Mincorso in Competenze Bibliografiche

Anatomy of a Scientific Publication

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NATURAL & LIFE SCIENCES

Main Types Of Scientific Publication

- **text book**

- **specialized text / handbook**

- **chapter in thematic book**

- **congress proceeding**

- **articles on internet**

- **patent**

- **technical report**

- **poster**

- **peer reviewed scientific articles** ⟹ **scientific journal**

online sources
- **PubMed Central / MEDLINE - LS**
- Chemical Abstracts Service   -   Chem
- Google (NOT FILTERED)
- Google scholar
- Commercial databases (**ISI, Scopus**)
- University electronic library services
- Journal Publishers web page
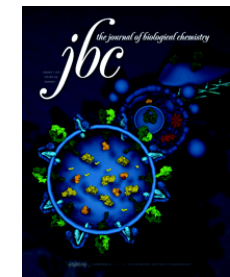
TYPES OF SCIENTIFIC JOURNAL

- **multidisciplinary**

  (eg., Nature, Science, PNAS)
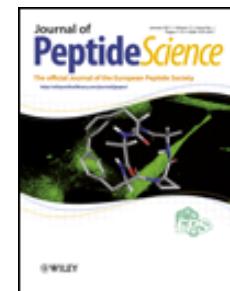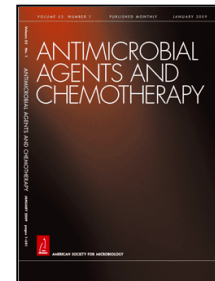

- **monodisciplinary**

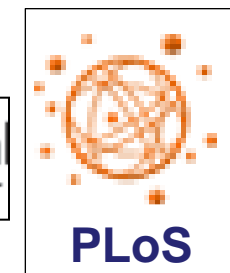 (eg., Biochemistry, J. Biological Chem.)

- **sectorial**   (eg., J. Peptide Science,

  Antimicrobial Agents & Chemotherapy)

- **solo online**

   (es., BioMedCentral, PLOS)

TYPES OF SCIENTIFIC ARTICLES

- **Editorial** — comment by the editor of a special issue on its contents

- **Full article** — full description of new data / knowledge

- **Communication/Letter/Note** — brief description of new data / knowledge

- **Review article** — compendium of known data / knowledge by expert

- **Comment** — discussion of another author's article

Editorial

Full article

ANATOMY OF A SCIENTIFIC ARTICLE

1) **Title**

Mode of action of human β-defensin 3 against *Staphylococcus aureus* and transcriptional analysis of responses to defensin challenge

Vera Sass[a], Ulrike Pag[a], Alessandro Tossi[b], Gabriele Bierbaum[c], Hans-Georg Sahl[a,*]

[a]Institute of Medical Microbiology, Immunology and Parasitology - Pharmaceutical Microbiology Section, University of Bonn, Bonn, Germany
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2) **Authors**

👁 *Author relevance in Life Sciences:*

🏅 1st author - Last author - Corresponding author   Other authors

3) **Affiliations**

- single group   - multiple groups   - international collaboration

👁

4) **Date of receipt and acceptance**

👁 Indication of easy/difficult peer review process

5) Abstract / Synopsis   *letter limit !*   *(Nowadays also Graphical Abstract)*

6) Key Words

7)   Abbreviations

8)   Introduction

9) Materials & Methods ↑↓

IMRD

➡ Abstract

A template based on positional residue frequencies in the N-terminal stretch of natural α-helical antimicrobial peptides was used to prepare sequence patterns and to scan the Swiss-Prot Database, using the ScanProsite tool. This search identified a segment in pilosulin 1, a cytotoxic peptide from the venom of the jumper ant *Myrmecia pilosula*, as a potential novel antimicrobial peptide sequence. This segment, corresponding to the 20 N-terminal residues, was synthesized and its structural properties and biological activities were investigated. It showed a potent and broad spectrum antimicrobial activity including standard and multi-drug resistant gram-positive and gram-negative bacteria and *Candida albicans*, confirming the validity of the search method. A rational redesign approach resulting in four amino acid substitutions yielded a variant with improved antibacterial and significantly reduced hemolytic activity.
© 2004 Elsevier Inc. All rights reserved.

➡ *Keywords:* Antimicrobial peptide; Sequence template; Cytotoxicity; Venom; Pilosulin

➡ [1] *Abbreviations used:* BSA, bovine serum albumin; ONPG, *o*-nitrophenyl-β-ᴅ-galactopyranoside; PBS, phosphate buffered saline.

The publication process

1) Choose appropriate journal (subject, impact, prestige etc.)

2) Submit manuscript   (Text, Figures, Supplementary material)

3) Editor - 1st decision: (Is subject/quality suitable for journal ?)

- NO → rewrite and choose another journal

- YES → manuscript sent to 2- 4 independent peer reviewers

4) peer review decision: 2-8 weeks

  - accept *sicut est* (very rare)

  novelty – validity – accuracy

  - accept with minor modification   → answer reviewers questions
                                             → make suggested modifications

  - qualified accept with major modification   → new experiments
                                                       → answer reviewer's questions
                                                       → extensive rewriting

  - refuse   → rewrite using reviewer critiques and choose other journal

Organization of a manuscript:

VALID ALSO FOR THESIS

- **Title:** precise and informative → attract readers on Pubmed   BAIT
- **Abstract:** provides key information   HOOK
- **Introduction:** why is it important   (scientific background)
- **Materials/Methods:** how you did it   (reproducibility)
- **Results:** presents data   (accurate & reliable)
- **Discussion:** interprets data   (concise & convincing)
- **Conclusions:** what was learned   (relevance of new knowledge)

A good scientific publication has:

- clear and concise presentation and discussion of data
- all necessary information on methods used
- complete set of figures and tables
- supplementary material if necessary

Scientific article **style**

- **simple**, **clear**, & **relevant**
  - not too compressed – no jargon or excessive abbreviation
  - avoid elaborate stile and hyperbolae (e.g. *extremel*).

- **present tense:**
  - to describe known facts or results (*... membranes are composed of phospholipids...*)
  - to compare data   (*... these values are greater than...*)
  - to interpret data   (*... our results confirm that...*)

- **past tense:**
  - to describe results of experiments (*the membrane was depolarized after treatment with the drug.*)

- **future tense:**
  - for proposed experiments (*.... more experiments will be carried out to determine if .....*)

- **active/passive:** use in balanced manner
  (active...*we show that the conformation <u>is</u> helical...*)
  (passive ...*spectra <u>were</u> measured using a Jasco 100 CD spectrometer.*)

Rules for good title

- **minimize number of words** (avoid too much detail)

- **accurately describe the content** (not too generic)

- **appealing** (good bait on PubMed)

- **avoid acronyms & overused terms** (e.g. *novel*)

⚠ ATTENTION

- **correct order for information** (essential info then qualify)

- **correct use of *compound titles* (: , -)** (if necessary, right sequence)

☒ *HIV-Infected Individuals - HIV Persistence and the Prospect of Long-Term Remissions*

☑ *HIV Persistence and the Prospect of Long-Term Remissions for HIV-Infected Individuals*

☒ *Selectivity, Synergism, and Cellular Regulation of Antibiotics Targeting Ribosomes*

☑ *Antibiotics Targeting Ribosomes - Selectivity, Synergism, and Cellular Regulation*

Rules for abstract

THE ABSTRACT

- principal objectives of the investigation.

- key methods employed.

- main result summary and principal conclusions.

Style:

- short (normally < 250 words, 1 paragraph)

- grammar - correct use of present/past & passive/active

- no references – (cost many character)

- avoid acronyms & symbols

- key parameters

Rules for abstract

….. Neandertal Genome (SCIENCE 328:723-25, 2010)

It is now possible to perform whole-genome shotgun sequencing as well as capture of specific genomic regions for extinct organisms. However, targeted resequencing of large parts of nuclear genomes has yet to be demonstrated for ancient DNA. Here we show that hybridization capture on microarrays can successfully recover more than 1 megabase of target regions from Neandertal DNA even in the presence of ~99.8% microbial DNA. Using this approach, we have sequenced ~14,000 protein-coding positions inferred to have changed on the human lineage since the last common ancestor shared with chimpanzees. By generating the sequence of 1 Neandertal and 50 modern humans at these positions, we have identified 88 amino acid substitutions that have become fixed in humans since our divergence from the Neandertals.   (124 words)

Style:

- short (normally < 250 words, 1 paragraph)

- grammar -   correct use of present/past & passive/active

- no references – (cost many character)

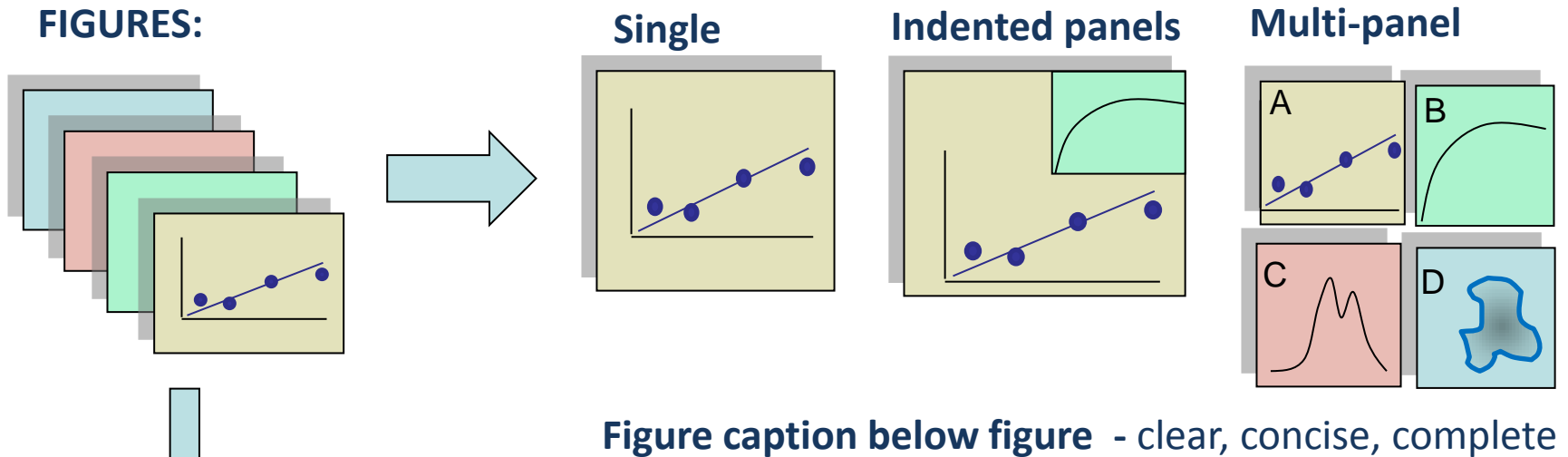- avoid acronyms & symbols

- key parameters

INTRODUCTION

- **justification** of the work done.

- **state of the art** - brief overview on & put your work into context.

- **cites relevant literature** - provides background & motivation for your work

- **author's intentions** - how work adds to current knowledge

MATERIALS / METHODS   (NO RESULTS HERE)

- <u>past</u> tense (finished experiments).

- <u>sufficient</u> detail for competent worker to repeat experiments

  e.g. ....*3 mg of protein were dissolved in phosphate buffer (pH 7.5).....*

- <u>precise</u> but not pedantic e.g *....3 mg of protein were dissolved ~~by stirring~~ in phosphate buffer at pH 7.5 ~~measured with a pH meter~~*]

- materials: reagents (makers), tissues, strains, methods, instrumentation
  e.g. ... *spectroscopic grade methanol (Sigma) was used as eluent...*

- methods: instruments, theoretical approaches, →details in supplementary data

- data analysis (<u>statistical methods</u> and how were they used)

RESULTS

- <u>Clear</u> figures and tables to present data presented, with concise explanations.

- <u>Selective</u> – only strictly relevant data and not too much detail
  (use supplementary section for details or peripheral data).

- <u>Limited N° of figures/tables</u> –not too complicated.

FIGURES:

Single

Indented panels

Multi-panel

supplementary material

Figure caption below figure - clear, concise, complete

⚠️ ATTENTION Avoid figure manipulation

TABLES

❌

Molecule	MIC (*S. aureus*	MIC (*E.coli*)	MIC *(C. albicans)*	charge
P26A	4, 8	16	2	2
P56V	8	2,4.8	8	1
Q77A	2	4	4	3

Table 1: *Bacteriostatic activity of peptides* (ABOVE TABLE)

✅

Molecule	charge	MIC (μM) [a]		
		S. aureus	*E.coli*	*C. albicans*
P26A	+2	4-8	16	2
P56V	+1	8	2-8	8
Q77A	+3	2	4	4

[a] minimal inibiting concentration, determined using the serial dilution method, average of three inependent experiments

DISCUSSION

• Orders and interprets the results

   - requires <u>organized thinking</u>
   - intellectual effort of the author, not of the reader.

• Logical & believable explanations supported by data

• Contribution to state of the art and new knowledge

• Use of figures → schematic representations of a proposed model

reader friendly

maximum parsimony

NB - RESULTS & DISCUSSION are often combined

   (different rules)
   (requires very organised thinking).

Conclusions

- separate sectionlast OR last paragraph of discussion.

- summary of lessons learned - knowledge gained - future   perspectives

- NOT a repetition of **Abstract**.

(ABSTRACT/CONCLUSIONS are often the only sections that are carefully read).

Aknowledgements

- Donated material, technical assistance or help with manuscript

- Funding agencies

Conflict of interest

- Funding or employment that could affect data interpretation

References

- Complete but not excessive - Accurate and homogeneous

- Specific format for each journal

- Reference managers like ZOTERO are STRONGLY RECCOMENDED

Evaluating an authors publication record

- **Method 1:** N° of publications & author placement (e.g. 1°, last)

- **Method 2:** Impact factor of journals in which publications appear

$$\text{journal IF} = \frac{\text{N° citations in period}}{\text{N° articles published}} \quad \text{(e.g. 5 years)}$$

- **Method 3**: N° of citations/publication - ISI (Web of Science)
  - Scopus (Elsevier)
  - Google Scholar

- **Method 4:** H-index (global citations)

  h publications each cited at least h times

- reflects both N° publications and N° of citations
- depends on the age of scholar h ≈ age in service
- sometimes limited to a period (5 or 10 years)