



Innovate
UK

Antimicrobial Resistance

Germany and Switzerland,
12 – 17 March 2023

Global Business Innovation Programme



Innovate
UK
EDGE

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Welcome

As part of our Global Business Innovation Programme (GBIP), Innovate UK and Innovate UK EDGE are delighted to bring a delegation of some of the UK's leading Antimicrobial Resistance (AMR) businesses, building solutions with AMR at the core of their value proposition.

AMR is an escalating hidden pandemic causing serious human and social impact with the highest burdens in low-resource settings. It has been estimated that in 2019 some 4.95 million deaths were associated with bacterial AMR, including 1.27 million deaths attributable to bacterial AMR¹.

Antimicrobials are becoming ineffective and infections more difficult to treat. This is putting modern medicine at risk with cancer chemotherapy, stem cell therapy, caesarean sections and other surgeries dependent on antimicrobials to prevent infection. In addition, previously treatable illnesses such as pneumonia, tuberculosis, and even minor wound infections are becoming increasingly difficult to address.

This GBIP contributes to Innovate UK's ongoing commitment to tackle the AMR crisis by driving research, development and commercialisation of novel antimicrobials, preventives such as vaccines and AMR diagnostics in the UK's AMR industry through joint innovation and international collaboration. Our delegation of 15 ambitious UK AMR companies will use the innovation visit to Germany and Switzerland as an opportunity to engage with key stakeholders from the global AMR industry, network with other professionals and initiate forward-focused collaboration. The combination of commercial expertise, creative excellence and

technological innovation across the UK, Germany and Switzerland has the potential to generate a significant value add for companies who operate in AMR markets and add to the global curbing of AMR.

We hope you enjoy sharing insights, thought-provoking ideas and making new connections that can help shape the growth of these exciting companies and start to open new business opportunities. On behalf of the GBIP organisers, we would like to thank our gracious hosts, attendees, delegates and all our partner organisations for their invaluable contributions to this programme.

Thank you for your support.



Dr. Phil Packer
Innovation Lead
Innovate UK



Bitia Najafi
Innovation & Growth Specialist
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Rocky Moore
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¹Source: The Lancet ([https://doi.org/10.1016/S0140-6736\(21\)02724-0](https://doi.org/10.1016/S0140-6736(21)02724-0))

Global Business Innovation Programmes

The Global Business Innovation Programmes, organised by Innovate UK and delivered by Innovate UK EDGE, bring together cohorts of up to 15 innovative UK businesses looking to grow and scale globally. Each programme focuses on a specific country, a technology or sector area, and enables the businesses to build global collaborations and partnerships to explore innovation opportunities.

Innovative UK businesses will tap into complementary knowledge, skills and facilities in the chosen country and develop understanding, cultural insight, and networks.

It will support businesses with a structured three-phase programme: getting ready for the market, visiting the market and exploiting the opportunity, together with harnessing the expertise of an Innovate UK EDGE Innovation & Growth Specialist to maximise the opportunities and impact for the business.

This brochure details the businesses that are taking part in the Antimicrobial Resistance Global Business Innovation Programme with Germany and Switzerland, and gives an overview of their business and objectives for this visit.

Antimicrobial Resistance within Germany, Switzerland and the UK

Germany, Switzerland and the UK have unique capabilities and technologies that could assist other nations to address AMR. There is a wide and deep expertise in this UK business delegation and these markets offer significant opportunities to join forces and help bring forward the development of novel antimicrobial strategies, diagnostic tools and preventives.

Germany is a key player in AMR; its Federal Ministry of Health invested more than EUR 56 million to fund the German Antibiotic Resistance Strategy to develop new treatments for bacterial infections. Germany also hosts the secretariat for the Global AMR Research and Development Hub and has particular strengths in design and engineering of high-tech instrumentation. German companies have diagnostics platforms which offer co-development opportunities for UK companies and Germany is investing in alternative antimicrobials such as natural products, phage therapy and DNA based technologies. The innovation visit will go to the Munich and the Stuttgart areas. The Munich area houses approximately 250 life sciences companies including 130 SMEs, two elite-universities as well as institutes, hospitals and innovation centres. In Munich, the focus is on antimicrobials, whereas in the Stuttgart region it is on AMR diagnostics.

The Life Sciences industry in the Basel region of Switzerland is a world leader and the driving force of the Swiss economy, housing some 800 Life Sciences companies including the headquarters of major pharma firms such as Roche, Novartis and Sandoz. This innovation visit will also include access to both days of the prestigious 7th AMR Conference in Basel, focusing on novel Antimicrobials and AMR Diagnostics. This will provide opportunities to hear from world leading AMR experts, as well as 1-to-1 matchmaking meetings to find new collaborators and partners for business growth, and to participate in several networking events.

The UK national action plan to tackle AMR sets out a 20-year vision to combat AMR through lowering the burden of infection and better treatment of resistant infections, development and optimal use of antimicrobials and good stewardship across all sectors. This is promoting access to safe and effective medicines and the implementation of new diagnostics, therapies, vaccines and interventions. The UK boasts a strong research base and a large number of companies focused on developing new antibiotics, AMR diagnostics and preventives such as vaccines.



Innovate UK and Innovate UK EDGE

Innovate UK

Innovate UK drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas.

We connect businesses to partners, customers and investors who can help them turn ideas into commercially successful products and services that drive business growth.

We fund business and research collaborations to accelerate innovation and business investment into Research and Development. Our support is available to businesses across all economic sectors, value chains and UK regions.

Innovate UK is part of UK Research and Innovation.

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Innovate UK EDGE

Innovate UK EDGE offers intensive local, national and international growth and scaling support tailored to the needs of ambitious, high-growth, innovation-driven small or medium sized businesses.

Each client's leadership team collaborates with an Innovation & Growth Specialist to hone its commercial strategy and identify targeted action to:

- Exploit their innovation to grow and scale
- Source funding and finance
- Enter global markets

We bring in wider ecosystem resources to enable clients to capitalise on their IP, find commercial and Research and Development partners, access cutting-edge facilities and convene in growth-stimulating Peer Networks.

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Leading the Visit

Dr. Phil Packer Innovation Lead Innovate UK

Phil is the Innovation Lead for AMR and Vaccines at Innovate UK, developing and delivering funding calls, supporting workshops and strategy.

Innovate UK have a One Health approach to AMR, funding SMEs and industry to develop new vaccines, antimicrobials and therapies for infectious disease in both humans and animals. In addition, capabilities and technologies are supported in Infection, Prevention and Control to reduce further spread of antimicrobial resistance in the Human Health, Environment and Agri-sectors.

The research developed and delivered in relation to vaccines for infectious diseases was crucial to supporting the UK's response to the Covid-19 pandemic.



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Bitra Najafi Innovation & Growth Specialist Innovate UK EDGE

Bitra joined Innovate UK EDGE in 2021 and is supporting SMEs in the South East region in achieving their business objectives and to help them grow.

She holds a Masters Degree in Medical Genetics and an MA in Counselling and psychotherapy.

Bitra has over 20 years of experience in the medical and healthcare sector and has successfully set up and grown businesses. She has also invested in a number of early stage MedTech companies.

During her career she has worked in international markets and grown her accounts significantly. Bitra is now part of the Global Business Innovation Programme team at Innovate UK EDGE.



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Leading the Visit

Liam Harris

**UK Science and Innovation Network
British Consulate General in Düsseldorf**

Liam is part of the UK Science and Innovation Network (SIN), a global network jointly funded by FCDO/BEIS, and he is based in the British Consulate General in Düsseldorf. In his role, he is responsible for the priority topics Emerging Technologies (AI, quantum) and Global Health/ Life Sciences, supporting UK science and innovation policy objectives through exchange with German counterparts and fostering bilateral collaboration opportunities.

Prior to joining SIN, he worked in various roles in the Department for International Trade, with a particular focus on Life Sciences Innovation and EU market access issues.

He holds a PhD from Imperial College London in the field of Defence Sector Technology Transfer.



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Reece Hamilton

**UK Science and Innovation Network
British Embassy Berne**

Reece is part of the Science and Innovation Network (SIN) team at the British Embassy Berne. As part of the SIN Switzerland team, it is Reece's responsibility to maintain the UK government's science and innovation interests in Switzerland. Currently, the UK's priorities fall under the topics of Life Science, Innovation, Emerging Tech, and Climate. To maintain these interests, Reece supports UK science and innovation policy objectives through exchange with Swiss counterparts in order to foster bilateral collaboration opportunities.

Before joining SIN, Reece worked as a Marine Biologist in Indonesia, Maldives, and Mauritius. In this role, he provided leadership and direction for protocols concerning marine life protection in-water and enforcement of greener standards in office and resort practices, as well as coordinating marine research projects.

Reece holds a Master of Science degree in Oceanography from the University of Southampton, and has worked alongside marine research and conservation organisations such as Manta Trust and Green Fins.



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Leading the Visit

Rocky Moore **Innovation & Growth Specialist** **Innovate UK EDGE**

Rocky is an Innovation & Growth Specialist and has been supporting SME growth for many years.

Before he joined Innovate UK EDGE, he was a successful entrepreneur, enabling him to understand what business owners go through to achieve business growth.

One of his key attributes to supporting SMEs is Rocky's ability to connect and develop reciprocal relationships ensuring they link in with long term strategies.

He is keen to help our UK SMEs develop their international markets through the Global Business Innovation Programmes.



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Dr. Maarten van Dongen **Director** **AMR Insights BV**

Maarten is an AMR expert and founder of AMR Insights BV. He is a Molecular and Medical Microbiologist by origin.

Maarten has worked for the international pharma and biopharma industry and has advised on Life Sciences and Innovation. In 2017, he founded AMR Insights to combat AMR by informing, educating and connecting professionals. It has set up a network of over 450 Ambassadors in some 60 countries and has developed into a global information platform and competence centre on AMR.

Maarten is committed to eliminating AMR because he does not accept that millions of people need to die as a result of resistant bacteria.



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Overview of Companies

AMPLY Discovery

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FluoretiQ

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Matoke Holdings Limited

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NovaBiotics

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Rostra Therapeutics

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AMPLY Discovery

Novel Biologic drugs and Nutraceuticals: Designed by evolution. Discovered by AI.

AMPLY Discovery deploys machine learning approaches which are inspired by the financial markets to mine biological data to discover novel drug and nutraceutical candidates. Using a proprietary in silico and in vitro based platform AMPLY can discover best-in-class molecules to help tackle some of mankind's greatest challenges.

Antimicrobial resistance, climate change, population growth, and regulation are all factors driving a \$100 trillion problem and an acute need for new drugs and bioactive ingredients to replace conventional antibiotics.

In-silico drug discovery short circuits the traditional discovery process and renders greater certainty upon drug development decisions. AMPLY's proprietary platform is based on nearly a decade of academic research and takes an innovative approach to next-generation drug discovery.



Contact

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Industry: **Biotech**

Visit objective

AMPLY Discovery is interested in discussing partnerships related to its current internal pre-clinical development programmes and collaborations or co-development on new applications of its technology.



Amprologix

Amprologix specialises in antimicrobial prospecting and AI-inspired design.

Amprologix is developing a portfolio of novel antibiotics derived from naturally occurring compounds, originally discovered in Prof Mat Upton's lab at the University of Plymouth. There is an urgent need for new antibiotics and the team behind Amprologix are experienced and committed to pioneering new solutions.

The company is currently developing a lead molecule to target drug resistant healthcare acquired infections (MRSA in particular) and fast follower derivatives to broaden the portfolio. The lead compound, epidermicin NI01, represents a new class of antibiotic drugs with no known resistant liabilities. Partners Ingenza have developed a scalable expression system for cost-effective GMP compliant production of NI01. In a rodent model of nasal decolonisation of MRSA carriage, a single dose of epidermicin NI01 was as effective as six doses of mupirocin, the current standard of care for this indication. Epidermicin has been formulated and taken through pre-clinical in vivo toxicology, where no adverse reactions were recorded.

Amprologix's portfolio of novel antibiotic candidates are peptide based antimicrobials that are naturally produced by bacteria (bacteriocins) and they are also using AI-based design approaches to generate novel sequences, not previously seen in nature.



Contact

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Industry: **Antimicrobial Drug Discovery**

Visit objective

Epidermicin kills Gram positive pathogens and they'd like to discuss evaluation in relevant infection models (e.g. impetigo and acne) and would also be interested in development of a companion diagnostic.



Cellexus International Ltd

Cellexus International manufacture the CellMaker: the only single use, pure airlift bioreactors available on the market today. The patented geometry of the 3D bioreactor bag allows for efficient, yet gentle mixing and easy scaling from 1.5 litres to 50 litres in a GMP compatible system. Airlift bioreactors are an alternative to both wave form bioreactors, which are less efficient, and to impeller systems, which cause increased shear stress on cells.

CellMaker systems have been developed and optimised to include bioreactors with controllable temperature and airflow suitable for phage production, dual systems for multiple simultaneous phage batches. The addition of reactive oxygen and pH sensors in the Plus model is ideal for microbial applications as well as plant cells and fungi, with an option of an extremely gentle low flow system for insect and mammalian cell types.

Single use, airlift bioreactors can reduce both the economical and environmental impact of biologics manufacturing. The single use system not only reduces downtime but also reduces energy, water and chemical usage required to clean and certify reusable vessels.

Cellexus CellMakers have multiple users in the AMR space, in phage manufacturing for both human clinical applications and animal health applications to remove antibiotics from the food chain, as well as being used to develop other antibiotic alternatives.



Contact

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Industry: **Equipment Manufacturing**

Visit objective

Cellexus would intend to exploit these introductions to increase market awareness, export more bioreactors into market and grow the company.



CodiKoat

CodiKoat has developed the fastest acting ISO certified antimicrobial and antiviral technology in the world. Their unique patented technology uses functionalised nanostructures and food grade chemicals to inactivate viruses, bacteria and fungi within seconds of contact – including coronaviruses.

CodiKoat has many applications including Pharmaceuticals, medical devices, Personal Protection Equipment (PPE), Cleaning products, Air Filtration systems, Fabrics for Apparel and Furniture and Electronic Devices such as touch screen displays, phones, point of sale systems, having an addressable market of \$1.5tn and growing.



CodiKoat

Contact

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Industry: **Biotechnology**

Visit objective

Identifying how to tackle AMR challenge with CodiKoat technologies, growing their network and finding new commercial partners.



FluoretiQ

Founded in 2017, FluoretiQ is a Bristol based biotech company committed to making the first antibiotic prescription, the right antibiotic prescription.

FluoretiQ specialises in the development of rapid point-of-care diagnostics to address antibiotic resistance, beginning with Urinary Tract and Sexually Transmitted Infections. They hold several patents to 2 proprietary technologies: NANOPLEX® which enables <15-minute detection of infection to support 'yes/no' antibiotic treatment decisions and SCFI™ (Sub-cellular Fluctuation Imaging) which enables <1 hour antibiotic susceptibility testing to identify effective antibiotic treatments.

With c.£2 Million raised to date, the company is focussed on commercialisation of its first NANOPLEX® product, with first revenues expected in 2023.



Contact

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Industry: **Medical Diagnostics**

Visit objective

FluoretiQ's objective is to continue building their relationships within the UK AMR community and identify opportunities for collaboration (clinical trials, co-development projects, distribution partners) in European markets.



Matoke Holdings Limited

Matoke Holdings has developed a novel antimicrobial technology, Reactive Oxygen®, to treat a range of clinical indications and to be a key pillar in the global fight against Antimicrobial Resistance by providing clinicians with a range of powerful antimicrobials, initially in wound care.

By using Reactive Oxygen® products to avoid, reduce and replace conventional antibiotics, Matoke's products will protect their efficacy from worsening resistance whilst delivering infection free outcomes, even for multi-drug resistant organisms. Matoke's products are ideally suited to a wide range of clinical indications, are cost effective to manufacture, suitable for use in a range of healthcare settings, are easy to use and do not lead to worsening bacterial resistance.

Reactive Oxygen® technology brings the promise of being the next major breakthrough in acute, surgical and chronic wound management with an elegant manifestation of a naturally occurring mechanism. Reactive Oxygen®'s inherent properties of biofilm penetration, the ability to stimulate immune response and tissue regeneration added to the antimicrobial impact independent of the organism and its resistance profile, will contribute to a major advance in standard of care and offers the hope of reducing conventional antibiotic usage thus reducing the potential for further resistance development.

Matoke

Holdings Limited

Contact

Paul Thompson - Operations Director

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Industry: Life Sciences

↙ Visit objective

Matoke's aim of GBIP participation is to forge links with one or more partners to identify collaborative clinical projects to demonstrate positive outcomes from the use of Reactive Oxygen®.



MetalloBio Limited

MetalloBio is a University of Sheffield start-up developing a novel antimicrobial platform technology. The platform is being developed as a systemic antimicrobial and a coating for medical devices.

The compounds that underpin MetalloBio's platform exploit a new chemical space, exhibit higher activities than clinical antibiotics, have a novel multi-modal mechanism, and represent a new antimicrobial class. Additionally, the compounds high activities are retained on extensively drug-resistant pathogens. The initial target indication for the technology is respiratory tract infections; however, given their broad-spectrum capabilities, there is potential to target other infectious diseases.



MetalloBio

Contact

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Industry: **Pharmaceuticals and Medical Devices**

Visit objective

MetalloBio's main objective from attending this programme is to meet with stakeholders, potential partners, and potential investors internationally to facilitate internationalisation of MetalloBio's technology.



NewGenne Ltd

NewGenne's EXeczema® Skin Wash and related products help health-centre operators who want to have fewer microbial infections and fewer cases of chronic hand eczema by providing their staff and patients with inherent incentives to remove microbes from the clinical setting and avoid antimicrobial treatments and stall antimicrobial resistance.

The key emphasis lies in removing pathogenic microbes rather than seeking to kill them. That provides a very strong return on investment for those utilising NewGenne's technology.

NewGenne is an innovative micro-company gaining half its revenue from exports.

↙ Visit objective

To meet collaboration partners to advance our anecdotal successes into peer-reviewed evidence. The first two articles relate to small studies lasting under a month.



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Industry: **Healthcare**



NovaBiotics

NovaBiotics is a clinical-stage company developing novel, immune-based therapies for medically unmet, life-threatening and life-limiting diseases.

NovaBiotics has developed two proprietary platforms from which it is generating first-in-class peptide, mRNA and small molecule therapies for bacterial fungal and viral infection. These include a phase 3 immunomodulator-antimicrobial for pneumonia (NM002), a registration-ready asset for infectious exacerbations of cystic fibrosis and non-CF bronchiectasis (NM001) and an IND-ready antifungal asset for invasive fungal disease (in IV form) and respiratory disease (in inhaled form).

The templates for NovaBiotics' drug candidates are innate immune effector molecules and as such, the mechanism of action of these compounds (antibacterial and anti fungal) is agnostic to drug resistance status of target pathogens and mitigates opportunities for resistance developing.



Contact

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Industry: **Healthcare-biotechnology**

Visit objective

Engage with commercial pharma/biotech partners for NovaBiotics therapeutics, gain a better understanding of the Research and Development landscape (assets and capabilities) in a region for AMR research and identify potential academic collaborators.



OGI Bio

OGI Bio have developed a low-cost modular platform that simplifies the bacterial culturing process and provides the user with more control and specificity.

The system automates routine processes of microbial culturing and analysis that would otherwise be performed manually freeing researchers to focus on the complex innovation questions they need to address to develop their rapid diagnostic test, or to test the mode of action of their antimicrobial compound.

OGI Bio's base system allows users to grow four individual cultures of bacteria, yeast or algae and measure the optical density up to every minute. The plug and play system can be tailored to their individual needs by adding or removing measurement and control features that are necessary for their culturing processes, reducing the cost of automation, whilst accelerating the research driving their innovation.

The turbidostat module maintains a culture under user-specified conditions of OD for extended periods of time meaning bacteria is accessible under tightly controlled conditions that are required when needed: "bacteria on tap". Users can also select additional measurements to probe such as Dissolved Oxygen concentration, pH, temperature or add fluorescent markers to the culture to (for example) identify specific modes of action of antimicrobials during the growth cycle of the culture.



Contact

Alex McVey - Chief Executive Officer

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Industry: **Biotechnology | Microbiology Laboratory Equipment**

Visit objective

OGI Bio is looking to engage with companies that are culturing microbes to learn more about their processes and requirements and identify where OGI Bio can support their innovation.



OLM Diagnostics

At OLM Diagnostics, their vision is to reduce illness and death associated with fungal disease globally; through use of rapid diagnostic testing and targeted, appropriate use of antimicrobials.

OLM Diagnostic's mission is to make fungal diagnostic testing accessible on a global scale, by developing and providing rapid diagnostic kits that are robust, accurate and effective, yet inexpensive. Their novel and reliable rapid-diagnostic tests fit seamlessly into current treatment pathways, with the aim of reducing the rate of drug resistant infections by promoting a new diagnostic led approach.

They aim to achieve this whilst delivering clear financial and clinical benefits to hospitals, clinicians and patient care.



Contact

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Industry: **Diagnostics**

Visit objective

To look at product development opportunities and routes into new markets.



Oppilotech

Oppilotech's modelling allows accurate mapping of cellular biochemistry at extremely high levels of resolution, which is utilised to identify the best drug targets whilst also confirming that cells cannot bypass their inhibition. Oppilotech have identified a number of novel antimicrobial drug targets, with a full understanding of the biochemical impact of target inhibition, meaning a higher chance of development success, and a lower chance of unexpected data later in development leading to failures. They have also used their approach in eukaryotic settings, applying their modelling to identify oncology targets.

The company has 4 antimicrobial drug development projects (3 in collaboration with other groups), 2 oncology drug development projects and a CRO modelling, consulting and lab testing services (for which the income is used to fund drug development work).

Their team is made up of a range of experienced scientists with experience in biochemistry, microbiology, med chem, antimicrobial drug development and AI/ML, as well as corporate functionality. Keen to collaborate, they are looking to advance their work.



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Industry: **Biotech**

Visit objective

Networking opportunities. Being a very small SME with limited access to facilities means progress through collaborative agreements. Also they can offer their capabilities as a service (modelling, microbiology) to other groups.



RapidX Bio

RapidX Bio is a Cambridge(UK)-based molecular diagnostic startup aimed at building rapid point-of-care qPCR machines testing for a wide range infectious diseases.

Powered by nanotechnology, RapidX machines are being developed for multiplexing up to 12 genetic targets in under 5 minutes, for bacteria as well as viruses. Some of these targets may be used for genotypic antimicrobial susceptibility testing. Development is geared toward making this technology for patient-facing use cases through incorporation of automated sample handling and a heavy central focus on affordability.



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Industry: **Molecular diagnostics/antibiotic susceptibility testing (AST)**

Visit objective

RapidX Bio is looking for potential scientific/clinical advisors as well as co-development partners from patient-facing organisations and antimicrobial susceptibility testing PCR assay/genotyping companies.



Rostra Therapeutics

Rostra Therapeutics is an early-stage company with a mission to develop a novel molecular platform technology into medicines to treat infectious diseases and help address the global threat of AMR.

The technology, Strathclyde Minor Groove Binders (S-MGBs) have been developed at the University of Strathclyde and early preclinical development work completed through the NIAID preclinical services program has shown high activity against fungi including all fungi highlighted as 'critical' in the WHO Fungal Priority Pathogen List. They also demonstrated low cytotoxicity, and they are progressing with further in vivo work, both in the US and Europe.

Rostra Therapeutics aims to develop its lead molecules into medicines to treat life threatening Invasive Fungal Diseases, infections that currently kill in excess of 1.5m patients each year with current therapeutic options being increasingly compromised by antimicrobial resistance.



Contact

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Industry: Lifescience

Visit objective

The objective for Rostra Therapeutics is to meet and develop collaborative relationships with potential drug development partners and investors, and increase understanding of future collaborative opportunities in Germany and Switzerland.



SpeedX

SpeedX specializes in molecular diagnostic solutions that go beyond simple detection to offer comprehensive information for improved patient management. Innovative real-time polymerase chain reaction (qPCR) technology has driven market-leading multiplex detection and priming strategies.

The misuse and overuse of antibiotics has impacted their effectiveness globally, and in response to this SpeedX has developed diagnostics that detect infection and genetic markers for antibiotic resistance in a single test enabling clinicians to implement Resistance Guided Therapy (RGT) — improving patient outcomes by empowering practitioners to make informed clinical decisions.

SpeedX has a growing portfolio of CE-IVD and IVDR Certified products focussing on multiplex diagnostics for sexually transmitted infections (STIs), antibiotic resistance markers and respiratory conditions.



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Industry: **Clinical Diagnostics**

Visit objective

Increase product awareness amongst key decision makers, meet key clinical laboratory contacts, establish clinical KOL network, and identify optimal sales channels and barriers to entry within this market.



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