AUROBAC THERAPEUTICS

AUROBAC THERAPEUTICS

BioTuesdays

March 7, 2023

AntiMicrobial Resistance (AMR): An Alarming Context

AUROBAC THERAPEUTICS

The rise of antibiotic-resistant infections is a major global threat

AMR is one of the leading public health threats of the 21st century and causes of deaths around the world.
By 2050, it will kill 10 million people a year (far beyond cancer).
The Lancet

1.27M DEATHS ATTRIBUTABLE TO BACTERIAL AMR IN 2019 (1)

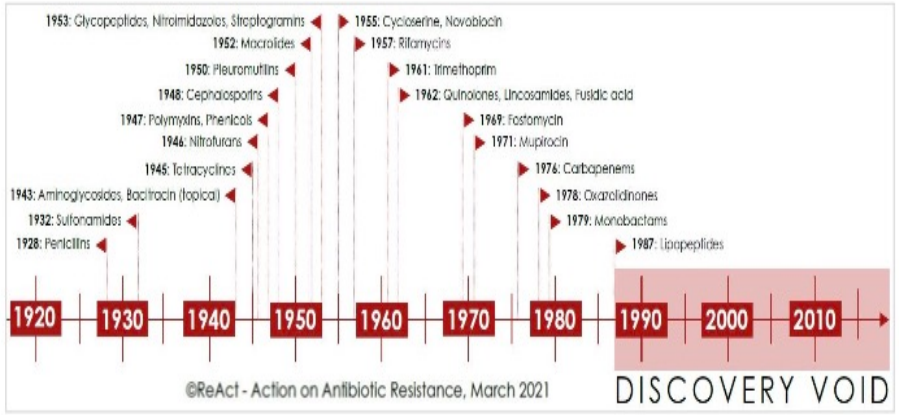
IN EUROPE, >670,000 INFECTIONS 33,000 DEATHS 1.5 BILLION €/YR

$100 TRILLION POTENTIAL LOSS FOR WORLD PRODUCTION

(1) Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

Global pharmaceutical companies have de-prioritized this therapeutic area in their strategy and product portfolios

Very little innovation in the field: in the last 20 years,
only 5 antibacterial drugs with a new mechanism of action have been launched



We must act now and structure the sector by developing innovations, ensuring its sovereignty and preparing for the consequences of possible future pandemics

Clearly Identified Market Failures in the AMR Space

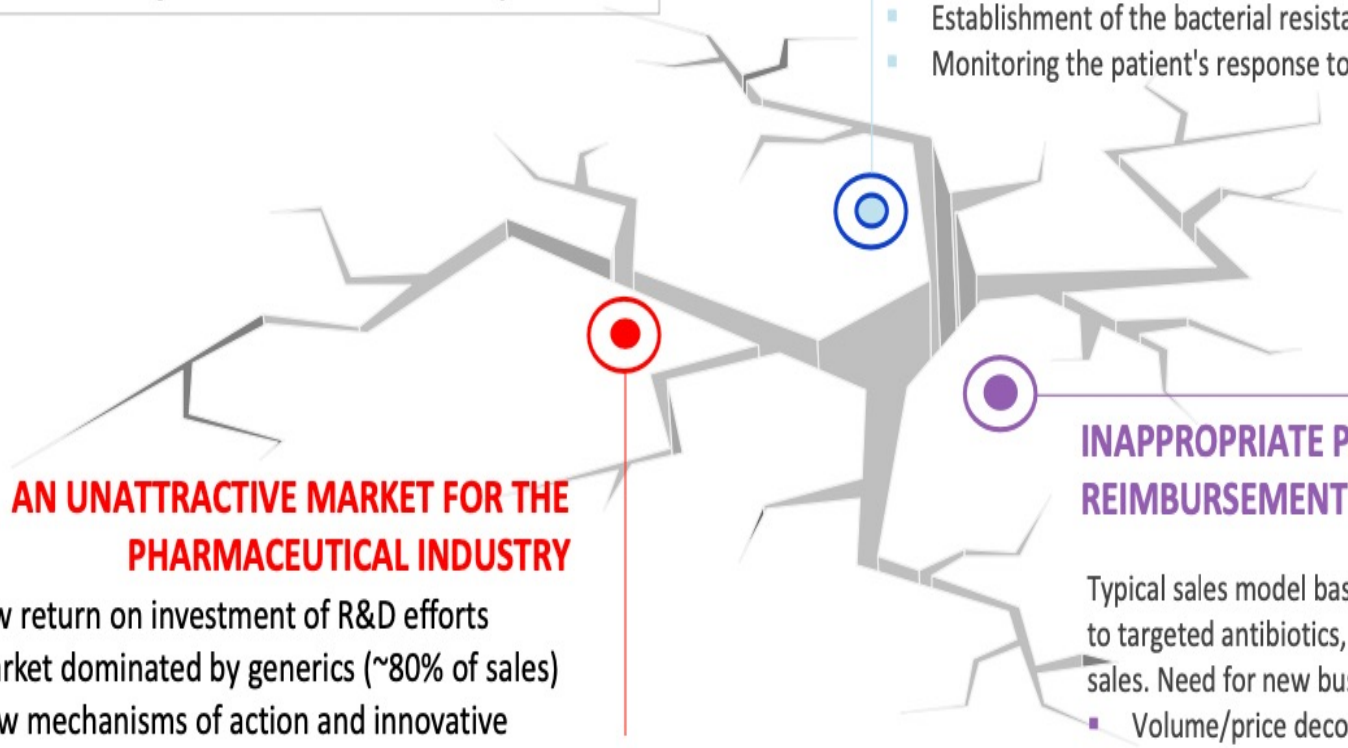
AUROBAC THERAPEUTICS

Global Antibiotics Market 2020: $ 41 billion (CAGR of 4% expected over 2021-2028)*

UNRECOGNIZED VALUE OF DIAGNOSIS

Diagnostics help reduce antibiotic resistance and save money throughout the patient journey:

- Appropriate prescription of antibiotics
- Determination of the nature of the infectious agent (bacterium vs. virus)
- Identification of the bacteria
- Establishment of the bacterial resistance profile
- Monitoring the patient's response to treatment



AN UNATTRACTIVE MARKET FOR THE PHARMACEUTICAL INDUSTRY

- Low return on investment of R&D efforts
- Market dominated by generics (~80% of sales)
- New mechanisms of action and innovative compounds: positioned as therapies of last resort
- Antibiotic treatment duration is short and price very low compared to chronic diseases

INAPPROPRIATE PRICING & REIMBURSEMENT MODELS

Typical sales model based on 'volume/price' is not adapted to targeted antibiotics, leading to a significant reduction in sales. Need for new business models:

- Volume/price decoupling ('subscription model')
- Pull' (marketing incentive)
- 'Push' (innovation incentive) incentives

** Antibiotic Market size, Growth and Trend report 2021-28 / Grand View Research*

The AMR Innovation Landscape is Broken

AUROBAC THERAPEUTICS

Why Has Innovation Stalled?

The broken business model is scaring off investors

Pricing is low

Pricing policy compares new drugs with old & cheap generic drugs

Volume of sales is low

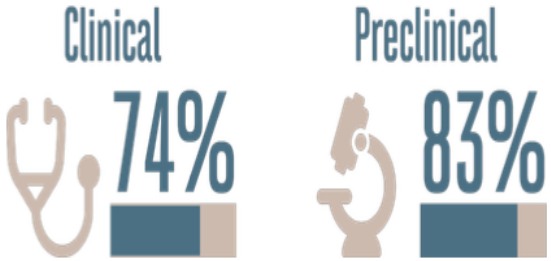
New products are kept in reserve to limit the rise of resistance

R&D costs are inevitably higher than the return on investment

Melinta, Achaogen, Tetraphase and **Nabriva** filed for bankruptcy after having bringing a new antibiotic to market in the last 5 years...

Why SMEs are Key Players?

SMEs hold 80% of AMR product portfolio*



50 out of 68 clinical products

241 out of 292 preclinical products

A whole ecosystem of SMEs focusing on AMR is about to collapse

*: 2020 WHO report on antibacterial pipeline https://www.who.int/publications/i/item/9789240021303

AMR: A Global Emergency Recognized at the Global Scale (WHO, CDC, G20, …)…

AUROBAC THERAPEUTICS

Analysis of the Clinical Pipeline of Treatments for Drug-Resistant Bacterial Infections: Despite Progress, More Action Is Needed

Formidable challenges that we believe remain that still need further attention are as follows:

- Difficulty in discovering novel antibacterial leads with selective activity against MDR bacteria that are nontoxic and have suitable pharmacokinetic and pharmacodynamic properties, especially with new modes of action
- Current unmet medical need for new drugs to treat drug-resistant *A. baumannii* (e.g. CRAB) and *P. aeruginosa* (e.g. CRPA) infections
- Development of antibacterial agents for use in neonates and children
- Development of efficient progression pathways for nontraditional antibacterial candidates through the manufacturing, clinical trials, and approval processes
- Difficulties in optimal trial design and selection of relevant intended target population
- Sustained advocacy for strong and sustainable political support and governmental commitments to promote R&D and help developers overcome economic, scientific, and technical barriers
- Implementation of business models that improve the current market dynamics with a focus on developing and securing approval of truly innovative and clinically differentiated antibacterial treatments

AMERICAN SOCIETY FOR MICROBIOLOGY | Antimicrobial Agents and Chemotherapy®

Mark S. Butler,[a-b] Valeria Gigante,[c] Hatim Sati,[c] Sarah Paulin,[c] Laila Al-Sulaiman,[c] John H. Rex,[d-e] Prabhavathi Fernandes,[f-g] Cesar A. Arias,[h-i] Mical Paul,[j-k] Guy E. Thwaites,[l-m] Lloyd Czaplewski,[n] Richard A. Alm,[o] Christian Lienhardt,[p] Melvin Spigelman,[q] Lynn L. Silver,[r] Norio Ohmagari,[s] Roman Kozlov,[t] Stephan Harbarth,[u-v] Peter Beyer[c]

… And Monitored Closely:

Bacterial Priority Pathogen List

AUROBAC THERAPEUTICS

(mostly bacterial) Priority Pathogen Lists	WHO (2017)	Indian[1] (2021)	CDC (2019)	CDC (2013)	ESKAPE (2008-9)
Acinetobacter baumannii, carbapenem-R	Critical	Critical	Urgent (carbapenem-R)	Serious (MDR)	Yes
Pseudomonas aeruginosa, carbapenem-R	Critical	Critical	Serious (MDR)	Serious (MDR)	Yes
Enterobacteriaceae, carbapenem-R, 3rd-gen ceph-R (ESBL+)	Critical	Critical	Urgent (carbapenem-R) Serious (ESBL+)	Urgent (carbapenem-R) Serious (ESBL+)	Yes
Enterococcus faecium, vancomycin-R	High	High	Serious (VRE)	Serious (VRE)	Yes
Staphylococcus aureus, methicillin-R, vancomycin-I/R	High	High	Serious (MRSA)	Serious (MRSA) Concerning (VRSA)	Yes
Helicobacter pylori, clarithromycin-R	High				
Campylobacter spp., fluoroquinolone-R	High		Serious (drug-R)	Serious (drug-R)	
Salmonellae spp., fluoroquinolone-R	High	High (drug-R)	Serious (drug-R, Typhi & non-typhoidal)	Serious (drug-R)	
Neisseria gonorrhoeae, 3rd-gen ceph-R, fluoroquinolone-R	High		Urgent (drug-R)	Urgent (drug-R)	
Neisseria meningitidis, 3rd-gen ceph-R, fluoroquinolone-R		Medium			
Streptococcus pneumoniae, penicillin-NS	Medium	Medium	Serious (drug-R)	Serious (drug-R)	
Haemophilus influenzae, ampicillin-R	Medium	Medium			
Shigella spp., fluoroquinolone-R	Medium	Medium	Serious (drug-R)	Serious	
Staphylococcus, coagulase-neg, Van/Lzd-R		Medium			
Clostridium difficile			Urgent	Urgent	
Candida spp. fluconazole-R			Urgent (C. auris) Serious (Drug-resistant)	Serious (Flu-R)	
M. tuberculosis	Separate[2]		Serious (drug-R)	Serious (drug-R)	
Group A *Streptococcus*			Concerning (erythro-R)	Concerning (erythro-R)	
Group B *Streptococcus*			Concerning (clinda-R)	Concerning (clinda-R)	
Aspergillus fumigatus			Watch (azole-R)		
Mycoplasma genitalium			Watch (drug-R)		
Bordetella pertussis			Watch (drug-R)		

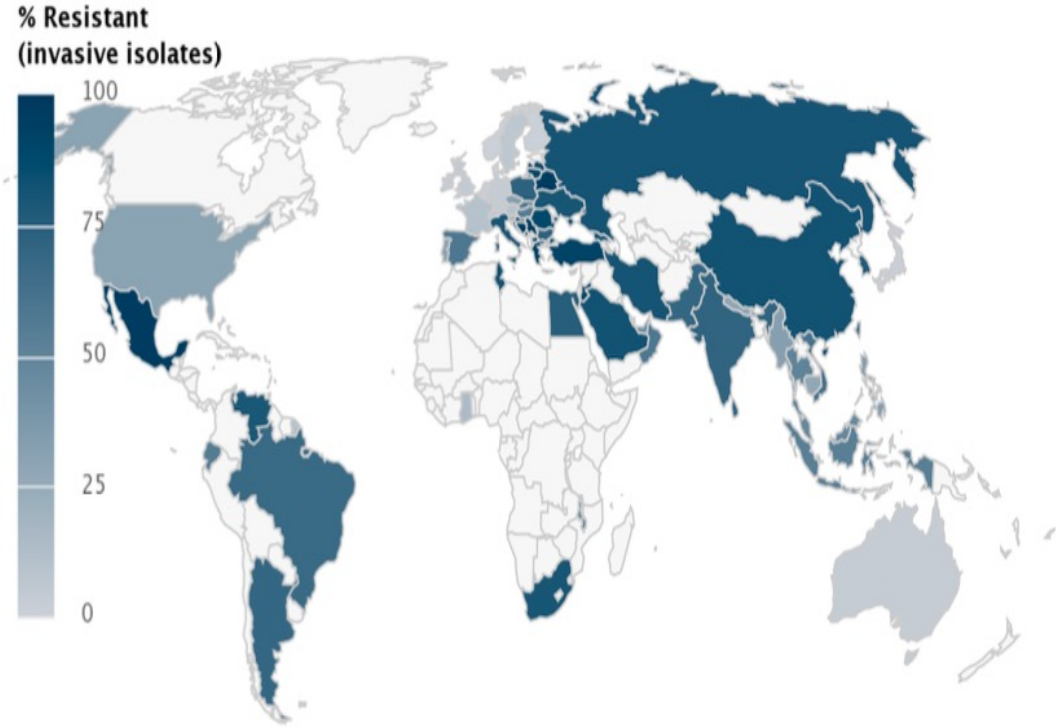
1. The Indian PPL sometimes differs slightly from WHO in terms of precise patterns of qualifying R.
2. TB is flagged in a standalone section as being a global priority for R&D.

Carbapenem-Resistant *Acinetobacter*: A Threat in Healthcare

AUROBAC THERAPEUTICS

- Labelled as an **Urgent Threat** by the WHO, Carbapenem-resistant *Acinetobacter* cause pneumonia and wound, bloodstream, and urinary tract infections. **These infections tend to occur in patients in intensive care units**
- Acinetobacter is a challenging threat to hospitalized patients because it **frequently contaminates healthcare facility surfaces and shared medical equipment**
- Some Acinetobacter are **resistant to nearly all antibiotics** and few new drugs are in development

Resistance of *Acinetobacter baumannii* to Carbapenems



ResistanceMap

OneHealthTrust. ResistanceMap: Antibiotic resistance. 2023. https://resistancemap.onehealthtrust.org/AntibioticResistance.php

In Response to This Context: Creation of AUROBAC THERAPEUTICS

AUROBAC THERAPEUTICS

Boehringer Ingelheim + evotec + BIOMÉRIEUX

AUROBAC THERAPEUTICS

Biopharmaceutical company founded **in 2022** as a Joint Venture by Boehringer Ingelheim, Evotec and bioMérieux, to create the **next generation of products to fight Antimicrobial Resistance (AMR)**

40M€ made available to the JV by the founders at the end of 2023

+ 40M€ committed for the acceleration phase after 2025

> 100 FTEs, including 85% high-level scientific staff within 5 years

Ambition to become a **global leader in the fight against AMR** over the next 10 years

AUROBAC THERAPEUTICS Strategic Plan

Build a **product pipeline with in-licensing or co-development opportunities** from any source (academics, biotechs, pharmaceutical companies)

Focus efforts on innovation addressing **clear unmet medical needs associated to increasing AMR**, aligned with viable clinical development plans **based on precision medicine concept**

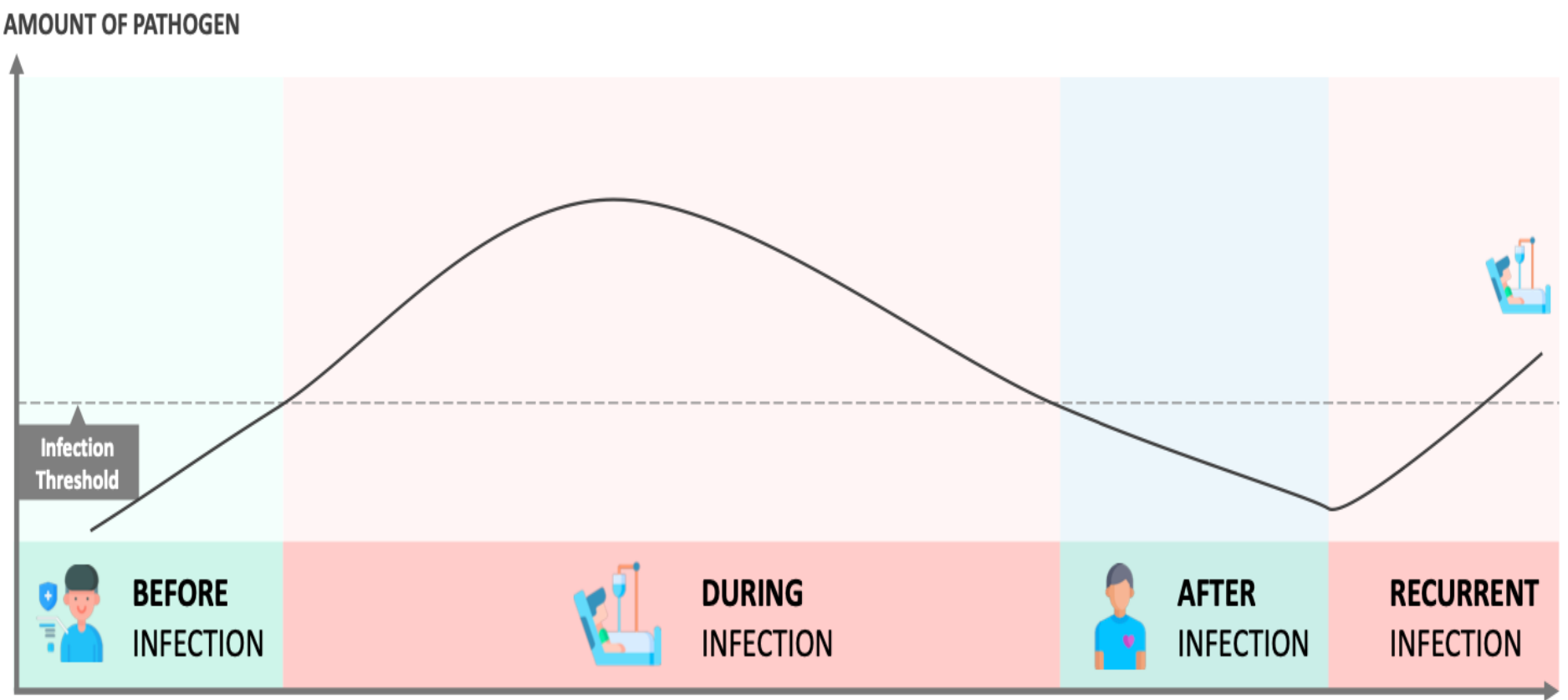
Demonstrate the clinical and medico-economic value of all the products developed by AUROBAC and define a **new adapted and sustainable economic model** in the AMR field

Structure the company with **experienced teams** to execute the strategy with the best added value, covering the entire value chain of R&D from preclinical research, development, clinical development, registration to commercialization

AUROBAC THERAPEUTICS Aim to Cover Each Step of the Infection Curve

AUROBAC THERAPEUTICS

AUROBAC THERAPEUTICS



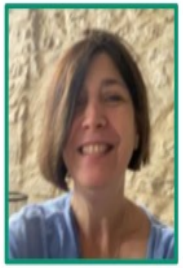
AUROBAC THERAPEUTICS – Team

Florence Séjourné
Chief Executive Officer
(& Founder-Board Member of the BEAM Alliance)

Julie Cervesi
Head of Business Development

Martin Everett
Chief Scientific Officer

Aude Subileau
Office Manager



Florence Rolland
Business Executive Assistant

AUROBAC THERAPEUTICS – Board Members

Frank Kalkbrenner

Global Head

BI Venture Fund

Boehringer Ingelheim

Philippe Archinard

Deputy CEO - Innovation & Scientific Partnerships

Institut Mérieux

BIOMÉRIEUX

Karl Penz

Head of Finance - Innovation Unit (R&D)

Boehringer Ingelheim

Karen Lackey

Global Head, Integrated Drug Discovery

evotec