

## Introduction Workshop: October 2017

### Facilitator Cheat-Sheet

#### 1) The Introduction: What is the problem?

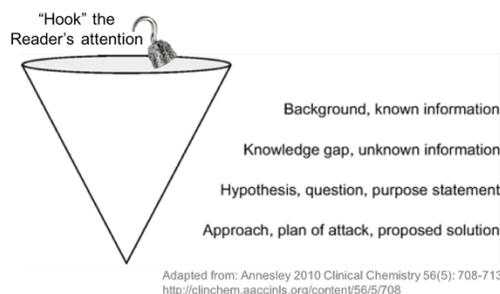
- **Introduction Workshop:** Today's workshop is the second in our workshop series. We will be talking about your introduction, mainly focusing on how to structure it and what to include.
- **General information:**
  - Due date for introduction: Friday December 1, 3 pm.
    - Will go to us and your thesis advisor for feedback
    - Schedule time with your advisor in January to discuss his/her feedback
    - Give a copy to your direct mentor and ask for their feedback
    - Language should be so that any student in the life sciences can understand → you can ask your peers to read your intro and give you feedback
    - Once you revise your introduction based on feedback, your introduction is done. Your introduction is not dependent on your results.
  - General Length: 10 +/- 2 double spaced pages
    - Challenging to be concise
    - Long introductions are easier to write
    - You need to really think about what should go into your intro
  - Figures: 0-1
    - Don't have to have a figure
    - ONLY add figures if it helps the reader understand an important piece of background information (for example: a complicated pathway or experimental screen).
    - Figures should supplement the text not replace a thorough explanation.
  - Subheadings
    - Acceptable but not necessary
    - Subheadings are often a crutch and replace good transitions between ideas.
    - You should not need subheadings, but if you decide to include them, make sure you still provide good transitions between subheadings.
- **Function of the Introduction:**

The introduction serves several roles:

  - It attracts the interest and curiosity of the reader.
  - It establishes the context in which your work took place by providing background information.
    - This is done by discussing the relevant literature and setting the stage by summarizing the current understanding in the field.
  - It states how your works fits into the context and why it is worth pursuing.
  - It ends with the statements of your hypothesis and gives an outlook/summary of what to expect when reading on.

## 2) Structure of the Introduction

The introduction should be structured like a funnel:



- The first sentence is your **HOOK**.
    - The hook is the writer's way of attracting your attention.
    - Often it is a general, big picture statement that is aimed at attracting a broader audience.
    - You can start with something that's intriguing or an issue that is timely and appealing to people so that they would want to know more about it.
    - Example: "The high rate of albinism among newly born babies in a mango-growing community alarmed concerned government agencies."

(From: <http://simplyeducate.me/2014/03/01/how-to-write-a-good-thesis-introduction-the-hook/>)

  - Try to use key words from your title to link the title to your introduction.
- Provide **background information** to establish context
    - Provide a concise review of the published literature in your field. Summarize what was known before you started your work.
    - Generally, the introduction starts with more general/global information (about what is known about the field in general) and then moves to more specific information (what is known about your specific area of study) and finally to a specific focus point (the question that was investigated/your objectives when writing the paper).
    - Make sure your summary is unbiased and not just summarizing the findings of your lab or labs with similar results/ideas.
    - Describe the published results in your own words. Remember that copying words is plagiarism.
    - Cite the papers you mention. Remember, copying ideas without the proper citations is plagiarism.
  - Introduce the **knowledge gap**
    - Point out what information is still missing in the field, leading your reader to your hypothesis/question.
    - Discuss how your study fits into the given context and how it will advance the knowledge within the field.
  - State your **question/hypothesis** and explain your **approach**
    - Give the reader an idea of the purpose of your thesis in the form of the hypothesis, question or problem you investigated.
    - Briefly explain your rationale and approach to getting answers to your question.
    - Make sure to not mix introduction with results, discussion and conclusion.

### **Exercise 1a:**

- Give students Handout #1, paragraphs cut outs from Pagliuca et al. introduction, and tape. Ask students to work in pairs to:
  - Assemble the paragraphs in a suitable order for an introduction.
  - Assign each paragraph to the suitable part of the introduction according to the funnel diagram and in one phrase describe what each paragraph does.
  - Give students 10 minutes to complete, then discuss outcome

- After discussing, draw students' attention to the first sentence
  - What's their hook?
    - Their first sentence does not focus on diabetes which would limit their audience.
    - Rather, they focus on the intriguing idea of using stem cells to generate cells and tissues for disease treatment and drug screening.
- And the last paragraph.
  - What do the authors do here?
    - Short summary of what was done and found.
  - What kind of data/experiments would you expect to see in this paper? Underline "hints" in text?
    - Culture experiments turning hPS cells into beta cells by supplying signaling factors
    - Characterization of the generated beta cells: prove that they produce insulin, show other features of beta cells, co-expression of markers, ultrastructure
    - Some kind of in vivo transplant data
- From the last and the first paragraph, suggest a title for this paper
  - "Generation of functional human pancreatic  $\beta$  cells in vitro"
- How might this introduction be expanded to provide a more detailed picture of the scientific background leading to the research carried out in the article?

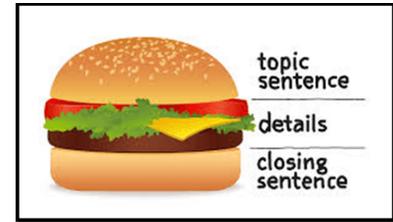
### 3) Good Practices for Scientific Writing

- **Purpose:** We want to spend a little time revisiting some good practices in scientific writing; namely focusing on phrases and linkages, paragraph structure and the known-new contract which we discussed during the thesis workshop.
- **Phrases and Linkages:** Using phrases and transitional words can be very helpful orienting the reader and giving them an idea of what is coming next.

#### *Exercise 1b:*

- Ask students to find/underline 2-3 phrases in the introduction characteristic for the background, knowledge gap and hypothesis/approach section.
- Show the students the highlighted version of the introduction:
  - the background section → recent research..., studies on .....
  - the knowledge gap section → unfortunately, ..., attempts-to-date ....., these cells fail to .....
  - the hypothesis and approach section → we set out to ..., we generated ..., we demonstrate ...
- Point out that the 2<sup>nd</sup> and 3<sup>rd</sup> paragraph have knowledge gap phrasing which helps to underscore the problem in the field and the importance of their work.
- Distribute Handout #2 with Helpful Phrases. This handout provides a table of useful phrases that help clue the reader into the different sections of the introduction and a table of transitional phrases to indicate relationships.
- **Topic sentences and paragraphs:**
  - Paragraphs:
    - Provide structure for your writing
    - Usually contain one specific idea or point
    - Use different paragraphs for different ideas or points - this creates a flow of thought

- Are usually structured in the following manner:
  - Topic sentence: summary/introduction; linking to above paragraph
  - Main information: details on the topic
  - Some paragraphs might have a conclusion: take home message
- Topic sentence:
  - is the first sentence in each paragraph.
  - usually summarizes the paragraph, thereby telling the reader what the following sentences will be about.
  - focuses the reader's attention and organizes the following sentences.
  - All the following sentences in the paragraph provide more detail about the fact stated in the topic sentence.
  - Ask students to identify topic sentences for each paragraph and see how they are followed by details in the rest of the paragraph.
- Closing sentence:
  - Some paragraphs need a "wrap-up" statement, especially if they're long or contain complex information
  - Gives the reader the take-home message of the paragraph
  - Serves as a nice springboard to the next paragraph
- **Known-New Contract:** We talked about the known-new contract in the thesis proposal workshop where background information (topic) is provided in the beginning of the sentence and the new information (stress) is introduced at the end of the sentence, since its job is to intrigue the reader. The topic position of the next sentence links back to the stress position from the previous sentence. So, the idea is to go from old to new stitching together your sentences as you go.



### **Exercise 2:**

- Give students Merkle et al. introduction handout.
- Ask students to analyze the second paragraph with respect to the known-new contract. Circle the topic position and underline the stress position.
  - Note how nicely this paragraph flows together.
  - Note how the authors keep the subject and verb close together.
- Ask students how long they think this introduction would be double spaced with 1 inch margins as your introduction would be?
  - Show them the print out → ~ 2 pages
  - This introduction is four paragraphs so you will have ~20 paragraphs in your introduction
- **Additional writing tips:**
  - *Subject-Verb Proximity:* As you saw in the Merkle et al. paper, keep your subject and verb close together
  - *Citations:* You need to add citations for every idea/information you are mentioning. Remember, stating facts that you did not discover without citation is plagiarism. Stating ideas which you read in an article without citation is plagiarism.
  - *Define Abbreviations:* You need to define all abbreviations when they first appear. Always define abbreviations in the text and do not overuse abbreviations. It becomes laborious and challenging to read.
  - *Be Concise:* Do not add unnecessary detail and keep your sentences short and concise.

- *Proofread and spellcheck*: Leave time to proofread. Set your introduction aside for at least a day or two and re-read it with a fresh brain.
- *Feedback*: Ask at least two people to read through your introduction and give you feedback.

#### 4) Activity for Participants

- Introduce activity:
  - Give students handout #3.
  - By this point, they should know the 5-10 key papers from your field that should be included in your introduction.
  - Students will think about their thesis and these key papers and write an outline for their introduction.
    - Have a logical flow of information – structure introduction as we’ve discussed
    - Include the key concepts that allow you to frame your research project
    - Start thinking about where the key papers fall into your outline
  - Example: Distribute Handout #4 and go back to Exercise 1a introduction and point out the hook (a broad statement) and what information went into the background, knowledge gap and hypothesis/approach sections.

##### Background

- Pluripotent stem cells can be used for disease treatment and drug discovery
  - Add examples
- Diabetes is a growing disease and can be used as a model disease for stem cell therapy
  - Add details about diabetes, number of affected people, difference between type 1 and type 2 diabetes
  - Short description of the disease (beta cells destroyed, etc.)
  - How diabetes is currently treated
  - Why stem cells are an attractive therapy option
- Stem cells to screen new drugs to treat diabetes
  - Add advantages
- What is known about beta cell differentiation in vitro
  - Add examples
  - Emphasize in vivo transplantation date

##### Knowledge gap:

- Discuss that current in vitro differentiation process not really understood
  - Add examples
- In vitro differentiation results in abnormal phenotypes and failure to produce insulin
  - Add examples

##### Hypothesis and approach:

- I conceived a new strategy for large-scale production of human beta cells
  - Using assay 1, I show A
  - Using method 2, I generate B
- Give students ~20 minutes to complete this and then have them pair off with a partner to discuss. Facilitators can check in with each group and give their feedback.