

Scientific presentations: some tips and examples

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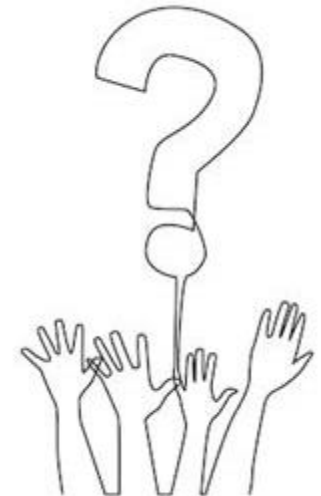
Five basic rules

1. Look at your audience, speak to the last row of the room
2. Tell a story, think of a way to link each slide to the next one
3. Adapt the number of slides to the time you have: 1 slide per min.



Five basic rules

1. Look at your audience, speak to the last row of the room
2. Tell a story, think of a way to link each slide to the next one
3. Adapt the number of slides to the time you have: 1 slide per min.
4. **Content:**
 - a minimum of text, well structured: use always a font size > 18
 - no tables (or only small ones)
 - A final summary with take home messages (5 maximum)
5. **Science is usually proceeding in 4 steps:**
 - Question asked
 - Method used to answer it
 - Result obtained
 - Interpretation, leading to the next question



Application: two steps

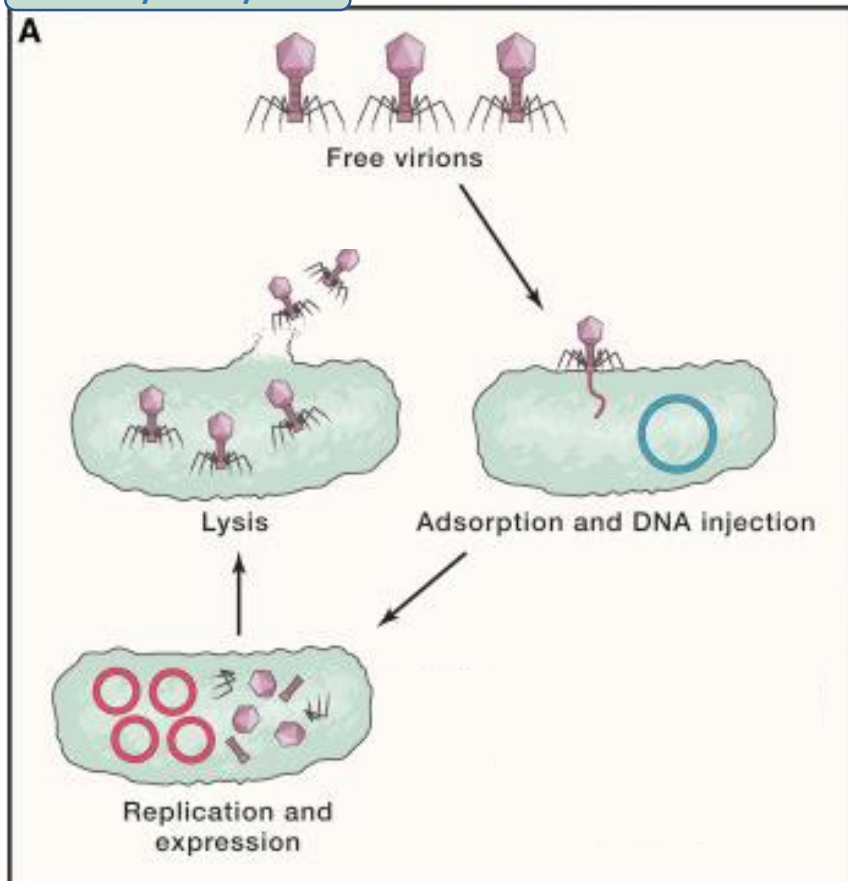
- First, I'll present a phage paper (Schmidtk et al., CHM, 2025)
 - ✓ I'll introduce in some slides what *should not* be done
 - ✓ Try to follow my talk, nevertheless!
 - ✓ Note the slide number where you have a problem
 - ✓ After my talk, we'll collectively debug the slides
- After the break:
 - ✓ Each one/each binome takes 45 minutes to read the result section of a paper and each one prepares two slides to present this result
 - ✓ 45 minutes to expose the slides to the group



Some basic reminders for the article presentation

Virulent phage

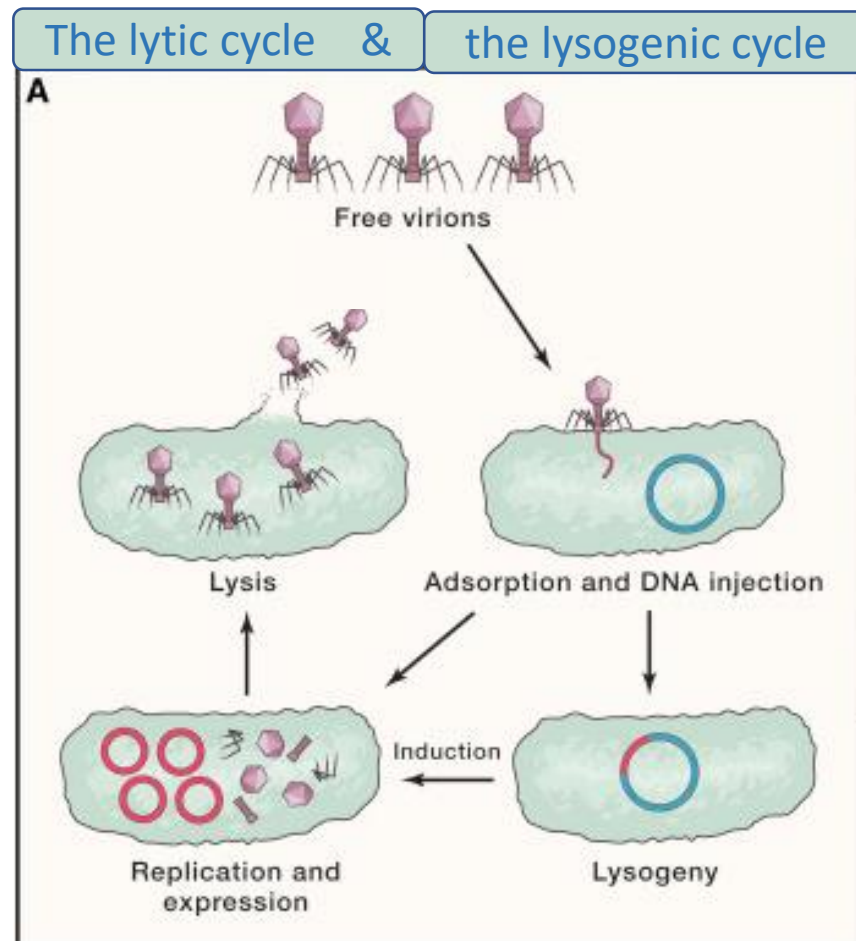
The lytic cycle



- Two basic life styles among phages:
 - Virulent phages

Some basic reminders before starting

Temperate phage



- Two basic life styles among phages:
 - Virulent phages
 - Temperate phages

Some basic reminders before starting

- Two basic life styles among phages:
 - Virulent phages
 - Temperate phages
- Two sub-categories of temperate phages:
 - Integrated lysogenic cycle: prophage integrated into the bacterial chromosome
 - Marker gene = integrase
 - Plasmidic lysogenic cycle : prophage replicates as a plasmid
 - Marker genes: less clear, two rep genes, partition genes

Plasmidic lysogeny

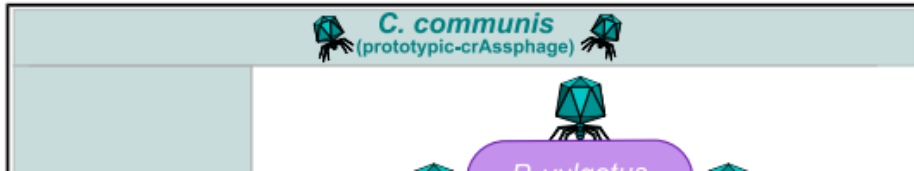
Integrated lysogeny



Cell Host & Microbe

The prototypic crAssphage is a linear phage-plasmid

Graphical abstract

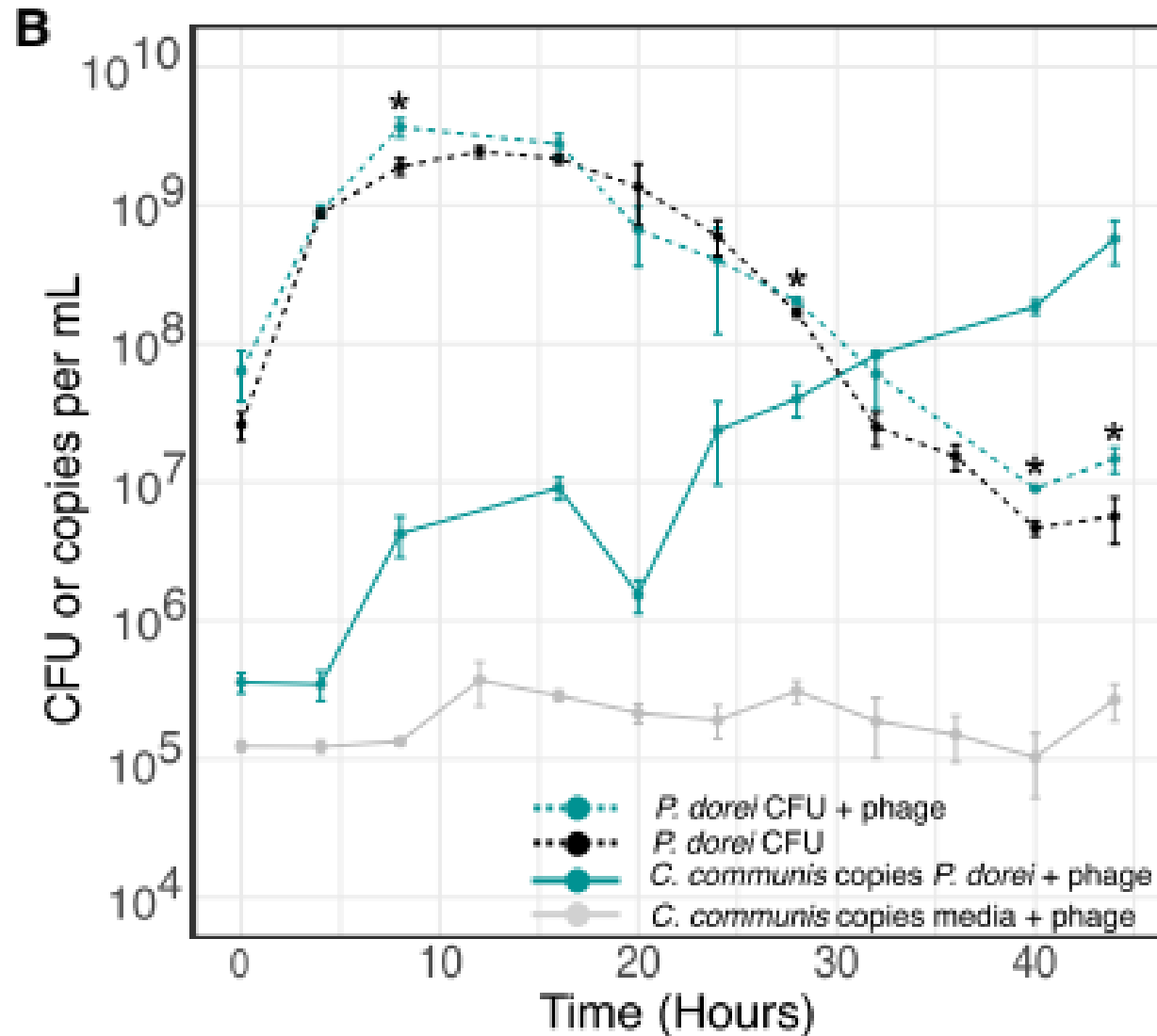


Authors

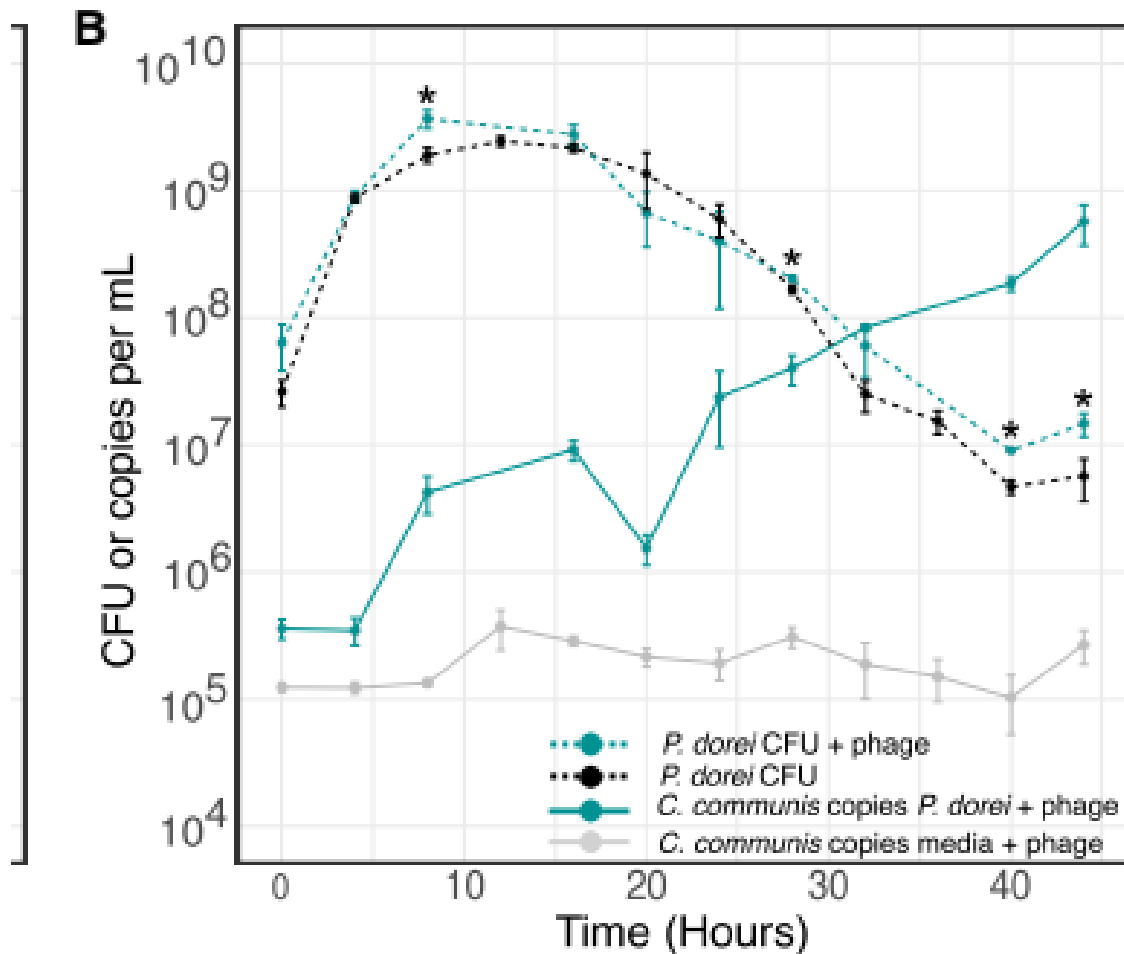
Danica T. Schmidtke, Angela S. Hickey,
Jakob Wirbel, Jordan D. Lin,
Ivan Liachko, Gavin Sherlock,
Ami S. Bhatt

- The first CrAssphage, *C. communis* (*Intestiviridae*), was discovered by its genome, assembled from virome metagenomic reads in human gut microbiota
- CrAss stands for Cross-assembly
- Since then, a whole order of *Crassvirales* was uncovered
- *C. communis* very difficult to cultivate, no plaques formed, but grows in liquid on *Bacteroides stercoris* and *Phocaeicola dorei*

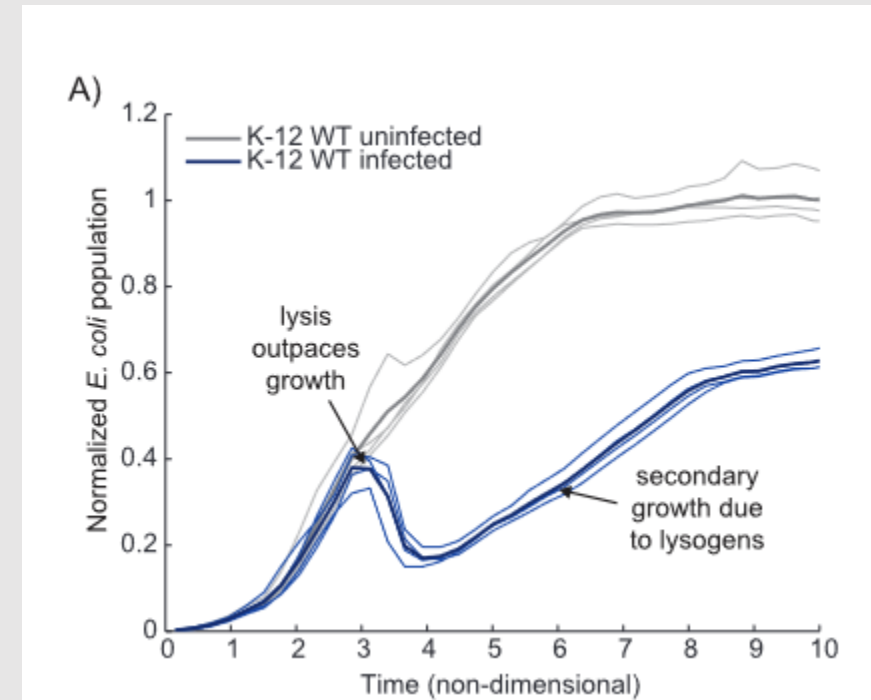
Does *C. communis* lyse its host?



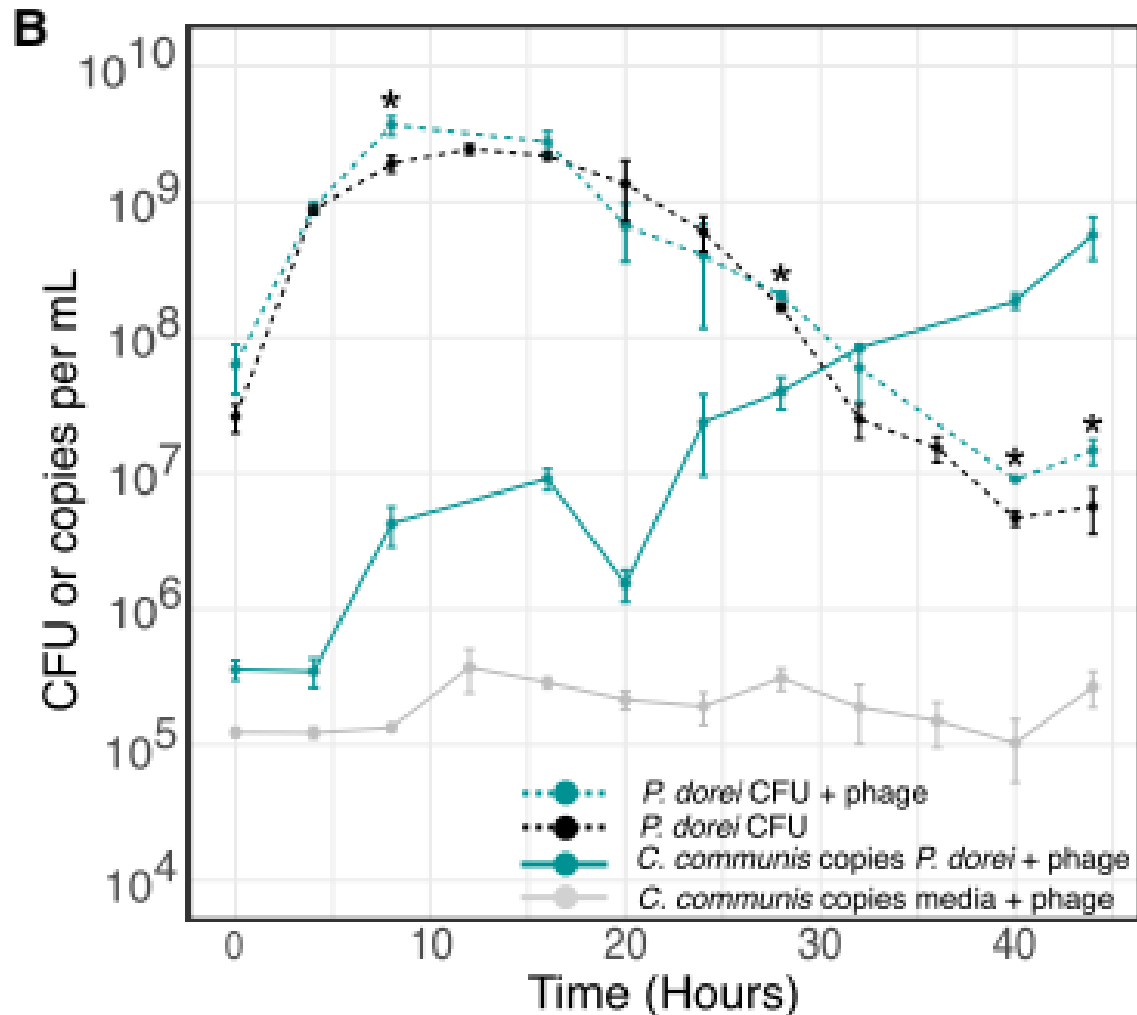
Does *C. communis* lyse its host?



A typical growth inhibition curve by a temperate phage (λ)



Does *C. communis* lyse its host?



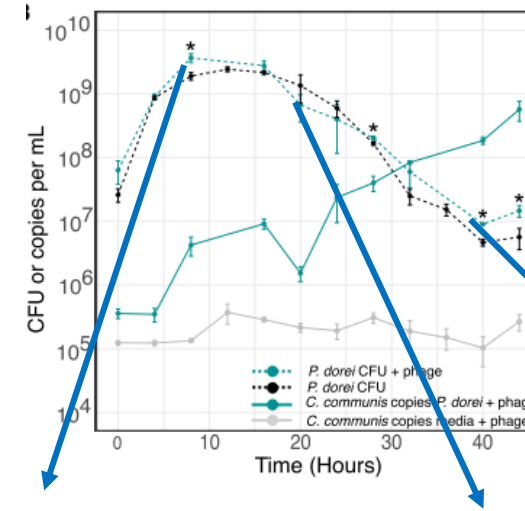
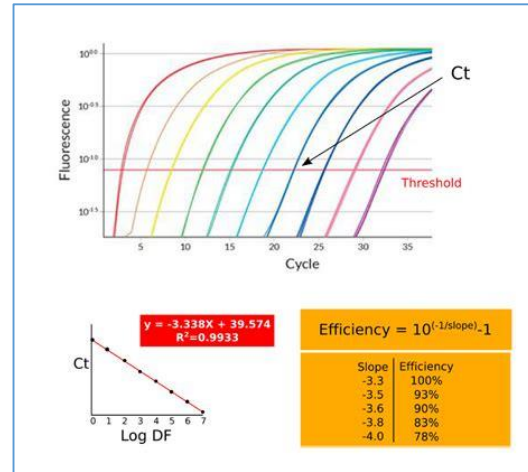
Conclusion:

C. communis does not fully lyse its host,
but its genome multiplies slowly

Unlike classical temperate phages, a very atypical
phage behaviour

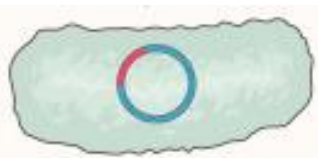
Is it possible to detect *C. communis* DNA inside bacteria?

Result: no DNA in any colony

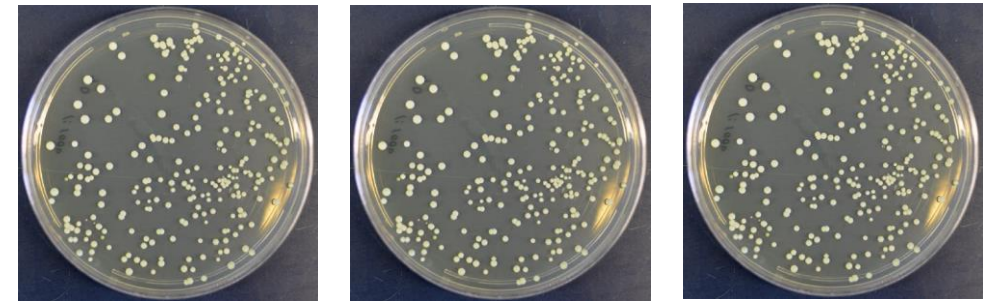


Plasmidic lysogeny

Integrated lysogeny



500 qPCR on phage DNA




- Conclusion: the phage *C. communis* does not establish stable lysogeny with its host

So what is the lifestyle of *C. communis*?

- It is not temperate (no lysis in liquid, nor stable association with bacteria)
- It is not virulent (no lysis in liquid)
- A new type of interaction with its host?
- A glimpse at crAss001 phage (*Steigviridae*)

Research article | [Open access](#) | Published: 18 August 2021

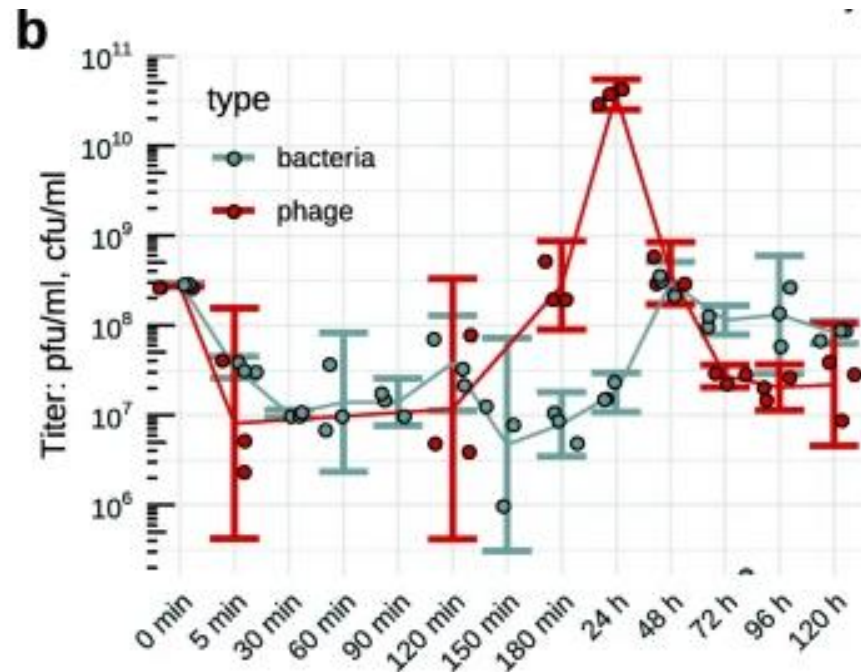
Long-term persistence of crAss-like phage crAss001 is associated with phase variation in *Bacteroides intestinalis*

[Andrey N. Shkoporov](#) , [Ekaterina V. Khokhlova](#), [Niamh Stephens](#), [Cara Hueston](#), [Samuel Seymour](#), [Andrew J. Hryckowian](#), [Dimitri Scholz](#), [R. Paul Ross](#) & [Colin Hill](#) 

[BMC Biology](#) **19**, Article number: 163 (2021) | [Cite this article](#)

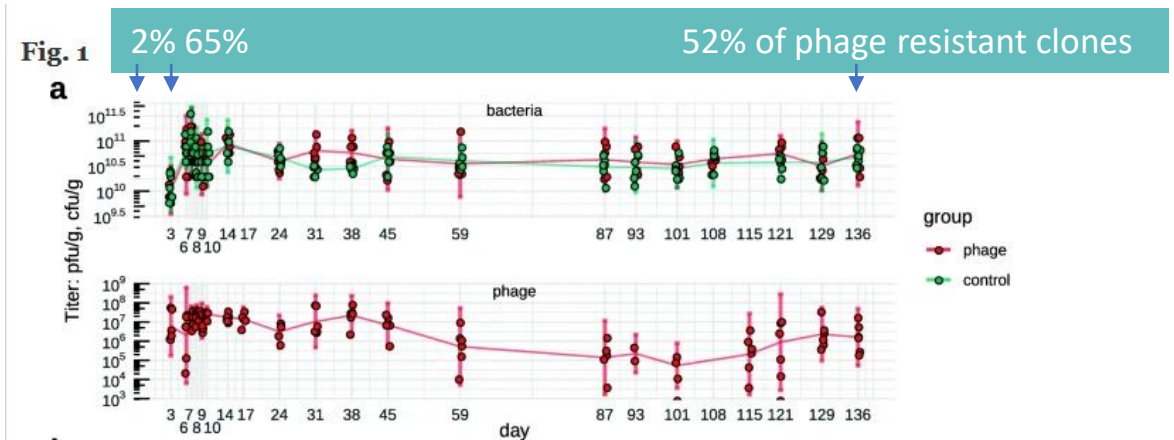
Doi: 10.1186/s12915-021-01084-3

Incomplete lysis upon phage infection of a liquid culture



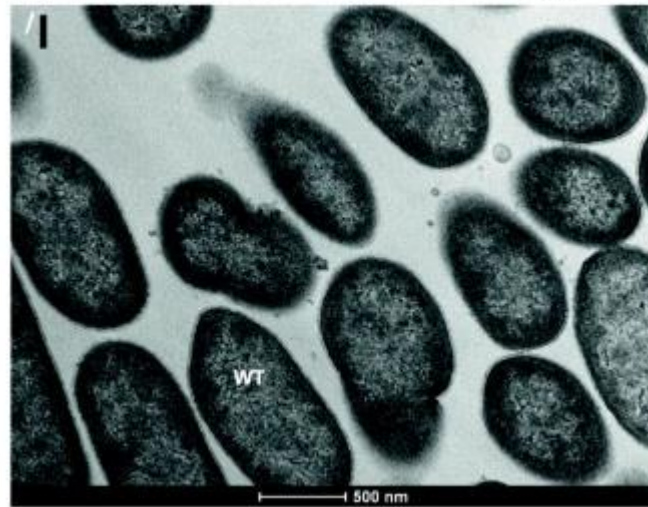
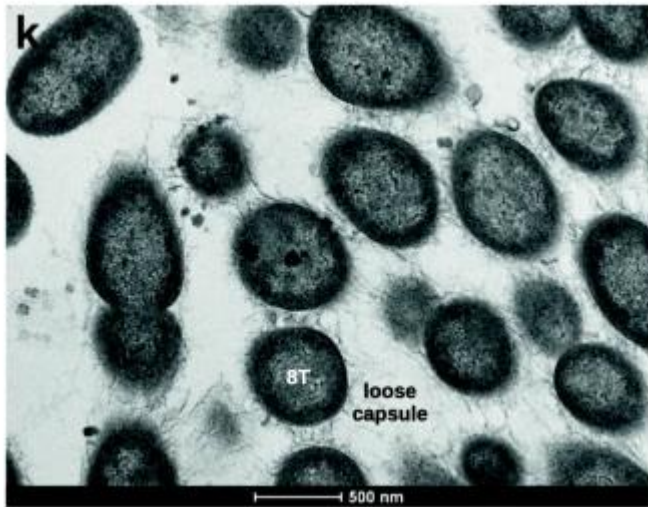
Bacteria= *Bacteroides intestinalis*
 Phage= Crass001

- In vitro infection at MOI = 1
- Bacterial count shifts 100-fold, and then continues to be maintained over 5 days, together with the phage
- A long term persistence of both bacteria and phages, also in monoxenic mice:



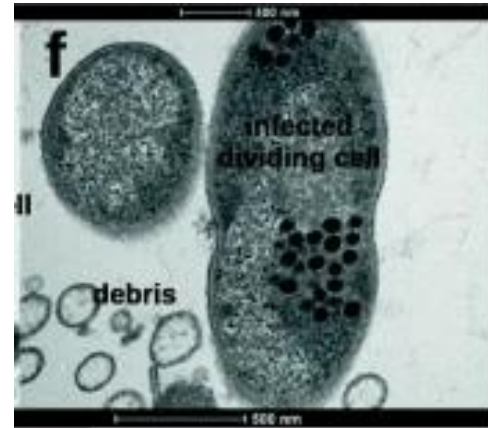
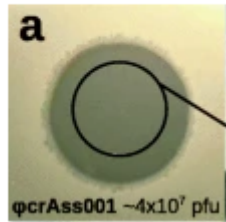
A mixture of phage sensitive and phage resistant bacteria permit this interaction

- WT bacteria have a thick capsule
- Phage resistant bacteria have a loose hairy capsule



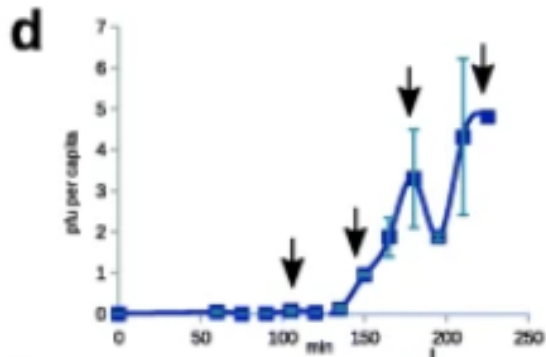
Moreover, the phage cycle seems interrupted

Fig. 2

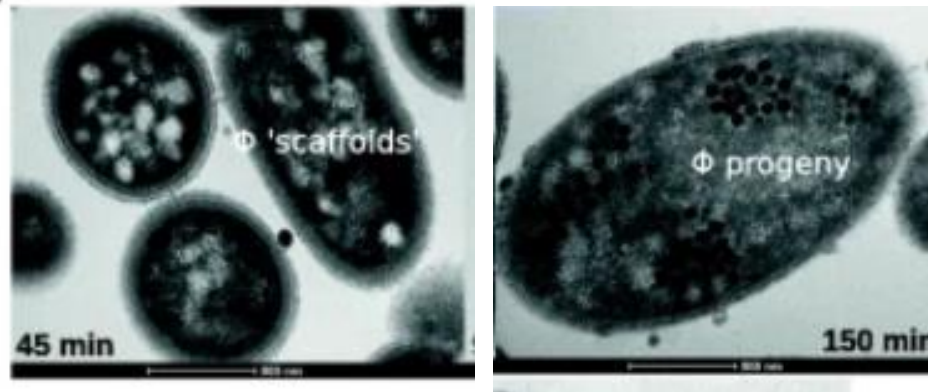


- Dividing bacteria present in turbid plaques contain capsids

Fig. 4



c

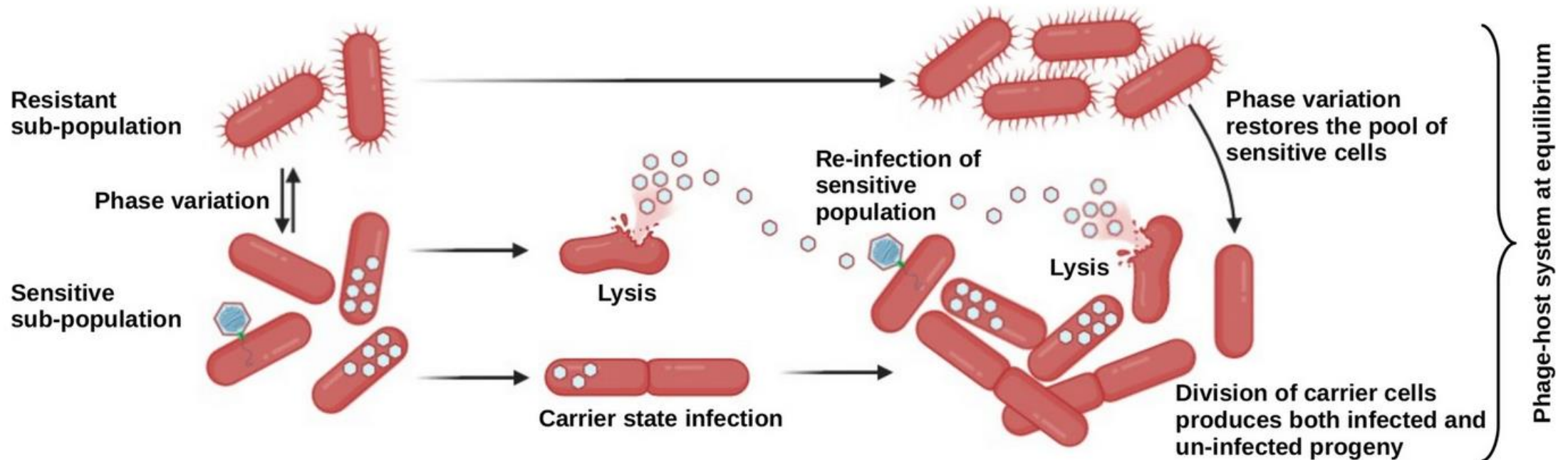


- Liquid cultures infected MOI=1 release few phages per cycle

A carrier state infection may explain the stable phage-bacteria co-existence

Fig. 5

From: [Long-term persistence of crAss-like phage crAss001 is associated with phase variation in *Bacteroides intestinalis*](#)



Now, let's go back and improve the slides

Slide number	Problems
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Part II: an exercise on 3 papers

- Each group of 2 students (or 1 if preferred) takes a figure of the following papers, and prepares 2-3 slides to present it

JOURNAL ARTICLE

The enemy from within: a prophage of *Roseburia intestinalis* systematically turns lytic in the mouse gut, driving bacterial adaptation by CRISPR spacer acquisition FREE

Jeffrey K Cornuault, Elisabeth Moncaut, Valentin Loux, Aurélie Mathieu, Harry Sokol, Marie-Agnès Petit, Marianne De Paepe ✉

The ISME Journal, Volume 14, Issue 3, March 2020, Pages 771–787, <https://doi.org/10.1038/s41396-019-0566-x>

Section	Names
Figure 1	
Figure 2	
Figure 3	
Figure 4	
Figure 6	

› Nat Microbiol. 2025 Jan;10(1):144-157. doi: 10.1038/s41564-024-01886-5. Epub 2025 Jan 3.

Bacteria use exogenous peptidoglycan as a danger signal to trigger biofilm formation

Sanika Vaidya ^{1 2}, Dibya Saha ^{# 3}, Daniel K H Rode ^{# 3}, Gabriel Torrens ⁴, Mads F Hansen ^{1 5}, Praveen K Singh ¹, Eric Jelli ^{1 6}, Kazuki Noshō ³, Hannah Jeckel ³, Stephan Göttig ⁷, Felipe Cava ⁴, Knut Drescher ⁸

Section	Name
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Figure 1

Figure 3

Figure 4

Figure 5

Figure 6

Research | [Open access](#) | Published: 16 March 2006

A putative RNA-interference-based immune system in prokaryotes: computational analysis of the predicted enzymatic machinery, functional analogies with eukaryotic RNAi, and hypothetical mechanisms of action

[Kira S Makarova](#), [Nick V Grishin](#), [Svetlana A Shabalina](#), [Yuri I Wolf](#) & [Eugene V Koonin](#) 

[Biology Direct](#) **1**, Article number: 7 (2006) | [Cite this article](#)

70k Accesses | **1073** Citations | **137** Altmetric | [Metrics](#)

Section	Name
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Figure 1

Figure 5

*Prediction proved true 1 year later:
Barangou et al., Science, 2007 (not open access!)*