From Blank Page to Manuscript Draft

Manuscript Writing Workshop

ONLINE WORKSHOP – DAY 3

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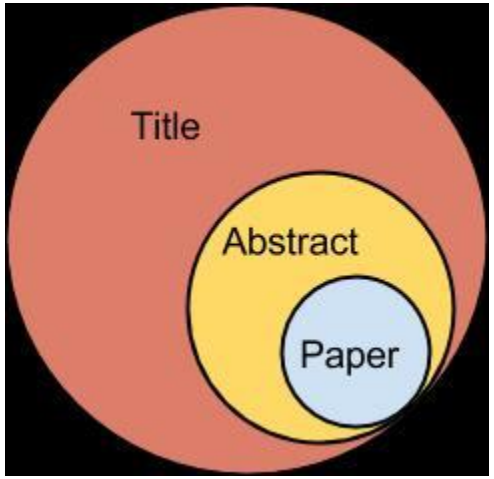
Abstract

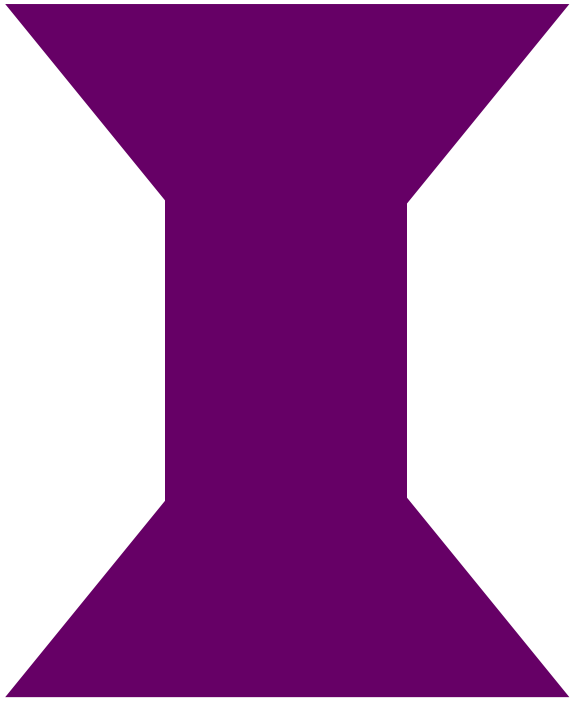


Relative views of various paper sections

Image credit: Macmillan science communication

So…where do the title and abstract fit?

If this is your paper body…



This is your title and abstract!

The abstract and title of your paper serve to highlight the key points and ultimately convince a reader to read the rest of your paper.

Abstract

The advertisement for your research –

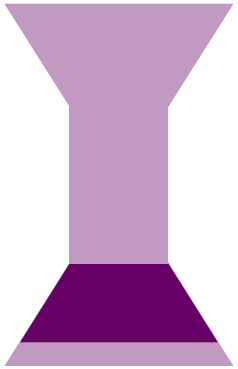
What you did *and*
the ***major findings***

Abstract

This should include the **purpose** of your research put into **perspective** to attract readers

Breakdown of the Abstract

- What are the key parts of an abstract?
- How is this section structured?



Overall **problem** in general field
Clear statement of a problem that would interest all readers of journal

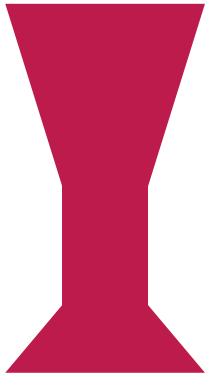
- Why should the reader **care**?
  Give a reason why this reader should care about this problem

- What was **done previously/is known**?
  Any required background – only what is necessary to understand the gap
  *May not be necessary!

- What did this paper try to do **(hypothesis)**?
  Major goals and objectives of the paper

- What were the **major findings**?
  The key results of the paper

What is the **major significance** of this?
Indicate the importance of this work and why it deserves publication



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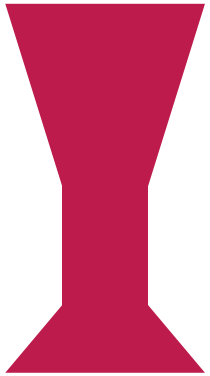
Antibody–drug conjugates (ADCs) selectively deliver chemotherapeutic agents to target cells and are important cancer therapeutics. However, the mechanisms by which ADCs are internalized and activated remain unclear. Using CRISPR-Cas9 screens, we uncover many known and novel endolysosomal regulators as modulators of ADC toxicity. We identify and characterize C18ORF8/RMC1 as a regulator of ADC toxicity through its role in endosomal maturation. Through comparative analysis of screens with ADCs bearing different linkers, we show that a subset of late endolysosomal regulators selectively influence toxicity of noncleavable linker ADCs. Surprisingly, we find cleavable valine–citrulline linkers can be processed rapidly after internalization without lysosomal delivery. Lastly, we show that sialic acid depletion enhances ADC lysosomal delivery and killing in diverse cancer cell types, including with FDA (US Food and Drug Administration)-approved trastuzumab emtansine (T-DM1) in Her2-positive breast cancer cells. Together, these results reveal new regulators of endolysosomal trafficking, provide important insights for ADC design and identify candidate combination therapy targets.

Tsui et al., *Nature Chemical Biology* **2019**, 949–958



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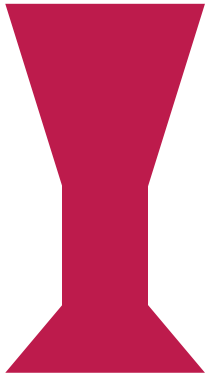

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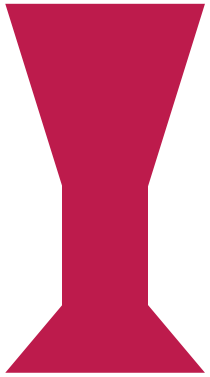
Protein complex formation highly depends on the interplay between preorganization and flexibility of involved binding epitopes. The design of epitope mimetics mainly focuses on the stabilization of a particular bioactive conformation often not considering the conformational dynamics. This limits the potential of peptidomimetics in particular when aiming for challenging targets such as transcription factors. Here, we report the first peptide-derived inhibitor of the NF-Y transcription factor by first constraining the conformation of an epitope using the hydrocarbon stapling approach and then fine-tuning its flexibility. In the initial set of constrained peptides, we observed a severe effect of a single non-interacting α-methyl group on complex stability. The combination of X-ray and NMR structures as well as isothermal titration calorimetry and CD spectroscopy reveal how this methyl group affects the conformation of the peptide in its bound state. Adaption of the methylation pattern results in a peptide which inhibits transcription factor assembly and its subsequent recruitment to the target DNA. These results highlight the importance of residual conformational freedom when constraining protein fragments in their bioactive conformation.

Jeganathan, et al., *Angew Chem* **2019**
https://doi.org/10.1002/anie.201907901



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- What were the **major findings**? — 3 sentences
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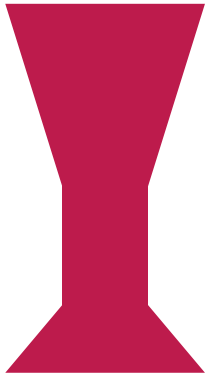

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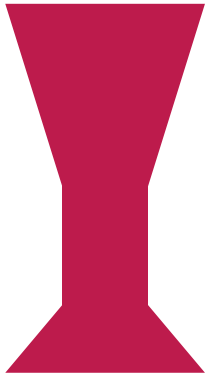
Given the critical role that proteins play in almost all biological processes, there is great interest in controlling their presentation within and release from biomaterials. Despite such outstanding enthusiasm, previously developed strategies in this regard result in ill-defined and heterogeneous populations with substantially decreased activity, precluding their successful application to fragile species including growth factors. Here, we introduce a modular and scalable method for creating monodisperse, genetically encoded chimeras that enable bioactive proteins to be immobilized within and subsequently photoreleased from polymeric hydrogels. Building upon recent developments in chemoenzymatic reactions, bioorthogonal chemistry, and optogenetics, we tether fluorescent proteins, model enzymes, and growth factors site-specifically to gel biomaterials through a photocleavable protein (PhoCl) that undergoes irreversible backbone photoscission upon exposure to cytocompatible visible light ($\lambda \approx 400$ nm) in a dose-dependent manner. Mask-based and laser-scanning lithographic strategies using commonly available light sources are employed to spatiotemporally pattern protein release from hydrogels while retaining their full activity. The photopatterned epidermal growth factor presentation is exploited to promote anisotropic cellular proliferation in 3D. We expect these methods to be broadly useful for applications in diagnostics, drug delivery, and regenerative medicine.

Shadish et al., *JACS* **2019,** 1413915619-15625



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- What were the **major findings**? — 3 sentences
- What is the **major significance** of this? — 1 sentence

Given the critical role that proteins play in almost all biological processes, there is great interest in controlling their presentation within and release from biomaterials. Despite such outstanding enthusiasm, previously developed strategies in this regard result in ill-defined and heterogeneous populations with substantially decreased activity, precluding their successful application to fragile species including growth factors. Here, we introduce a modular and scalable method for creating monodisperse, genetically encoded chimeras that enable bioactive proteins to be immobilized within and subsequently photoreleased from polymeric hydrogels. Building upon recent developments in chemoenzymatic reactions, bioorthogonal chemistry, and optogenetics, we tether fluorescent proteins, model enzymes, and growth factors site-specifically to gel biomaterials through a photocleavable protein (PhoCl) that undergoes irreversible backbone photoscission upon exposure to cytocompatible visible light ($\lambda \approx 400$ nm) in a dose-dependent manner. Mask-based and laser-scanning lithographic strategies using commonly available light sources are employed to spatiotemporally pattern protein release from hydrogels while retaining their full activity. The photopatterned epidermal growth factor presentation is exploited to promote anisotropic cellular proliferation in 3D. We expect these methods to be broadly useful for applications in diagnostics, drug delivery, and regenerative medicine.

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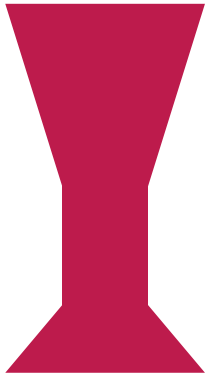

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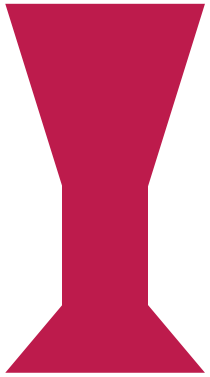
Illisimonin A was isolated from *Illicium simonsii* and has a previously unreported tricyclic carbon framework. It displayed neuroprotective effects against oxygen-glucose deprivation-induced cell injury in SH-SY5Y cells. It incorporates a highly strained trans-pentalene ring system. We report the first synthesis of (±)-illisimonin A. Notable steps in the route include a 1,3-dioxa-2-silacyclohexene templated Diels–Alder cycloaddition and type-3 semipinacol rearrangement to generate the trans-pentalene. The final step is an iron-catalyzed C–H oxidation. The synthetic route is robust, with 94 mg of racemic material prepared in a single pass. Resolving an intermediate enabled the synthesis of natural (–)-illisimonin A. The absolute configuration of (–)-illisimonin A was revised to 1*S*,4*S*,5*S*,6*S*,7*R*,9*R*,10*R* based on the X-ray structure of a heavy-atom analogue.

Burns and Rychnovsky, *JACS* **2019**, 1413413295-13300



- Overall **problem** in general field — 0 sentences
- Why should the reader **care**? — 1 sentence
- What was **done previously/is known**? — 2 sentences
- What did this paper try to do **(hypothesis)**? — 1 sentence
- What were the **major findings**? — 5 sentences
- What is the **major significance** of this? — 0 sentence

Illisimonin A was isolated from *Illicium simonsii* and has a previously unreported tricyclic carbon framework. It displayed neuroprotective effects against oxygen-glucose deprivation-induced cell injury in SH-SY5Y cells. It incorporates a highly strained trans-pentalene ring system. We report the first synthesis of (+)-illisimonin A. Notable steps in the route include a 1,3-dioxa-2-silacyclohexene templated Diels–Alder cycloaddition and type-3 semipinacol rearrangement to generate the trans-pentalene. The final step is an iron-catalyzed C–H oxidation. The synthetic route is robust, with 94 mg of racemic material prepared in a single pass. Resolving an intermediate enabled the synthesis of natural (−)-illisimonin A. The absolute configuration of (−)-illisimonin A was revised to 1*S*,4*S*,5*S*,6*S*,7*R*,9*R*,10*R* based on the X-ray structure of a heavy-atom analogue.

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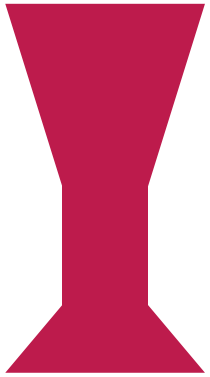

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- What did this paper try to do **(hypothesis)**? — 1 sentence
- What were the **major findings**? — 4 sentences
- What is the **major significance** of this? — 1 sentence

Illisimonin A, isolated from *Illicium simonsii*, was recently shown to have neuroprotective effects against oxygen-glucose deprivation-induced cell injury in SH-SY5Y cells. It has a previously unreported tricyclic carbon framework and incorporates a highly strained trans-pentalene ring system that provide unexplored synthetic challenges. We report the first synthesis of (±)-illisimonin A. Notable steps in the route include a 1,3-dioxa-2-silacyclohexene templated Diels–Alder cycloaddition and type-3 semipinacol rearrangement to generate the trans-pentalene. The final step is an iron-catalyzed C–H oxidation. Resolving an intermediate enabled the synthesis of natural (−)-illisimonin A. The absolute configuration of (−)-illisimonin A was revised to 1*S*,4*S*,5*S*,6*S*,7*R*,9*R*,10*R* based on the X-ray structure of a heavy-atom analogue. The robust synthetic route, with 94 mg of racemic material prepared in a single pass, makes it applicable for larger scale commercial synthesis.

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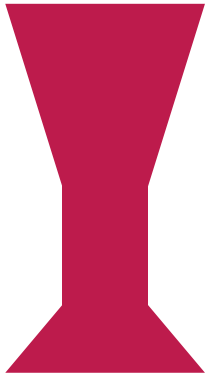

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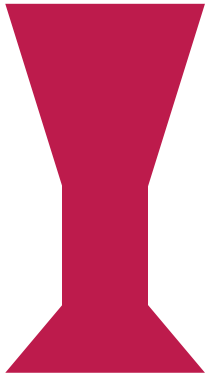
Ableist microaggressions are brief or covert insults that are targeted towards individuals based on their disability status (Keller and Galgay 2010; Sue et al. 2007). Qualitative studies have revealed that anger, embarrassment, and frustration are commonly experienced by people with disabilities in relation to ableist microaggressions, however, more quantitative studies are required (Keller and Galgay 2010). The current study examined the relationship between ableist microaggressions, academic performance, and mental health outcomes. Canadian university students (n = 108) with self-identified disabilities completed a survey that assessed disability-related discrimination, institutional betrayal, institutional support, academic performance, and mental health. Experiences of discrimination significantly predicted greater symptoms of anxiety, depression, poorer academic self-concept, and lower grade satisfaction. After controlling for the effects of overt and covert discrimination, institutional betrayal significantly predicted a lower academic self-esteem and higher symptoms of depression. However, institutional support does not appear to buffer against these experiences.

Lett et al., *Disability & Society* **2019**
https://doi.org/10.1080/09687599.2019.1680344



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Parts of an abstract

What should be included in an abstract?

Questions you can answer to write yours

Overall **problem** in general field

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- What did this paper try to do **(hypothesis)**?
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Questions on the abstract

- Do you have an opening that **catches the reader's attention**?
  - Do you have the darkest 2 colors first?
  - Can you arrange so you do?
- Do you avoid starting with a field-specific **definition or fact**? (i.e., Color #3)
  - Can you bury this color in the darker green colors?
- Do you have all **6 colors**?
- Do you have **red text** indicating the gap in the field?
  - Is this red text close to the top?
- Is the **results section** your longest section?
- Do you end with **purple**?

Drafting the Abstract

Starting from a blank page

- How to structure
- How to start writing
- What to include
- What to avoid
- How to get “unstuck”

Drafting the Abstract

What should you already have completed?

- Figures
- Materials and methods*
- Results
- Discussion
- Introduction
- Conclusion

*Can be saved for later depending on drafting style.

*Basically, the **body** of the paper!*

1. Parts of an abstract

Overall problem in general field

- State the problem clearly and at the beginning of the abstract
- Tailor the scope of the problem to the scope of the journal
  - i.e., field-specific journals can have more specific problem statements

Where can you find this information?

- Conclusion
  - Is there a potential applications?
- Introduction
  - The first paragraph – what is the overall problem you are using to relate to your reader?
  - What is the gap you are seeking to fill?

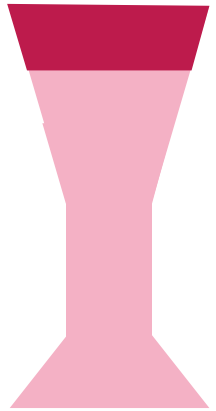
Questions for finding the overall problem:

- What gap in the field is this research addressing?
  - ***Hint*** *– good for basic research with no specific application!*

    "Current methods for studying XXX lack the ability to AAA, BBB, and CCC,…"
- What is a potential application of this research?

  "There is no currently existing method for treating XXX…."
- How many people might be affected by this research (as in how many are affected by a disease this addresses? a natural disaster this studies? a governmental policy this analyzes?)

  "The lack of proper models for flood scenarios occurring after tropical storms means that over a million people are currently living in areas that cannot be properly outfitted to withstand changing climate conditions."



Why should the reader care?

- Absolutely necessary section – but often forgotten or deleted for space!
- Don't assume the reader will recognize this themselves – they won't
- Show readers exactly why your research matters and how it affects their life
- This is your ***best chance*** to capture a reader's attention – don't miss it!

Where can you find this information?

- Introduction
  - The first paragraph – why does the overall problem affect your readers??

Questions for discovering why the reader should care:

- Negative effect

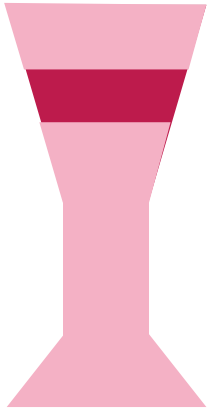
  Show the reader the consequences of your problem statement

  "…which means that estimates derived from this method can be off by as much as 20%."

- Positive effect

  Indicate how a gap can be filled or a problem solved to eliminate the pain point.

  "The enzyme ABC1 has recently been shown to play a driving role in this disease, and knockout studies in mice indicate that an inhibitor would eliminate the major symptoms, providing dire relief to over a million suffers per year."



What has been done? What is known?

- Providing background information on the field can help show:
  - Where your work fits in
  - The importance of your work in the field

Where can you find this information?

- Discussion
  - What work did you directly compare with yours?
- Introduction
  - The previous work paragraph

Questions for determining relevant information to include:

- What is a major, recent advance in this field?

  "Recently, it was shown that XXX…"

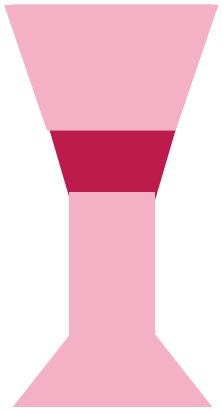
  "Mitochondria have recently been shown to display XXX behavior in YYY conditions…"

- What is the definitive piece of work on this subject?

  "In 2002, the discovery of XXX opened up this field of research…"

- What research does yours directly build from?

  "XXX and YYY tried to solve this problem by ZZZ…"



What did this paper try to do (hypothesis)?

- What were you trying to do in this paper?
- What was your goal?
- What did you try to accomplish?

Where can you find this information?

- Introduction
  - Last paragraph of the introduction should include your hypothesis
- Discussion
  - The first paragraph of your discussion should again recap the hypothesis

Questions for determining relevant information to include:

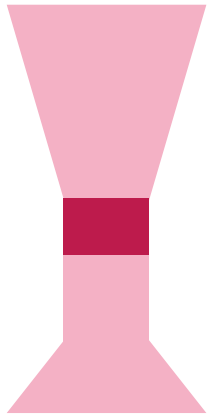
- What were your trying to make/do/accomplish?

  "In this work, we sought to…"

  "We herein describe a method for…"

- What gap in the field were you trying to fill?

  "The results of a concentrated study of the effects of XXX are therefore presented herein."



What were the major findings?

- Traditional summary of major findings
- Tell what you discovered and what important techniques you used to get there.

Where can you find this information?

- Results
  - Make notes of the major results presented in the paper

Questions for determining relevant information to include:

- As an expert in the field, what results would most catch YOUR attention?
- What results do you consider to be the major highlights of the paper?

  "In this paper, we show that…"
- What results would be surprising to a reader in the field?

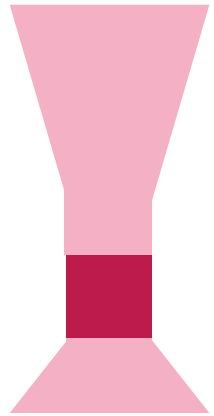
  "Contrary to what has been previously thought about XXX, we discovered that…"
- What results will likely change or advance the field?

  [gap) "To address this, we developed the [method description]."
- What results can be directly tied to an application?

  "The discovery of XXX provides a likely path towards the treatment of [disease]."
- Were specialized techniques or methods used that would interest a reader?

  "This was accomplished using an combination of [technique 1] and [technique 2], developed specially for the measurement of XXX."
- Is there a technique that was developed in this work?

  "The platform developed herein allowed us to measure [result] and would be a valuable tool for XXX, YYY, and ZZZ applications."



What is the major significance?

- Relates the work to the field at large.
- Describes the importance of your research and how it advances science.
- Show editors, peer reviewers, and readers why this manuscript deserves to be published.

Where can you find this information?

- Discussion
  - How does your work affect the gap in the field or extend current knowledge of the field?
- Conclusion

Questions for determining relevant information to include:

- What does this work bring to the field?

  "…, greatly advancing our current knowledge of this pathogen and providing new avenues for future studies into various treatment or containment options."

- Does this work change the field in some way?

  "This work provides an alternative to the XXX method that is currently used to provide a more accurate estimation of the YYY."

- How does this work advance science?

  "This work demonstrates for the first time how…"

- Why should the readers of the specific journal you are submitting this to be excited about this work?

  "Previous modeling techniques were unable to account for XXX phenomenon, so this research provides more accurate measurements of YYY for ZZZ application, and can be expanded upon in future programs to address [other existing problem]."

Putting it all together

Quick guide to composing your abstract

(~250 words)

1. Overall problem in general field **(1 sentence)**

2. Why should the reader care? **(1 sentence)**

3. What has been done/is known? **(0-1 sentence)**

4. What did this paper try to do (hypothesis)? **(1 sentence)**

5. What were the major findings? **(3-5 sentences)**

6. What is the major significance of this? **(1 sentence)**

Do

What should you do before starting?

What should you keep in mind while writing?

- Check the word count for your journal
  - Most want <250 words
  - Some will want less and/or couple it with a significance statement
- Compose the entire manuscript first
- Make sure your story is solidified
- Make the abstract standalone

Include

What goes into the abstract?

- Exact numbers or details whenever possible
- The main highlights of the paper (only!)
- Rationale for the study
- Why your research matters

Do not include

What should not be in your abstract?

- References
- Experimental details (unless a new/interesting technique)
- Jargon
- Overly technical terms
- Abbreviations

But I'm stuck!!

Abstract edition

But I'm stuck!

- Have you **written the body** of the paper?
- Have you **answered the questions** for each of the 6 parts of the abstract? (slides 23-28)
- Stuck on the major problem and why the reader should care? **Start writing from the middle points**
- Have you put it together using the **Quick Guide** guidelines?

- Still stuck?
  - Try the "**PDF Guide to Abstracts**" (www.butlerscicomm.com) for more details and tips

Title

1. **Keywords**
   - What are the main words that **describe your study**?
   - What words would a reader use to **find your work**?
   - What words make you **stand out** from other similar papers?

2. **Emphasis**
   - What **type of study** was this?
   - What was the **overall point** or purpose?

3. **Impact**
   - What did your study **accomplish**?
   - What is **new or different** in your study?
   - What makes your words **stand out** from the field?

Three main components of a title:

Keywords, **emphasis**, **impact**.

-Are the **main keywords** of your paper emphasized in your title?
  -What words would *YOU* use to search for your paper?
  -What words do you *repeatedly use* in the paper (next slide)?
  -What words make your paper *stand out* from other similar papers?

-Are there words in your title that are **NOT keywords**? Why?

-Are the terms written in such a way as to be **accessible to your target audience?**
  i.e., avoid specific biological terms for very general audience manuscripts, and vice versa

Exercise:
-Write down what you think are the **5-15 keywords** of the study

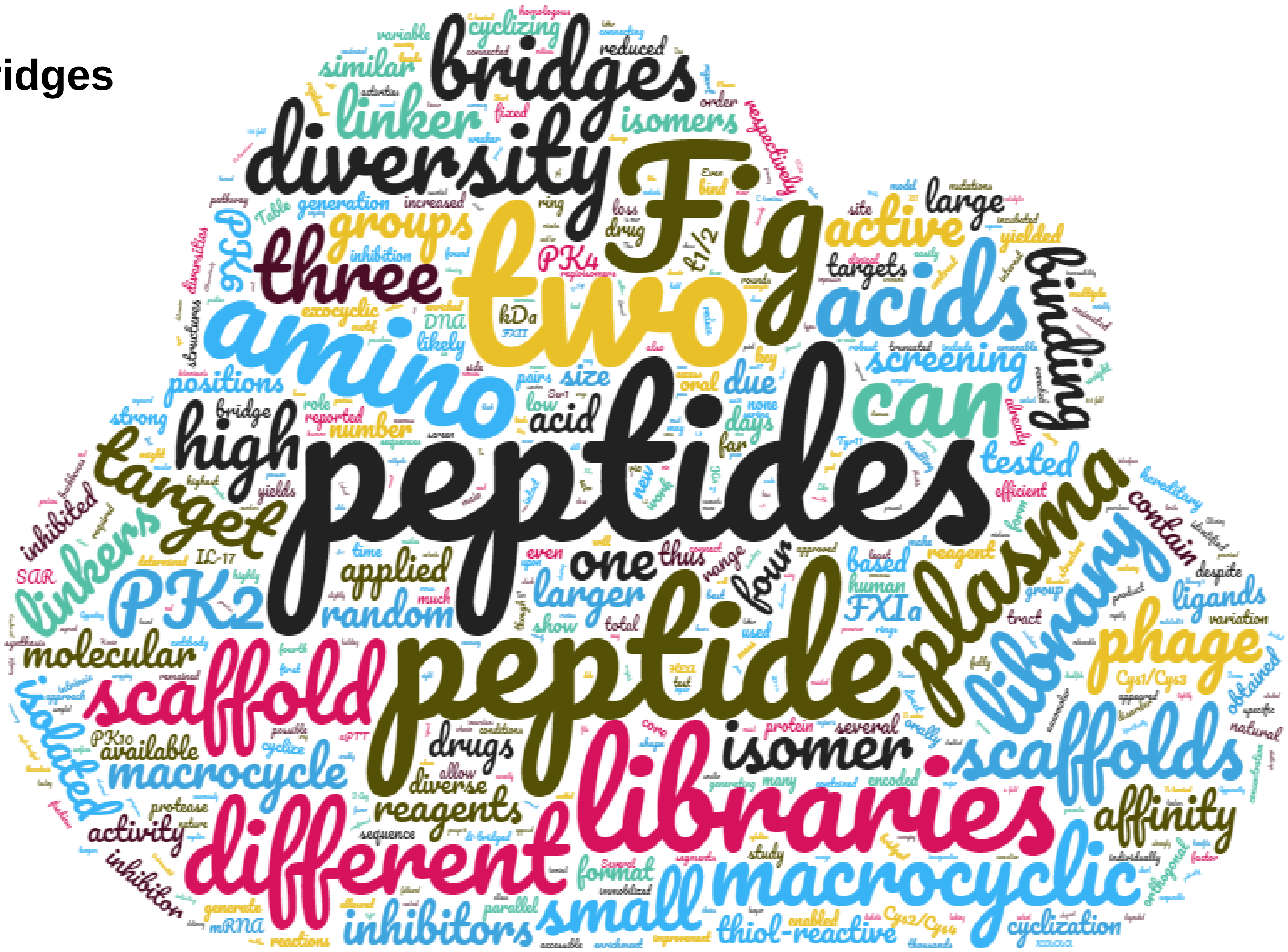
-**Compare** to your written title

-What keywords are **missing** from your title? Do you need non-keywords?

https://www.wordclouds.com/

Title:

Cyclization of peptides with two chemical bridges affords large scaffold diversities



https://www.wordclouds.com/

Title:

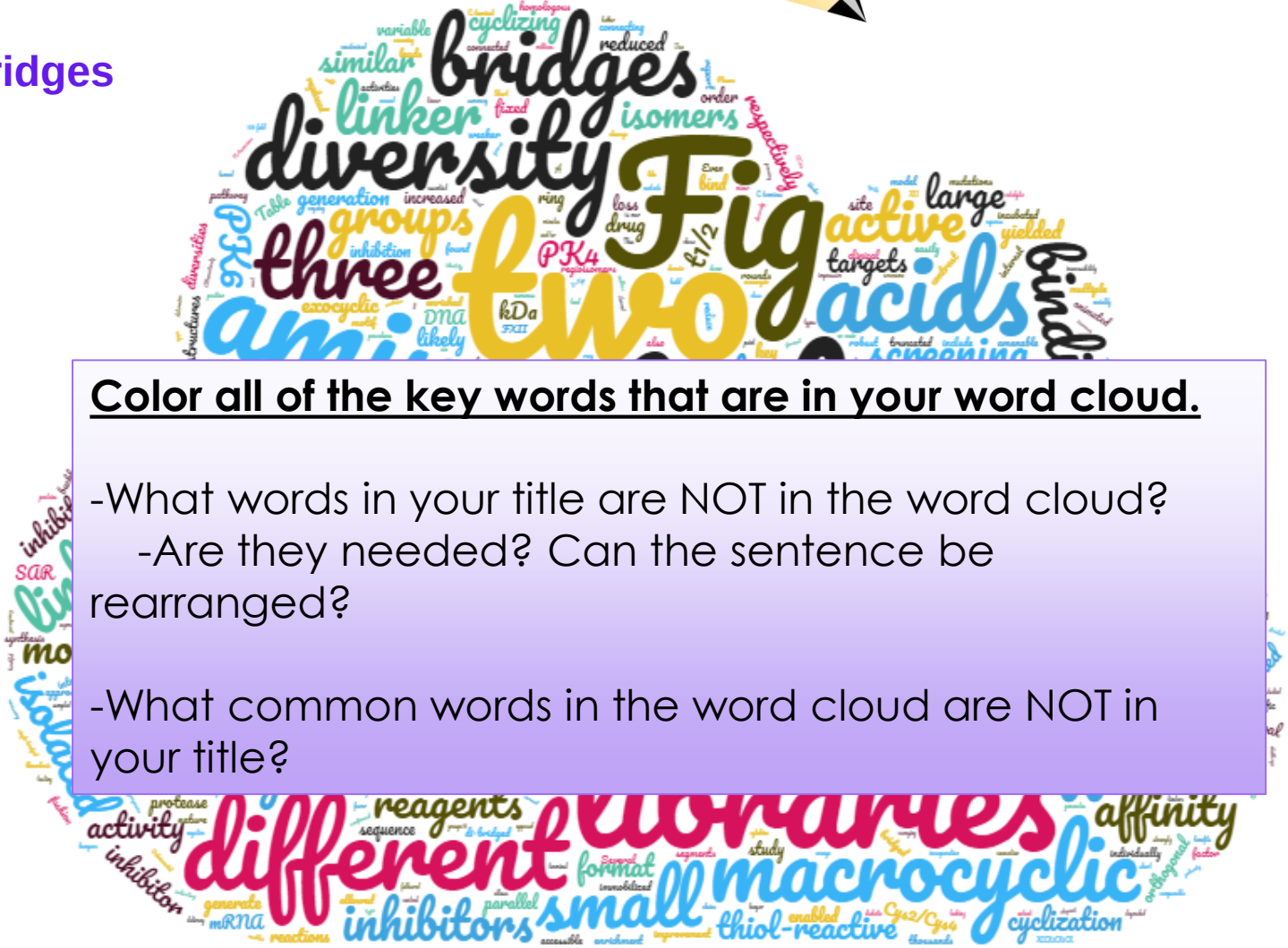
Cyclization of peptides with two chemical bridges affords large scaffold diversities

Suggested Title:

Libraries of peptides cyclized with two chemical bridges afford large scaffold diversities

Suggested Title:

Peptides cyclized using two chemical bridges afford phage libraries with diverse scaffolds



Color all of the key words that are in your word cloud.

-What words in your title are NOT in the word cloud?
-Are they needed? Can the sentence be rearranged?

-What common words in the word cloud are NOT in your title?

Pro tip!

Libraries of peptides **cyclized with two chemical bridges afford large scaffold diversities**

12 words

Peptide libraries **cyclized with two chemical bridges afford large scaffold diversities**

11 words

Keywords, **emphasis**, **impact**.

-Do you highlight the **major relevance** of your paper?
i.e., did you make an applicable method? Have an important result to convey?

-**What is this**?
basic research
a new method
an advance of a previous method
a new application,
a new biological truth, etc.

Color any word related to your major relevance

-Is it adequately indicated?

-What could you add to better represent this?

Suggested Title:

Libraries of peptides cyclized with two chemical bridges affords large scaffold diversities

Suggested Title:

Peptides cyclized using two chemical bridges afford phage libraries with diverse scaffolds

Keywords, **emphasis**, **impact**.

-**Why** should your reader read this paper?

-What is **new** or **different** from previous research?

-How does this work **affect your field**?

-What makes you **stand out** from the competition?

Color words related to your impact

-Is it adequately represented?

-What other words could you add to highlight this?

Suggested Title:

Libraries of peptides cyclized with two chemical bridges affords large scaffold diversities

Include

What goes into the Title?

- 10-15 words
- Keywords from your study that would be recognized by the field
- An indication of your scope
- What is of interest to field
- Detail to match the scope of journal
  - i.e., PNAS vs. Journal of Computational Biology

Do not include

What should not be in your Title?

- Abbreviations
- Phrases such as “study of”, “analysis of”
- Words such as “novel”, “new”, etc.
- Negative words or phrases
- Repeat words
- Reduce filler words: “the”, “of”, etc.

But I'm stuck!!

Title edition

-Have you **written** your paper?

-What **key words** would you be excited about as an expert in the field?

-Have you checked the most **repeated words** in your paper?

-Have you highlighted the **emphasis and impact** of the paper?

For more information…

- **Website and blog – butlerscicomm.com**
  - Regularly post *tips, strategies, step-by-step formulas* for writing manuscripts and motivation
  - *Sign up for my list* to get these right to your inbox!

- **Social media**
  - Twitter - @ButlerKaycie
  - Facebook – www.facebook.com/ButlerSciComm/
  - LinkedIn – Kaycie Butler OR Butler Scientific Communications

- **Workshops**
  - In-person or Skype workshops on any aspect of manuscript preparation

- **Editing services**
  - Detailed content editing for how to structure your manuscript and communicate your research.

- **Future online courses**
  - Online courses you can take *ON YOUR TIME, WHENEVER YOU NEED THEM*. Stay tuned!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FINISHED ANOTHER PARAGRAPH, DID WE?
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THE END!