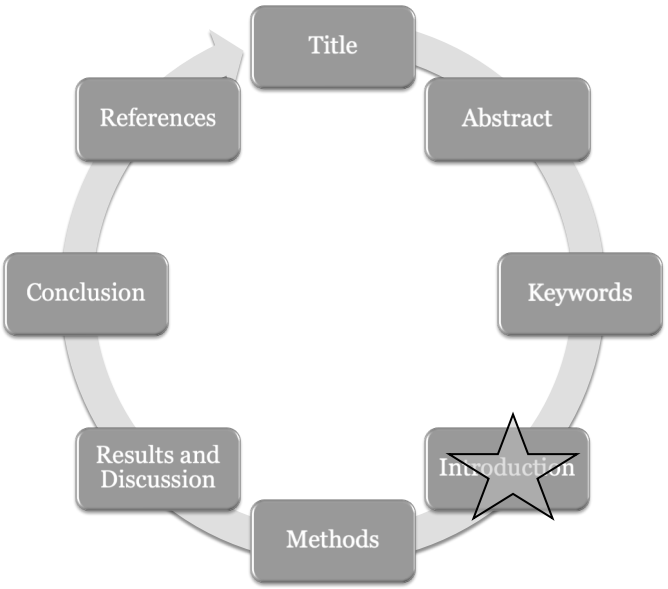
Preparing scientific articles in the field of Pharmacy

1



2

Get it started

3

- Most researchers finds it challenging to start writing a new manuscript and to remain during the process
- Every writer experiences good and bad writing days
- There are many possibilities to make writing generally more efficient (and also more fun)

4

- Before actually starting to write a manuscript, it is absolutely vital that first author and main collaborators have a clear, shared understating of the primary research objective and key findings of the manuscript

- Without this, it will be impossible to write a clear and concise story

5

Checklist for how to start writing a paper

- Set aside time for writing and choose the optimal environment.
- Split the thinking from the writing: structure your complete story-line, and create empty tables/figures before actually writing full sentences and paragraphs.
- Choose a potential journal early.
- Divide the writing of a paper into manageable chunks.
- Make use of writing sessions and sufficient short and long breaks.
- Reward yourself for achieving intermediate- and long-term goals.

Daniel Kotz
Jochen W.L. Cals
E-mail address: d.kotz@maastrichtuniversity.nl (D. Kotz)

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Journal of Clinical Epidemiology 66 (2013) 397
Journal of Clinical Epidemiology

WRITING TIPS SERIES

Effective writing and publishing scientific papers—part I: how to get started

6

Scientific Writing: the basics

Back to basics

7

- Careful word choices
  - Aids clarity, simplicity and accuracy
- Skills of writing sentences
  - The aim is to write sentences that are clear, direct and brief
- Skills of writing paragraphs
  - Unity, coherence and development

8

- Careful word choices
  - Foundation stones of good writing
    - Clarity, simplicity and accuracy
  - Clarity means choosing the simplest and most accurate word to express each idea
  - Achieving clarity makes your intended meaning easy to understand
  - We often use longer words out of habit, or because we notice that other writers do

9

Box 1. Simplicity and clarity

Poor word choice	Better word choice
Acquire	Get
Utilize	Use
Attempted	Tried
Ascertain	Make sure
Subsequent	Next
Voluminous	Big, large, full
Purchase	Buy
Remainder	Rest

Women and Birth (2008) 21, 86–91
available at www.sciencedirect.com
ScienceDirect
journal homepage: www.elsevier.com/locate/wombi

DISCUSSION

Writing for publication: The basics

Kathleen Fahy *

10

Wordy	Concise
... if conditions are such that	... if
... in order to	... to
... there can be little doubt that this is	... this probably is
... plants exhibited good growth	... plants grew well
... bright green in colour	... bright green
... by means of	... by/with
... created the possibility	... made possible
... due to the fact that	... because
... fewer in number	... fewer
... for the reason that	... because, since
... in all cases	... always
... in view of the fact that	... since, because
... it is often the case that	... often
... it is possible that the cause is	... the cause may be
... it would appear that	... apparently

11

- Be as clear as possible!
  - "If you can not explain something simply, you do not understand it well"
  - Do not make science a "secret"
  - Do not make science a "suspense thriller"
  - Do not use complicated words to look "serious"
  - Hint → Editors do not like abbreviations

12

- Sentences
  - Active voice
    - In scientific writing “active” rather than “passive voice” is generally preferred

For example, instead of writing "The food was eaten by the pig", write "The pig ate the food". The active voice is easier to read and reduces the sentence length

13

- Paragraph
  - Tells a story that reader should be able to follow and understand
  - Ideas need to be structured logically
  - Transition expressions are used to make relationships between sentences clear → link sentences together to achieve the reading to flow
    - Examples → therefore, likewise, for example, notwithstanding, and, on the contrary *etc.*
  - Brevity → means using the fewest words possible
    - Brevity is a result of disciplined and consistent self-editing

14

Recommendations for effective scientific writing

Scientific "advice"

15

- Focus
  - Introducing a multitude of questions, ideas and possible relationships and avoiding the formulation of clear hypotheses is a really *clever and evasive trick*
  - Readers will have no clue about the aims and the direction of the author's thoughts and it can successfully hide his lack of original ideas
  - ***Introduce the ideas and main findings straightaway***

16

- Originality, novelty and personality
  - Publications reporting experiments and observations that have been made extensively before with the same result are really mind-numbing, particularly when no original ideas are being tested
  - Keep updated constantly (scientific events, articles, patents *etc.*)

"*It has been shown numerous times that seagrasses are very important to coastal productivity (Abe 1960, Bebe 1970). It was decided to examine whether this was also the case in Atlantis*"

Fictive Cebe

17

- Write short length manuscripts
  - Make sure that the reader keeps interest
  - "Cut-cut-cut" rule
- Discuss implications and speculations
  - Speculations on possible relationships, mechanisms and presentation of interesting parallels to neighboring research areas should be presented on the manuscript's ***discussion***
  - It opens of new avenues for research

"*It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material*"

James Watson and Francis Crick (1953)

18

- Invest in good illustrations
  - Scientific articles can be made impressively attractive and interesting by including good quality illustrations
  - Graphical abstract

19

- Clever figures make the difference on smartphones and tablets

20

- Suppress flowery language
- Use statistical elements wisely
  - Keep in mind that are interests in biological aspect of adaptation, behavior and evolution, for example
- Avoid excessive references
  - Select the references by their relevance
  - Excessive quotation maintains the low quality of scientific publications by slowing down the reader, hiding any interesting information and taking up valuable space

21

INTRODUCTION

Infections that develop in traumatic and surgical wounds remain a major problem. One key approach to minimize such a problem is the application of topical antimicrobial agents.[1,2] Silver has long been recognized as a broad spectrum and highly effective antimicrobial agent for the treatment of infectious wounds.[3] In 1884, a German obstetrician, C.S.F. Crede, formulated 1% silver nitrate ($AgNO_3$) in eye drops to treat gonococcal ophthalmia neonatorum, which could be the first scientifically documented medical use of a silver-based compound.[4] The use of silver-based dressings was shown to enhance epithelialization of clean wounds in pig models, indicating the beneficial effect of silver ions in wound care besides its antimicrobial activity.[5,6] Laufman et al.[7] reported that 0.5% $AgNO_3$ aqueous solution may be as efficacious as antibiotics for the prophylaxis of burn infections. Notwithstanding, $AgNO_3$ is hypotonic and can seriously cause hyponatremia and hypochloremia.[8,9] Due to the reduction of silver ions, use of $AgNO_3$ can change the color of the wound beds into dark gray or black, which can also cause irritation.[10–12] To prevent these problems, much attention has been given to the use of pure atomic silver, i.e., in the form of nanoparticles (hereafter, nAgs), which exhibits much stronger antimicrobial activity than the bulk silver metal.[13] Several methods have been used to prepare nAgs from silver ions: they are, for instances, chemical reduction, γ-ray irradiation, and ultrasonication.[14–16] Recently, a variety of water-soluble polymers such as poly(vinyl alcohol) (PVA), poly(vinyl pyrolidone) (PVP), poly (ethylene glycol) (PEG),[17] gum acacia,[18,19] cellulose-

Additional Supporting Information may be found in the online version of this article.
Correspondence to: P. Supaphol (pitt.s@chula.ac.th).
Contract grant sponsor: Thailand Graduate Institute of Science and Technology; contract grant number: TG-55-09-50-055D.
Contract grant sponsors: "Integrated Innovation Academic Center—IIAC," Chulalongkorn University Centenary Academic Development Project, Chulalongkorn University; Center for Petroleum, Petrochemicals and Advanced Materials (CPPAM); Petroleum and Petrochemical College, Chulalongkorn University.

Journal of Applied Polymer Science, Vol. 124, 1668–1682 (2012)

Introduction

22

- Its purpose is to explain to the reader
  - What the research question is
  - How it is original
  - How it is important
  - And, succinctly outline how the study intends to answer it
- This section clarifies the motivation for the work and prepares readers for the structure of the paper
- Provide adequate background information, using relevant literature to acquaint readers with the topic

23

- **DO NOT** include a detailed literature review
- Ensure you have quoted ***key papers*** and ***findings***
  - Avoid excessive references

> *"CNTs are a recently discovered form of carbon with a graphitic lattice and a long, tubular structure [1]. CNTs have been the subject of much interest in recent years, due to their attractive mechanical properties (~1000 GPa Young's modulus) [2–4], tuneable electronic behavior (conducting or semi-conducting depending on tube chirality) [5], and unique dimensions (~1–100 nm diameter, up to several cm length) [6–8]. As a result of these properties, nanotubes have potential applications in many fields, including composite reinforcement [9,10], transistors and logic circuits [11,12], field emission sources [13], and hydrogen storage [14,15]. CNTs can be grown by a variety of means, the most common of which are: arc discharge [16], laser ablation [17], and chemical vapor deposition (CVD) [18,19]."*

19 references!

24

- It should point readers to publications to which they need to refer in order to understand the motives for the current research
- Highlight knowledge gaps and how your study provides further information on the area
- It should end with the aims being clearly stated

25

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Reinforcing...

Introduction

1. Why is your research important?
2. What is known about the topic?
3. What are your hypotheses?
4. What are your objectives?

26

- It should consist of a few paragraphs that define the context for the current work reported
  - For most journals, this is a brief section
    - 250 to 600 words
    - 10-15% of the total word count

27

- The first sentence should catch the reader's eye → it must awake interest
  - New England Journal of Medicine, 1975
    - "Most medical communications are difficult to read. To determine why, contributions to three issues of New England Journal of Medicine were studied and the prose analyzed"
  - British Medical Journal, 1994
    - "Nose bleeds in adults are the commonest reason for emergency admission to an otolaryngology ward, but the cause of the condition remains unknown. Case reports suggest an association between nose bleeds and regular, high alcohol consumption"

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Introduction

Antioxidants are molecules capable of inhibiting the oxidation of other molecules. Although oxidation reactions are essential for life, they can also be damaging. All living organisms maintain complex systems of multiple types of antioxidants to protect their cells from oxidative damage. Antioxidants can also act as pro-oxidants, under certain circumstances. The efficacy and benefit of an antioxidant is, therefore, very much dependent on the delivery of the antioxidant to the organism.

Introduction

Ultraviolet radiation (UVR), an external oxidative stressor, can cause adverse effects such as sunburn, photosensitivity reactions, or immunologic suppression, as well as long-term sequelae, like photoaging or malignant skin tumors [1–4]. Healthy skin possesses an antioxidant defense system against oxidative stress [1, 3, 5, 6]. However, overexposure to UVR can overwhelm cutaneous antioxidant capacity, leading to cell damage. Supplying the exogenous antioxidants to the endogenous antioxidant system may prevent or minimize UVR-induced photoaging. This can be accomplished by topical application [1, 2, 7–10].

30

- A common mistake to start the Introduction is presenting authors and respective areas of study in *general terms*, without mentioning their major findings
  - "Parmenter (1976) and Chessman (1978) studied the diet *of Chelodina longicollis* at various latitudes and Legler (1978) and Chessman (1978) conducted a similar study on *Chelodina expansa*"
  - "Within the confines of carnivory, *Chelodina expansa* is a selective and specialized predator feeding upon highly motile prey such as decapod crustaceans, aquatic bugs and small fish (Legler, 1978; Chessman, 1984), whereas *C. longicollis* is reported to have a diverse and opportunistic diet (Parmenter, 1976; Chessman, 1984)"
    - Text more informative enabling readers to clearly place the current work in the context of what is already known

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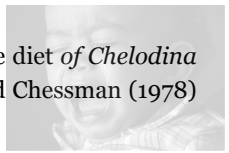

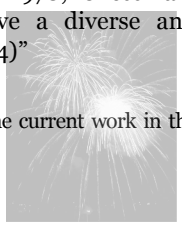

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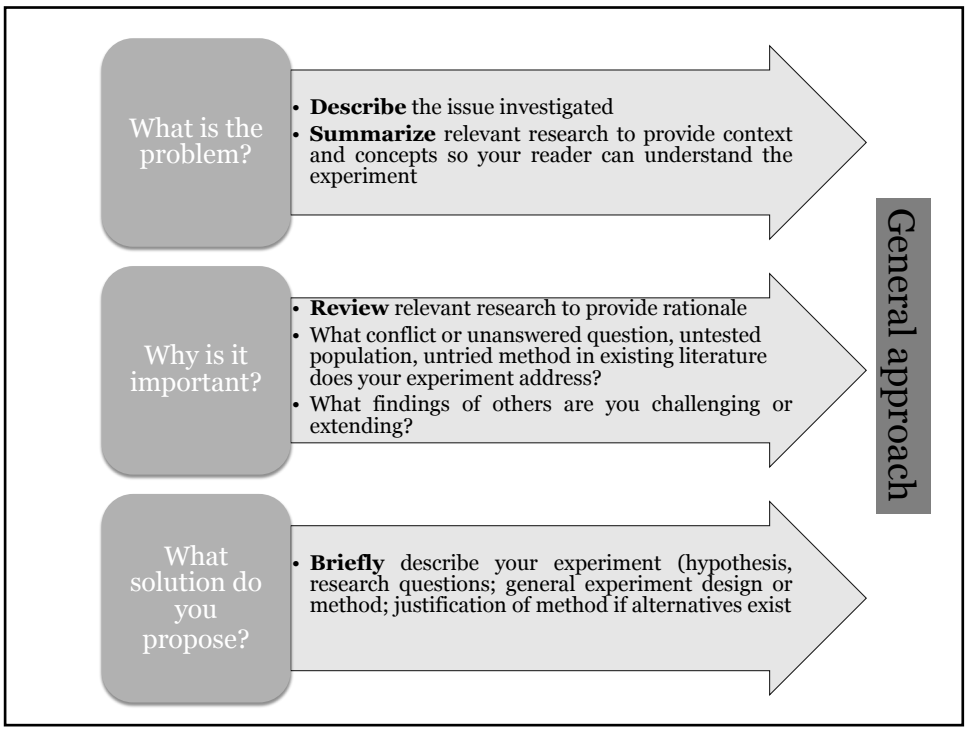
Approaches to write the *Introduction*

33



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8860 J. Agric. Food Chem. 2009, 57, 8860–8867
DOI:10.1021/jf901599j

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY
ARTICLE

Bisdesmosidic Saponins from *Securidaca longepedunculata* Roots: Evaluation of Deterrency and Toxicity to Coleopteran Storage Pests

PHILIP C. STEVENSON,*,†,‡ THAMARA K. DAYARATHNA,†,§ STEVEN R. BELMAIN,† AND NIGEL C. VEITCH‡

†Natural Resources Institute, University of Greenwich, Central Avenue, Chatham Maritime, Kent ME4 4TB, United Kingdom, and ‡Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, United Kingdom. §Current address: Department of Biochemistry and the Siebens-Drake Research Institute, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario N6A 5C1, Canada.

Background to subject / Context

INTRODUCTION

Despite the commercial difficulties associated with the registration of plant compounds as agrochemicals, interest in pesticidal plants continues to grow (*1*,*2*). In the developed world, this is linked to increasing demand for organic produce, for which plant derived products are acceptable in pest control, despite examples such as rotenone having well-known mammalian toxicity (*3*). Effective alternatives to synthetic pesticides, however, are often a necessity rather than a choice for small-scale farmers in sub-Saharan Africa. This is because synthetic pesticides can be expensive, are often adulterated, are increasingly ineffective owing to pest resistance, and may be difficult to access reliably (*4*). At best, pesticidal plants provide low-cost, safer, and environmentally benign alternatives to synthetic pesticides.

Understanding why pesticidal plants are effective may facilitate the optimization of their use and therefore increase agricultural productivity, particularly among some of the world's poorest farmers (*5*). In this respect, we have investigated *Securidaca longepedunculata* Fresen. (Polygalaceae), a widespread tree of tropical African savannah, especially of Miombo and Caesalpinioid woodland. This species has a wide variety of indigenous uses including the protection of stored grain from weevil damage (*6*,*7*). The activity is reportedly associated with nonpolar compounds in the roots (*4*, *8*). Compounds identified from *Securidaca longepedunculata* previously include methyl salicylate (*9*), tannins (*10*), sucrose derivatives (*11*), phenolics (*12*) saponins (*13*, *14*), xanthones (*15*−*17*), and alkaloids (*18*,*19*). The aim of the present study was to evaluate the effect of the powdered root bark and methanol extracts of the root bark of this species against the Coleopteran stored product pests, *Sitophilus zeamais* Motchulsky and *Callosobruchus maculatus* F., up to 9 months after treatment of the stored commodity, and identify and elucidate structures of compounds responsible for the effects.

*Corresponding author. Tel: +44-208-332-5377. Fax: +44-20-8332-5310. E-mail: p.stevenson@kew.org.

MATERIALS AND METHODS

Reagents. Methanol (HPLC grade) and acetic acid (HPLC grade) were obtained from Merck (U.K.). All other chemicals were of analytical grade. Deionized water was obtained from an in-house Milli-Q Plus System (Millipore, Inc., Billerica, MA) at 18.2 MΩ.

Plant Material Extraction. *S. longepedunculata* roots were collected from Tamale in North Ghana (Royal Botanic Gardens, Kew ref

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Reason for this particular research

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Group expertise to research this issue

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Objectives

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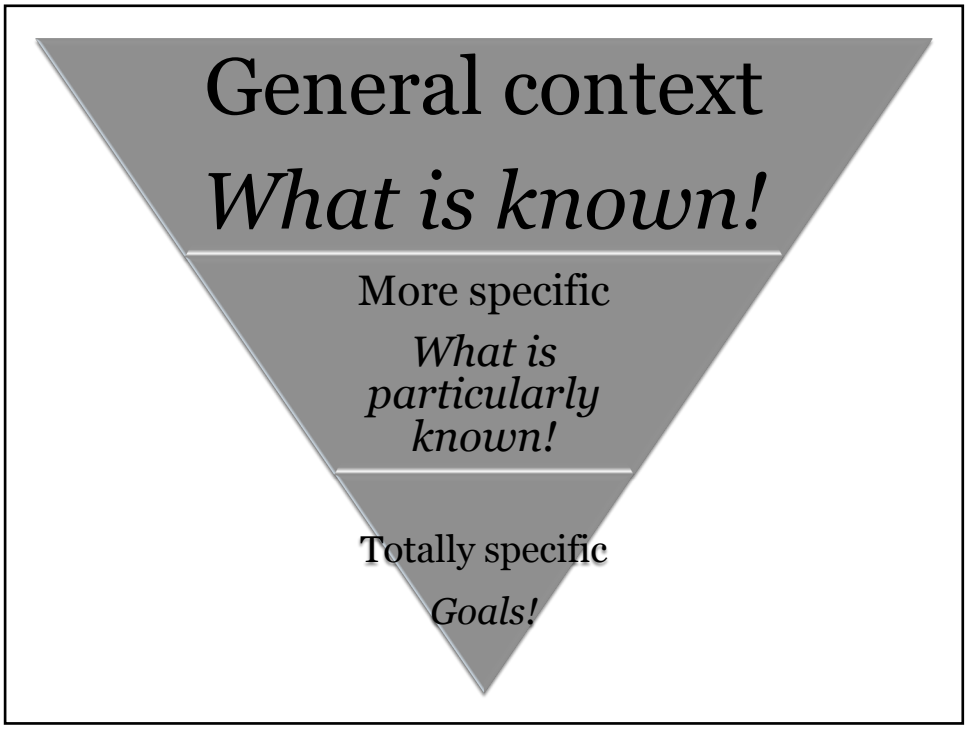

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- Introduction starts broad and progressively narrows down to the issue presented at the manuscript
  - According to *Nature (2010)*, it contains, at least, four paragraphs
    - Orient readers and establish the importance of the work
    - State the opposition between what scientific community currently has (what we have) and the desired situation (what we want)
    - Indicate what you have done in an effort to address the need
    - Preview the remainder of the paper to mentally prepare readers for its structure

40

- *Nature (2010) orientation to write the Introduction section*
  - Provide a compelling motivation for the research work to spark interest among audience
  - Select only data that provide the readers to better understand context and need, specially the importance of the work

41

- *Nature (2010) orientation to write the Introduction section*
  - Provide a compelling motivation for the research work to spark interest among audience
  - Select only data that provide the readers to better understand context and need, specially the importance of the work
  - **The fact that a phenomenon has never been studied before is not a robust reason to study it**

42

- Anchor *context* (importance of the work) in time and in space
  - Use *recently*, *in the past 5 years*, *since the early 2000s*
  - Geographically or within a given research field
- Emphasize the contrast between the actual and desired situations with words as *but*, *however*, *unfortunately*
- Usually, an *Introduction* is clearer and more logical when it separates what the Authors "have done" from "what the manuscript covers"
  - Try to clarify your contribution as a scientist → it increases the Research Group expertise
- Objective focuses on the readers!
  - For selective reading

43

- Use who did the work (normally, you and colleagues) as the subject of the sentence
  - "We…"
  - "Authors…"
- Use verbs that express research action
  - *To apply, assess, calculate, compare, compute, determine, design, develop etc.*
- Set the verb in the **past** tense

How to explore what have you done?

- Examples
  - During controlled experiment, **we investigated** the influence of HMP boundary conditions on liver flows.
  - To confront this problem, **we developed** a new software verification technique, which calculates the hash values based on the actual execution of the program.

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- Use the document itself as the subject of the sentence
  - "This paper…"
  - "This letter…"
- Use verbs expressing communication action
  - *To present, clarify, describe, detail, offer, discuss, report, summarize etc.*
- Set the verb in the **present** tense

How to explore the objective(s)?

- Examples
  - **This paper presents** the flow effects induced by increasing the hepatic-artery pressure and by obstructing the vena cava inferior.
  - **This paper discusses** the theory behind oblivious hashing **and shows** how this approach can be applied for local software tamper resistance and remote code authentication.

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An effective Introduction for a paper

(adapted from *Nature* 465, 305-310, 2010)

target-based lead discovery has produced disappointing results, generally for lack of whole-cell activity as documented for antibacterials. To secure this property in all chemical starting points for new antimalarial leads, we have tested the approximately two-million-compound library used for high-throughput screening at GlaxoSmithKline (GSK) for inhibitors of *P. falciparum*'s intraerythrocytic cycle, the parasite's growth phase responsible for disease symptoms, which is amenable to *in vitro* culture. This paper describes 13 533 compounds confirmed to inhibit parasite growth by more than 80% at 2 mM concentration, 82% of which were proprietary and thus unknown to the general research community.

what we want

Task

Object of the document

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Last “wise” words (for now!)

47

Some academic writers assume that the reader “should follow the paper” to find the answers about your methodology and your findings. As a result, many novice writers do not present their experimental approach and the major findings, wrongly believing that the reader will locate the necessary information later while reading the subsequent sections [5]. However, this “suspense” ap-

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FOCUS: EDUCATION — CAREER ADVICE

How to Write Your First Research Paper

Elena D. Kallestinova

What is going on with this paragraph?

- This” suspense” is not appropriate for scientific writing
- To interest the reader
  - Authors should be direct and straightforward
  - Authors should present informative one-sentence summaries of the results and the approach

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- It is of utmost importance to understand the significance of the *Introduction*
- Many researchers mistakenly think that all readers understand the importance of the research question and omit this part

49

- It is of utmost importance to understand the significance of the Introduction
- Many researchers mistakenly think that all readers understand the importance of the research question and omit this part
  - **The goal is to present the importance of your research contribution and your findings**

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- Consider that many Editors and Reviewers prefer short and focused introductions
- A good introduction will "sell" the study to Editors, Reviewers, readers and, some times, even to the media
- Connect this section with the Discussion, but avoid to overlap too much
- Do not hesitate to emphasize why your study is needed and important
- Remember that the final paragraph will attract readers' attention

51

- End the *Introduction* by stating your research question/hypothesis and explain briefly what you have done to answer this question
- Try to combine it with what was done to answer the question, preferably indicating the study design
  - Doing so, you will create a bridge to Methods (where this section will be detailed explained)

52

- End the *Introduction* by stating your research question/hypothesis and explain briefly what you have done to answer this question

- Try to combine it with what was done to answer the question, preferably indicating the study design
  - Doing so, you will create a bridge to Methods (where this section will be explained in detail)

Clever tendency!

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Manuscript draft

Therefore, in this paper the development of an alternative Synthetic Stratum Corneum (SSC) is described and the evaluation of its tribo-mechanical behaviour is presented. The SSC was produced from a mixture of PVA hydrogel and SDS surfactant, later mixed with rapeseed oil and, finally crosslinked with glutaraldehyde. The thermal properties of the films were determined via DSC and TGA measurements. FTIR measurements were performed to confirm the presence of the rapeseed oil and evaluate the changes in the functional groups after wetting the samples. The SSC was texturized with the features of the thigh of an individual and the roughness parameters were determined. Further, the contact angle and hydration degree at different relative humidities were obtained. The mechanical properties of the films were evaluated by tensile tests and stress relaxation measurements from which the viscoelastic parameters were calculated based on the SLS model. Further, the adhesive properties were determined based on pull-off measurements and the frictional behaviour of the SSC was evaluated in two different range of forces between 1-50 mN and 0.5-3.5 N.

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- Use present tense for *established* facts and past tense or present perfect for findings you do *not consider established*
  - ...low back pain **is** a common reason to consult physical therapists...
  - ...two treatment sessions a week **proved** more beneficial than one session per week...

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