GARDP
Global Antibiotic Research & Development Partnership
A joint DNDi / WHO initiative

Antimicrobial memory recovery, evaluation and exploratory programmes

Antimicrobial resistance (AMR) is a major and rapidly growing global public health challenge. Responsible for more than 700,000 deaths a year[1], it poses a significant threat to achieving the Sustainable Development Goals (SDGs), in particular SDG 3, which aims to ensure healthy lives and promote wellbeing for all[2].

The Global Antibiotic Research and Development Partnership (GARDP) is a not-for-profit research and development organization that addresses global public health needs by developing and delivering new or improved antibiotic treatments, while endeavouring to ensure their sustainable access.

Initiated by the World Health Organization (WHO) and the Drugs for Neglected Disease initiative (DNDi) in May 2016, GARDP is an important element of WHO's Global Action Plan on Antimicrobial Resistance that calls for new public-private partnerships to encourage research and development of new antimicrobial agents and diagnostics.

GARDP's programmes – sexually-transmitted infections, neonatal sepsis, paediatric antibiotics and antimicrobial memory recovery, evaluation and exploratory research – are designed to address global public health priorities. Each programme incorporates sustainable access and stewardship strategies to ensure treatments are affordable and available to all those who need them.

Partnerships are central to GARDP's model and include WHO, pharmaceutical and biotechnology companies, academia, governments, health authorities, philanthropic organisations and civil society from across the world.

Since the early 1990s there has been a 'void' in the discovery and development of new antimicrobials development.' Inherent challenges including complex science, lack of sufficient return on investment, regulatory issues and changes in R&D priorities of the pharmaceutical sector, led to the abandonment of countless antibiotic programmes.

Today, as the world faces the growing threat of AMR – revisiting these programmes may be part of the solution. There is an urgent need for new antimicrobial treatments to tackle drug-resistant infections and with radical changes in the science and technological advances, it may be possible to revive some of these long-forgotten compounds. Expert knowledge – the knowhow and experience to bring these projects back to life – is critical to achieving this.

At the same time, there is a priority need for exploratory research with dedicated programmes to support the discovery of novel antimicrobials. The development of resistance to novel antimicrobials is inevitable. To combat this, a broad range of sustainable treatments is needed with efforts across novel discovery, re-purposing of antibiotics and the development of new agents. There is a particular need to focus on public health priorities.

ANTIMICROBIAL MEMORY RECOVERY, EVALUATION AND EXPLORATORY PROGRAMMES

GARDP has developed programmes which aim to build a robust pipeline of pre-clinical and clinical drug candidates that will

- optimise (ensure best use of) existing antibiotics – repurposed and in new combinations (with old, new, and non-antibiotics).
- accelerate the recovery of and start the development of undeveloped drug candidates that can address public health priorities.
- Explore novel and innovative drug discovery and development approaches.

The antimicrobial recovery and exploratory programmes comprise two interlinked components.

1. DISCOVERY AND EXPLORATORY RESEARCH
2. ANTIMICROBIAL MEMORY RECOVERY AND EVALUATION

DISCOVERY AND EXPLORATORY RESEARCH

The aim of the antimicrobial discovery and exploratory programme is to use innovative approaches to identify and validate a portfolio of antimicrobial candidates for future development as sustainable treatment options. Its focus is on bacteria identified in the WHO's priority pathogen list, in particular on unmet needs that may not be prioritised by the private sector.

OBJECTIVE

By 2023

- Have two candidates nominated for pre-clinical development *an antibiotic to target serious drug-resistant infections (such as pneumonia or sepsis) and a candidate targeting drug-resistant fungal pathogens (such as Candida species).*

ANTIMICROBIAL MEMORY RECOVERY AND EVALUATION

The aim of the antimicrobial recovery and evaluation programme is to recover the knowledge, data, and assets of forgotten or abandoned antibiotics. Reviving those projects means working with the experts who investigated the molecules and training and supporting a new generation of antibiotic discovery researchers and developers. The programme will also identify and evaluate potential novel antimicrobial candidates from the private and public sector for development within the GARDP portfolio and undertake further research to further develop the current portfolio.

OBJECTIVES

By 2023

- Recover assets from companies that work or worked in the antibiotic space in order to find drug candidates to meet public health needs.
- Have one-to-two recovered new chemical entities in pre-clinical or clinical development (for serious bacterial infections, and priority populations).
- Recover and disseminate knowhow and expertise in antibiotic drug R&D before the knowledge of a generation of experts is lost.

A central component of the programmes is the REVIVE website[3], an interactive online space with three interconnected aims

– facilitate learning – including face-to-face workshops at conferences, as well as online open-access webinars, blogs and training materials.
– connect people – including linking new researchers with world-class experts.
– share knowledge, including the development of an 'antimicrobial toolbox' which will contain links to online databases of bacterial and fungal strains, whole genome sequences, undeveloped antimicrobials, and pre-clinical and clinical pipelines.

TO DATE, GARDP HAS

- Engaged more than 120 world-class experts in the programme – leading academics, industry experts and healthcare professionals.
- Launched the REVIVE website (in January 2018), which has hosted five webinars on different aspects of clinical development –pharmacovigilance and safety for researchers worldwide, as well as blogs from leading experts such as Lord Jim O'Neill.
- Held together, with partners such as CARB-X 'antibiotic development bootcamps' and other workshops at key international conferences such as the European Society of Clinical Microbiology and Infectious Diseases and the American Society of Microbiology.
- Engaged ten companies to share knowledge of their assets, with 20 'recovered' molecules being actively explored.

LOOKING AHEAD

In 2019, the programmes will

- Start collaborate activities to screen for antibiotic candidates
- Introduce the resources and antimicrobial toolbox elements on the REVIVE website. REVIVE will continue to conduct webinars, host expert blogs and run workshops and symposia at international conferences, with the aim of continuing to build participation at each event.
- As a result of ongoing evaluation, it is anticipated that one-to-two additional drug development projects may be initiated in 2019.

A GLOBAL COLLABORATION

The antimicrobial memory recovery evaluation and exploratory programmes have built collaborations with similar organisations and funding bodies working together to tackle AMR. These are critical to ensuring efforts are pooled and to avoid duplication. Key partners include CARB-X, Pew Charitable Trusts, ESCMID, ASM, BSAC, Joint Programming Initiative on Antimicrobial Resistance (JPIAMR).

GARDP has identified international partners for drug discovery with collaborative agreements in place to support specific discovery initiatives (e.g., Helmholtz Institute for Pharmaceutical Science, Germany, as well as the Cooperative for Open Access Drug Discovery (CO-ADD) at the University of Queensland, Australia).

1 Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations. The Review on Antimicrobial Resistance Chaired by Jim O'Neill, 2014
2 Sustainable Development Goals sustainabledevelopment.un.org/SDG3 3
3 See revive.gardp.org