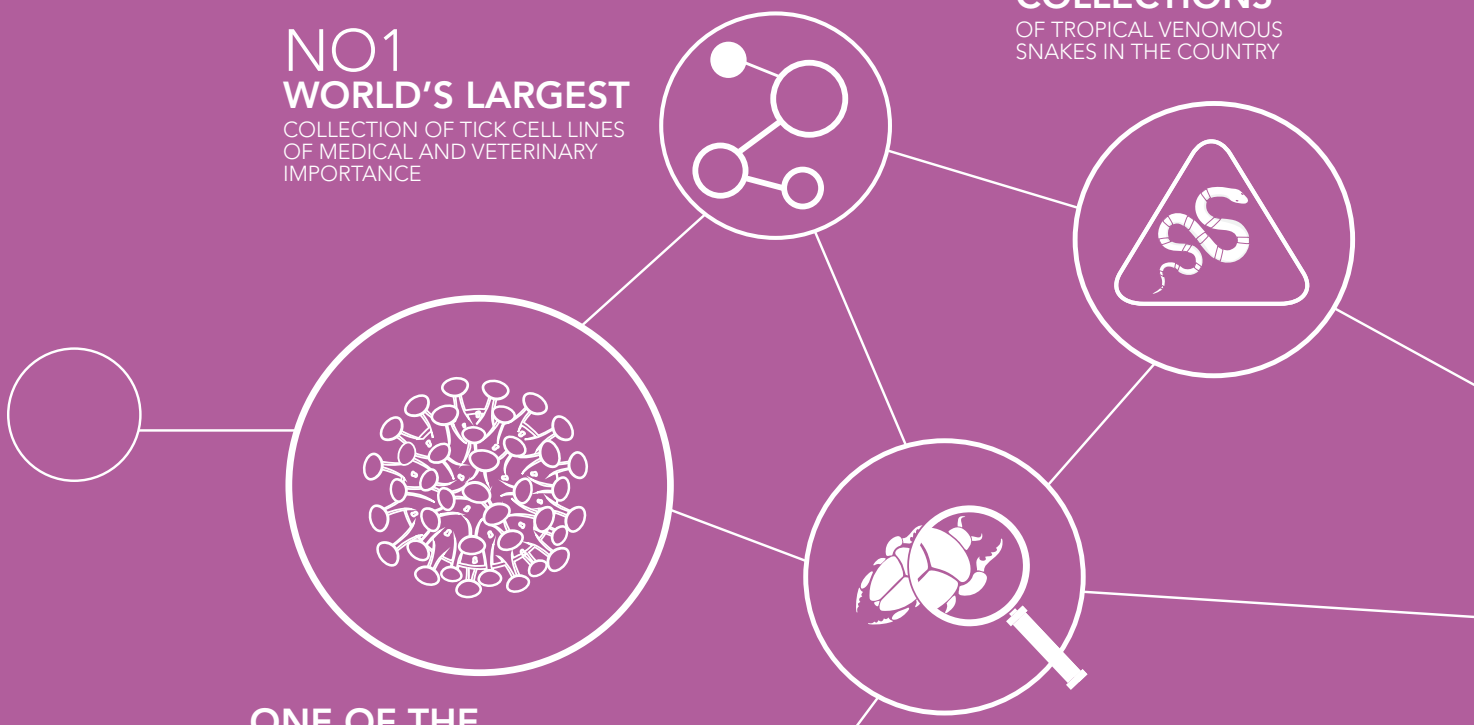
INVESTLIVERPOOL
ADVANCING THE CITY REGION

INFECTIOUS DISEASES

WE ARE **LEADING THE WAY.**



NO1
WORLD'S LARGEST
COLLECTION OF TICK CELL LINES OF MEDICAL AND VETERINARY IMPORTANCE

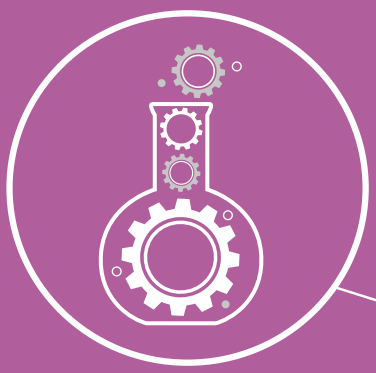
ONE OF THE BIGGEST COLLECTIONS
OF TROPICAL VENOMOUS SNAKES IN THE COUNTRY

ONE OF THE LARGEST
CONCENTRATIONS OF EXPERTISE IN INFECTIOUS DISEASES IN THE WORLD

ONE OF THE LARGEST CONCENTRATIONS
OF MEDICAL ENTOMOLOGISTS IN THE UK

THE LARGEST
INDUSTRIAL SUPERCOMPUTING FACILITY IN EUROPE

ONE OF THE LARGEST COLLECTIONS
OF INSECTICIDE RESISTANT MOSQUITO POPULATIONS IN THE WORLD



NO1
BIOMANUFACTURING CLUSTER
IN EUROPE

ONE OF THE LARGEST
CONCENTRATIONS OF
CATEGORY 3 LABORATORIES
IN THE UK

1ST **RESEARCH INSTITUTION IN THE WORLD**
DEDICATED TO
TROPICAL MEDICINE

LIVERPOOL HAS THE LARGEST CONCENTRATION OF TRANSLATIONALLY-FOCUSED PUBLIC SECTOR R&D EXPERTISE IN INFECTIOUS DISEASES IN THE UK AND IS IDEALLY POSITIONED TO LEAD THE GLOBAL FIGHT AGAINST VIRUSES FROM AIDS TO ZIKA.

GLOBAL BRITAIN:
LIFE SCIENCE LEADER.

The UK continues to be the leading business destination in Europe.

More than 165,000 people are employed by the life science sector here and our companies have more than £50 billion in turnover. From bench to bedside, we make it easier to discover, develop and deliver healthcare innovation. We have:

- One of Europe's lowest corporate tax rates
- Patent Box which can further reduce tax on all profits attributable to qualifying patents
- Generous Research and Development tax credits
- Access to specialist venture capital funds
- World-leading universities, researchers, science and facilities
- Established industrial R&D, manufacturing and supply chain
- National Health Service with 60+ million patients and access to unrivalled health data.

LIVERPOOL AND THE **NORTHERN POWERHOUSE.**

The North of England has more than 1,000 life sciences firms supporting 38,000 high-skilled jobs from Liverpool and Manchester partner cities like Leeds, Sheffield and Newcastle. A network of world-leading research universities powers this cluster.

England's 'Northern Powerhouse' region is home to one of Europe's strongest clusters in biological, medical and surgical manufacturing with Eli Lilly, Allergan, Fujifilm Diosynth Biotechnologies, Seqirus, JRI Orthopaedics, and DePuy Synthes all based here.

Liverpool's health science portfolio includes personalised health, tropical medicine and pharmacogenomics. From drug discovery, diagnostics and clinical trials through biopharmaceutical manufacturing of vaccines, the city region offers huge opportunity for life sciences businesses.

At the heart of this is Liverpool's global leadership in infectious diseases.

WHY LIVERPOOL FOR INFECTIOUS DISEASE PROJECTS?

Liverpool has the largest concentration of translationally-focused public sector R&D expertise in infectious diseases in the UK and is ideally positioned to lead the global fight against viruses from AIDS to Zika.

Liverpool has an extensive track record of establishing public-private partnerships and working with major public bodies in the area of infection including:

- World Health Organization

- USAID

- Department for International Development

- TDR – special programme for research and training in tropical diseases

- The Medicines for Malaria Venture

- The Bill & Melinda Gates Foundation

We have access to patient populations (and pathways for drug and diagnostic evaluation and implementation) in the UK and also in Africa, Asia and South America.

We have strong existing relationships with pharmaceutical and healthcare companies and our people are used to working in joint academic/commercial/health service teams.

And we have the people, skills and supply-chains to support the journey from drug discovery through to manufacturing and delivering vaccines.

CASE STUDY:
LIVERPOOL SCHOOL OF TROPICAL MEDICINE

Founded in 1898, Liverpool School of Tropical Medicine (LSTM) was the first institution in the world dedicated to research and teaching in the field of tropical medicine.

Today it is at the forefront of the battle against TB, HIV/AIDS, Malaria and the Zika virus.

State-of-the-art facilities continue to develop new drugs, vaccines and pesticides and the School is supported by a research order book of well over £210 million.

As a teaching institution, it attracts more than 600 students from 68 countries, from PhD research and Masters programmes to a range of professional courses.

LSTM hosts the largest concentration of medical entomologists in the UK with a research profile that spans from functional genomics of disease vectors to clinical trials; implementation research and the development of tools for monitoring and evaluation of disease transmission.

Drug and diagnostic discovery and development is a pillar of LSTM activity. The Research Centre for Drugs and Diagnostics (RCDD) works with industry, academia and NGOs to discover, develop and deliver novel therapies against a range of drug resistant pathogens. The Centre has access to state-of-the-art laboratories and equipment including Category 3 laboratories, medicinal chemistry laboratories, analytical laboratories, robotic liquid handling and high content imaging platforms.

Professor Janet Hemingway CBE, Director of Liverpool School of Tropical Medicine, said: "Being in Liverpool ensures that we have access to world-leading universities, global pharmaceutical companies and strong support networks, and can continue to lead innovation to break the cycle of poor health and poverty to improve the health and well-being of millions."

UNLEASHING THE POWER **OF BIG DATA.**

The ability to crunch billions of datasets on an industrial scale needs the power of supercomputers.

The UK has a National Health Service (NHS) with more than 60 million patients along with industry access points to dedicated networks for research, development, and clinical delivery. Combined with increasing electronic health records, large-scale clinical datasets, well-characterised patient cohorts, stratification tools, and biobanks, the UK offers unrivalled data and infrastructure to help your business develop and deliver more stratified medicine.

At Sci-Tech Daresbury, a national science and innovation campus located between Liverpool and Manchester, companies are taking advantage of Europe's largest industrial scale supercomputer.

The Hartree Centre at Sci-Tech Daresbury enables life sciences firms to analyse large datasets. Detailed modelling and simulation of molecular structures through generating 2D and 3D visualisations can reduce R&D costs by streamlining prototyping and accelerating the innovation cycle.

CASE STUDY:
ACCELERATOR

Liverpool's future as a world-class life sciences hub is taking a major step forward with a new £25 million laboratory development that enables innovative research into disease resistance. Accelerator, completed in September 2017, is the first development in the creation of a city centre health campus that is being built on the site of the new state-of-the-art Royal Liverpool University Hospital.

The Liverpool Health Campus consists of 200,000 sq m of space, attracting life sciences, biomedical research companies and health organisations. This will generate 5,000 high value jobs and help the city develop a thriving life sciences economy.

Janet Budd, Director of Accelerator at the Royal Liverpool and Broadgreen University Hospitals NHS Trust, said: "The Accelerator will provide a hub for life sciences, enabling clinicians, academics and industry to collaborate in research and innovation to develop their ideas into the very latest life-saving treatments. It's a focal point for international businesses to develop solutions with global impact."

CONCENTRATION OF **BIOMANUFACTURING.**

The Liverpool City Region is one of the largest biopharmaceutical manufacturing clusters in Europe.

Major manufacturers such as AstraZeneca, Seqirus, Bristol Myers-Squibb, Eli Lilly, Teva and Allergan, are complemented by a rapidly expanding commercial R&D community, including one of the country's largest clusters of eHealth companies.

Around 360 people work at AstraZeneca's biologics site in Liverpool, which has unique facilities to bulk-manufacture the nasal spray influenza vaccine and can produce up to 19 million vaccine doses every year. Since 2010, there has been £75 million of investment at the site to support increased production of the vaccine for use in the UK and internationally.

Bristol Myers-Squibb has a major Pharmaceutical Research Institute site in Wirral and has a long history of research and manufacturing in the region. The facility undertakes chemistry, manufacturing and control activities. These include investigation of new medicinal compounds to ascertain how they can best be turned into medicines that can be manufactured at commercial scale.

Manufacturers of diagnostic equipment and medical devices for clinical testing are located here too. The MAST Group is an independent world-class manufacturer and supplier of diagnostic products headquartered in Bootle. Manufacturing of their core range of microbiology products takes place here.

Our growing digital manufacturing capabilities are enhanced by Sensor City a Liverpool-based technical innovation centre and University Enterprise Zone that fosters the creation, development, production and promotion of cutting edge sensor technologies for use in a wide range of sectors.

Pharmaceutical and medical manufacturers in the Liverpool City Region benefit from major new investments in ports and logistics infrastructure which makes for more efficient supply-chains.

CASE STUDY:
BIOBANK FACILITATES DISCOVERY

The Liverpool Bio Innovation Hub (LBIH) Biobank is an exciting new venture, created to help SMEs access high quality biosamples and data. Based in the University of Liverpool, the Biobank has benefited by amalgamation with the Liverpool Tissue Bank, one of the oldest tissue banks in the country.

The LBIH Biobank collects biological samples (tissue and blood) from patients undergoing surgery. These samples are banked to provide an invaluable resource for research groups investigating the molecular mechanisms involved in a range of medical conditions with the aim of devising new treatments and therapies. On average, the LBIH Biobank consents and collects biological samples from over 800 patients per year.

By collecting and storing tissue the LBIH Biobank provides foundation for research into the molecular mechanisms involved in disease development and supports the discovery of new biomarkers for detection, diagnosis, treatment stratification and development.

Located together with the Biobank in LBIH is laboratory, office and write-up space for SMEs, with clinical and academic expertise close at hand to support companies.

THE RIGHT SKILLS **IN THE RIGHT PLACE.**

Liverpool City Region has the talent and skills to lead the fight against infectious disease.

As well as the world-leading researchers and students at the Liverpool School of Tropical Medicine, the region has a specialised pipeline of talent that makes it such a great place to locate.

With more than 90,000 students, of which 30,000 graduate each year, Liverpool City Region offers you direct access to some of the world's best academic talent.

University of Liverpool is a world-class university and provides one of the largest concentrations of health and life sciences expertise in the UK. The Faculty of Health & Life Sciences is the enabling organisation responsible for the thousands of experts involved in research and teaching here.

Liverpool John Moores University (LJMU) is one of the largest, most dynamic and forward-thinking universities in the UK. The School of Pharmacy and Biomolecular Sciences is one of the oldest providers of pharmacy education in Europe, delivering industry-relevant courses since 1849.

Liverpool Life Sciences University Technical College (UTC) is the first school in the UK specialising in life sciences for 14 to 19 year olds. It provides outstanding academic and vocational education by working closely with local employers to create the next generation of scientists, healthcare practitioners, engineers and entrepreneurs.

Our city region has produced innovative Skills for Growth agreements for our key sectors which reflect a unique and innovative joint working between public, private and academic organisations to address current and future skills needs.

CASE STUDY:
SEQIRUS

Seqirus, the world's no.2 influenza vaccine provider has recently committed investments of more than £60 million to expand its state-of the-art manufacturing site in Liverpool.

These investments are enabling Seqirus to fully manufacture seasonal and pandemic influenza vaccines in-house, from starting material right through to formulation, final packaging and delivery to markets all over the world. Seqirus Liverpool produces the world's only licensed adjuvanted seasonal influenza vaccine, specifically designed to protect older adults.

With extensive research and production expertise and manufacturing plants in the US, UK and Australia, Seqirus is a transcontinental partner in pandemic preparedness and a major contributor to the prevention and control of influenza globally.

CENTRE OF EXCELLENCE **IN INFECTIOUS DISEASES RESEARCH.**

A joint collaboration is innovating the way we look at infectious diseases on a global level.

The Centre of Excellence in Infectious Diseases Research (CEIDR) is a partnership between the University of Liverpool and the Liverpool School of Tropical Medicine.

Utilising a range of highly specialised facilities that accommodate the full lifecycle of discovery, development and deployment CEIDR will work with the NHS and industry to capitalise on the expertise and research within the institutions, allowing partners to simplify the R&D processes and reduce time and cost in order to accelerate new products into the marketplace.

The Centre's portfolio of external research grants is worth in excess of £100 million per annum and covers antimicrobials, diagnostics, drugs, vaccines and vector control products at all stages of the pipeline – from early stage discovery to large scale operational implementation and evaluation.

Partners of CEIDR include major players such as Abbott; AstraZeneca; BASF; GlaxoSmithKline; Pfizer; Sumitomo; Syngenta and Unilever.

CASE STUDY:
MAST GROUP

Headquartered in Liverpool City Region, MAST Group Ltd provides microbiology and immunology products to all corners of the world.

It also produces infectious disease and autoimmune diagnostics, using a variety of the latest technologies and manufactures the latest in diagnostic products for clinical, industrial and veterinary testing.

MAST offers its extensive product range through its own companies plus a global network of distributors, such as Davies Diagnostics in Johannesburg, South Africa.

It also supplies, on a country by country basis, other quality diagnostic products from several internationally renowned manufacturers.

We have a team of business location experts from across Liverpool City Region that can assist you with your next project.

We can provide detailed research on markets, sectors and workforce demographics. We can put you in touch with the right contacts at industry networks and partner organisations. We're happy to introduce you to potential partners at our world-class universities and our existing businesses. We can help you to identify all the available support to help your expansion and show you a wider range of sites, premises and development opportunities.

Email us at **LCR@investliverpool.com** or telephone +44 (0)151 233 5912
for help and we look forward to working on your plans with you.

investliverpool.com

INVESTLIVERPOOL
ADVANCING THE CITY REGION

HALTON BOROUGH COUNCIL
Knowsley Council
Liverpool City Council
Sefton Council
St.Helens Council
WIRRAL

Liverpool City Region Local Enterprise Partnership
LIVERPOOL VISION
European Union
European Regional Development Fund

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