The

ANATOMY & Physiology

of a **Specific Aims Page**

Justine M. Pinskey, PhD

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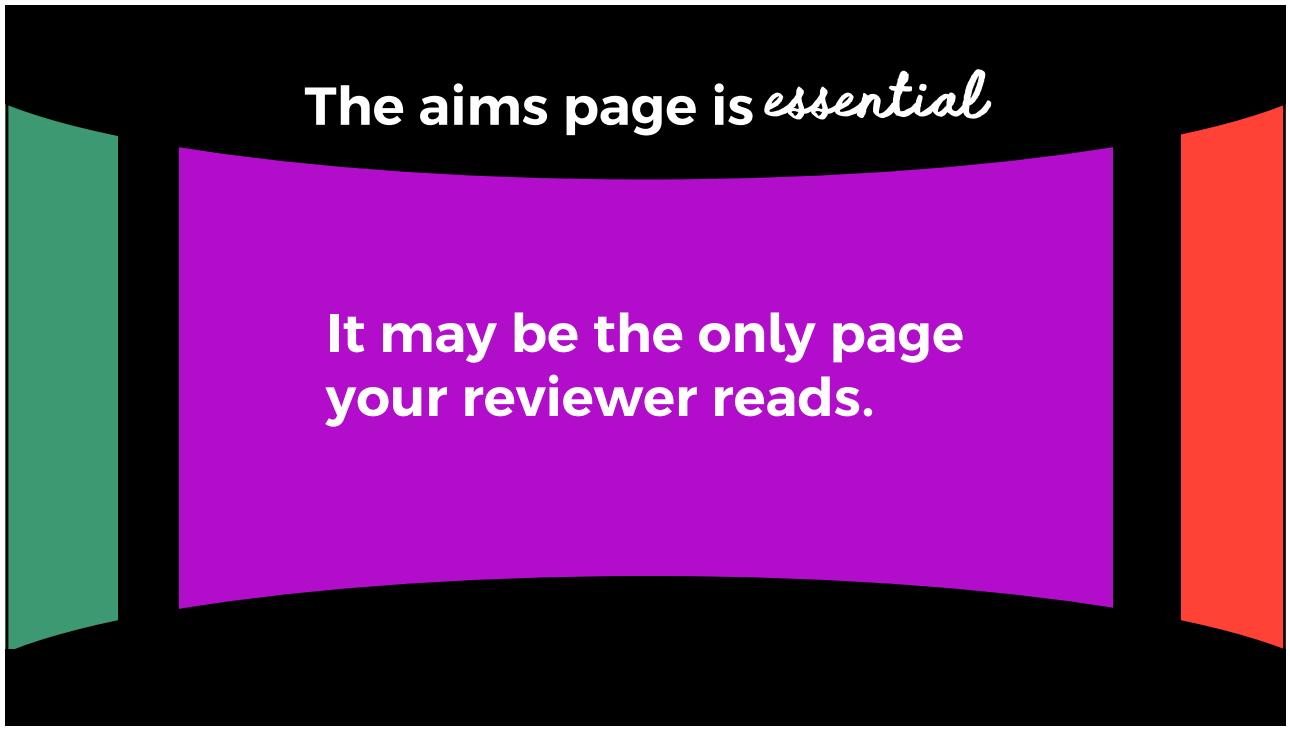
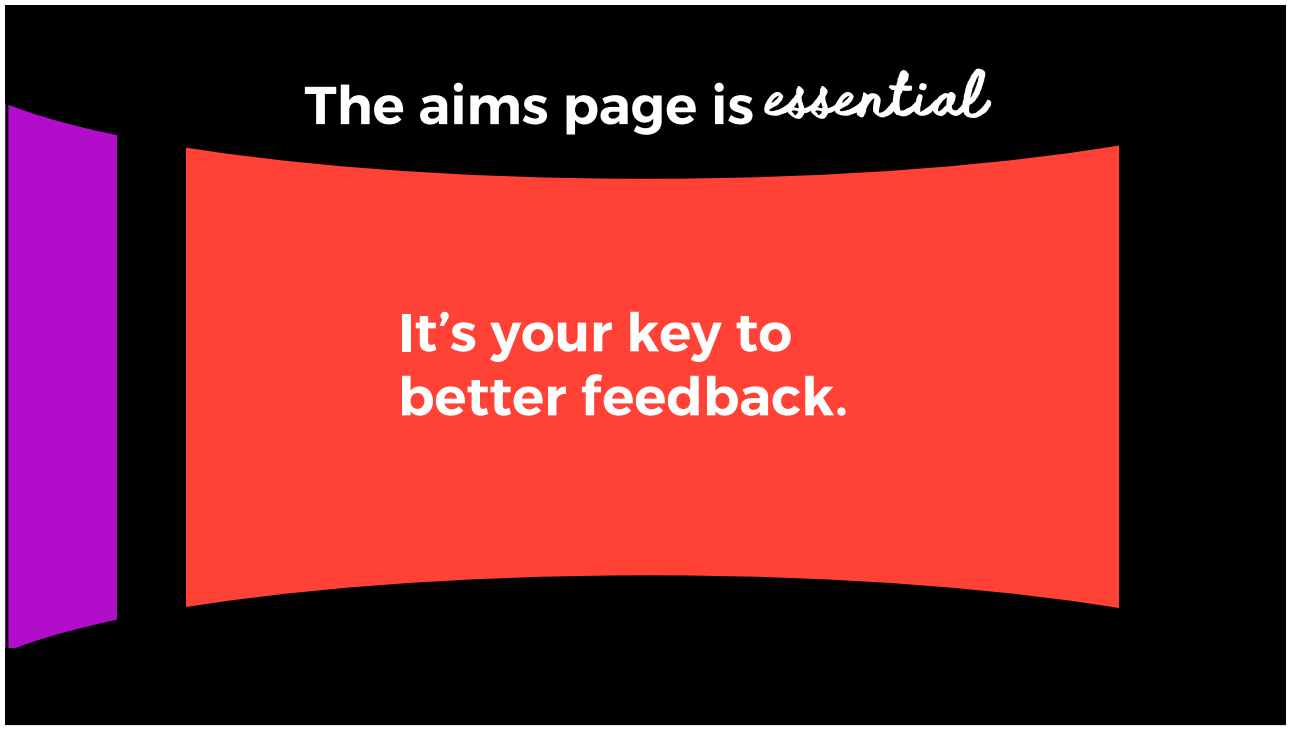
The aims page is *essential*

It's your application's first impression.

2


The aims page is essential
It may be the only page your reviewer reads.

3


The aims page is essential
It's your key to better feedback.

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As the Sr. Scientific Writer for iCAP,

I help new, tenure-track faculty **improve their writing skills**

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intro

body

aims

impact

THE PROBLEM

THE SOLUTION

THE PLAN

THE PAYOFF

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intro

THE PROBLEM

hook

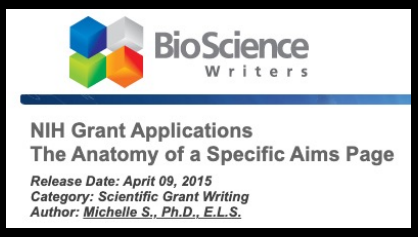
known information

gap

critical need

Examples modified from:

https://www.biosciencewriters.com/NIH-Grant-Applications-The-Anatomy-of-a-Specific-Aims-Page.aspx



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intro

THE PROBLEM

hook

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critical need

Viruses are involved in 15-20% of human cancers worldwide, highlighting their potential to reveal common oncogenic mechanisms. One such virus is human T cell leukemia virus type I (HTLV-1), the disease-causing agent of adult T cell leukemia/lymphoma (ATLL). HTLV-1 encodes a potent oncoprotein, Tax, which regulates important cellular processes, including gene expression, proliferation, apoptosis, and polarity. Although the Tax oncoprotein can transform cells in culture and induce tumors in various transgenic mouse models, the *mechanism by which Tax transforms cells is not well understood*. Though many Tax mutants have been generated and characterized, *a major obstacle in the field* is the variability between transgenic models due to random transgene integration sites, variable transgene copy number, and inconsistent transgene expression levels. These challenges make it difficult to link the biological activities of Tax mutants with their transforming potential.

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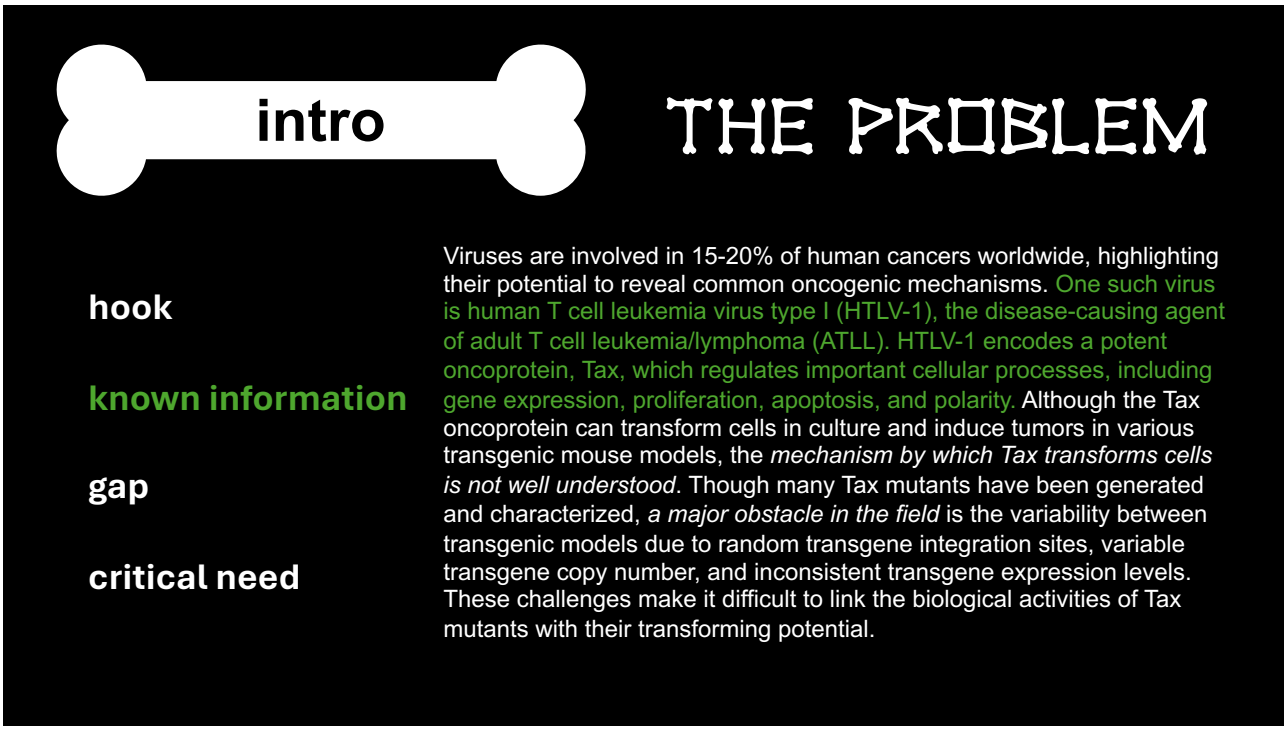
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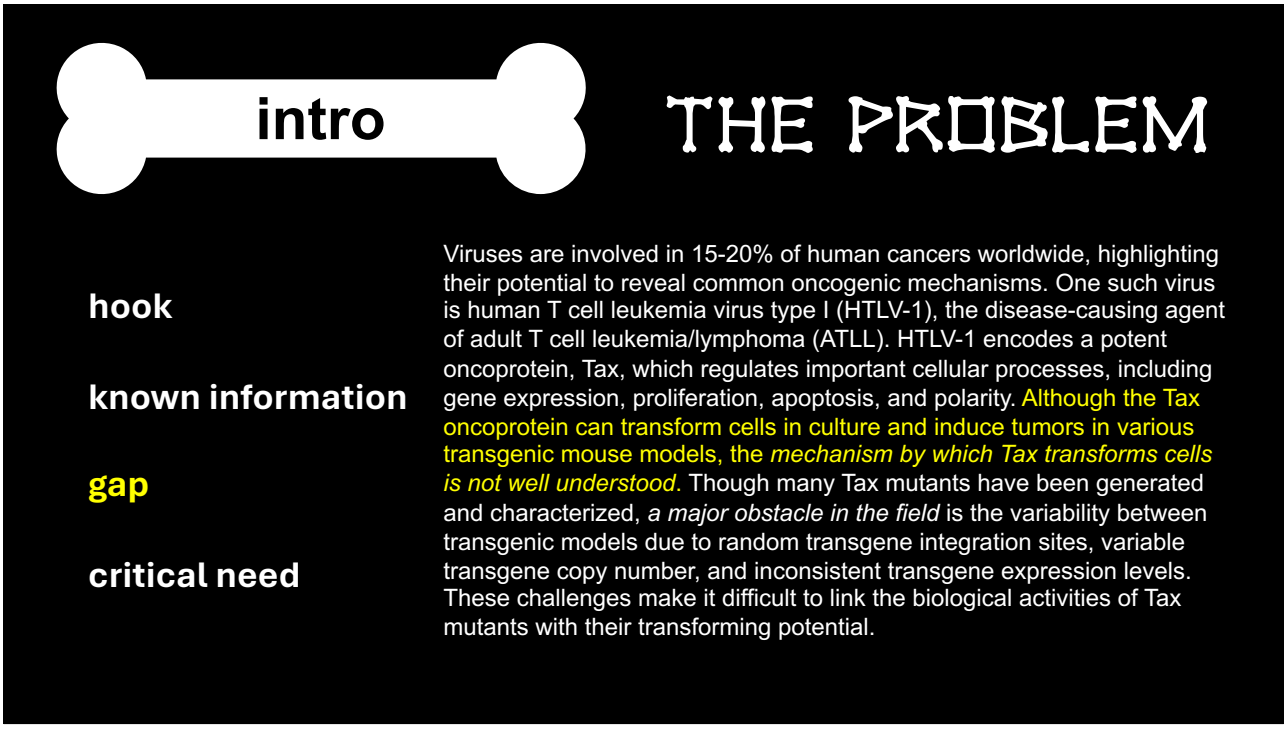
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body

THE SOLUTION

proposed solution

qualifications

objectives / rationale

hypothesis

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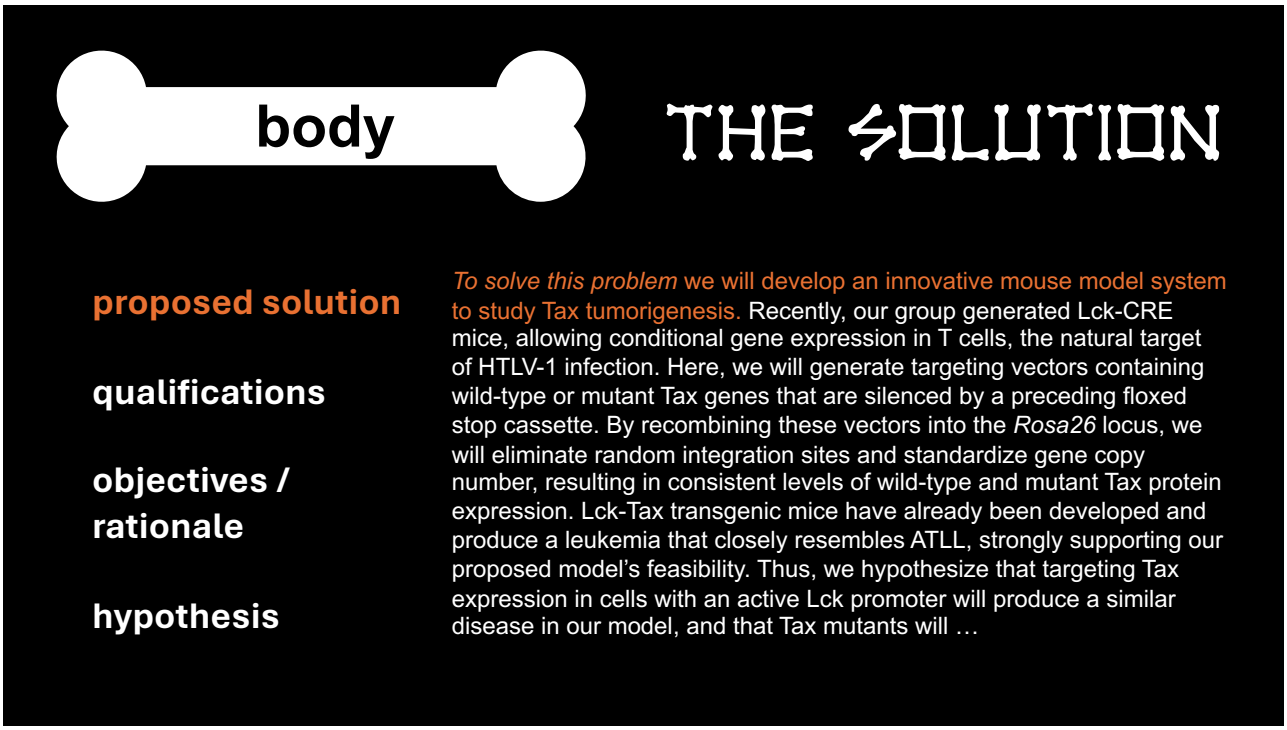
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To solve this problem we will develop an innovative mouse model system to study Tax tumorigenesis. Recently, our group generated Lck-CRE mice, allowing conditional gene expression in T cells, the natural target of HTLV-1 infection. Here, we will generate targeting vectors containing wild-type or mutant Tax genes that are silenced by a preceding floxed stop cassette. By recombining these vectors into the Rosa26 locus, we will eliminate random integration sites and standardize gene copy number, resulting in consistent levels of wild-type and mutant Tax protein expression. Lck-Tax transgenic mice have already been developed and produce a leukemia that closely resembles ATLL, strongly supporting our proposed model's feasibility. Thus, we hypothesize that targeting Tax expression in cells with an active Lck promoter will produce a similar disease in our model, and that Tax mutants will …

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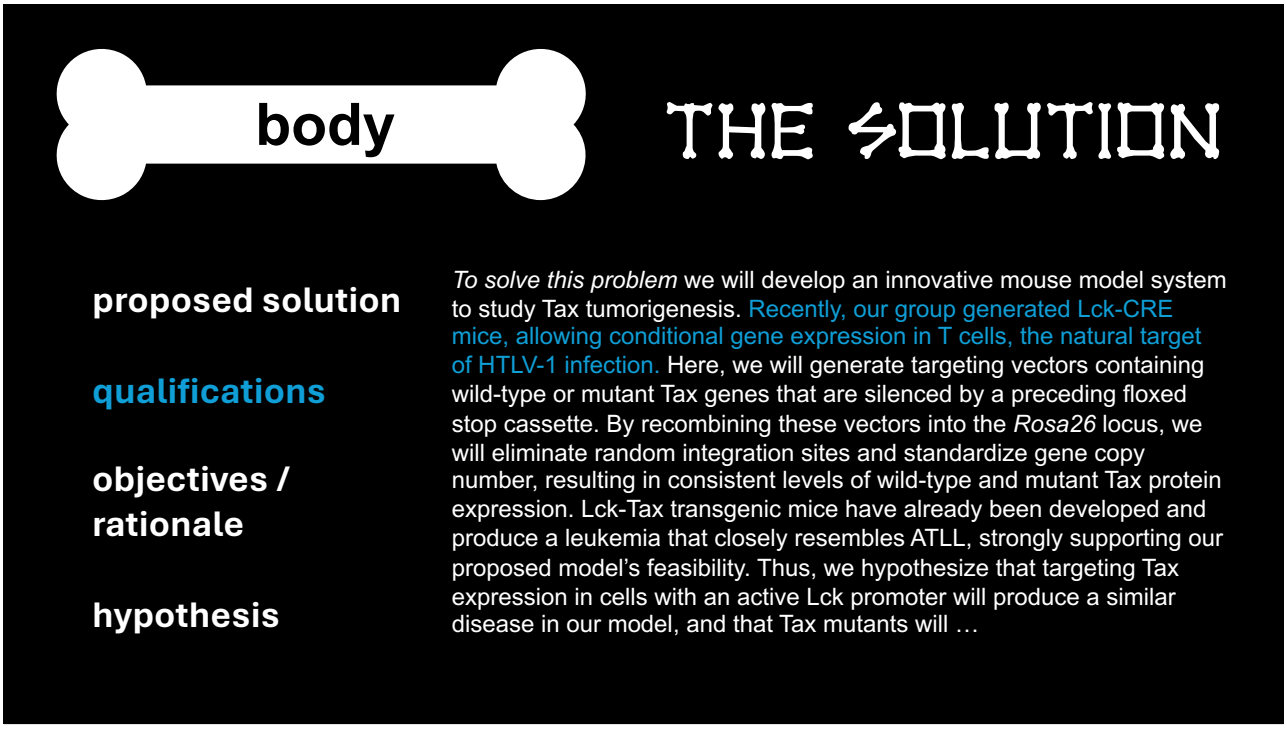
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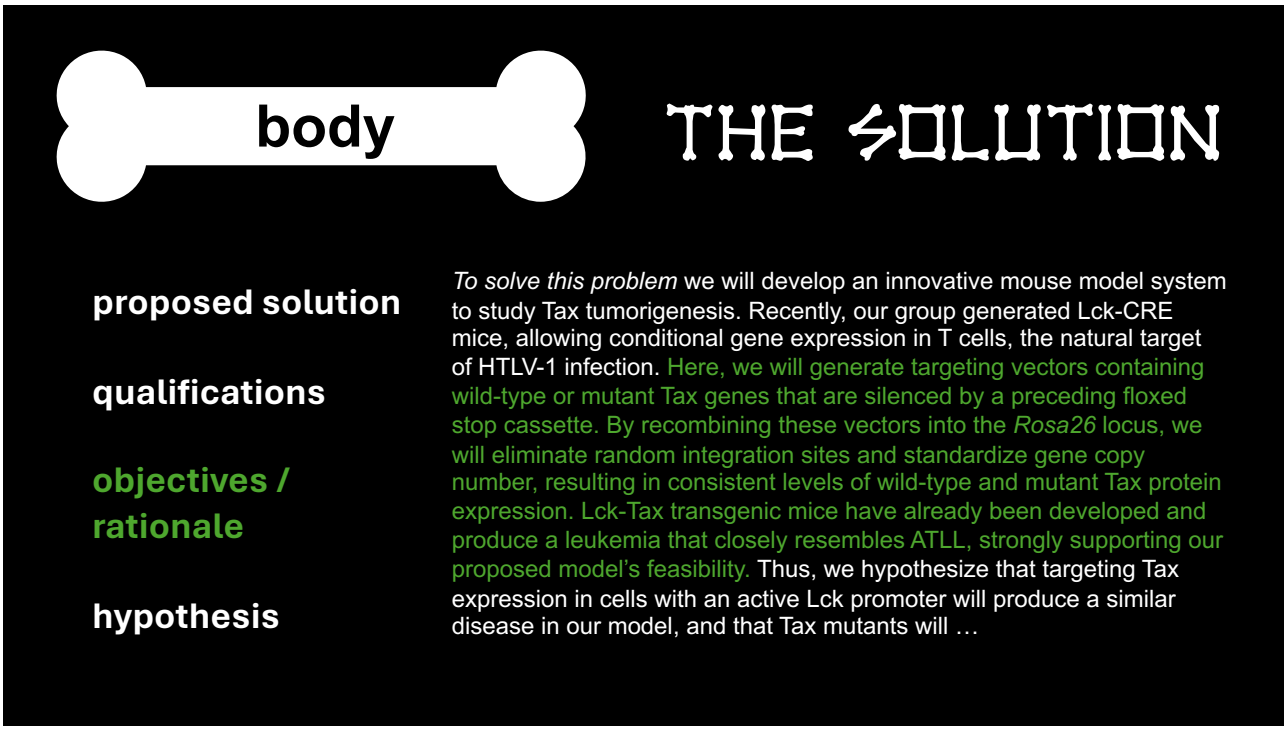
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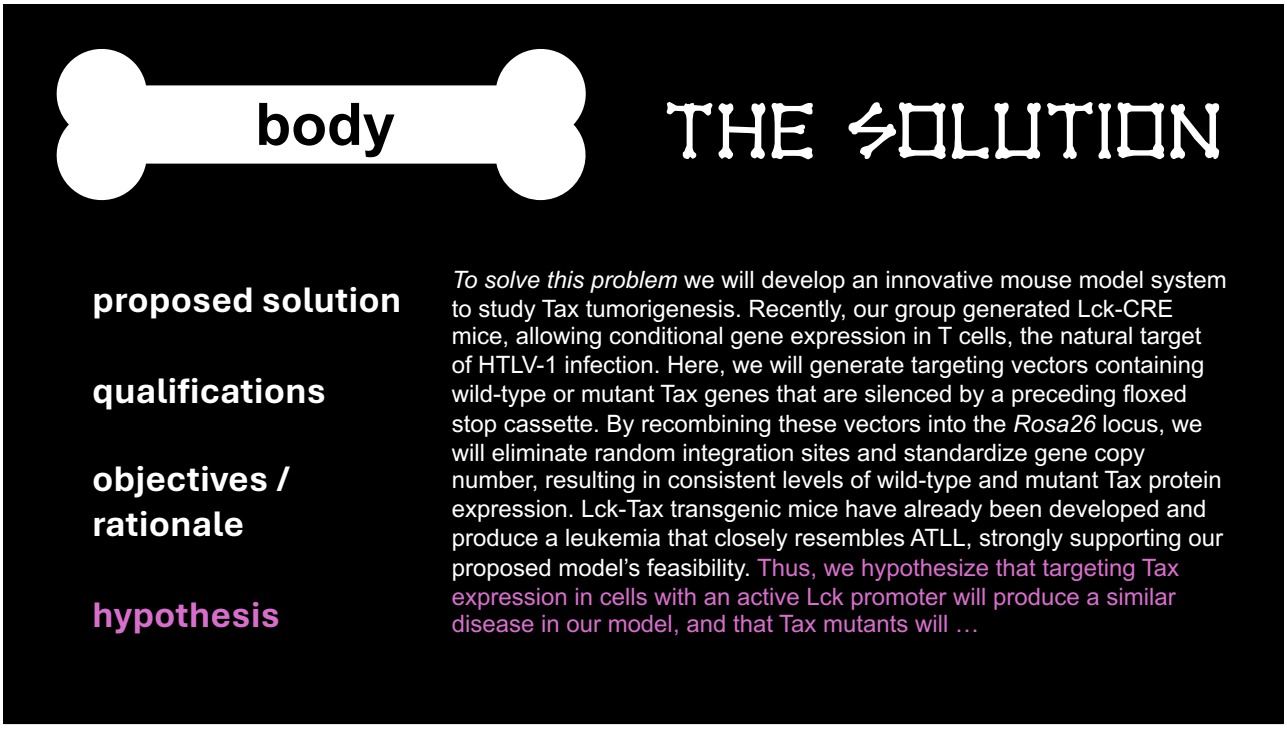
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aims
THE PLAN
title
strategy
outcome/impact

17


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title
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outcome/impact
Aim 1: Establish an innovative mouse model for HTLV-1 Tax tumorigenesis. Targeting vectors containing silenced wild-type or mutant Tax genes will be knocked in to the Rosa26 locus of C57BL/6 mice. These mice will then be crossed with homozygous Lck-CRE mice, thereby removing the stop cassette and generating mice that express wild-type Tax proteins specifically in T cells. By developing this model, we will enable unprecedented investigation into tax-mediated transformation mechanisms.

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aims

THE PLAN

title

strategy

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impact
THE PAYOFF
innovation
outcomes
overall impact

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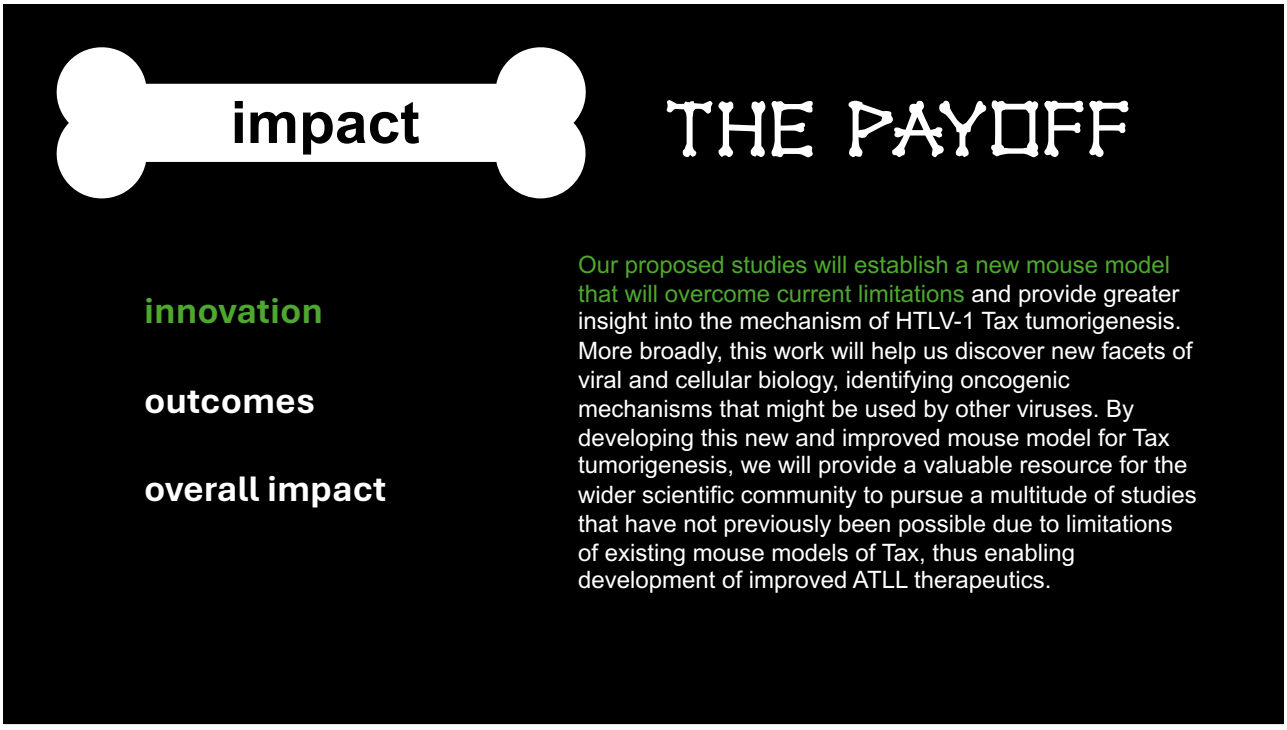
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Our proposed studies will establish a new mouse model that will overcome current limitations and provide greater insight into the mechanism of HTLV-1 Tax tumorigenesis. More broadly, this work will help us discover new facets of viral and cellular biology, identifying oncogenic mechanisms that might be used by other viruses. By developing this new and improved mouse model for Tax tumorigenesis, we will provide a valuable resource for the wider scientific community to pursue a multitude of studies that have not previously been possible due to limitations of existing mouse models of Tax, thus enabling development of improved ATLL therapeutics.

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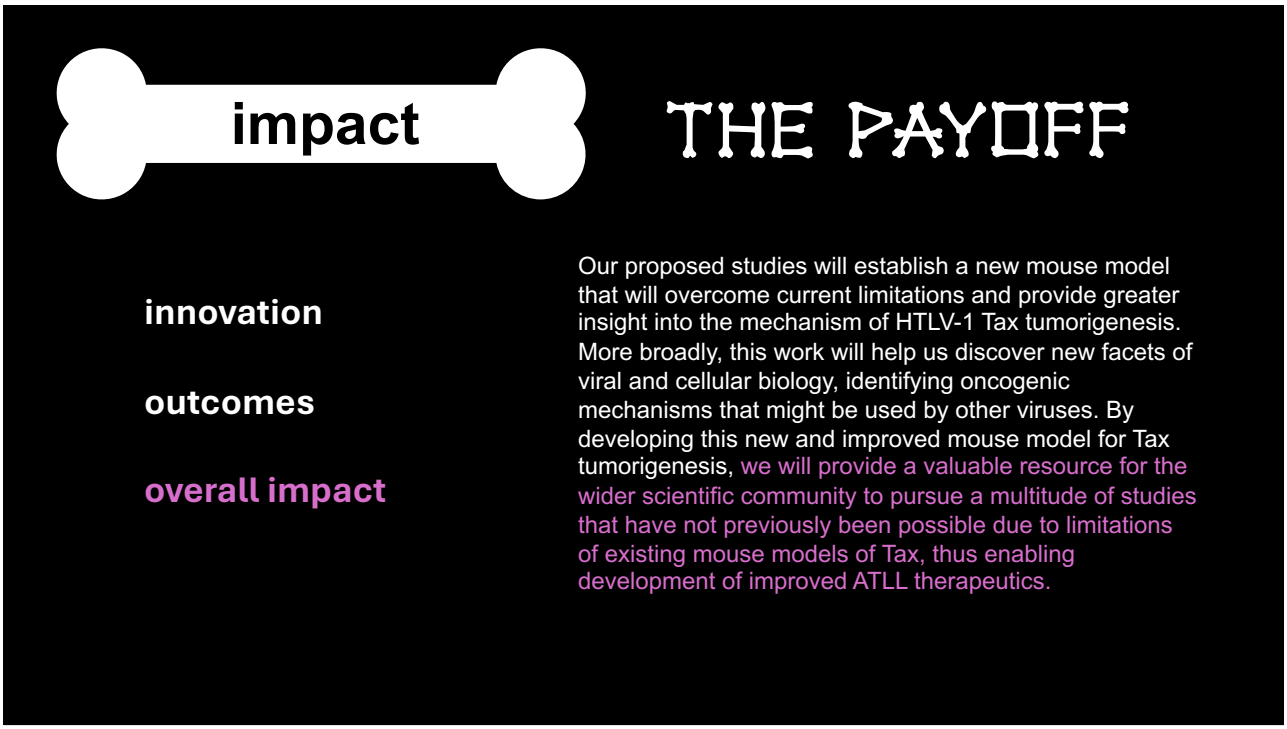
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The Challenge

what & why

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COMMON Pitfalls

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Too much information

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intro

body

aims

THE PROBLEM

THE SOLUTION

THE PLAN

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Too much information

Separate drafting from editing

Save your scraps

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Too many hypotheses

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Too many hypotheses

Choose one clear, overarching hypothesis*

Check that it is tested by each of the aims

Be explicit

****There are exceptions***

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"Weak" words

"look around" *(no defined endpoint)*	"find out" *(tangible progress)*
Analyze	Determine
Characterize	Identify
Explore	Solve
Investigate	Map
Describe	Establish
Examine	Visualize
Compare	Build
Correlate	Delineate
Survey	Design
	Implement

*There are exceptions

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"Weak" words

JAMA Network | Open

Original Investigation | Medical Journals and Publishing

Use of Promotional Language in Grant Applications and Grant Success

Huilian Sophie Qiu, PhD; Hao Peng, PhD; Henrik Barslund Fosse, PhD; Teresa K. Woodruff, PhD; Brian Uzzi, PhD

"…the percentage of **promotional language** used in medical science grants was **positively associated** with **receiving funding** …"

**There are exceptions*

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Category	Promotional Words
Importance	compelling, critical, crucial, essential, foundational, fundamental, imperative, important, indispensable, invaluable, key, major, paramount, pivotal, significant, strategic, timely, ultimate, urgent, vital
Novelty	creative, emerging, first, groundbreaking, innovative, latest, novel, revolutionary, unique, unparalleled, unprecedented
Rigor	accurate, advanced, careful, cohesive, detailed, nuanced, powerful, quality, reproducible, rigorous, robust, scientific, sophisticated, strong, systematic
Utility	accessible, actionable, deployable, durable, easy, effective, efficacious, efficient, generalizable, ideal, impactful, intuitive, meaningful, productive, ready, relevant, rich, safer, scalable, seamless, sustainable, synergistic, tailored, tangible, transformative, user-friendly
Quality	ambitious, collegial, dedicated, exceptional, experienced, intellectual, longstanding, motivated, premier, prestigious, promising, qualified, renowned, senior, skilled, stellar, successful, talented, vibrant
Scale	ample, biggest, broad, comprehensive, considerable, deeper, diverse, enormous, expansive, extensive, fastest, greatest, huge, immediate, immense, interdisciplinary, international, interprofessional, largest, massive, multidisciplinary, myriad, overwhelming, substantial, top, transdisciplinary, tremendous, vast
Attitude	attractive, confident, exciting, incredible, interesting, intriguing, notable, outstanding, remarkable, surprising
Problem	alarming, daunting, desperate, devastating, dire, dismal, elusive, stark, unanswered, unmet
Examples sentences with Promotional Words	"Further, a *unique* and *key* aspect of this program is the sharing of common mouse strains, reagents…" "There remains an *imperative* need for more *advanced* PACT breast imaging technologies." "Addressing this severe knowledge gap in one of the most *fundamental* aspects of cytoskeletal biology is *paramount* to understanding how actin functions in cells." "The proposed methods offer a *revolutionary* innovation and will be a game-changer in the…" "These *innovative* and *novel* studies will provide essential new information about the regulation of…" "We propose to go deep in analyzing a very *unique* and *unprecedented* large scale human genomic data set for ageing research."

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Redundancy / lack of creativity

Example disease is bad.

Our approach will cure example disease.

This is important because we will cure example disease, and example disease is bad.

Example disease negatively impacts millions worldwide.

Our approach will provide new treatment options for example disease.

Not only will this research help cure example disease, but the knowledge/tools we gain will help cure other diseases too.

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Redundancy / lack of creativity

Be specific

Think *potential

without overstating

Example disease negatively impacts millions worldwide.

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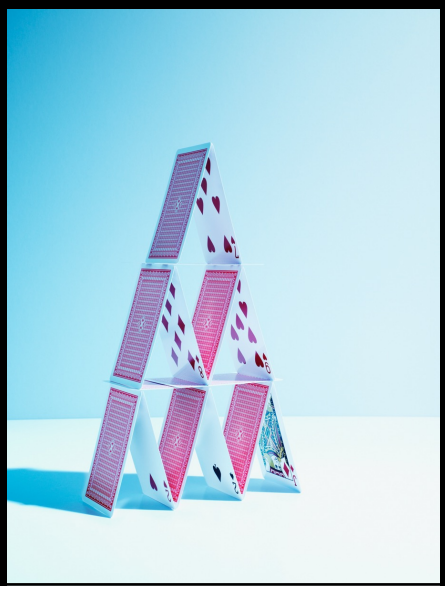
Dependency



For each aim, ask yourself:

what if it completely fails?

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"Academic" language

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Short words

Subsequently, we investigated whether the compound would facilitate improvements in protein function.

Next, we studied whether the compound would improve protein function.

- Crystal Herron, PhD, ELS
Redwood Ink

39

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Short words

Subsequently, we **investigated** whether the compound would facilitate improvements in protein function.

Next, we **studied** whether the compound would improve protein function.

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Long vs. short

utilize	**use**
A large number of	**many**
important	**key**
predominant	**main**
optimal	**best**; **ideal**
components	**parts**
elucidate	**clarify**; **resolve**

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Abstract Nouns vs. verbs

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Next, we studied whether the compound would improve protein function.

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Abstract Nouns vs. verbs

Subsequently, we investigated whether the compound would **facilitate improvements in** protein function.

Next, we studied whether the compound would **improve** protein function.

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Redwood Ink

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Abstract Nouns vs. verbs

There is **an accumulation of** ATP in cells	ATP **accumulates** in cells
For purposes **of demonstration**	To **demonstrate**
To facilitate **improvement of** our protocol	To **improve** our protocol
This compound **influences the regulation of** …	This compound **regulates** …
With the **exception of**	**Except**
Over the **course of** the incubation	**During** the incubation

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Prepositional Phrases

The reason **for** the failure **of** the big bad wolf **to** blow down the house **of** the third little pig was **that** the construction material was **of** a heavy type **of** brick that was resistant **to** all but the most significant **of** changes **in** wind pressure.

The big bad wolf could not blow the third little pig's house down because it was made **of** sturdy brick.

Because the third little pig had a sturdy brick house, the big bad wolf could not blow it down.

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"Academic" language

Search your document for:
"of, to, in, for, with, from, through, at, over …"

Ask for **feedback!**

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KEY Takeaways

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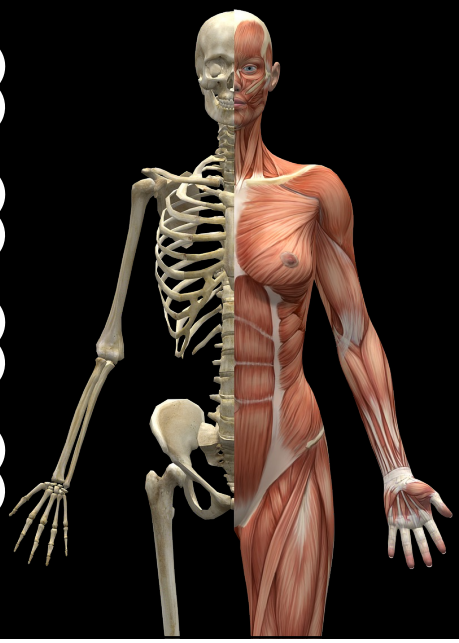
intro

body

aims

impact



PROBLEM

SOLUTION

PLAN

PAYOFF

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what & why

Too much information

Too many hypotheses

Weak words

Redundancy

Dependency

“Academic” language

Ask for feedback!

Edit, save your scraps

Streamline

Strong words

Think potential

Stand alone aims

Search document

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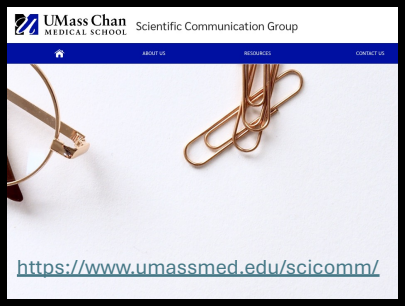
Resources



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Acknowledgements

The Grant Writing Guide: A Road Map for Scholars — Betty S. Lai
Redwood Ink
BioScience Writers
NIH Grant Applications
The Anatomy of a Specific Aims Page
Release Date: April 09, 2015
Category: Scientific Grant Writing
Author: Michelle S., Ph.D., E.L.S.
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UMass Chan MEDICAL SCHOOL Office of Health Equity
UMass Chan MEDICAL SCHOOL Office of Faculty Affairs
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