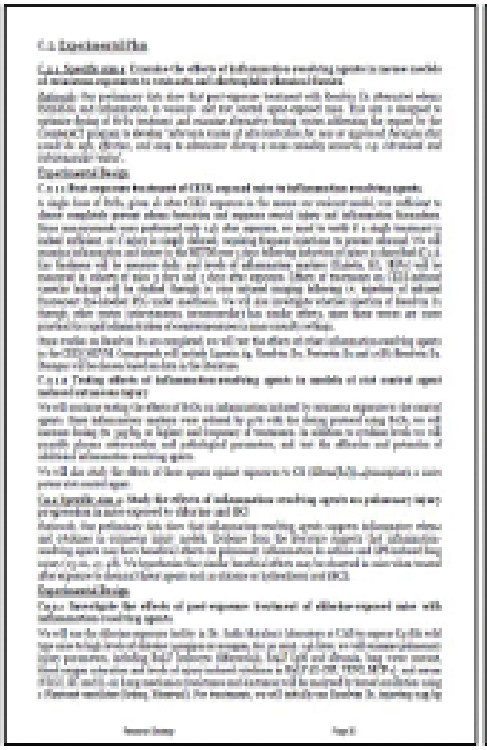
Example: preliminary data preface approach

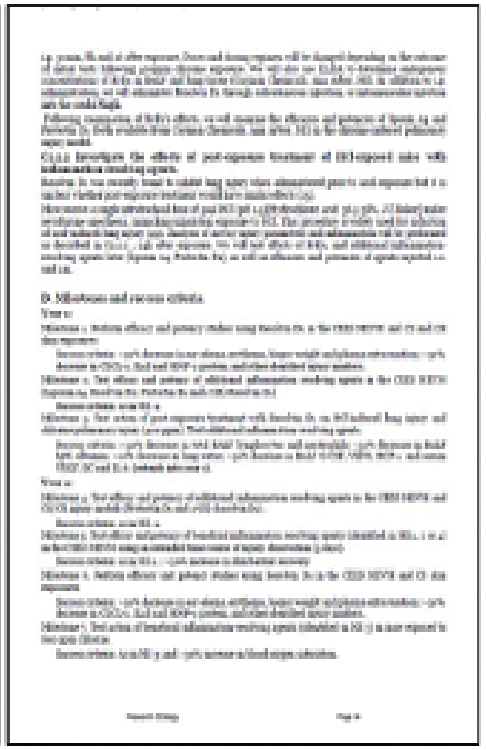


Example: preliminary data blended approach









Schedule

E. HARMONOGRAM WYKONANIA PROJEKTU BADAWCZEGO - PLAN ZADAŃ

Lp.	Nazwa zadania badawczego	Nazwa zadania badawczego w j. angielskim	Podmiot realizujący zadanie	Planowany czas trwania (miesiące)	Przewidywane koszty zadania brutto (zł)	Środki własne (zł)	Dofinansowanie z NCN	
							zł	%
1	2	3	4	5	6	7	8	9
1.	Badania wpływu HO-1 na tworzenie MIC	Investigation of the effect of HO-1 on formation of MIC	Uniwersytet Jagielloński, Wydział Biochemii, Biofizyki i Biotechnologii	6	163 800	0	163 800	100,0
2.	Badania wpływu HO-1 na funkcjonowanie MIC	Investigation of the effect of HO-1 on function of MIC	Uniwersytet Jagielloński, Wydział Biochemii, Biofizyki i Biotechnologii	12	301 600	0	301 600	100,0
3.	Badania in vitro wpływu HO-1 na mimikrę naczyniową: porównanie MIC i MC	Investigation on effect of HO-1 on vasculogenic mimicry in vitro: comparison of MIC and MC	Uniwersytet Jagielloński, Wydział Biochemii, Biofizyki i Biotechnologii	12	369 200	0	369 200	100,0
4.	Badania in vivo wpływu HO-1 na angiogenezę, mimikrę naczyniową i naciek leukocytarny	Investigation on effect of HO-1 on angiogenesis, vasculogenic mimicry and leukocyte infiltration in vivo	Uniwersytet Jagielloński, Wydział Biochemii, Biofizyki i Biotechnologii	6	210 600	0	210 600	100,0

Milestones

- Milestones show the progression of steps to achieve the performance target.

- Milestones can be used to determine if a project is drifting off course.

- Milestones shift the focus from activities to measurable results that move a project toward a performance target.

- When developing milestones, determine how they can be measured.

Practical hints:

* Make milestone "flexible" to allow showing various results as the achievement. (e.g. "*optimization of phenotyping of HSC subpopulations*" instead of "*optimization of phenotyping of LT-HSC based on 6 markers detected on unfixed cells isolated from HO-1 KO mice and measured by LSR-II flow cytometer*")

* Plan milestone in accordance to the reporting schedule. Do not make too detailed and too numerous milestones.

Environment - feasibility

Reviewer will look for answers to questions:

- Does the scientific environment in which the work will be done contribute to probability of success?

- Do the proposed studies benefit **from unique features** of the scientific environment or subject population or employ useful collaborative arrangments?

- Is there evidence of institutional support?

Be confident…

Budget: major categories of expenses

Pozycja	Rok 2013	Rok 2014	Rok 2015	Rok 2016	Razem
1	2	3	4	5	6
Koszty bezpośrednie realizacji projektu, w tym:	126 000	232 000	284 000	162 000	804 000
- wynagrodzenia wraz z pochodnymi	42 000	84 000	84 000	42 000	252 000
- koszty aparatury	0	0	0	0	0
- inne koszty bezpośrednie	84 000	148 000	200 000	120 000	552 000
Koszty pośrednie	37 800	69 600	85 200	48 600	241 200
Koszty realizacji projektu ogółem	163 800	301 600	369 200	210 600	1 045 200

+ justification of costs with: detailed allocation of salaries, and description of classes of reagents, rationale for travels

CV and your research record

- Reviewers will look for answers:

* Are the investigators appropriately 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

- Most grants will specify the font, font size and margins for the grant. Stick to these directions.

- Consider using a numbering system, adding a space between each paragraph

- **Use paragraphs** to break up ideas and help structure an argument. Each paragraph should cover a specific topic that is supported by details or data.

- **Highlight important statements** to help the reviewer may not pick up your points. Important aspects should be mentioned three or four times throughout the document, but your argument shouldn't be redundant.

- Make sure your **core argument runs through the entire document** and is supported by the details.

- Having a "fresh eye" to look at your proposal will greatly improve its quality.

Basic rule: Omit needless words

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: your reviewers are reading a lot of grants

- 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

Top errors in grant proposal

- Proposing too much

* common problem with new PIs

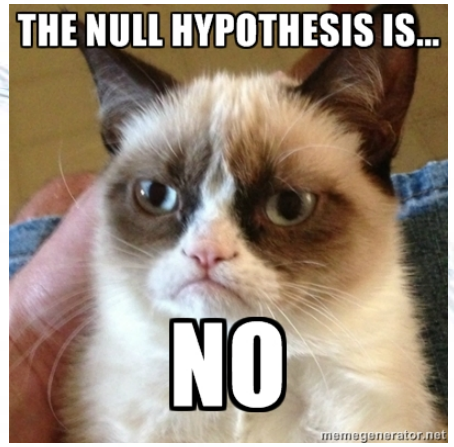
* giving reviewers too many targets to throw darts at

* assuming that the reviewers will be impressed with your ability to do everything

* demontrates a lack of focus

- No hypothesis or predictions

* Descriptive ”bean counting” or ”fishing”



Top errors in grant proposal

- **Disconnect between Specific Aims and Research Design & Methods**
  * methods without designs (without research strategy)
  * incomplete details of methods

- **Expertise missing**
  * failure to demonstrate capability in preliminary studies
  * capability not demonstrated in publications
  * lack of appropriate collaborators and consultants

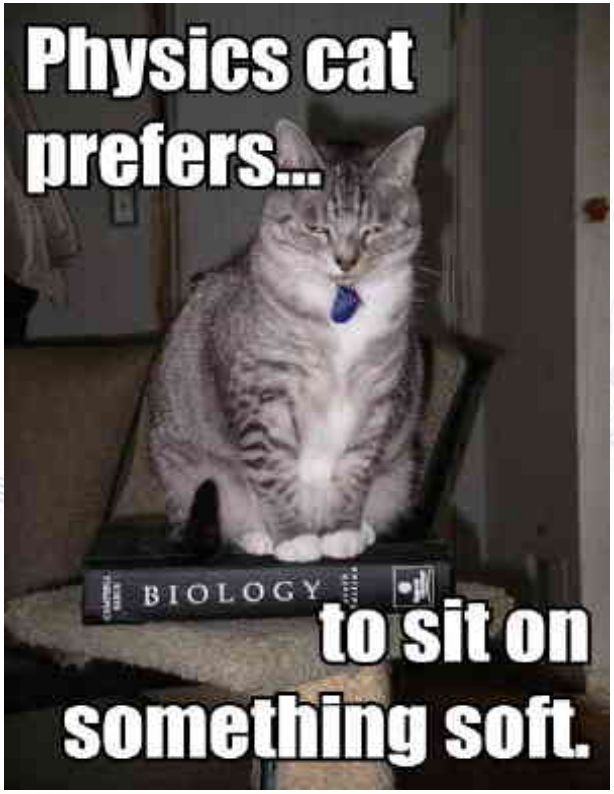
Expertise missing

NCN disciplines

HS - Arts, Humanities and Social Sciences

ST - Physical Sciences and Engineering

NZ - Life Sciences



NCN HS panels

HS1: Fundamental questions of human existence and the nature of reality *(philosophy, cognition, religious studies, theology)*

HS2: Cultures and cultural creativity
(literary theory and comparative literature, history of literature, linguistics, library science, cultural studies, arts)

HS3: The study of the human past
(history, archaeology, ethnology, cultural anthropology)

HS4: Individuals, institutions and markets
(economics, finance, management, demography)

HS5: Social norms and governance
(law, political science, regional and social policy)

HS6: Human nature and human society
(psychology, education and sociology)

That was Zen, This is Meow

NCN ST panels

ST1: Mathematics
(all areas of mathematics, pure and applied, plus mathematical foundations of computer science, mathematical physics and statistics)

ST2: Fundamental constituents of matter
(particle, nuclear, plasma, atomic, molecular, gas and optical physics)

ST3: Condensed matter physics
(structure, electronic properties, fluids, nanosciences)

ST4: Physical and Analytical Chemical sciences
(analytical chemistry, chemical theory, physical chemistry/chemical physics)

ST5: Materials and Synthesis
(materials synthesis, structure-properties relations, functional and advanced materials, molecular architecture, organic chemistry)

ST6: Computer science and informatics
(informatics and information systems, computer science, scientific computing, intelligent systems)

NCN ST panels

ST7: Systems and telecommunications engineering
(electronic, communication, optical and systems engineering)

ST8: Products and processes engineering
(product design, process design and control, construction methods, civil engineering, energy systems, material engineering)

ST9: Astronomy and space research
(astro-physics/chemistry/biology; solar system; stellar, galactic and extragalactic astronomy, planetary systems, cosmology, space science, instrumentation)

ST10: Earth system science
(physical geography, geology, geophysics, atmospheric sciences, oceanography, climatology, ecology, global environmental change, biogeochemical cycles, natural resources management)

Gravity is optional

NCN NZ panels

NZ1: Molecular and Structural Biology and Biochemistry
(molecular biology, biochemistry, biophysics, structural biology, biochemistry of signal transduction)

NZ2: Genetics, Genomics
(genetics, molecular genetics, genomics, proteomics, metabolomics, bioinformatics, computational biology, systems biology and genetic epidemiology)

NZ3: Cellular and Developmental Biology
(cell biology, developmental biology, ageing biology, neurobiology)

NZ4: Biology of Tissues, Organs and Organisms
(morphology and functions of animal's and and human's systems, organs and organisms, diagnostic and therapy methods, experimental medicine, experimental oncology, basics of neurology, pharmacology, pharmacotherapy)

NZ5: Human and Animal noninfectious diseases
(mechanisms, diagnosis and treatment of diseases, poisonings and injuries)

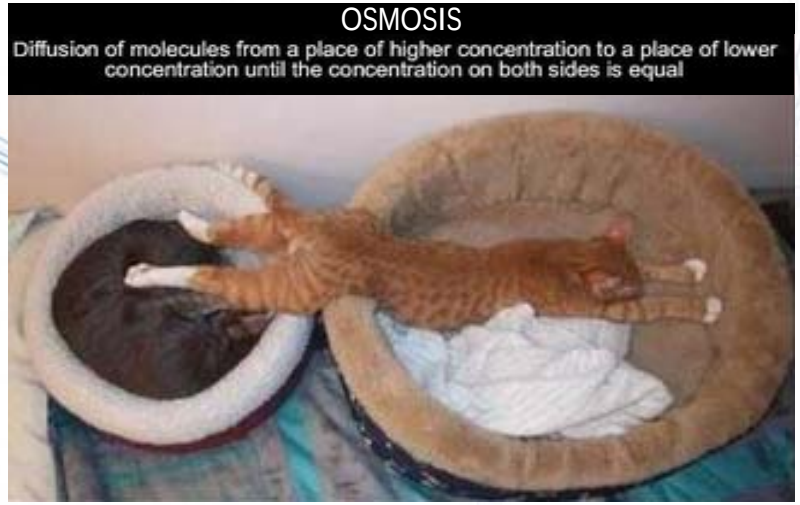
NCN NZ panels

NZ6: Human and Animal immunology and infection
(immunity, immune disorders, immunotherapy, infectious and invasive diseases)

NZ7: Public health
(etiology, diagnosis and treatment of disease, public health, epidemiology, pharmacology, clinical medicine, regenerative medicine, medical ethics)

NZ8: Evolutionary and environmental biology
(evolution, ecology, population biology, biodiversity, biogeography)

NZ9: Applied life sciences and biotechnology
(agricultural, animal, fishery,
forestry and food sciences; biotechnology,
environmental biotechnology)



Major parts of Preludium project

Preludium:

I. **Abstract**
(1 page – in English)

II. Short description
(5 pages – in Polish, for scientists of your discipline but not very familiar with your field)

III. Full description
(15 pages – in English, for experts familiar with your field)

Project evaluation (Preludium)

4 stages of evaluation:

I. Formal assessement
(by administration staff)

II. First stage of merit evaluation – short description of the project
(by two members of the Expert Panel, confirmed and accepted during the first panel meeting)

III. Second step of merit evaluation – full description of the project
(full revision made by two external experts)

IV. Final ranking and decission
(done during the second panel meeting)

Final hint: leave enough time

Noland's Law:

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