

# WildBioPhage

## Nuevos Probióticos y Fagos Para Combatir la Incidencia de *Enterococcus* en Avicultura



Proyecto CPP2022-009927, financiado por MCIN/AEI/10.13039/501100011033 y por la Unión Europea-NextGenerationEU/PRTR.

**Jornada anual del Grupo Inter-plataformas de Economía Circular GIEC 2024.**

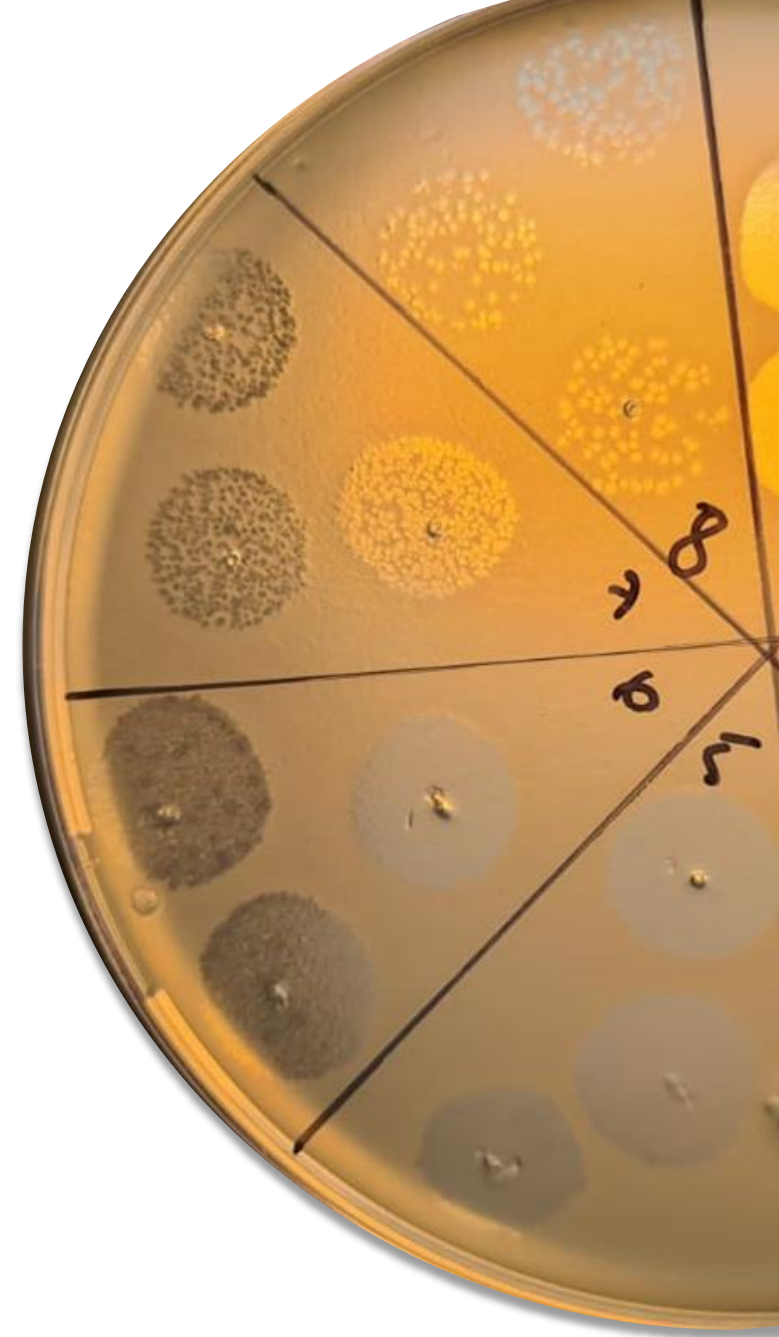
**Retos y oportunidades de colaboración público-privada.**

**Madrid, 13 de Noviembre del 2024**

**Dra. Sandra Sevilla Navarro, DVM, PhD  
EBVS® Diplomada Europea en Avicultura  
[s.sevilla@cecav.org](mailto:s.sevilla@cecav.org)**

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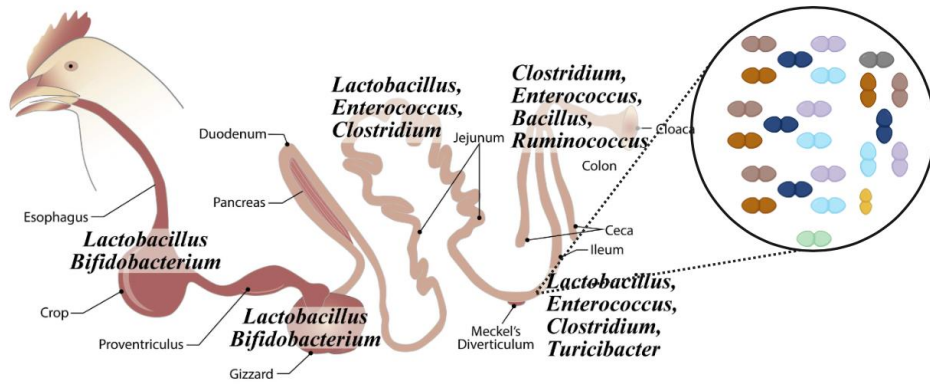
**Objetivo:** Elaborar una solución eficaz basada en nuevos probióticos y bacteriófagos específicos frente a cepas patógenas de *Enterococcus* como **alternativa a los antibióticos.**



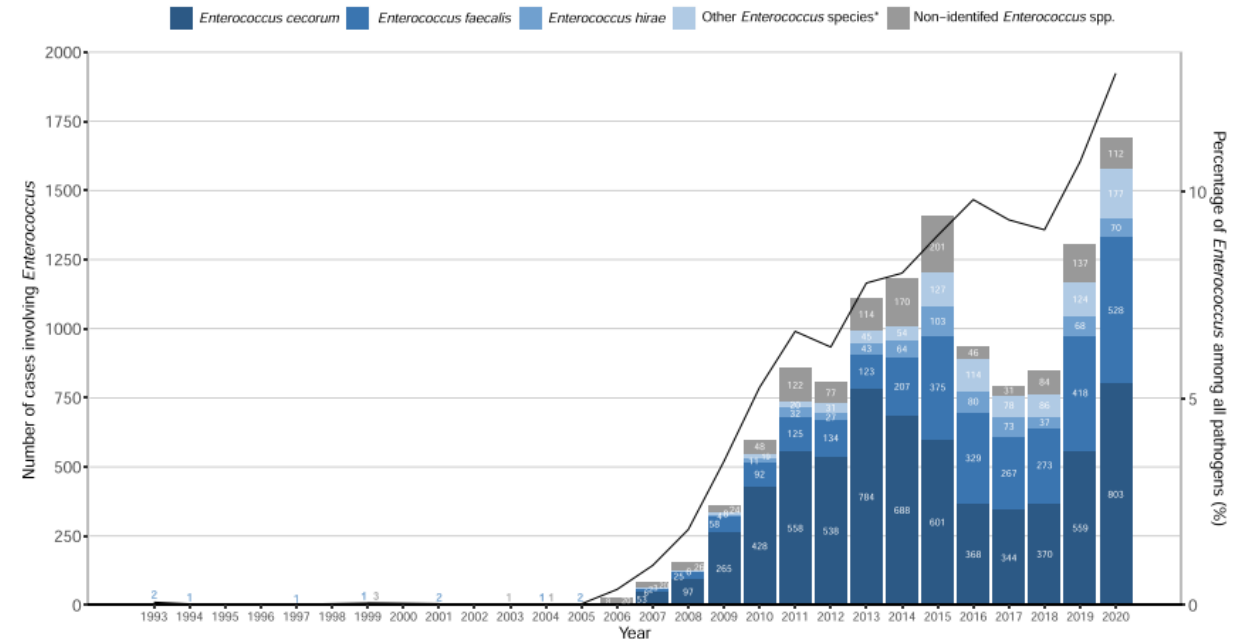
# WildBioPhage

## ENTEROCOCCUS SPP.

Enfermedades enterocócicas están siendo reconocidas como una de las principales causas de mortalidad en broilers, pavos y patos.



Bacteria que coloniza el GIT de los animales día **1 de vida**.



\* Other Enterococcus species covers *E. gallinarum*, *E. faecium*, *E. casseliflavus*, *E. durans*, *E. avium* and *E. columbae*.

# WildBioPhage

**ESKAPE** (*Enterococcus*, *S. aureus*, *K. pneumoniae*, *A. baumannii*, *P. aeruginosa*, and *E. coli*)

**ENTEROCOCCUS SPP.**

Resistencia a vancomicina → **CRITICAL PRIORITY**

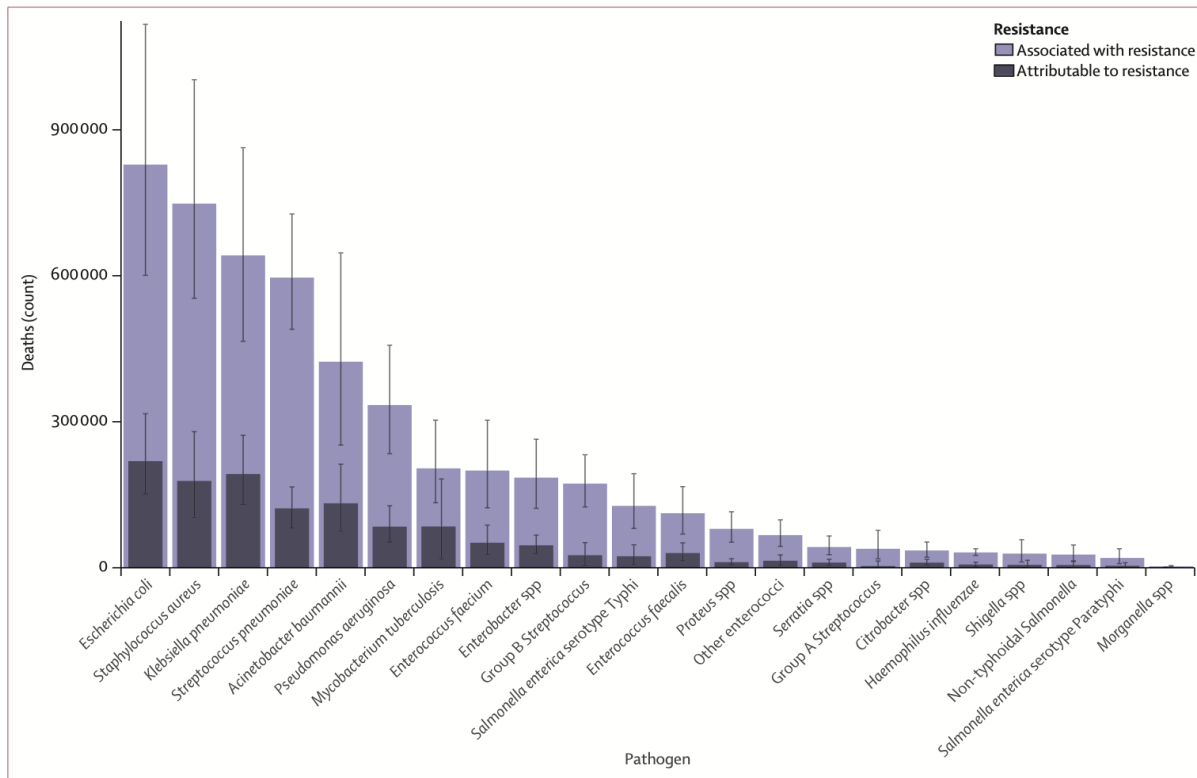
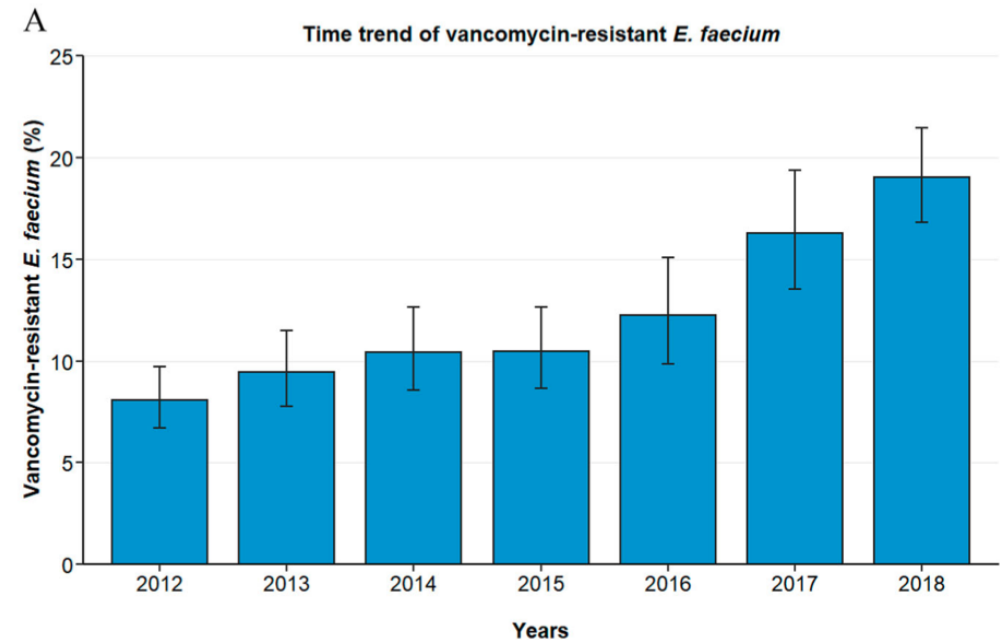


Figure 4: Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by pathogen, 2019. Estimates were aggregated across drugs, accounting for the co-occurrence of resistance to multiple drugs. Error bars show 95% uncertainty intervals.



# WildBioPhage

## RESISTENCIAS ANTIMICROBIANAS

**4,95 millones** Muertes en  
**GLOBAL** 2019

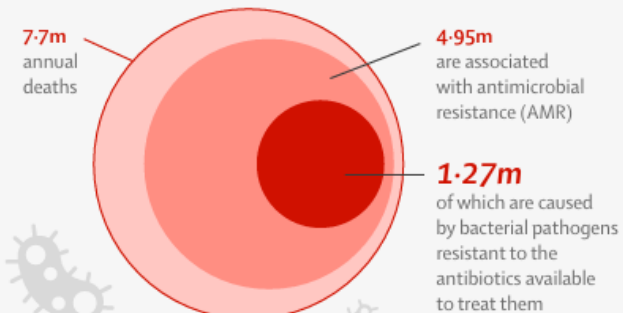


1,2 millones directamente  
atribuibles a AMR

**10 millones**  
falecidos en  
**2050**

Antimicrobial resistance: an enormous, growing, and unevenly distributed threat to global health

Each year, an estimated 7.7 million deaths are associated with bacterial infections



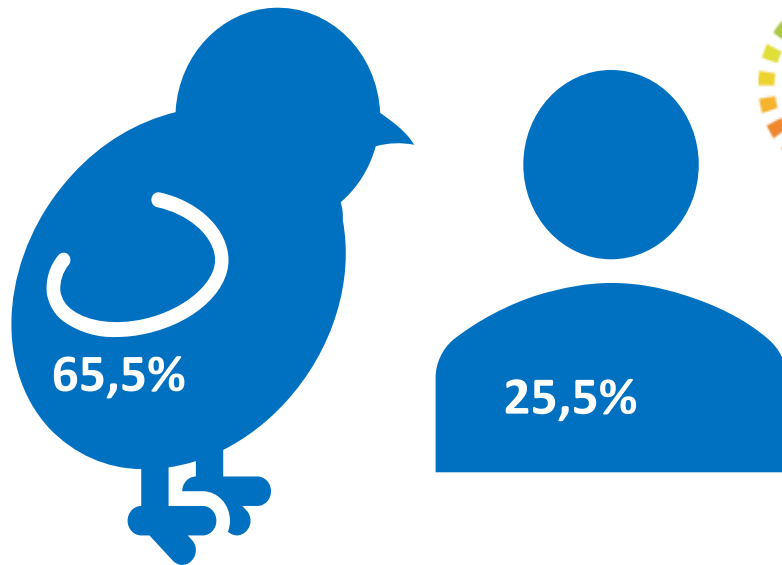
Rising AMR has been documented over the past two decades. Projections from the OECD for high-income countries predict resistance to third-line antibiotics—the last-resort drugs—could be 2.1 times higher in 2035 compared to 2005



# 2050 Pandemia Silenciosa

# WildBioPhage

## RESISTENCIAS ANTIMICROBIANAS



Plan Nacional  
Resistencia  
Antibióticos

**Reducción del consumo de ATB**

## Pipeline Phenomenon

Sólo 10 nuevos antibióticos aprobados entre 2017 y 2023. **Solo 2 definidos como innovadores por la OMS.**

# WildBioPhage

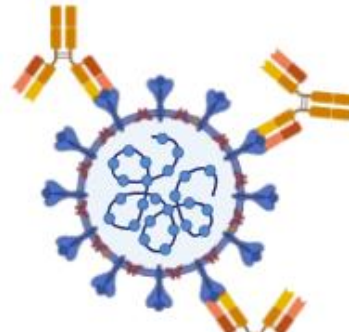
## PROBIÓTICOS



1

### Mejora de la digestión y absorción de nutrientes

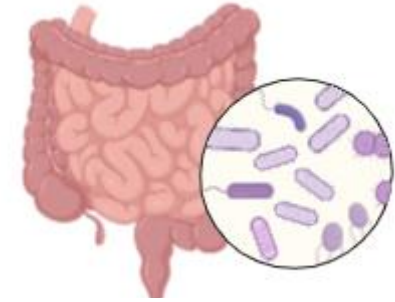
Los probióticos mejoran **la digestión y facilitando la absorción de nutrientes** esenciales en las aves.



2

### Fortalecimiento del sistema inmunológico

El uso de probióticos ayuda a desarrollar una **respuesta inmune más robusta**, protegiendo a las aves contra diversas infecciones y enfermedades.



3

### Control de patógenos intestinales

Los probióticos pueden **inhibir el crecimiento de patógenos** como *Enterococcus*, contribuyendo a la salud y bienestar general de las aves.



# WildBioPhage

1

## Producción de secreciones beneficiosas

La glándula uropigeal secreta sustancias que actúan como probióticos, ayudando a mantener la salud intestinal en pollos al combatir bacterias patógenas.

2

## Regulación de la microbiota intestinal

Las secreciones de la glándula uropigeal contribuyen a la regulación de la microbiota intestinal, favoreciendo el crecimiento de bacterias beneficiosas en pollos.

3

## Protección contra infecciones

La producción de probióticos por esta glándula protege a los pollos de infecciones, particularmente del patógeno *Enterococcus*, mejorando su salud general.

## PROBIÓTICOS



ORIGINAL RESEARCH  
published: 28 July 2020  
doi: 10.3389/fmicb.2020.01735



## Great Tit (*Parus major*) Uropygial Gland Microbiomes and Their Potential Defensive Roles

Kasun H. Bodawatta<sup>1\*</sup>, Signe K. Schierbech<sup>1,2</sup>, Nanna R. Petersen<sup>1,2</sup>, Katerina Sam<sup>3,4</sup>, Nick Bos<sup>2</sup>, Knud A. Jønsøen<sup>1</sup> and Michael Poulsen<sup>2</sup>

[www.nature.com/scientificreports](https://www.nature.com/scientificreports)

## scientific reports



**OPEN** Uropygial gland microbiota differ between free-living and captive songbirds



# WildBioPhage

## BACTERIÓFAGOS

Descubierto hace 100 años (1915) como “Parásito de bacterias”

### Entidades más abundantes del mundo



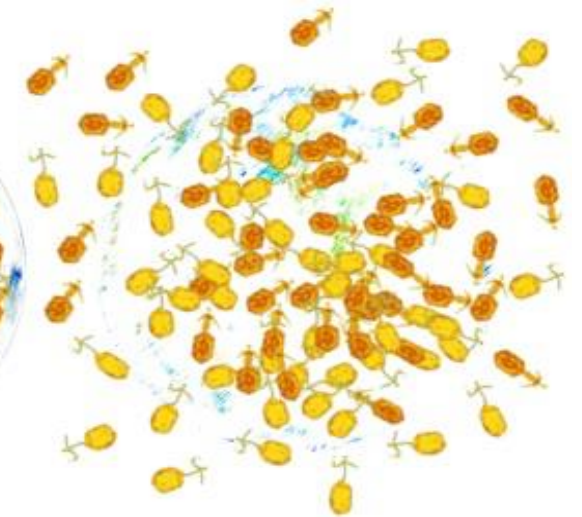
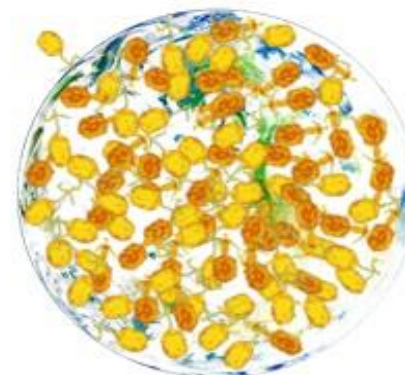
$10^{31} = 10.000.000.000.000.000.000.000.000.000.000.000$



$10^{15} = 1.000.000.000.000.000$

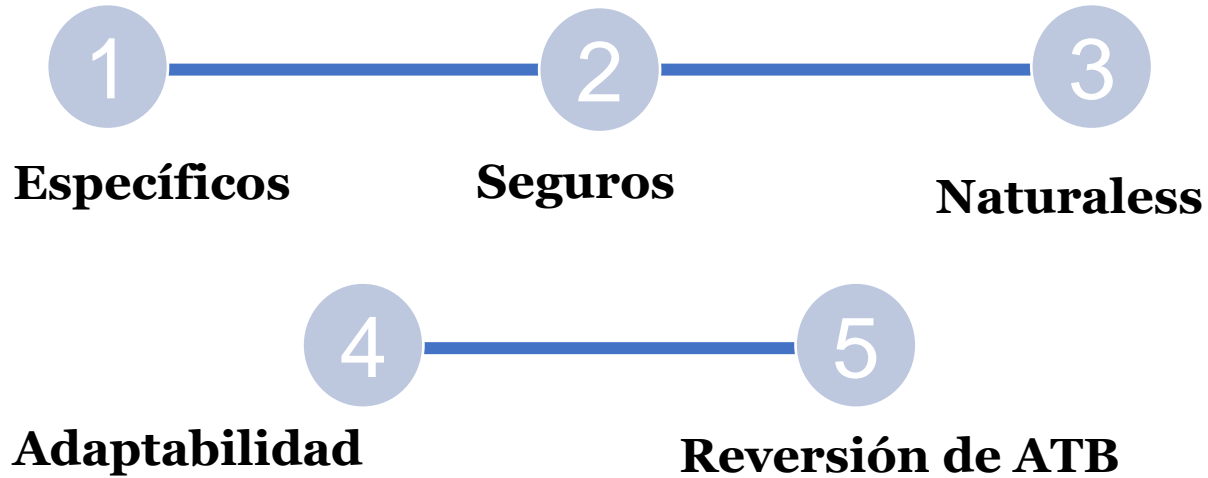


$7.8^9 = 7.800.000.000$



# WildBioPhage

## BACTERIÓFAGOS



**The Good Virus** *An alternative therapy to antibiotics*

There are 10 - 100x more phages on Earth than bacteria themselves

First named in 1917 by Felix d'Herelle

Phage therapy was first demonstrated to cure *Salmonella* in poultry in 1919, and has been used as a medical treatment for humans

Modern phage therapy in crop agriculture has already been approved in some countries

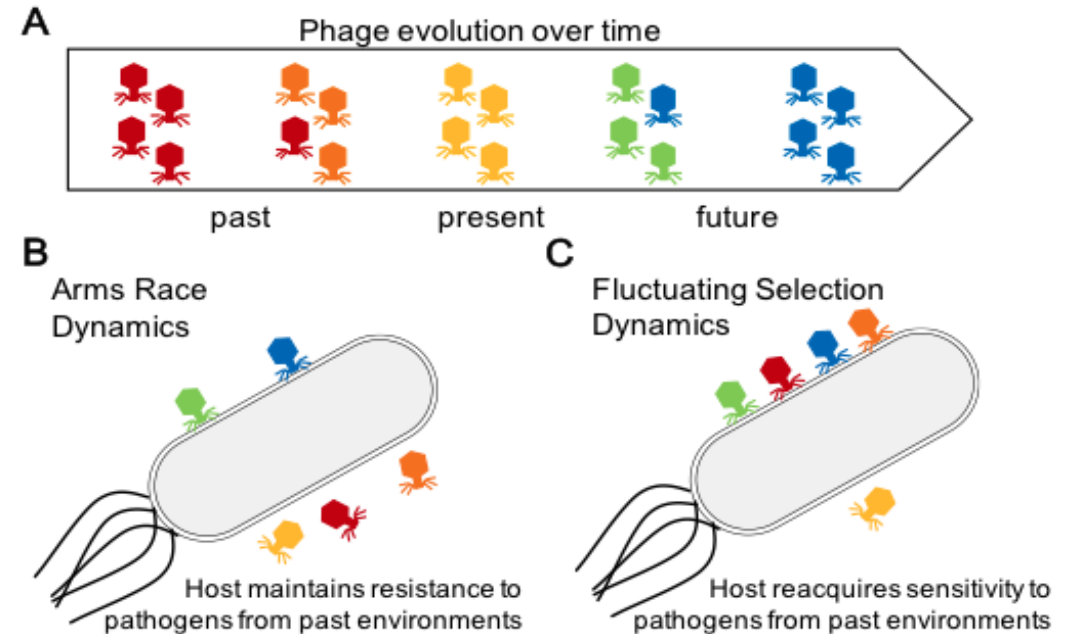
Using a cocktail of phages would make it less likely that bacteria would develop resistance to all

Some phages can even reduce AMR in bacteria, and could be used in synergy with antibiotics

**The future?** Africa could develop its own 'phage banks' - places to store and provide phages for tailored treatment

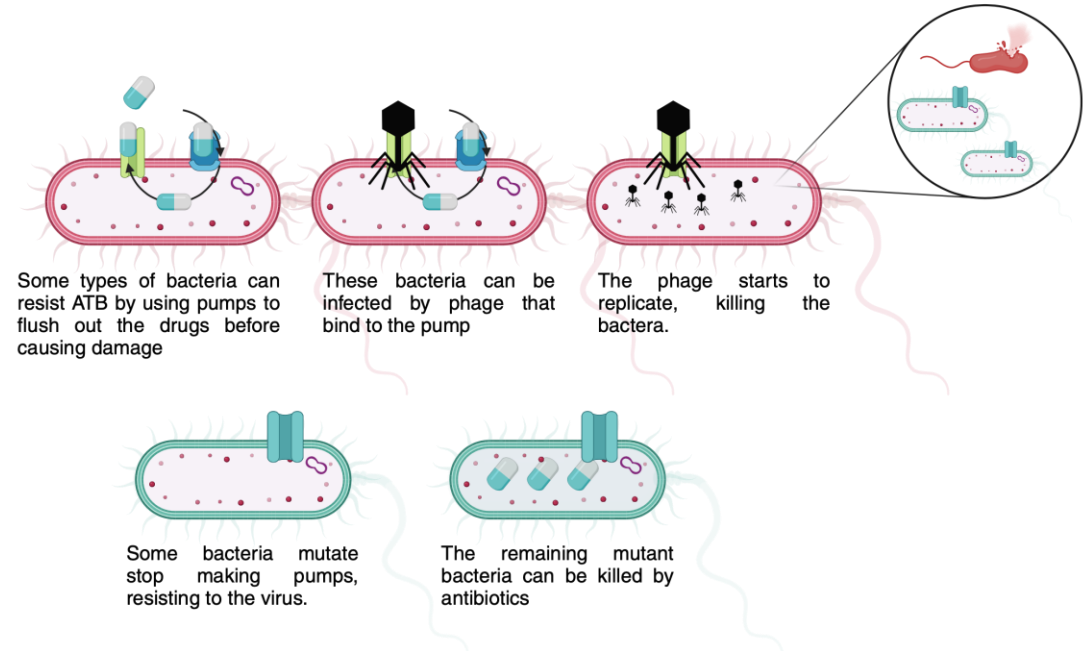
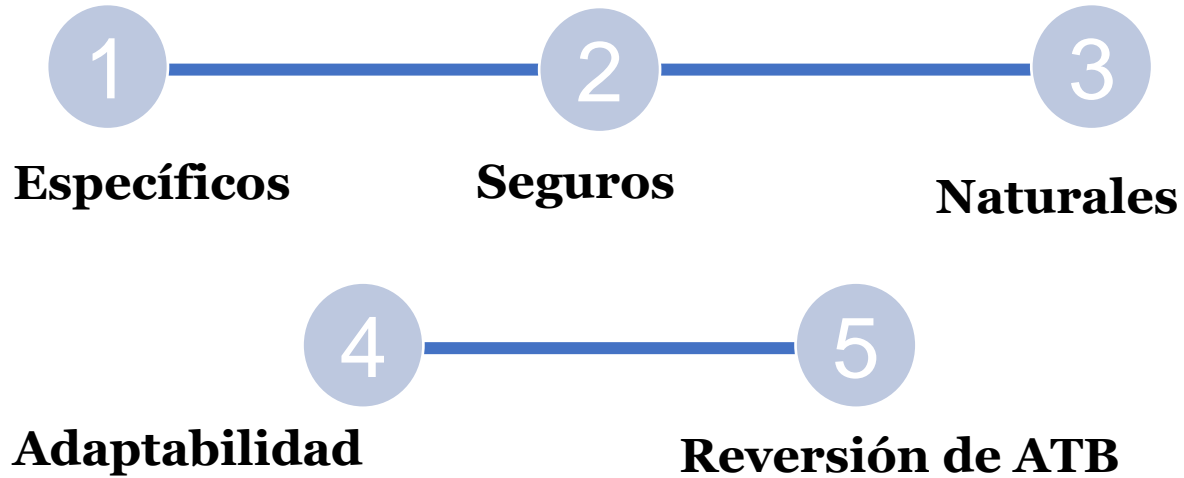
**Why use phages?**

- Unlike antibiotics, phages are highly specific. They quickly co-evolve to overcome any resistance in the bacteria they infect
- Antibiotics are toxic and disrupt an animal's microbiome. Phages are naturally found in animals and are better tolerated
- Phages self-replicate, so treatment could involve just a single dose



# WildBioPhage

## BACTERIÓFAGOS



### The Good Virus

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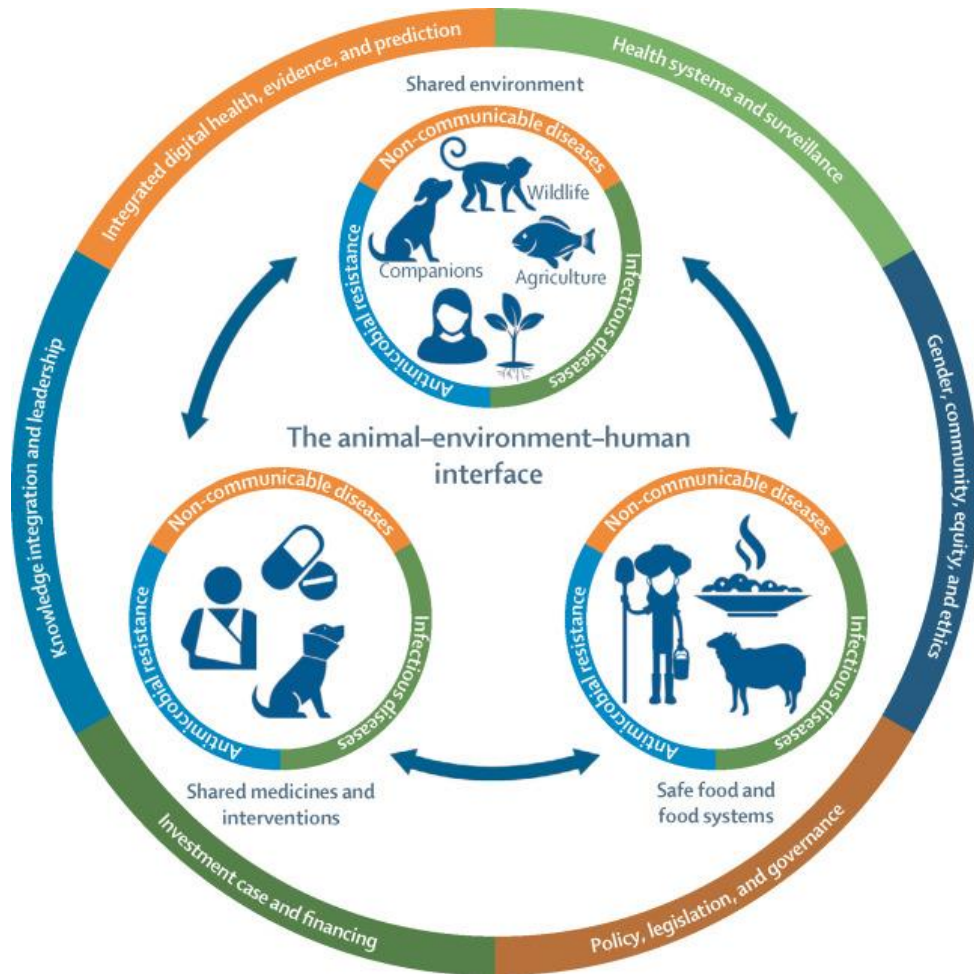
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PROBIÓTICOS + BACTERIÓFAGOS

## Terapia dirigida

Solución ante la creciente  
amenaza de las AMR



Ejemplo de Herramienta *One Health*





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## Proyecto de Colaboración - Público Privada



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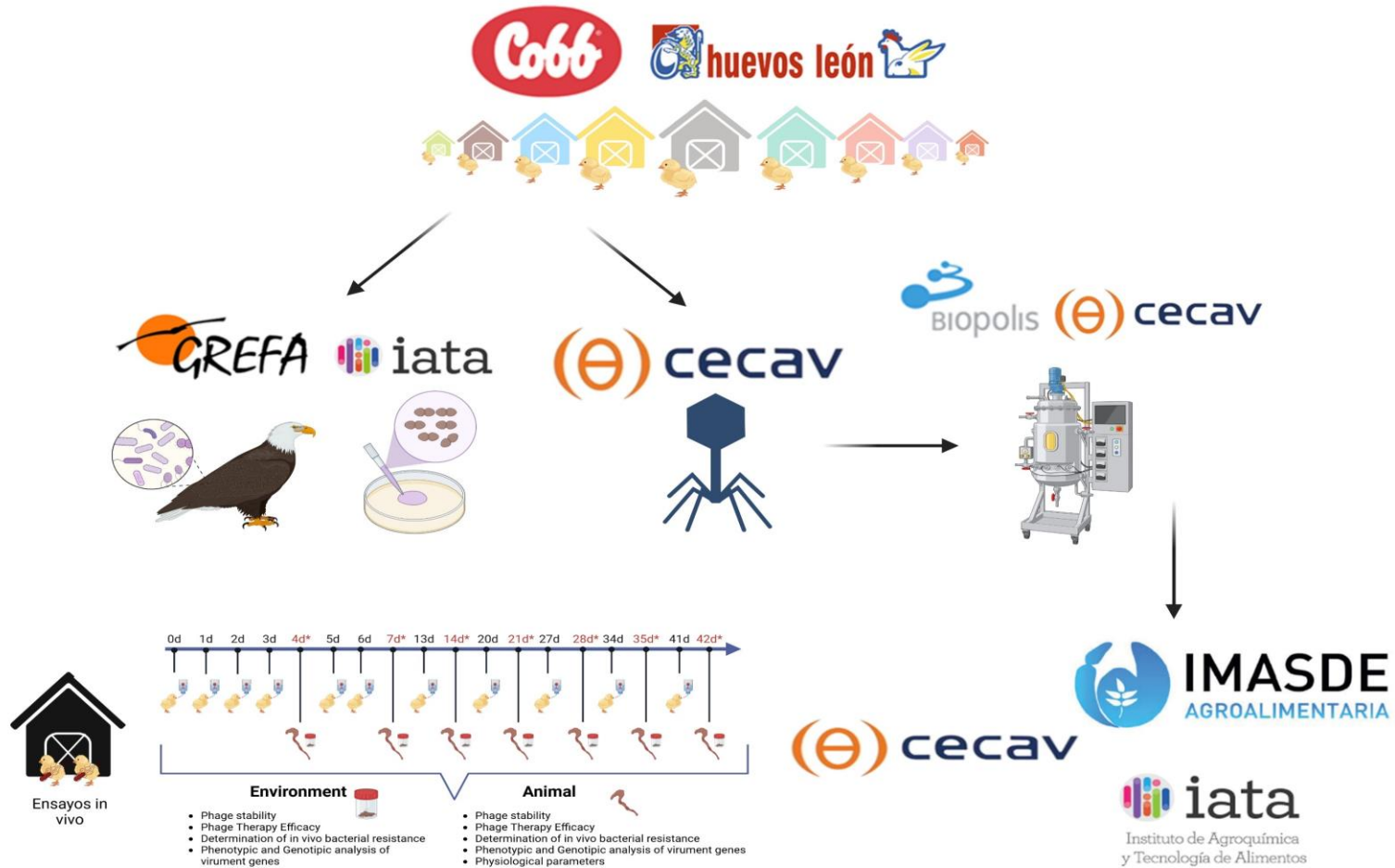
### EMPRESAS



### ORGANISMOS PÚBLICOS Y PRIVADOS



# WildBioPhage



Investigación Elemental

Producción industrial

Transferencia tecnológica

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