



SCIENCE COMMUNICATION: HOW BEST TO ENGAGE YOUR AUDIENCE

Ralf Dahm

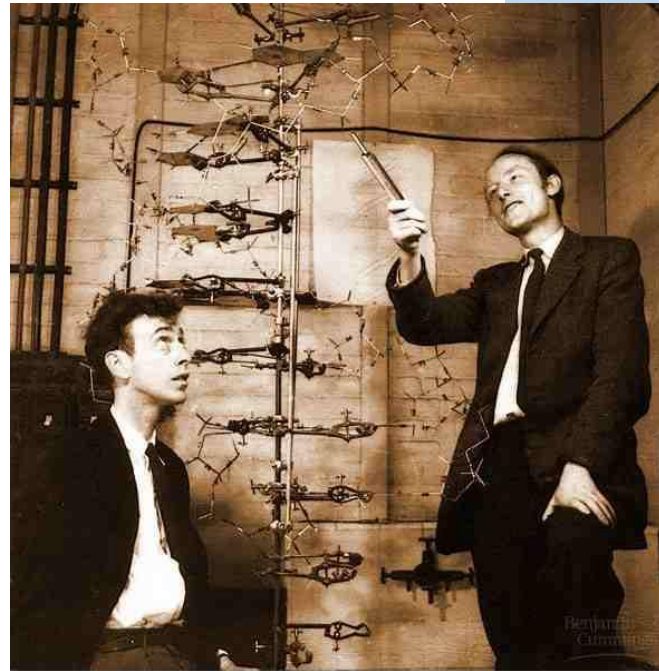
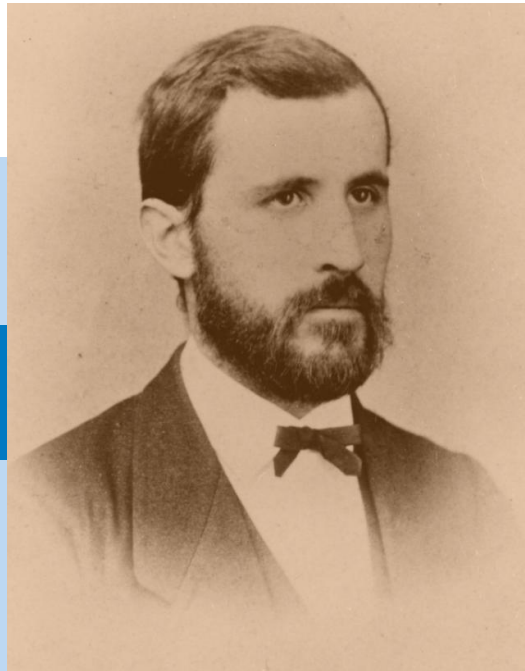
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BIG DISCOVERIES DO NOT ALWAYS LEAD TO FAME

- Who knows these gentlemen?

Friedrich Miescher

Discovered DNA



James Watson &
Francis Crick

Discovered the
structure of DNA

MIESCHER'S DISCOVERIES



DNA is...

A novel substance

Equal in importance to proteins

Present in the nucleus → Chemically defines the nucleus

Present in all cell-types

Amount of DNA increases when cells proliferate, e.g. in tumors

Sperm head composed of DNA & protamine [histone equivalent] that occur in constant ratios

Speculated on role of nucleus/DNA in fertilization & heredity



Given the importance of DNA & Miescher's discoveries,
why does hardly anyone remember him?



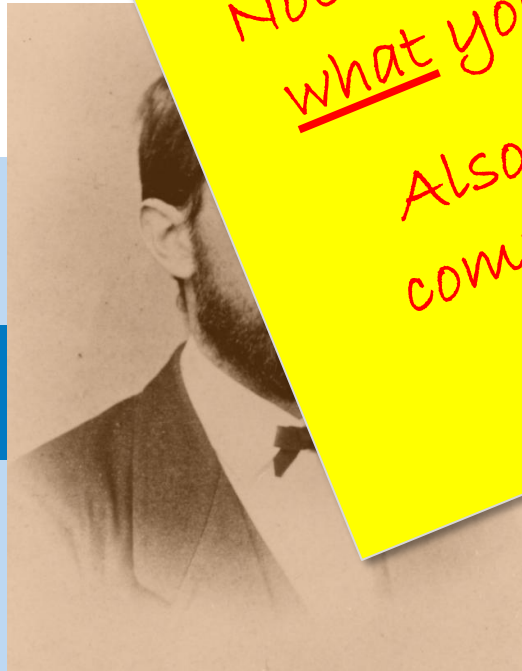
BIG DISCOVERIES DO NOT ALWAYS LEAD TO FAME

- Who knows these names?

Not only important
what you discover
Also, how you
communicate it

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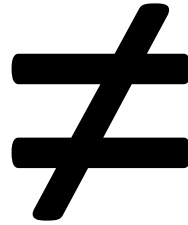


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THE GOOD NEWS

Effective
Communication



- Few basic rules
- Same for different kinds of presentations, publications...
- Can be learned

GENERAL PRINCIPLES

of Good Communication

- 1) Think of your audience
- 2) Focus on the big picture
- 3) Have clear take-home messages
- 4) Keep it short & simple
- 5) Use concrete examples
- 6) Tell a story
- 7) Prepare & practise

WHY DO WE COMMUNICATE?

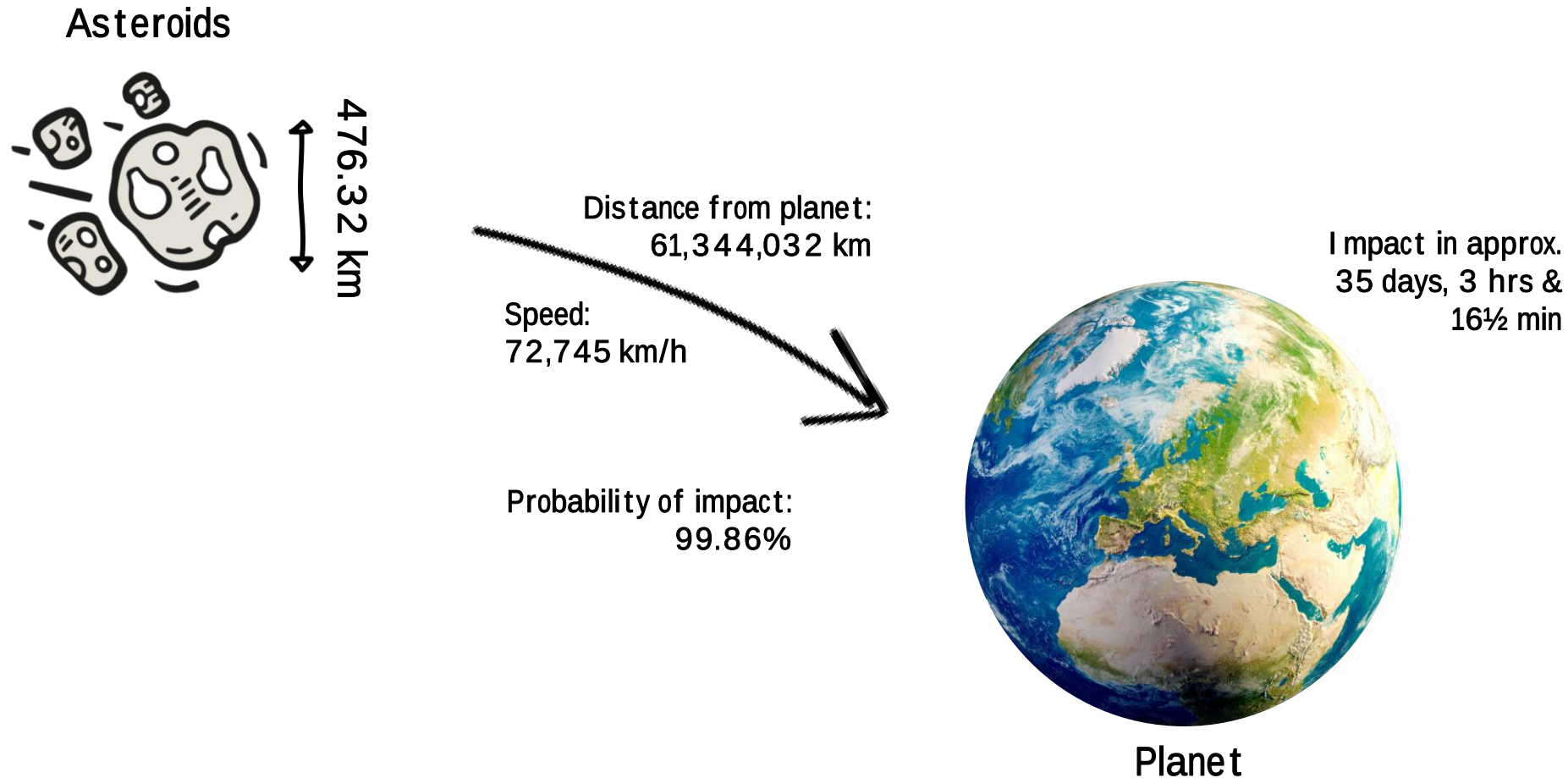
as scientists

- Get published
- Win over collaborators
- Make a name for yourself
- Obtain funding
- Get jobs
- Educate
- Convince others (colleagues, stakeholders, public) ...

WHO DO WE COMMUNICATE FOR?

- If your audience does not pay attention, you may as well not communicate at all

MAKE WHAT YOU COMMUNICATE RELEVANT TO YOUR AUDIENCE



WHENEVER & WHATEVER YOU COMMUNICATE: THINK OF YOUR AUDIENCE

- Who are they?
 - What do they care about?
 - What do they know? What don't they know?
 - Why are they there & what do they expect?
- Allows you to maximize your impact

MAKE IT RELEVANT – HOW TO IN A SCIENTIFIC CONTEXT?

- Deliver information in a context that matters to your audience

“Cataract surgery is the most common surgical procedure in industrialized nations”

- 7 / 10 of you will undergo cataract surgery
- ...% of the health care budget is spent on this



PRESENT INFORMATION IN A CONTEXT THAT MATTERS TO YOUR AUDIENCE

We investigate postprandial metabolic regulation & insulin signaling dynamics

- We study why after some meals you feel energized, but after others you are sleepy, unfocused & hungry again quickly

We examine neuroendocrine modulation of cognitive performance under acute stress

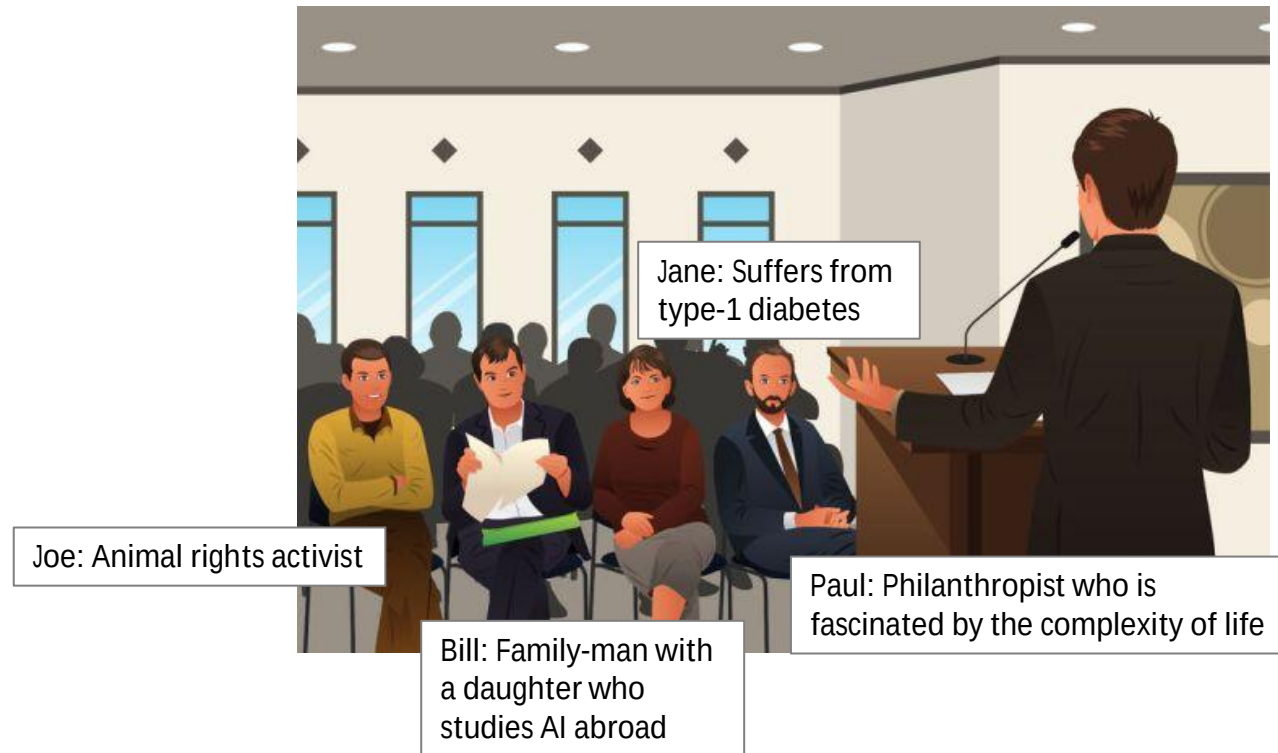
- We study why stress can make it harder to think clearly, remember things, or take decisions — even when you know the material

Our research focuses on host–microbiome interactions following perturbation of commensal bacterial communities

- We study why a course of antibiotics can cure your infection but also give you diarrhea, stomach problems, or leave you vulnerable to other infections

SCENARIO:

YOU SEEK FUNDS FOR A RESEARCH CENTRE FOCUSED ON COMPUTATIONAL MEDICINE



→ How do you get them interested in your talk?

MAKE IT RELEVANT — HOW TO IN A SCIENTIFIC CONTEXT?

- Deliver information in a context that matters to your audience
- Use analogies to make abstract data more tangible

ANALOGIES CAN MAKE INFO MORE ACCESSIBLE

- 4.5 bn yrs ago: Earth forms
- 3.6 bn yrs ago: Life emerges
- 250,000 yrs ago: Anatomically modern humans appear
- 11,000 yrs ago: Agricultural revolution

4.5 billion years = 1 year

- 1 January: Earth forms
- 14 March: Life emerges
- 31 Dec, 23:31 hrs: Anatomically modern humans appear
- 31 Dec, 23:59 hrs: Agricultural revolution



HOW RICH IS ELON MUSK?

- Net worth Elon Musk: ~ \$834.7bn (Feb 2026)
- Net worth typical US citizen: \$192,700

1 cappuccino (\$5) for Musk: \$21,658,018

MAKE IT RELEVANT – HOW TO IN A SCIENTIFIC CONTEXT?

- Deliver numbers/data within a context that matters to your audience
- Use analogies to make abstract facts more tangible
- Focus on implications/benefits of your work:
saving lives, saving time, saving money, saving the environment...

THE IMPORTANCE OF DNA REPAIR



- Every day: $\sim 230,000$ lesions / cell
- $> 10^{13}$ cells in the human body
- Total damage: $> 10^{18}$ lesions / day,
every one of which can be the one that causes cancer
- $10^{18} \approx$ Grains of sand on all beaches on Earth

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- Use emotion → Highly motivational & easier to remember than facts

Child suffering from
Xeroderma pigmentosum

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By making it relevant, you make it memorable & convincing

ONCE YOU KNOW WHO YOUR AUDIENCE IS, TAILOR YOUR COMMUNICATION TO THEM

- Capture their attention with a gripping start
- Explain why your topic matters (to them)
- Explain the “problem” & how it relates to them
- Explain how you address the problem, what the outcome is & what this means (to them)

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DEFINE WHAT YOU WANT TO COMMUNICATE

Be very clear about what you want to impress your audience with
= Your take-home message(s)

→ Build your talk / text around it:

- What story best conveys your take-home message?
- What details do you need to support your message?

YOUR TAKE-HOME MESSAGE(S)

= Most important part of your talk

- Convey the significance of your work
- Keep them brief & simple
- Define & state them very clearly
- Not more than 1 key message for every 10-15 min. you talk

*A designer knows he has achieved perfection
not when there is nothing left to add, but
when there is nothing left to take away.*

Antoine de Saint-Exupéry

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YOUR RESULT MATTERS, NOT HOW YOU GOT IT



TELL YOUR AUDIENCE WHAT YOU FOUND...

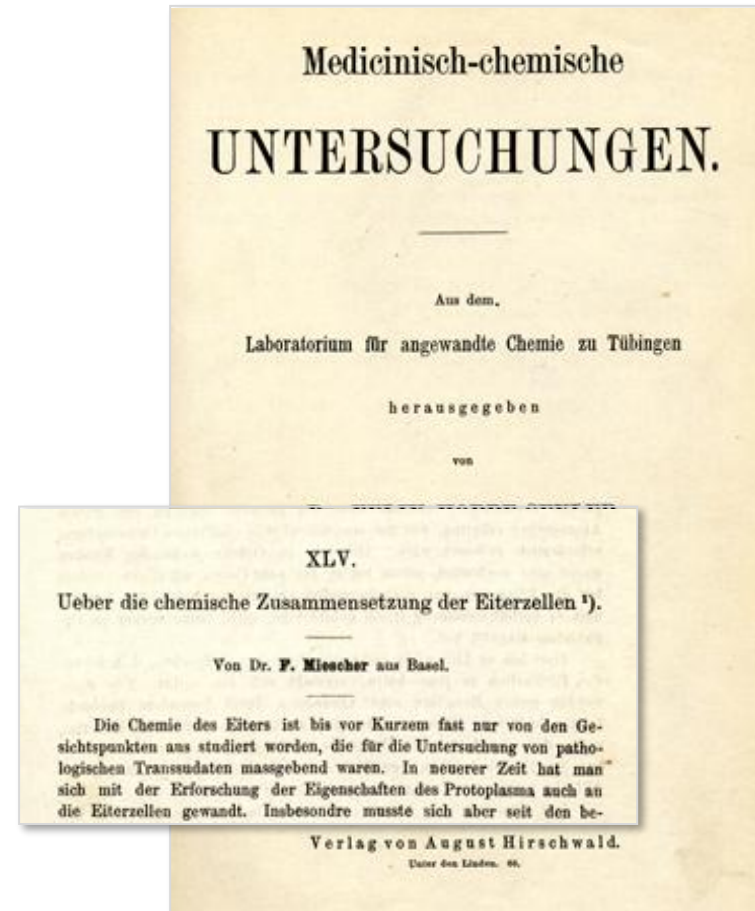
...not what you did

Example:

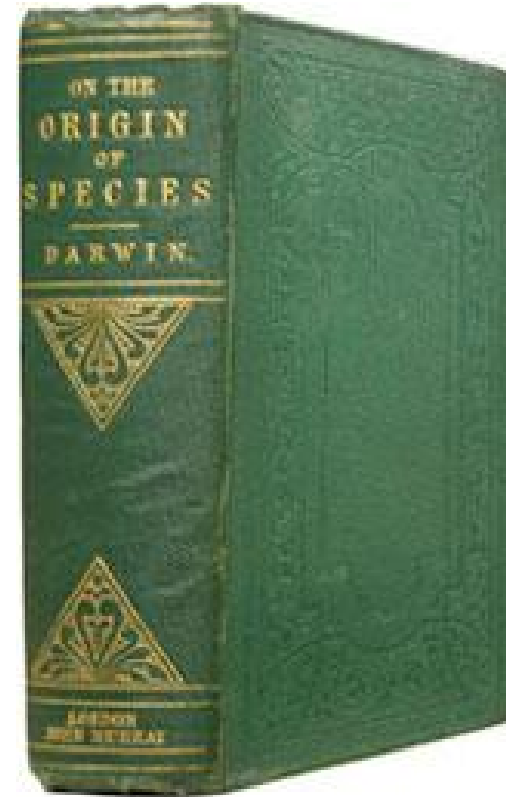
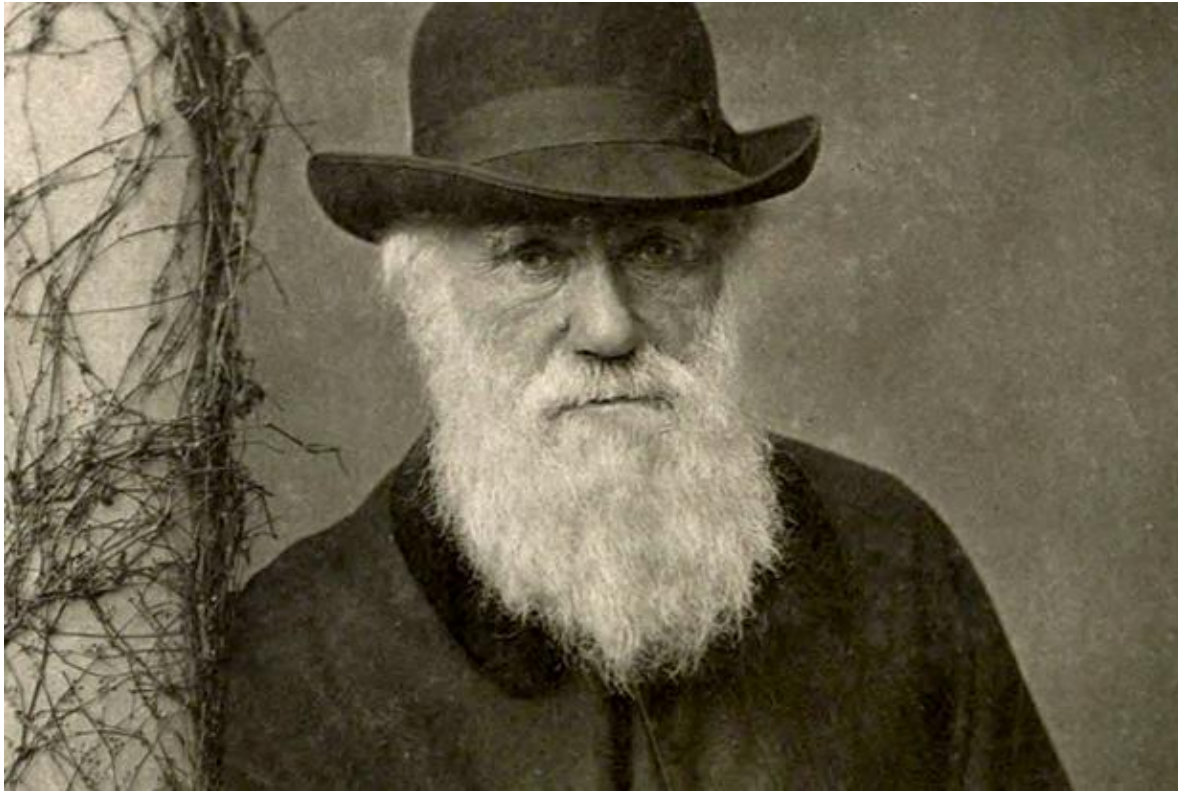
Title of a paper that missed the point:

“On the Chemical Composition of Pus Cells”

→ *Discovery of a New Class of Molecule*



EXAMPLE OF A PUBLICATION THAT GOT IT RIGHT



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USE CONCRETE EXAMPLES TO ILLUSTRATE YOUR POINT

The *pax6* gene

- Member of the homeobox gene family of transcription factors
- Master control gene with essential functions in the development of eyes (and other sensory organs)
- Highly conserved across bilaterian species, e.g. ectopic expression of mouse *pax6* in *Drosophila melanogaster* can induce ectopic eyes

PAX6 CONTROLS EYE DEVELOPMENT



USE PICTURES TO ILLUSTRATE ABSTRACT CONCEPTS



IN A NUTSHELL...

- Find out what your audience knows, wants & expects
- Tailor your communication to them
- Define your take-home message(s)
- Make your communication accessible & engaging