

Infection ostéo-articulaire complexes, place de la phagothérapie

Phage therapy in severe bacterial infections: The French experience

tristan.ferry@univ-lyon1.fr

 [@FerryLyon](https://twitter.com/FerryLyon) 

Infectious and Tropical Diseases Unit, Croix-Rousse Hospital , Hospices Civils de Lyon, Claude Bernard Lyon1 University, Lyon
Centre International de Recherche en Infectiologie, CIRI, Inserm U1111, CNRS UMR5308, ENS de Lyon, UCBL1, Lyon, France

Clinical officer ESCMID Study group for Non-Traditional Antibacterial therapy (ESGNTA)

Centre de Référence des IOA complexes de Lyon (CRIoAc Lyon)



Conflict of interest

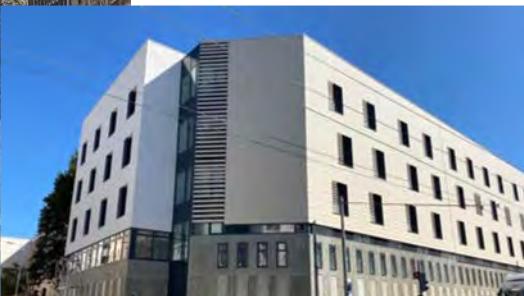
- **Phaxiam (ex-Pherecydes)** : Expert (Board), research grant, investigator coordinator of clinical trials (contract with hospital, no direct funding)
- **Armata** : Punctual expert (contract with university, no direct funding)
- **Contrafect** : Expert investigator coordinator of clinical trial (contract with hospital, no direct funding)

This presentation contains bloody images/videos for the operating rooms that can disturb sensitive people

All photos are my property

All cases are not (yet) published, keep this presentation confidential, please

I am infectious disease physician (with a PhD)

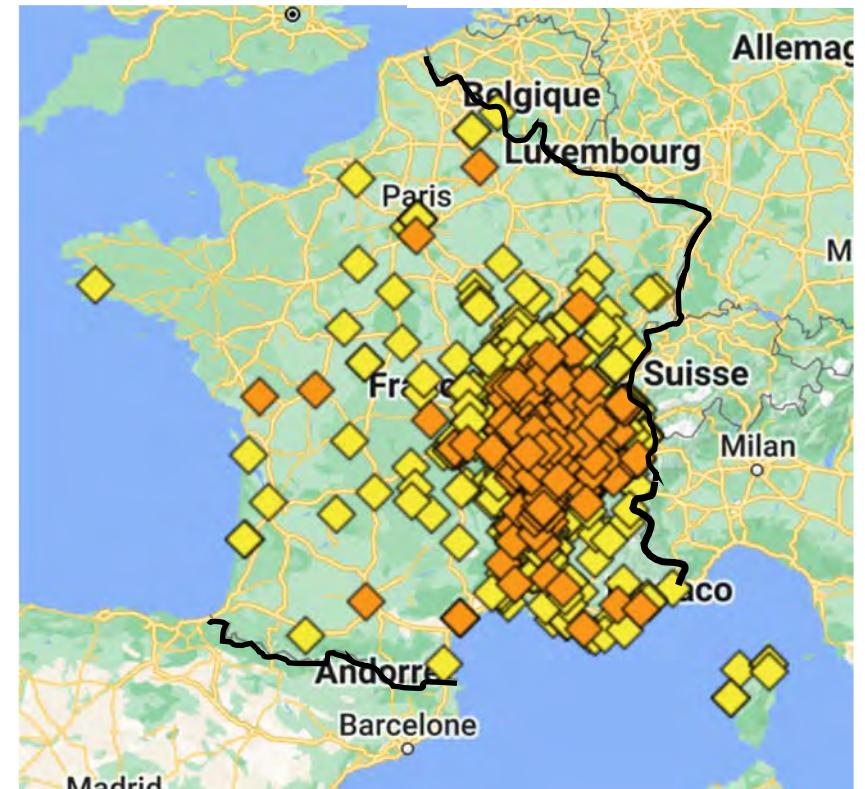


I have conflict of interest with the patients!

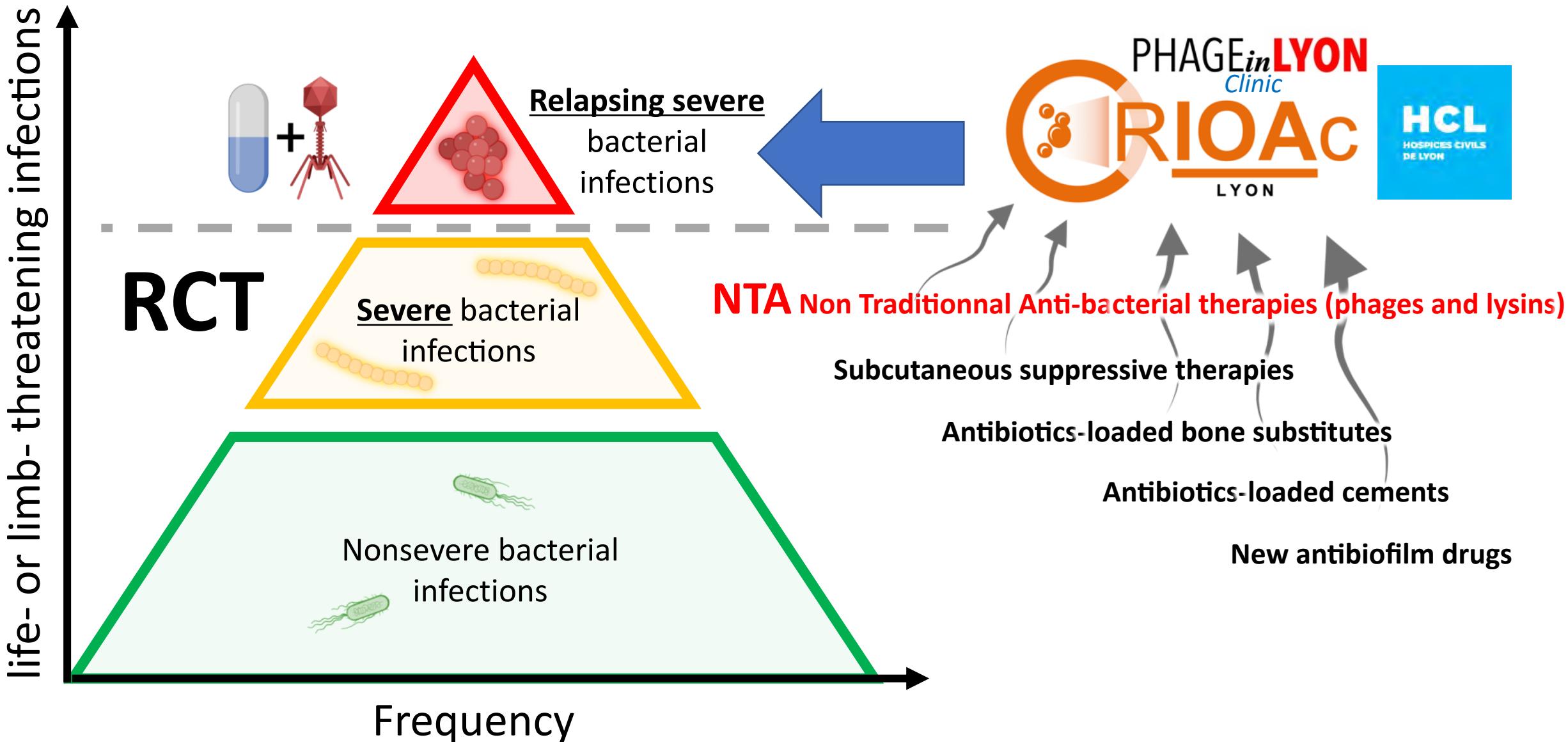
Referral center for the management of complex bone and joint infections (BJI)



◆ 2014-2020
◆ 2021



The pyramid of bacterial infectious diseases



Bone and joint infections: Lyon becomes the national expert center for phage therapy

The reference center for complex bone and joint infections, based at the Hospices Civils de Lyon, will centralize all requests concerning this last resort treatment, using viruses against resistant bacteria.

Le Progrès - 23 Feb. 2023 at 17:51 | updated 23 Feb. 2023 at 18:08 – Reading time: 2 min



National online
multidisciplinar meetings



Dedicated to innovative
anti-infective therapies

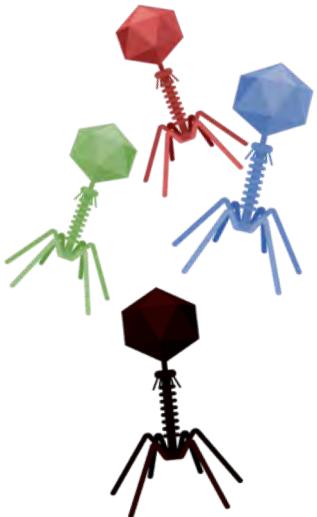


PHAGEinLYON

Clinic



Photo: Tristan Ferry



Infectious diseases department

Clinical development

Multidisciplinary meetings

Identifying relevant indications

Managing the patient

Compassionate use

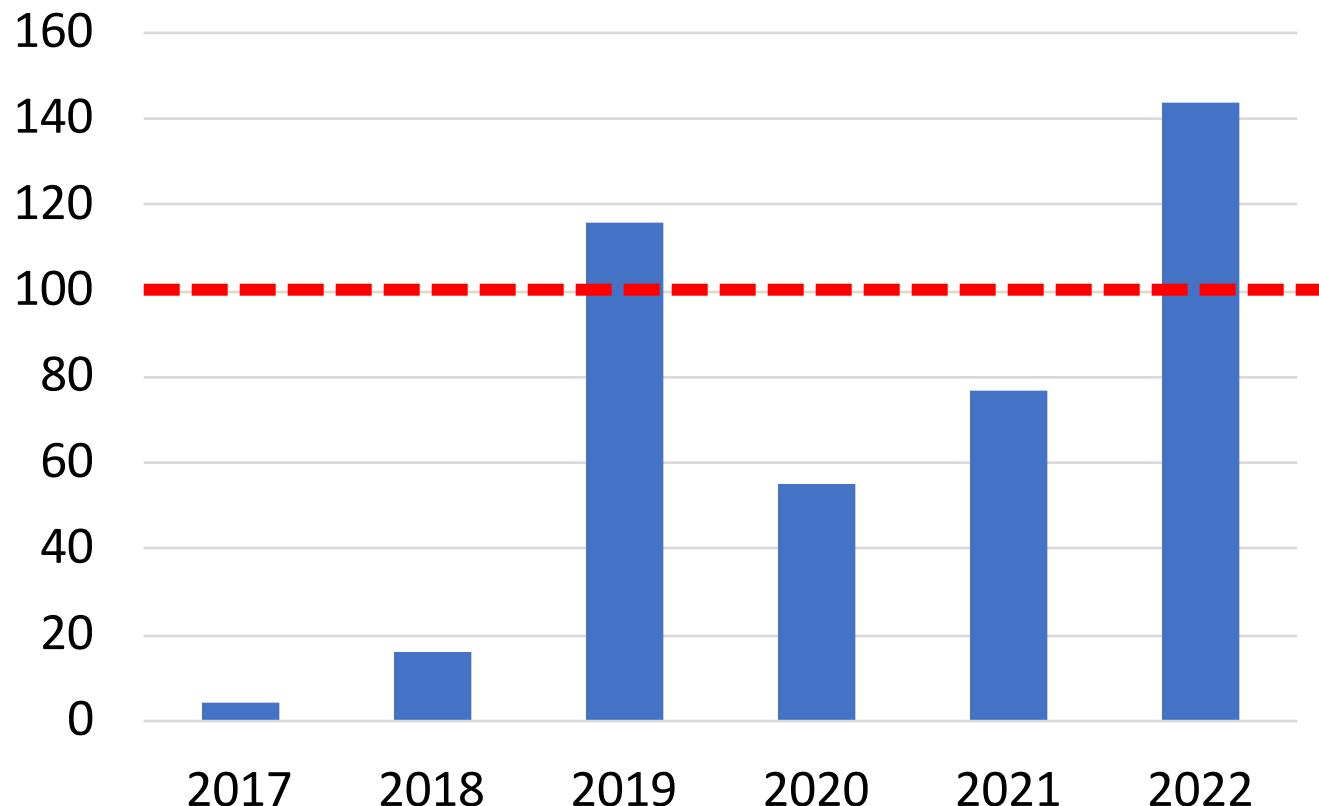
Cohort studies

Pharmacokinetic in humans

Clinical trials



Phage requests



PHAGE *in LYON* Clinic

Involved bacteria

32 % *Staphylococcus aureus*
16 % *Pseudomonas aeruginosa*
6 % *Staphylococcus epidermidis*

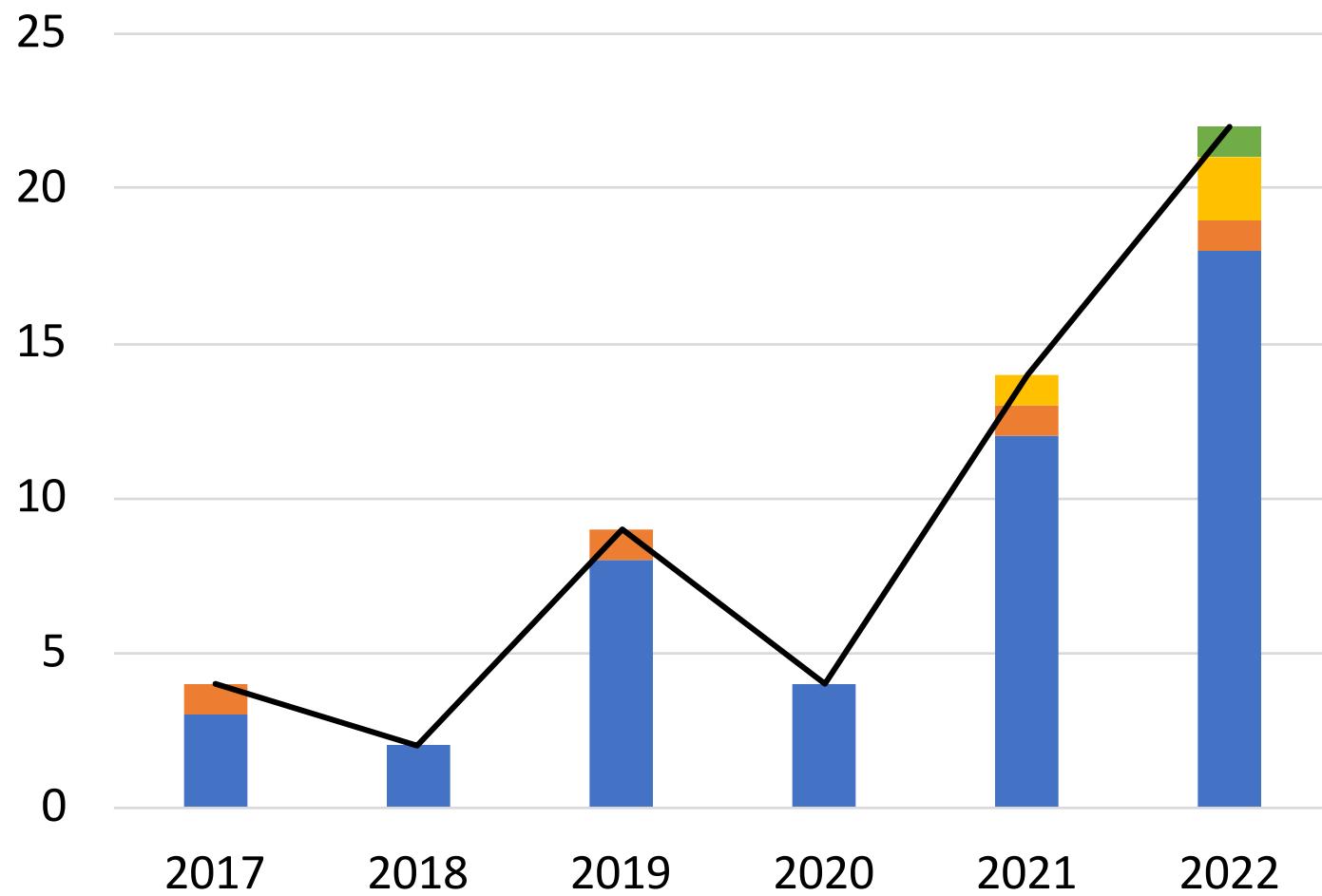
Type of infection

37% Prosthetic-joint infection
27% Other bone and joint infection
8% Lung infection

Source : T. Ferry



Treated patients



PHAGE *in* LYON
Clinic

- Bone and joint
- Endocarditis
- Other
- Lung
- Vascular graft infection

Source : T. Ferry

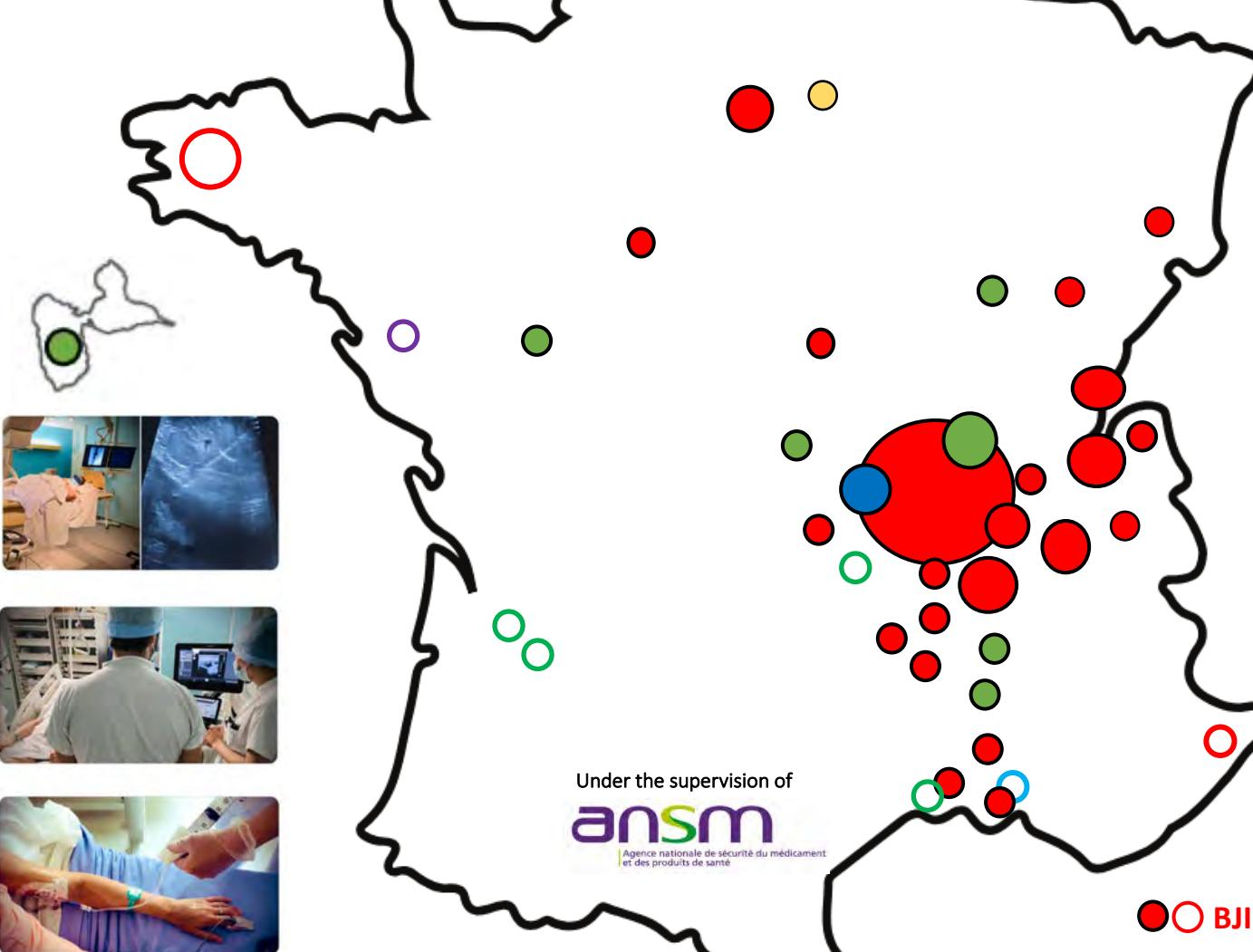


Implementation of a Phage Therapy Center in a CRIODC

CMI CLINICAL
MICROBIOLOGY
AND INFECTION

FERRY T. et al. 2022

Updated



HCL
HOSPISES CIVILS
DE LYON

PHAGEinLYON
Clinic



CRIODC
LYON

CIRI
Centre
International
de Recherche
en Infectiologie

FONDATION HCL
HOSPISES CIVILS
DE LYON

59 patients in Lyon since 2017

~75% of the whole patients treated in France



- 55 with phages from **PHAXiAM**
- 4 with phages from **PHEREZYDES**



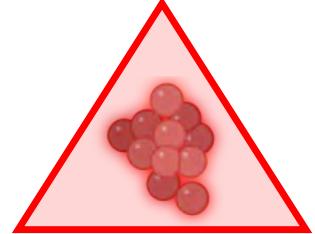
- 46 **BJI** (including 38 **PJI**)
- 10 **endocarditis/vascular graft**
- 3 **lung infections** (VAP + bacteremia, pneumonia in lung graft bronchectasia, cystic fibrosis exacerbation)



+ 14 patients managed outside Lyon
including 1 in and 1 in

BJI Endocarditis Pneumonia Burn Abscess

A large panel of severe bacterial infections



Central nervous system infections

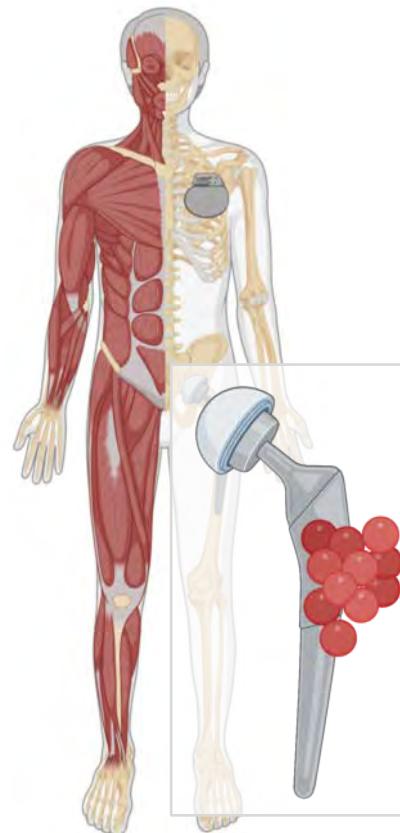
Implant-associated meningitis

Lung infections

Ventilator-associated pneumonia
Exacerbation in cystic fibrosis
Exacerbations in bronchiectasis

Urinary tract infections

Pyelonephritis
Ureteral stent-associated infection



Digestive-tract infection

Typhoid fever, shigellosis
Cholera

Cardiovascular infections

Endocarditis
Cardiac electronic device infection
Prosthetic-valve endocarditis
Vascular graft infection

Muskuloskeletal infections

Wound infection
Osteomyelitis, fracture-related infection
Implant-associated bone and joint infection
Prosthetic joint infection

Book chapter in press

A review of phage therapy for bone and joint infections

Tristan Ferry^{1,2,3,4,5}

¹ Service de Maladies Infectieuses et Tropicales, Hôpital de la Croix-Rousse, Hospices Civils de Lyon, Lyon, France

² Université Claude Bernard Lyon 1, Villeurbanne, France

³ Centre de Références des IOA Complexes de Lyon, CRIoAc Lyon, Lyon, France

⁴ StaPath team, Centre International de Recherche en Infectiologie, CIRI, Inserm U1111, CNRS UMR5308, ENS de Lyon, UCBL1, Lyon, France

⁵ Education and Clinical Officer of the ESCMID Study Group for Non-traditional Antibacterial Therapy (ESGNTA)

Springer 2023 In press

Bacteriophage Therapy: From Lab to Clinical Practice
Joana Azeredo and Sanna Sillankorva (eds.)

Phages have anti-biofilm activity

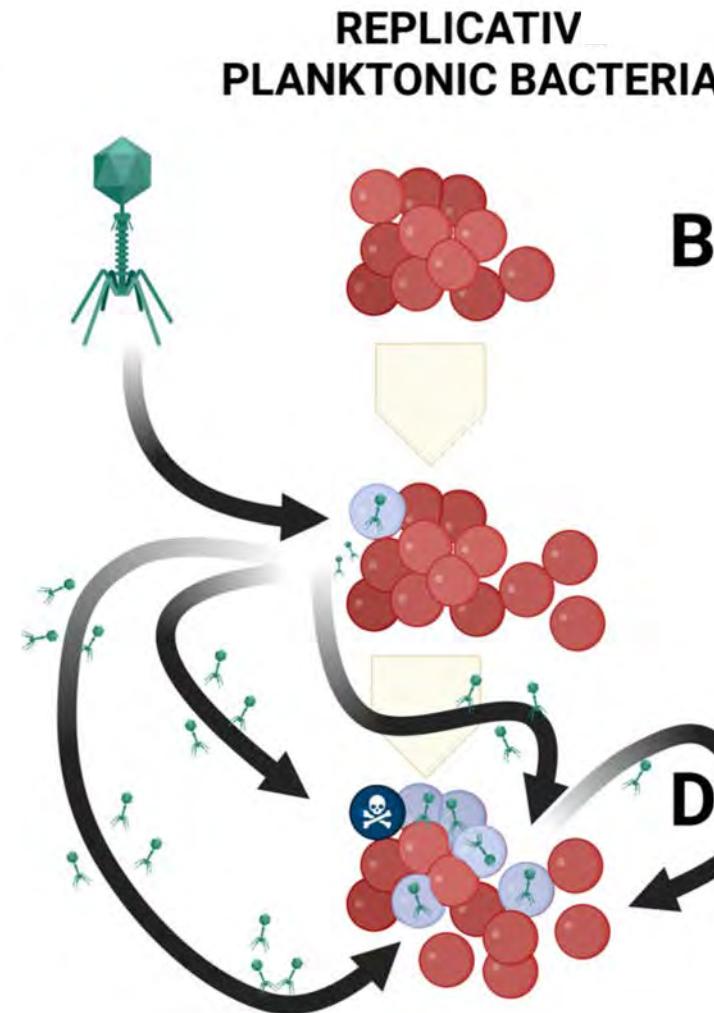


World Health Organization

**Non-Traditional
Antibacterial
therapy**

ESGNTA
European Society of Clinical Microbiology and Infectious Diseases

ESCMID STUDY GROUP
FOR NON-TRADITIONAL
ANTIBACTERIAL THERAPY



FONDATION
HCL
HOSPICES CIVILS
DE LYON

PHAGEinLYON
Clinic

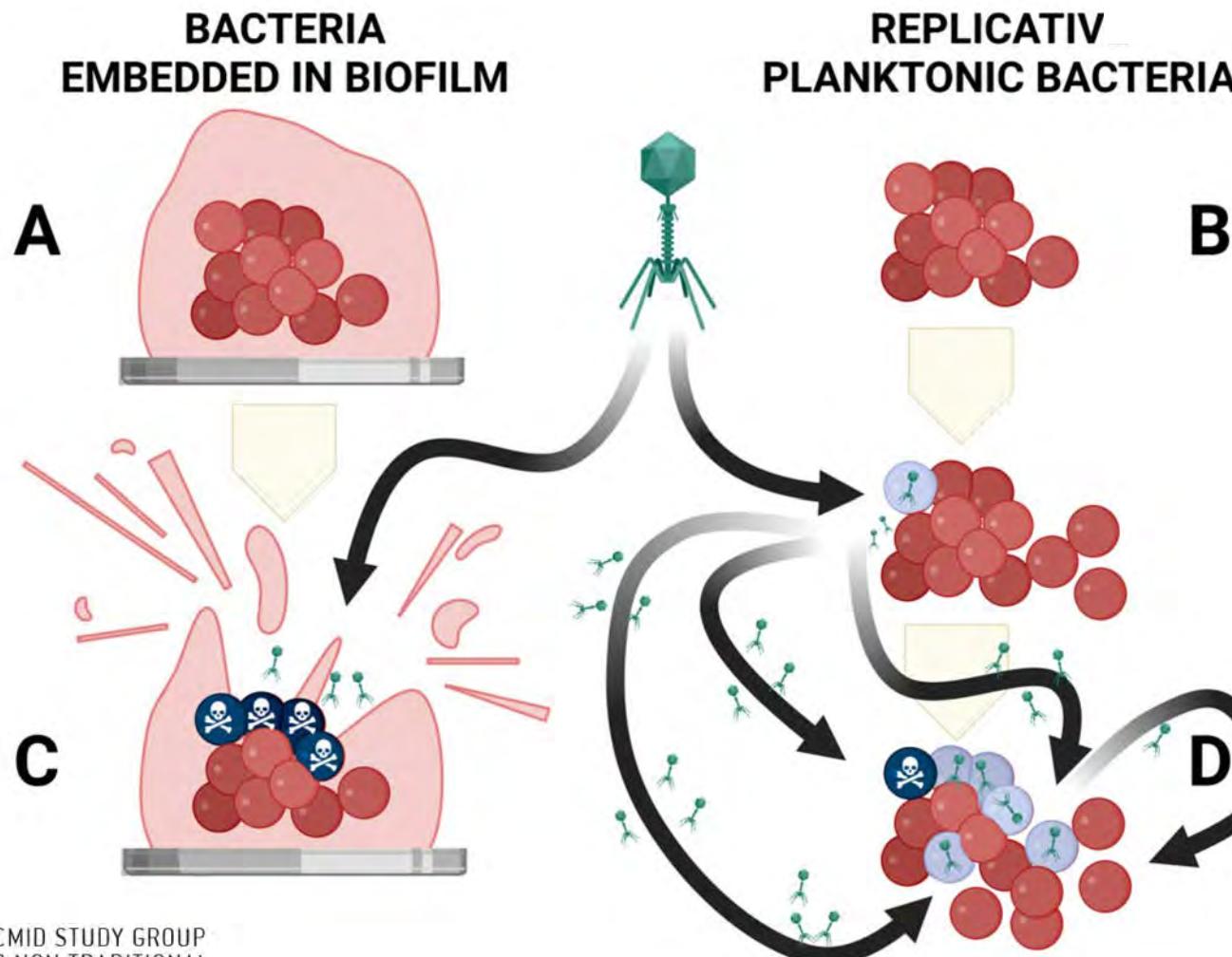
T. Ferry. Springer 2023 In press

Phages have anti-biofilm activity



World Health Organization

**Non-Traditional
Antibacterial
therapy**



PHAGEinLYON
Clinic

 **ESGNTA**
European Society of Clinical Microbiology and Infectious Diseases

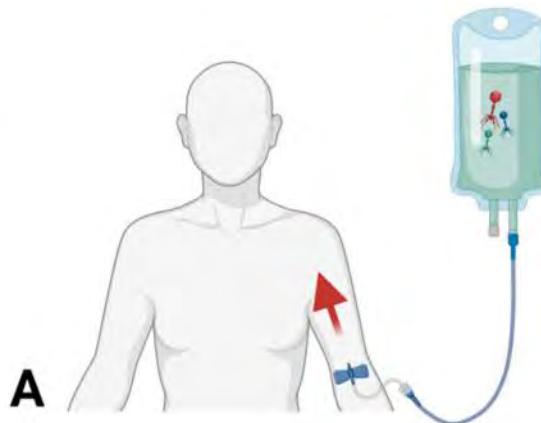
ESCMID STUDY GROUP
FOR NON-TRADITIONAL
ANTIBACTERIAL THERAPY

T. Ferry. Springer 2023 In press

What are “conventional” ways of administration to treat bone and joint infections

CONVENTIONAL ADMINISTRATIONS

SYSTEMIC

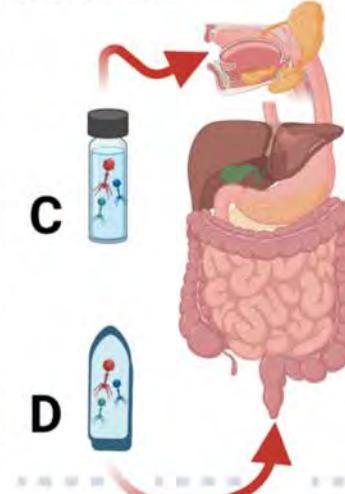


LOCAL



E

HISTORICAL



C

D

G



Intra articular injection(s) of active bacteriophages as adjuvant therapy in patients with PJI
qualified for open or arthroscopic DAIR followed by suppressive antimicrobial therapy (SAT):
the PHAGEinLYON experience at the CRIODC Lyon referral center



Tristan Ferry, Thomas Briot, Camille Kolenda, Clément Javaux, Gilles Leboucher,
Fabien Craighero, Sébastien Lustig, Frederic Laurent, Cecile Batailler

tristan.ferry@univ-lyon1.fr

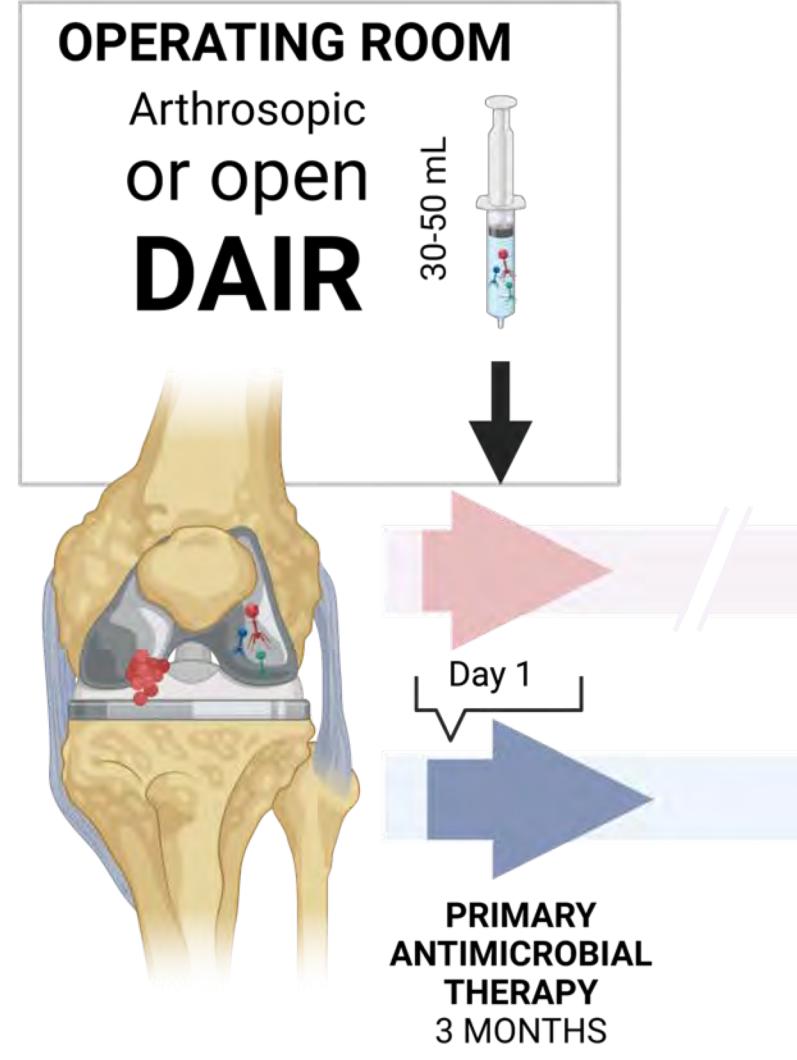
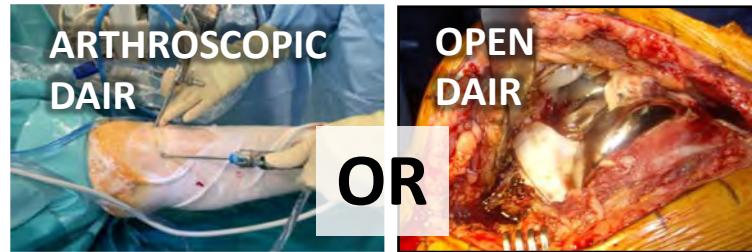
   @FerryLyon 

Infectious and Tropical Diseases Unit, Croix-Rousse Hospital, Hospices Civils de Lyon, Claude Bernard Lyon1 University, Lyon
Centre International de Recherche en Infectiologie, CIRI, Inserm U1111, CNRS UMR5308, ENS de Lyon, UCBL1, Lyon, France

Clinical officer ESCMID Study group for Non-Traditional Antibacterial therapy (ESGNTA)

Referral center for the management of complex bone and joint infections (CRIODC Lyon)





#PhagoDAIR procedure



PHAGE **in** LYON
Clinic



PhagoDAIR I

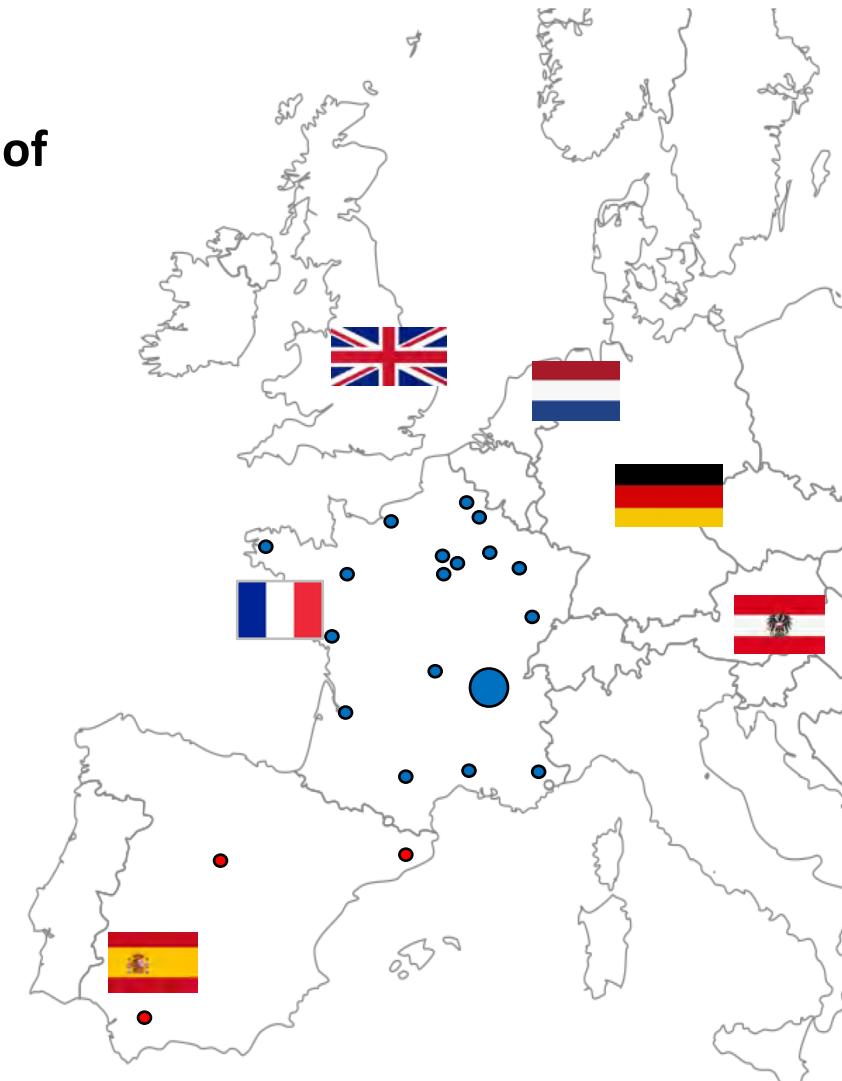
A Pilot, Multicenter, Randomized, Non-Comparative, Double-Blind Study of
Phage Therapy in Patients with Hip or Knee PJI due to *S. aureus*
Treated with DAIR and Antibiotic Therapy

Inclusion Criteria

1. *S. aureus* monomicrobial knee or hip PJI with clinical signs of infection with indication of DAIR and **Suppressive Antibiotics Therapy (SAT)**.
2. Phagogram displaying the susceptibility of the strain to at least one of the anti-*Staphylococcus aureus* bacteriophages

Primary Objective

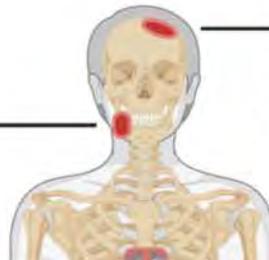
To estimate the **rate of clinical control of infection at Week 12±2** which will allow to calculate the sample size for future comparative studies.



PHAXIAM
Ex-
 **PHEREKYDES**
PHARMA



Mandibular
osteomyelitis
(w/o implant)



Post-operative
skull bone
infection
(w/o implant)



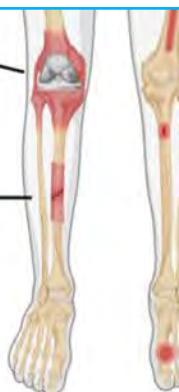
elitis



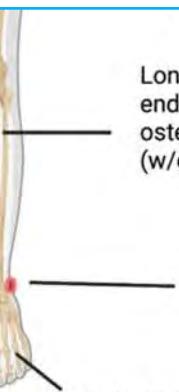
Prosthetic-joint infection
(w/o loosening)



Long bone
septic non-union
(w/o implant)



Long bone focal
endomedullary
osteomyelitis
(w/o implant)



focal cortical
osteomyelitis
(w/o implant)
(w/o bone exposition)

Diabetic foot infection



Unpublished clinical cases

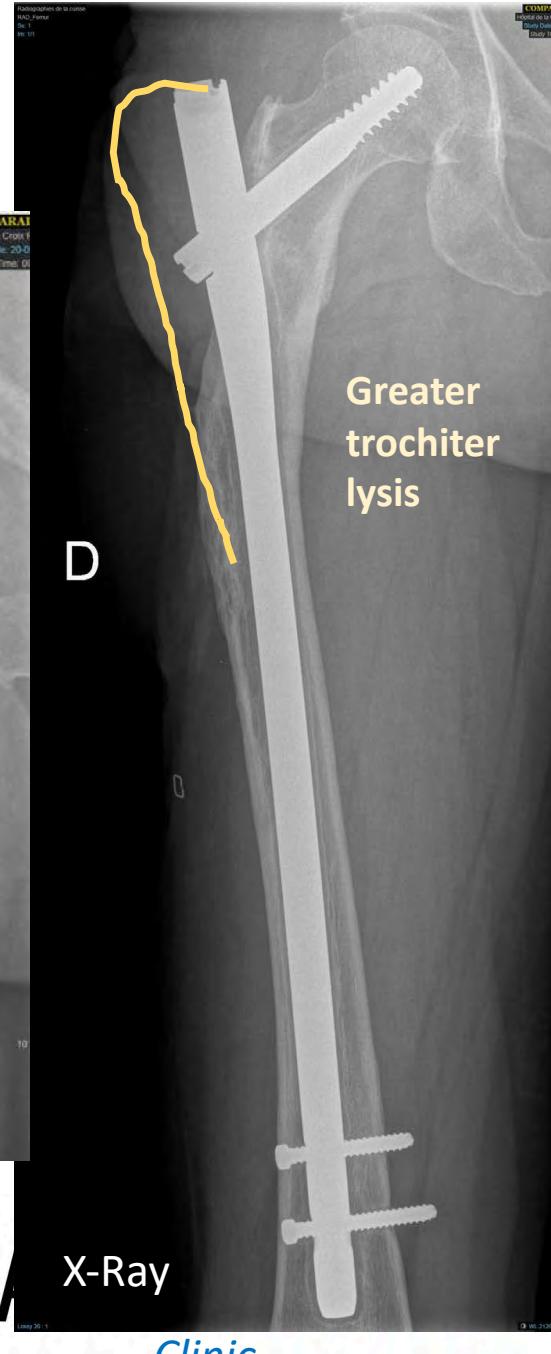
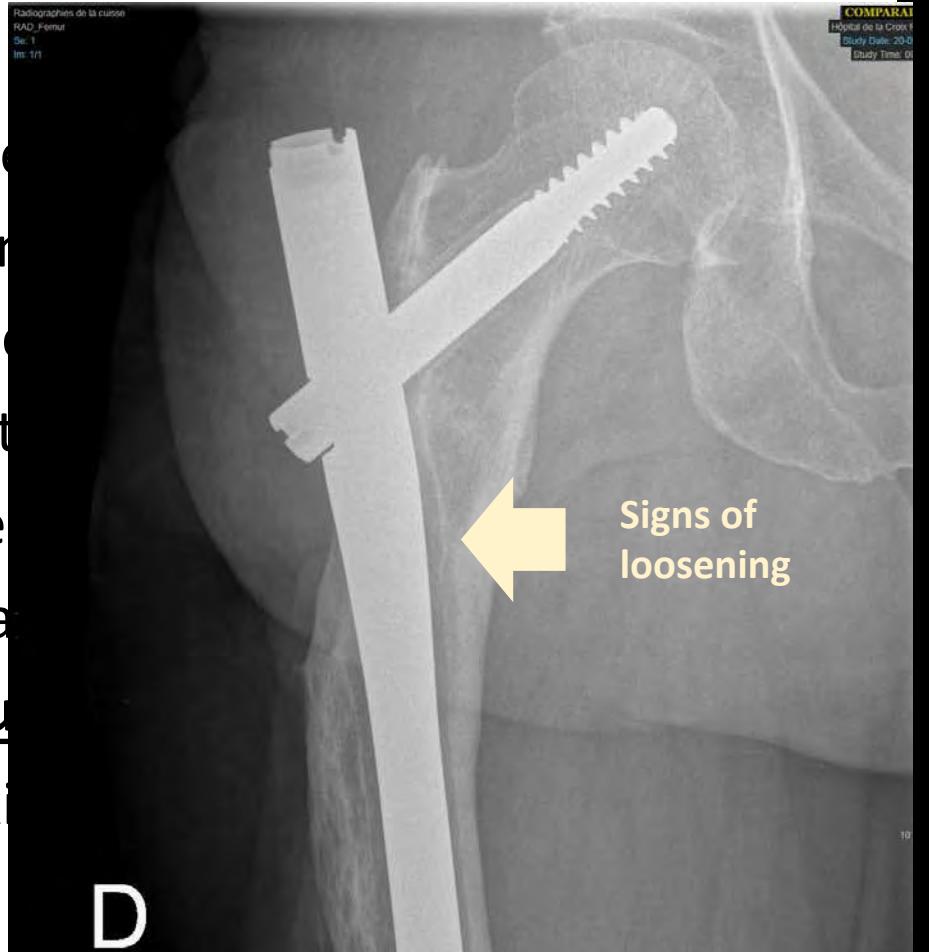
Clinical case #1:
Relapsing implant-associated infection with abscesses

Clinical case #2:
Relapsing long-bone pendiaphysitis

Clinical case #1

Clinical case #1

62-year-old man with a history of Leiomysoma, Radiotherapy, Fracture, Osteosynthesis, 2-stage surgery, Recovery, Prosthetic joint replacement.



Clinical case #1

62-year-old woman

Leiomyosarcoma

Radiotherapy

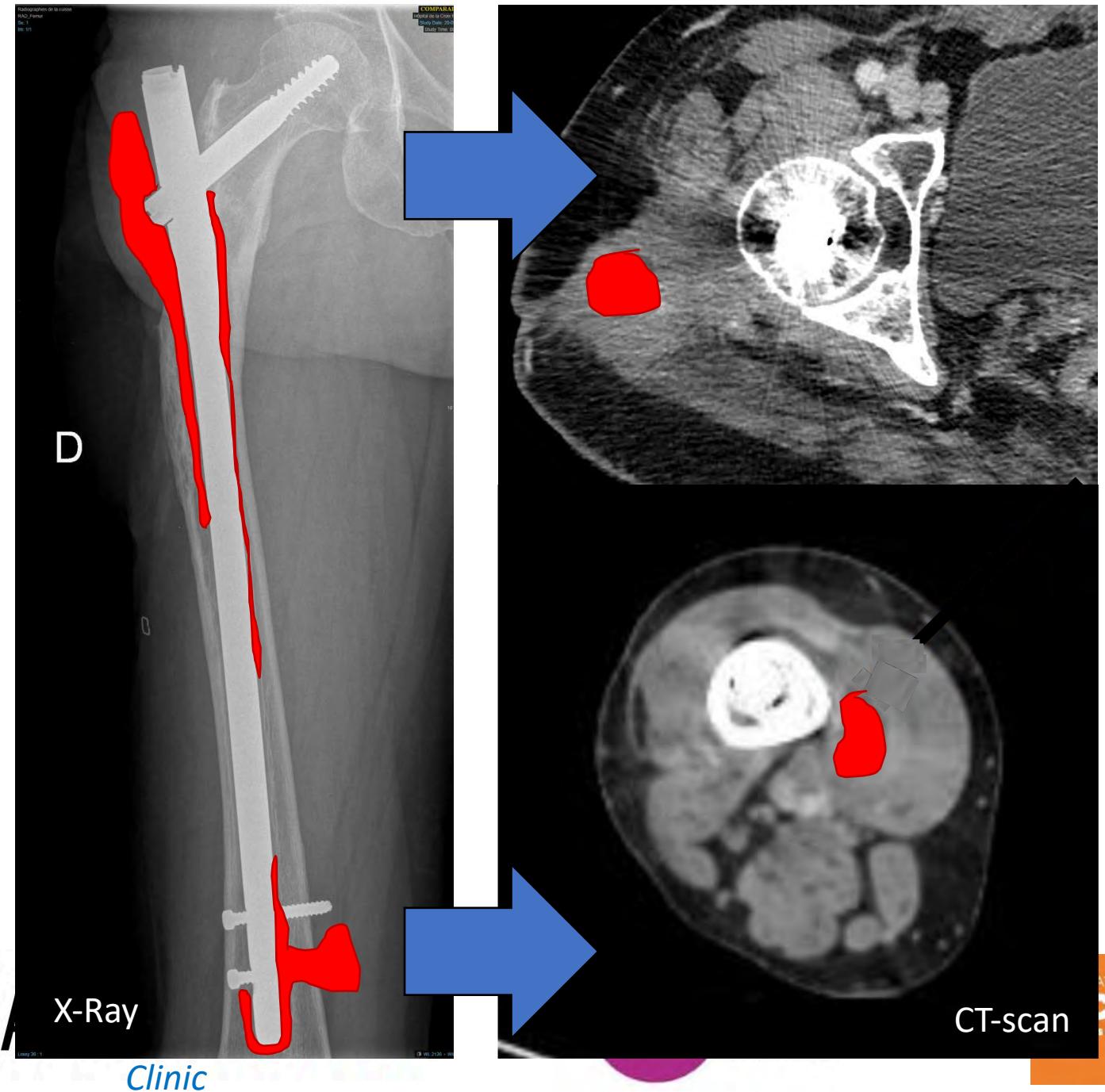
Fracture

Osteosynthesis, soft tissue flap

2-stage exchange of a nail

Recurrent *S. aureus* infection

Proximal and distal abscesses



Clinical case #1

Questions from the MODERATORS

What is the standard of care?

- 1- Surgery with nail explantation, debridement, ATBx
- 2- Surgery with 1-stage nail exchange, debridement, ATBx
- 3- No surgery, ATBx including suppressive ATBx
- 4- No surgery, Phage therapy in combination with ATBx



Clinical case #1

Answer

What is the standard of care?

- 1- Surgery with nail explantation, debridement, ATBx
- 2- Surgery with 1-stage nail exchange, debridement, ATBx
- 3- No surgery, ATBx including suppressive ATBx
- 4- No surgery, Phage therapy in combination with ATBx



Clinical case #1

Answer

What is the standard of care?

- 1- **Surgery with nail explantation, debridement, ATBx**
- 2- **Surgery with 1-stage nail exchange, debridement, ATBx**
- 3- **No surgery, ATBx including suppressive ATBx**
- 4- **No surgery, Phage therapy in combination with ATBx**



Clinical case #1

Questions from the
MODERATORS

What would you do if you imagine phage therapy?

- 1- **Single** active phage **IV** during several weeks
- 2- **Cocktail** of active phages **IV** during several weeks
- 3- **IV** way of administration during ≥ 1 week
- 4- **locally during surgery** (1 shot)
- 4- **locally under sonography** (≥ 1 shot)
- 5- Combination with primary **ATBx**
- 6- Followed by **suppressive antimicrobial therapy** if the outcome is favorable

Multiple
Choice
Question



PHAGE *in* LYON
Clinic

ciri
Centre International de Recherche en Infectiologie

FONDATION
HCL
Hôpices Civils
de Lyon

Clinical case #1

Questions from the MODERATORS

What would you do if you imagine phage therapy?

- 1- **Single** active phage **IV** during several weeks
- 2- **Cocktail** of active phages **IV** during several weeks
- 3- **IV** way of administration during surgery
- 4- **locally during surgery** (1 shot)
- 4- **locally under sonography** (2 shots)
- 5- Combination with primary **ATBx**
- 6- Followed by **suppressive antimicrobial therapy** if the outcome is favorable

No good answer

Area of uncertainties

Experienced-based approach

Multiple
Choice
Question

Answer

Clinical case #1

What would you do if you imagine phage therapy?

- 1- **Single** active phage **IV** during several weeks
- 2- **Cocktail** of active phages **IV** during several weeks
- 3- **IV** way of administration during ≥ 1 week
- 4- **locally during surgery** (1 shot)
- 4- **locally under sonography** (≥ 1 shot)
- 5- Combination with primary **ATBx**
- 6- Followed by **suppressive antimicrobial therapy** if the outcome is favorable

Multiple
Choice
Question



Answer

Clinical case #1

What would you do if you imagine phage therapy?

- 1- **Single** active phage **IV** during several weeks
- 2- **Cocktail** of active phages **IV** during several weeks
- 3- **IV** way of administration during ≥ 1 week
- 4- **locally during surgery** (1 shot)
- 4- **locally under sonography (≥ 1 shot)**
- 5- **Combination with primary ATBx**
- 6- **Followed by suppressive antimicrobial therapy if the outcome is favorable**

Multiple
Choice
Question



PHAGE *in* LYON
Clinic

ciri
Centre International de Recherche en Infectiologie

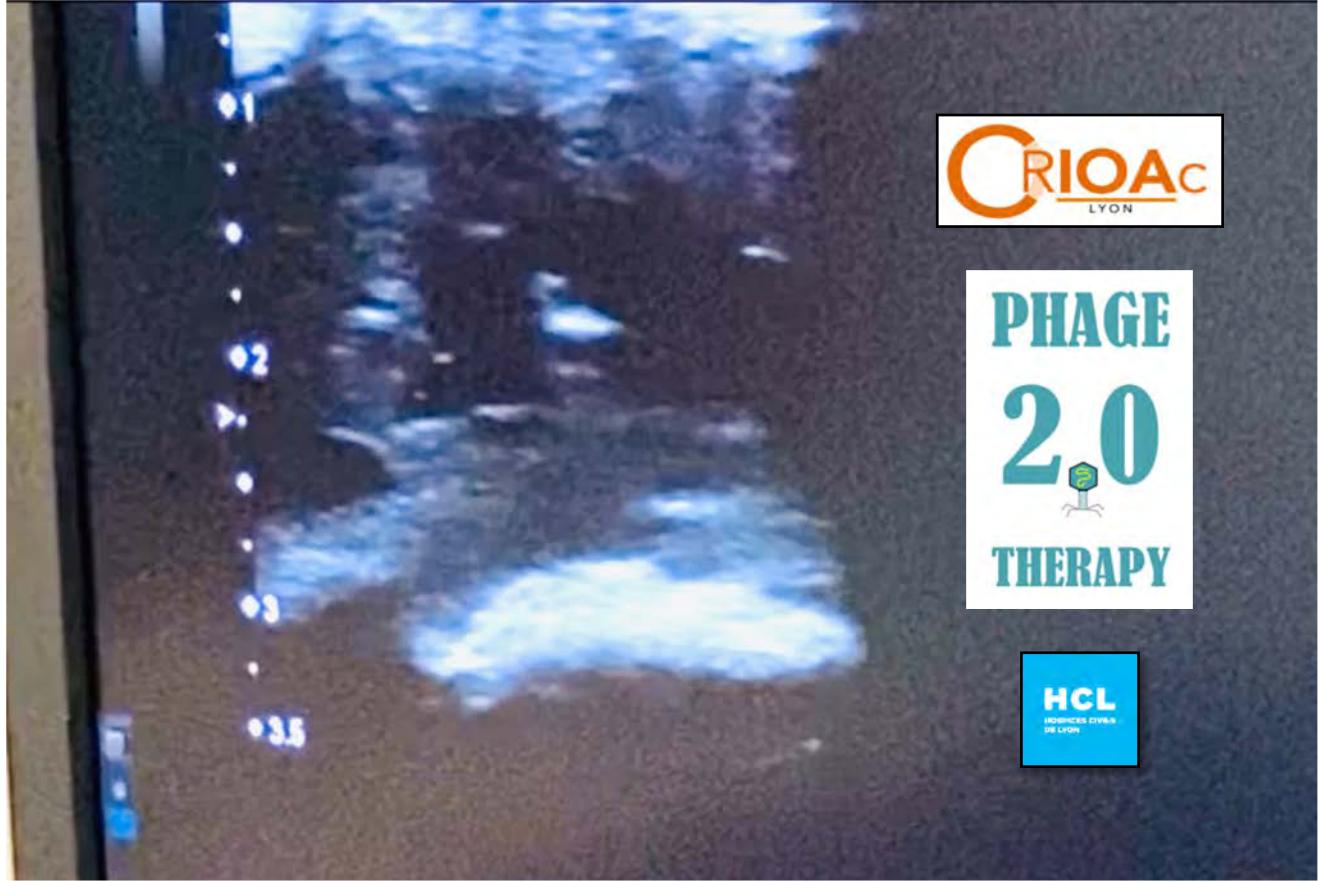
FONDATION
HCL
HOSPICES CIVILS
DE LYON

Clinical case #1

No surgery

Personalized phage cocktail

One shot phage injection in each abscess (proximal and distal)



Highly purified phage cocktail 10^9 phages/mL
PP1493, PP1815, PP1957

 **PHERE CYDES**
PHARMA
PHAXIAM

  **PHAGEinLYON**
 **Clinic**  **Centre International de Recherche en Infectiologie**


Clinical case #1

No surgery

Personalized phage cocktail

One shot phage injection

Primary ATBX (3 months) then suppressive antimicrobial therapy (cephalexin)

Favorable outcome at 24 months



Clinical case

No surgery

Personalized phage cocktail

One shot phage injection

Primary ATBX (3 months) then suppressive antimicrobial therapy (cephalexin)

Favorable outcome at 24 months



*“I acknowledge so much Pr. Ferry
and the PHAGE^{Clinic}_{inLYON} team, thanks
to them, I save precious time!”*

Clinical case #2

Clinical case #2

44-year-old active woman

Past history of transfemoral amputation due to tibial sarcoma

Complication with *S. aureus* post-operative distal femur infection, treated with surgical debridement and antibiotics

Relapse with proximal and distal fistula associated with small discharge for many years, with limited functionnal impact



Clinical case #2

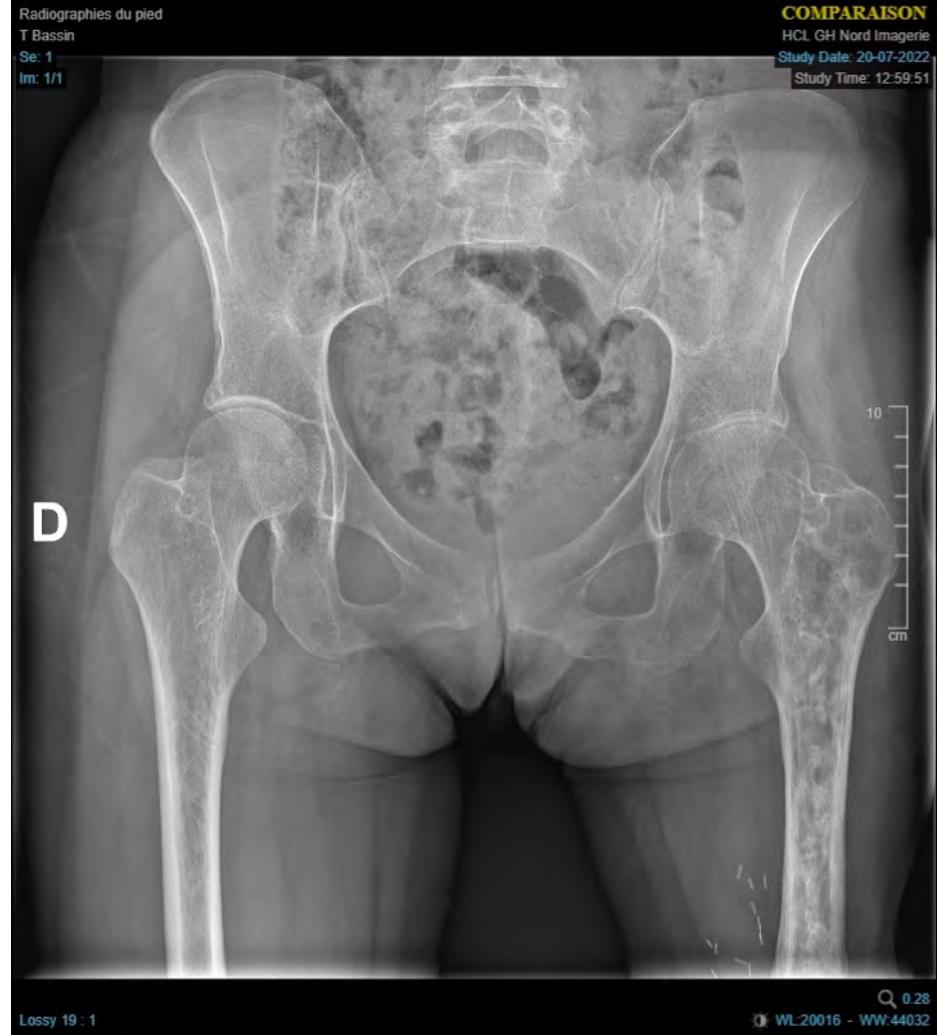
44-year-old active woman

Past history of transfemoral amputation due to tibial sarcoma

Complication with *S. aureus* post-operative distal femur infection, treated with surgical debridement and antibiotics

Relapse with proximal and distal fistula associated with small discharge for many years, with limited functionnal impact

Fear of the patient to loss any function



Clinical case #2

Questions from the
MODERATORS

What is your diagnosis?

- 1- Chronic distal focal femoral osteomyelitis
- 2- Chronic proximal focal osteomyelitis
- 3- Chronic pandiaphysitis



Clinical case #2

Answer

What is your diagnosis?

- 1- Chronic distal focal femoral osteomyelitis
- 2- Chronic proximal focal osteomyelitis
- 3- Chronic pandiaphysitis**



PHAGE*in***LYON**
Clinic



Clinical case #2

Questions from the
MODERATORS

What are the treatment options?

- 1- No surgery and no ATBx
- 2- Puncture and ATBx, including suppressive ATBx
- 3- Surgery with intramedullar debridement, shortening of the femur and ATBx, without suppressive ATBx
- 4- Surgery with intramedullar debridement, shortening of the femur and ATBx, followed by suppressive ATBx
- 5- Puncture, phage therapy and ATBx including suppressive ATBx
- 6- Puncture, surgery with intramedullar debridement, phage therapy and ATBx including suppressive ATBx



Clinical case #2

Questions from the
MODERATORS

What are the treatment options?

- 1- No surgery and no ATBx
- 2- Puncture and ATBx, including suppressive ATBx
- 3- Surgery with intramedullar debridement and ATBx, without suppressive ATBx
- 4- Surgery with intramedullar debridement and ATBx, followed by suppressive ATBx
- 5- Puncture, phage therapy and ATBx including suppressive ATBx
- 6- Puncture, surgery with intramedullar debridement, phage therapy and ATBx including suppressive ATBx

No good answer
Area of uncertainties
Experienced-based approach

Clinical case #2

Questions from the MODERATORS

What would you do if you imagine phage therapy?

- 1- Single active phage
- 2- Cocktail of active phages
- 3- IV administrations during ≥ 1 week
- 4- Phage(s) injected locally under CT-scan or sonography (≥ 1 shot)
- 4- Phage(s) injected locally during surgery (1-shot) especially just after the intramedullar debridement
- 5- Phage(s) injected locally after surgery (≥ 1 shot) using an intramedullar catheter put in place after intramedullar debridement

Multiple
Choice
Question



Clinical case #2

Questions from the MODERATORS

What would you do if you imagine phage therapy?

- 1- Single active phage
- 2- Cocktail of active phages
- 3- IV administrations during \geq 1 week
- 4- Phage(s) injected locally under the skin
- 4- Phage(s) injected locally during the intramedullar debridement
- 5- Phage(s) injected locally after surgery (≥ 1 shot) using an intramedullar catheter put in place after intramedullar debridement

No good answer
Area of uncertainties
Experienced-based approach

Multiple
Choice
Question

Clinical case #2

Answer

What are the treatment options?

- 1- No surgery and no ATBx
- 2- Puncture and ATBx, including suppressive ATBx
- 3- Surgery with intramedullar debridement, shortening of the femur and ATBx, without suppressive ATBx
- 4- Surgery with intramedullar debridement, shortening of the femur and ATBx, followed by suppressive ATBx
- 5- Puncture, phage therapy and ATBx including suppressive ATBx
- 6- Puncture, surgery with intramedullar debridement, phage therapy and ATBx including suppressive ATBx



Clinical case #2

Answer

What are the treatment options?

- 1- No surgery and no ATBx
- 2- Puncture and ATBx, including suppressive ATBx
- 3- Surgery with intramedullar debridement, shortening of the femur and ATBx, without suppressive ATBx
- 4- Surgery with intramedullar debridement, shortening of the femur and ATBx, followed by suppressive ATBx
- 5- Puncture, phage therapy and ATBx including suppressive ATBx
- 6- Puncture, surgery with intramedullar debridement, phage therapy and ATBx including suppressive ATBx**



Clinical case #2

Answer

What would you do if you imagine phage therapy?

- 1- Single active phage
- 2- Cocktail of active phages
- 3- IV administrations during ≥ 1 week
- 4- Phage(s) injected locally under CT-scan or sonography (≥ 1 shot)
- 4- Phage(s) injected locally during surgery (1-shot) especially just after the intramedullar debridement
- 5- Phage(s) injected locally after surgery (≥ 1 shot) using an intramedullar catheter put in place after intramedullar debridement

Multiple
Choice
Question



PHAGE*in***LYON**
Clinic

ciri
Centre
International
de Recherche
en Infectiologie

FONDATION
HCL
Hôpices Civils
DE LYON

Clinical case #2

Answer

What would you do if you imagine phage therapy?

1- Single active phage



2- Cocktail of active phages

3- IV administrations during ≥ 1 week

4- Phage(s) injected locally under CT-scan or sonography (≥ 1 shot)

4- Phage(s) injected locally during surgery (1-shot) especially just after the intramedullar debridement

5- Phage(s) injected locally after surgery (≥ 1 shot) using an intramedullar catheter put in place after intramedullar debridement

Multiple
Choice
Question



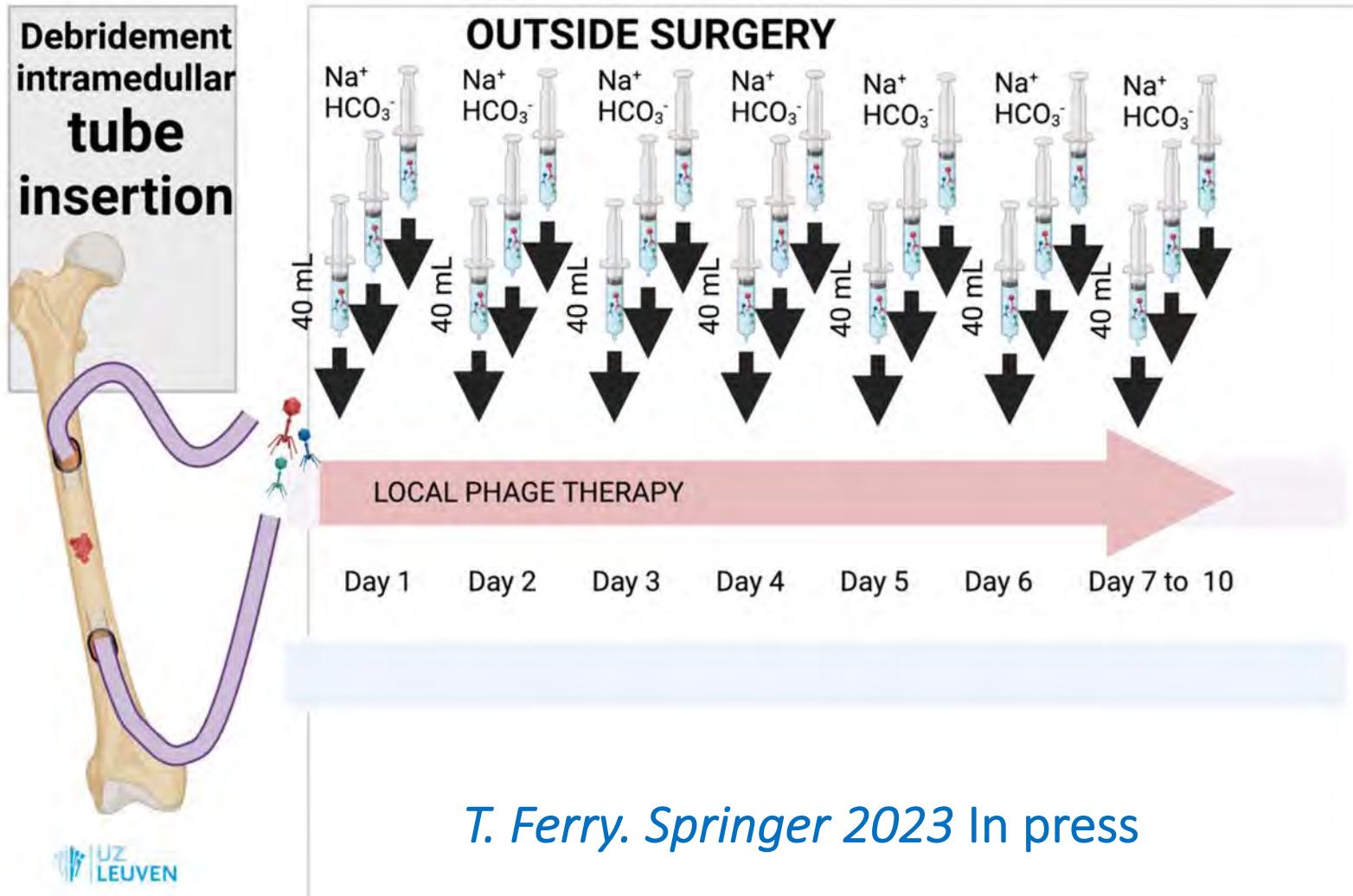
PHAGE *in* LYON
Clinic



Clinical case #2

Experience in Belgium

Onsea et al. Viruses 2019



Clinical case #2

- **Puncture under sonography** of between the fistula and the bone to obtain the strain responsible for infection (no liquid)
- Susceptible *S. aureus* in culture from a swab after local disinfection
- Multidisciplinar discussion
- Strain sent by our microbiologists (C. Kolenda, T. Roussel-Gaillard)
- Highly purified phage cocktail 10^9 phages/mL
- **PP1493, PP1815, PP1957**



Orthopaedic department
CRIODC Lyon, Croix-Rousse Hospital

Pr. S. Lustig

Dr. Axel Schmidt

Me!



Introduce phage therapy
into the operating room

PHAGE *in* LYON
Clinic

CRIODC
LYON



Orthopaedic department
CRIOfac Lyon, Croix-Rousse Hospital

Pr. S. Lustig

Dr. Axel Schmidt

Me!



Intravenous phage therapy
1 injection per day during 7 days

PHAGE *in* LYON
Clinic



Infectious diseases ward



CRIOfac
LYON

Outome

- 3 months of primary ATBx
- Switch to suppressive antimicrobial therapy (clindamycin)
- Fistula closed
- Favorable outcome at 1 year
- Function keeped!

French poem

« The happiness merchant »

Finger crossed!



Lyon BJI Study group



Coordinator: Tristan Ferry

Infectious Diseases Specialists – Tristan Ferry, Florent Valour, Thomas Perpoint, Florence Ader, Sandrine Roux, Agathe Becker, Claire Triffault-Fillit, Anne Conrad, Cécile Pouderoux, Pierre Chauvelot, Paul Chabert, Johanna Lippman, Evelyne Braun

Surgeons – Sébastien Lustig, Elvire Servien, Cécile Batailler, Stanislas Gunst, Axel Schmidt, Elliot Sappey-Marinier, Quentin Ode, Michel-Henry Fessy, Anthony Viste, Jean-Luc Besse, Philippe Chaudier, Lucie Louboutin, Adrien Van Haecke, Marcelle Mercier, Vincent Belgaid, Aram Gazarian, Arnaud Walch, Antoine Bertani, Frédéric Rongieras, Sébastien Martres, Franck Trouillet, Cédric Barrey, Ali Mojallal, Sophie Brosset, Camille Hanriat, Hélène Person, Samuel Prive, Philippe Céruse, Carine Fuchsmann, Arnaud Gleizal;

Anesthesiologists – Frédéric Aubrun, Mikhail Dziadzko, Caroline Macabéo, Dana Patrascu;

Microbiologists – Laetitia Beraud, Tiphaine Roussel-Gaillard, Céline Dupieux, Camille Kolenda, Jérôme Josse;

Imaging – Fabien Craighero, Loic Boussel, Jean-Baptiste Pialat, Isabelle Morelec;

PK/PD specialists – Michel Tod, Marie-Claude Gagnieu, Sylvain Goutelle;

Clinical research assistant and database manager – Eugénie Mabrut

PHAGE *in* LYON Clinic

Acknowledgments to ANSM, Phaxiam, and QAMH!

Coordinator: Tristan Ferry

Tristan Ferry, Myrtille Le Bouar, Gilles Leboucher, Thomas Briot, Camille Kolenda, Tiphaine Roussel-Gaillard, Karine Dallosto



PHAGE*in*LYON Clinic

Acknowledgments to ANSM, Phaxiam, and QAMH!

See you next time!



Clinical Officer

ESGNTA

European Society of Clinical Microbiology and Infectious Diseases

ESCMID STUDY GROUP FOR
NON-TRADITIONAL
ANTIBACTERIAL THERAPY





demande phagothérapie hcl



Images

Videos

News

Books

Maps

Flights

Finance

About 1,570 results (0.40 seconds)



Hospices Civils de Lyon

<https://www.chu-lyon.fr> › phagothe... · Translate this page



Phagothérapie (Bactériophage) | Fiche santé HCL

Jun 27, 2023 — Vous souhaitez **demander** un avis pour un éventuel traitement par bactériophages. Ce traitement exceptionnel est exclusivement envisageable dans ...



GCS Sara

<https://myhcl.sante-ra.fr> › Default · Translate this page



Demande de traitement par bactériophages / phagothérapie

Demande de traitement par bactériophages / phagothérapie - Hôpital de la Croix Rousse ...

Copyright ©HCL 2023 - Tous droits réservés | 5.9.0.1. {1}. ##LOC[OK]##.

Votre espace de suivi personnel et sécurisé aux
Hospices Civils de Lyon

Demande de traitement par bactériophages / phagothérapie - Hôpital de la Croix Rousse

Vous souhaitez demander un avis pour un éventuel traitement par bactériophages.

Ce traitement exceptionnel est exclusivement envisageable dans certaines situations précises où le pronostic fonctionnel ou vital est engagé.

Certains phages peuvent être à disposition, mais ils restent rares et ils ne couvrent malheureusement pas toutes les situations cliniques.

Merci de répondre de façon la plus précise possible aux questions posées dans les pages suivantes et de joindre les documents demandés.

Phagotherapy demande patient
Maladies infectieuses et tropicales (HOP. CROIX-ROUSSE)



ESGNTA

European Society of Clinical Microbiology and Infectious Diseases

ESCMID STUDY GROUP
FOR NON-TRADITIONAL
ANTIBACTERIAL THERAPY

Join us!

Elected Executive Committee:

Ran Nir-Paz, Israël

Jean-Paul Pirnay, Belgium

Clinical officer: Tristan Ferry, France

Shawna Mc Callin, Switzerland

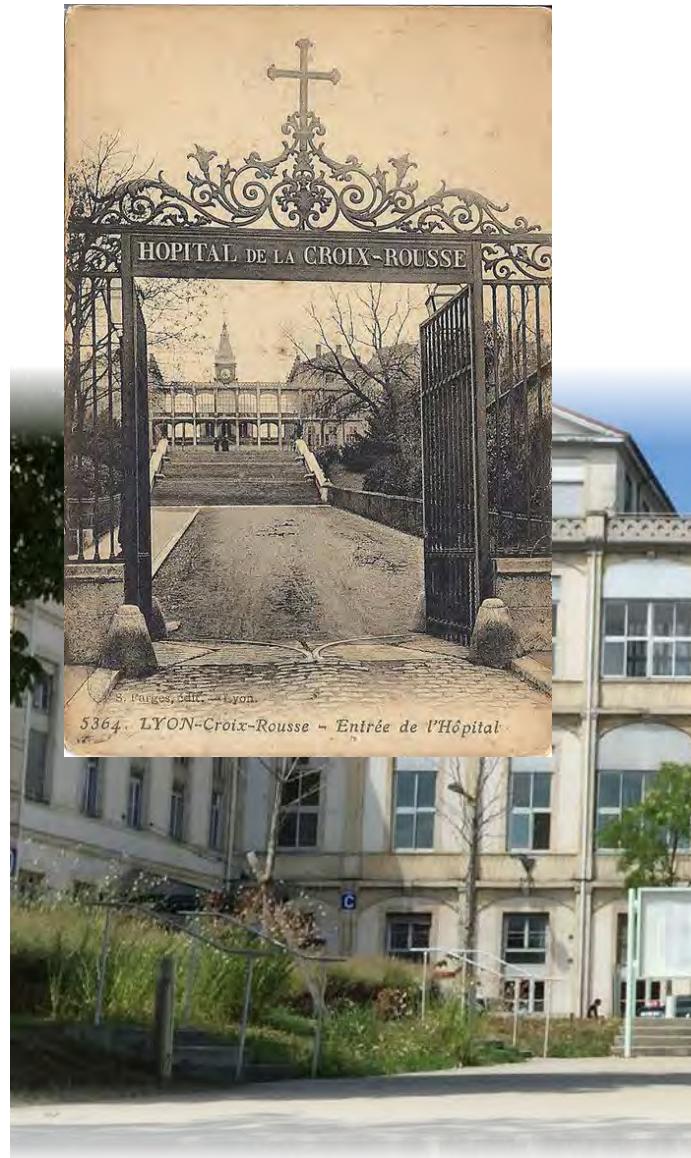
Zuzanna Drulis-kawa, Poland



ESCMID

MANAGING INFECTIONS
PROMOTING SCIENCE

Croix-Rousse Hospital



<https://www.crioac-lyon.fr/>



Lyon BJI
study Crioac LYON group



- Published cases
- Open acces papers
- All thesis in pdf
- All recommendations
- Newsletter



@  Tristan Ferry
@   FerryLyon
@   CrioacLyon

Channel
 **YouTube**
CrioacLyon