# Writing and Critical Analysis of Scientific Articles

Master II Applied Microbiology

Prof H. Ouled Haddar
Department of Applied Microbiology and Food Sciences
University of Jijel

# Content

# References


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# I. Scientific Communications and Publications

# Introduction

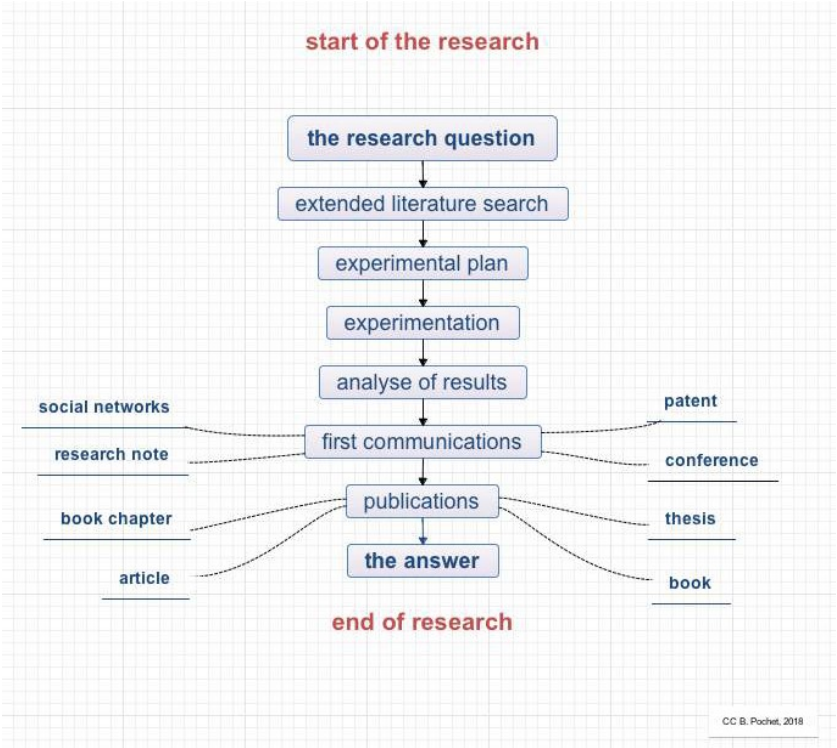
Even though scientific literature extends beyond the strict framework of research, it largely finds its origin therein.

Research without publication remains incomplete**.

Starting from the research question, the research process progresses through several stages before reaching the exploitation of the results and their communication in various forms.

Such communication provides an answer to the research question, enriches the scientific literature, and advances scientific knowledge.

## Research process



Scientific Communications and Publications are at the heart of how research shapes knowledge and society.

They allow scientists not only to record and preserve discoveries but also to share them transparently with peers and the public. As Day and Gastel (2012) emphasize,

«Good communication is what makes science cumulative—it enables others to build on previous findings»

Beyond journal articles, scientific communication includes presentations, posters, and reviews, all of which require clarity, honesty, and precision.

Effective publications strengthen credibility, foster collaborations, and expand the impact of research across disciplines and borders.

In an era of information overload, the ability to communicate science in a clear and accessible way is as important as the research itself.

# Scientific Communication

«Scientific communication refers to the processes and practices through which research findings, methods, and ideas are conveyed to specific audiences, ranging from experts to the general public. It encompasses both formal channels (e.g., journal articles, conference presentations, technical reports) and informal channels (e.g., academic networking, science outreach)»

# Scientific Publication

Scientific publication is a formal, peer-reviewed process of disseminating original research or scholarly work, most often in the form of journal articles, books, or conference proceedings.

It serves as a permanent and citable record of knowledge and provides a basis for academic recognition and evaluation.

While scientific communication is broad, covering all modes of transmitting scientific knowledge, scientific publication is a narrower, codified subset that focuses on producing validated, enduring contributions to the scientific record.

# Example

A researcher presenting preliminary results in a conference talk or poster session is engaging in scientific communication, as the goal is to inform, exchange, and discuss ideas with peers.

When those same results are later written into a peer-reviewed article and published in a journal, they become a scientific publication, permanently archived and formally recognized as part of the scientific literature.

Compared to oral communication, written communication offers several advantages:

- ✓ It can reach a potentially unlimited audience.
- ✓ It can be shared, circulated, and accessed across contexts.
- ✓ It provides a permanent record and serves as evidence of the message.
- ✓ It sustains attention more effectively than speech, which is often quickly forgotten.
- ✓ The information is less prone to distortion or alteration.

## The Notion of Scientific Publication

A scientific publication is a written and published report describing the results of original research. This report must be presented according to a professional code derived from scientific ethics, editorial experience, and tradition.

Formally, to be considered a valid primary scientific article, a scientific paper must contain original results (first publication) and be published in accordance with specific rules.

In particular, it must be submitted for acceptance to the editorial board of an appropriate journal and must contain sufficient information (observations, methods, etc.) to allow the board to assess the intellectual process and, if necessary, to replicate the research procedure in order to test its reproducibility.

Furthermore, the published report must be disseminated in a permanent form and made available without restriction to the scientific community, and in particular to recognized bibliographic database services (Biological Abstracts, Current Contents, etc.).

As a result,

- ✓ conference or congress reports (“Proceedings”),
- ✓ government reports,
- ✓ literature reviews (“Review papers”),
- ✓ thesis manuscripts ??
- ✓ institutional bulletins, or
- ✓ certain popular science publications

are not considered valid primary publications. Instead, they are defined as secondary publications.

It should also be noted that not all journals have the same readership, style, or requirements. Care must therefore be taken to select a journal suited to the type of article and to the message one wishes to convey (an article of international or regional interest, popular science article, etc.).

One must be aware that this choice entails certain editorial constraints (style, length, language, illustrations).

# Types of scientific publications

**Popular science article**

An article written for the general public that explains scientific concepts or research in a simple, accessible way, without technical jargon. Not considered primary scientific literature.

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Sommaire



Réseau

LES BACTÉRIES PROBIOTIQUES : INNOVATIONS ET TENDANCES DE DÉVELOPPEMENT TECHNOLOGIQUE

## 1. INTRODUCTION

*Depuis une dizaine d'années, un intérêt considérable s'est développé dans les secteurs alimentaire et pharmaceutique pour l'utilisation de « probiotiques » (Bifidobacterium, Lactobacillus) - des cultures lactiques à effets bénéfiques sur la santé.*

Contrairement à d'autres produits de santé naturels, les bienfaits des probiotiques sont largement documentés dans la littérature scientifique. Les effets santé de ces derniers sont souvent immédiats contre certaines maladies répandues, dont le syndrome du côlon irritable qui affecte 12 % de la population canadienne. L'efficacité des probiotiques pour neutraliser la virulence de plusieurs organismes pathogènes a aussi été démontrée. Les effets les mieux documentés sont sans aucun doute l'amélioration de la digestion du lactose, la lutte contre les diarrhées et les flatulences, en plus d'une action immunostimulante. Certains y voient également des applications pour les soins corporels, incluant le traitement des caries dentaires, de la transpiration et de certaines affections cutanées.

Conséquence de l'accumulation de preuves scientifiques, le marché des probiotiques affiche une croissance soutenue de 12 % par année depuis les cinq dernières années. Aux États-Unis et en Europe, les aliments fonctionnels à base de probiotiques se retrouvent principalement dans le secteur des produits laitiers. Le rapport sur le marché des aliments fonctionnels (The international market for functional foods), produit par Leatherhead Food International en 2006, montre qu'à l'échelle mondiale, les produits laitiers fonctionnels représentent 43 % de l'ensemble du marché. Ils constituent ainsi le plus grand groupe de produits de cette nature. Parmi les produits laitiers fonctionnels, les laits fermentés totalisent 29 %. La valeur pour ce marché était estimé à 1 554 million $US en 2005. De tels chiffres démontrent l'importance d'intégrer des probiotiques dans le développement des aliments fonctionnels.

The Journal of Antibiotics (2009) 62, 5–16

www.nature.com/ja

REVIEW ARTICLE

# Microbial drug discovery: 80 years of progress

Arnold L Demain[1] and Sergio Sanchez[2]

**Microbes have made a phenomenal contribution to the health and well-being of people throughout the world. In addition to producing many primary metabolites, such as amino acids, vitamins and nucleotides, they are capable of making secondary metabolites, which constitute half of the pharmaceuticals on the market today and provide agriculture with many essential products. This review centers on these beneficial secondary metabolites, the discovery of which goes back 80 years to the time when penicillin was discovered by Alexander Fleming.**
*The Journal of Antibiotics* (2009) **62**, 5–16; doi:10.1038/ja.2008.16; published online 9 January 2009

**Keywords:** agricultural products; antibiotics; pharmaceuticals; resistance development

**Review paper**

A scholarly article that compiles, summarizes, and critically analyzes existing research on a specific topic. It does not present new experimental data but helps synthesize knowledge.

WGO Practice Guidelines Probiotics and Prebiotics 1

World Gastroenterology Organisation
Organisation mondiale de Gastroentérologie

Recommandation Pratique:

**Probiotiques et Prébiotiques**

Mai 2008

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**Institutional bulletin or newsletter**
A publication issued by an institution (e.g., university, research center, government agency) to share updates, reports, or general information. It is not a primary scientific source.

INFECTION AND IMMUNITY, Oct. 2000, p. 5998–6004 Vol. 68, No. 10
0019-9567/00/$04.00+0


# *Saccharomyces boulardii* Preserves the Barrier Function and Modulates the Signal Transduction Pathway Induced in Enteropathogenic *Escherichia coli*-Infected T84 Cells

DOROTA CZERUCKA,[1]* STEPHANIE DAHAN,[1] BAHARIA MOGRABI,[2] BERNARD ROSSI,[2] AND PATRICK RAMPAL[1]

*Laboratoire de Gastroentérologie et Nutrition[1] and INSERM U364, IFR50, Faculté de Médecine,[2] Université de Nice-Sophia Antipolis, 06107 Nice Cedex 2, France*

Received 24 February 2000/Returned for modification 30 March 2000/Accepted 6 June 2000

**Original scientific paper**

A peer-reviewed article reporting the first publication of new and original research findings, including methods, results, and discussion. Considered valid primary literature.

TOXICOLOGICAL SCIENCES 42, 152–157 (1998)
ARTICLE NO TX972396

# Short Communication: Renal Tubular Vacuolation in Animals Treated with Polyethylene-Glycol-Conjugated Proteins

Alison Bendele, Jim Seely, Carl Richey, Gina Sennello, and George Shopp[1]

*Amgen Inc., Boulder, Colorado 80301*

Received January 31, 1997; accepted October 15, 1997

Short Communication: Renal Tubular Vacuolation in Animals Treated with Polyethylene-Glycol-Conjugated Proteins. Bendele, A., Seely, J., Richey, C., Sennello, G., and Shopp, G. (1998). *Toxicol. Sci.* 42, 152–157.

During toxicologic evaluation of a dimeric PEG-linked protein, tumor necrosis factor binding protein (TNF-bp), vacuolation of renal cortical tubular epithelium was seen in male and female Sprague–Dawley rats (200–300 g) given iv doses of 40, 20, or 10 mg/kg every other day for 3 months. Tubular lesions in rats treated with 20 or 40 mg/kg for 3 months were only partially reversible after a 2-month recovery period. Despite the presence of marked vacuolation, there were no changes in BUN, creatinine, urinalysis parameters, urinary NAG, urinary $B_2$-microglobulin, or fractional sodium excretion. Single iv doses ≥20 mg/kg TNF-bp caused similar but milder changes. However, equivalent doses of PEG alone or the non-PEG-linked TNF-bp did not cause light microscopic evidence of vacuolation. Treatment of rats with another PEG-linked protein of similar molecular weight resulted in similar changes. Immunostaining for TNF-bp revealed positivity in the apical cytoplasm of renal tubular epithelium within 1 h of iv dosing. Immunostaining of kidneys from chronically dosed rats indicated that protein was present in some vacuoles as long as dosing continued; however, kidneys from animals on a reversibility study had vacuoles but no immunostaining for TNF-bp. These results,

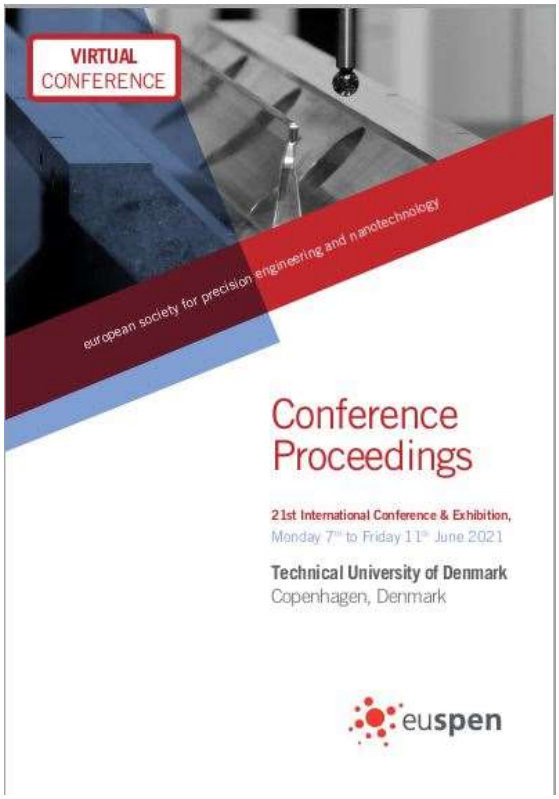
mor necrosis factor (TNF) linked by a single 20-kDa polyethylene glycol (PEG) molecule. This TNF-inhibitory protein has shown activity in animal models of arthritis and other inflammatory disorders (Martin *et al.*, 1995; Selmaj *et al.*, 1995). The PEG-linked dimeric version of this p55 receptor is more potent than the non-PEG-linked monomeric protein in *in vitro* and *in vivo* efficacy models, and the plasma half-life is substantially longer (unpublished data, Bendele *et al.*).

Chronic iv administration of this molecule resulted in renal cortical tubular vacuolation in laboratory animals (unpublished data, Bendele *et al.*). Cynomolgus monkeys and Sprague–Dawley rats treated iv every other day with 40, but not 4, mg/kg, TNF-bp for 1 month developed kidney lesions characterized by the presence of single or multiple cytoplasmic vacuoles in tubular epithelial cells. These vacuoles were sufficiently large to result in distortion of the tubular profiles and compression of nuclei. However, necrosis of epithelial cells was not seen. Standard clinical chemistry and urinalysis parameters were normal despite the presence of morphologic alterations. The lesions resembled those occurring in laboratory animals or humans with osmotic nephrosis (Trump and Janigan, 1962; Engberg, 1976; Moreau *et al.*, 1975; Janssen 1968). Tubular vacuolation has also



**Short communication**

A concise scientific article presenting significant new findings or preliminary results that deserve rapid dissemination. It is peer-reviewed and considered primary literature.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