



# Life Science **CLUSTERS**

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# Biotechnology Clusters – supporting the UK as Europe's No1 in Bioscience

## UK Trade & Investment

In 1999 the DTI report, "Biotechnology Clusters", defined ten critical factors in the generation of a successful biotechnology cluster in the UK: strong science base; entrepreneurial culture; growing company base; ability to attract key staff; availability of finance; premises and infrastructure; business support services and large companies in related industries; skilled workforce; effective networks and a supportive policy environment.

In this article, we will present the current strengths of the UK as a bioscience mega-cluster, describing its component regional clusters in the context of government support and the ways in which UK Trade & Investment interfaces with regional organisations to ensure that they meet their international objectives.

### How do the UK clusters promote development of bioscience business?

The process of converting a novel biotechnology concept into a high value product requires long-term finance, watertight legal protection, a structured but flexible company, purpose-built premises and well-established services. Highly experienced, innovative individuals are needed to carry out R&D, identify intellectual property, develop and run the business, raise capital and create partner alliances.

### How does the government support UK bioclusters?

Biotechnology, particularly the development of novel biopharmaceutical products is acknowledged as an industry with the highest risks and the highest returns, with long lead times and slow product cycles. In this challenging environment, and in order to remain competitive, the UK needs to support the creation and expansion of bioscience clusters whilst preserving innovation and entrepreneurship.

The DTI provides direct financial support via technology grants, as well as information and promotional services. UKTI represents UK bioscience overseas, providing contacts through networking and influence through lobbying. At regional level, the regional development agencies (RDAs), in partnership with private industry, provide business support services and investment funds for a broad range of companies in the sector

The RDAs also financially support bioincubator facilities and bioscience network organisations that operate at a local level, bringing together the best service

providers with biotechnology personnel at focused events, providing a source of local information and mentoring and promoting the cluster externally to encourage commercial partnering. Increasingly, these networks are associated with bioincubators, such as Diagnox in Oxford, BioCity Nottingham and CELS in the North East.

## The UK Mega-Cluster

### Cambridge

As the UK's leading cluster, home to over 185 biotech companies, 17 of the UK's publicly quoted biotech companies and a quarter of the public biotechs in Europe, Cambridge has an array of strengths. The intellectual focus provided by the famous University, which boasts 20% of the world's Nobel Prize winners in medicine and chemistry, also made Cambridge a natural starting point for biotechnology in the UK.

It contains world-leading centres of research excellence: the Sanger Centre, leading genomic research; the John Innes Centre for plant research; the Babraham Institute providing world class immunology research, with a new bioincubator; and the Laboratory for Molecular Biology that has generated a number of firsts including the antibody technologies that have produced most of the world's new biologic medicines.

Support services for biotechnology in Cambridge are delivered by ERBI, a privately run network that has strong ties with UKTI. The network provides a wide range of support including an annual BioPartnering event, business mentoring, training and education in all aspects of bioscience business and strong links to other international bodies, particularly in Europe.

### London

London is host to over 100 bioscience companies and a constellation of research, manufacturing and business units belonging to global pharma's top players, including the headquarters of GSK and Astra-Zeneca, the world's second and fifth largest pharmaceutical companies, respectively.

With 5 world-class medical schools, 28 universities and over 50 clinical research centres, the UK capital's principle strengths include medical and clinical research as well as technology innovation.

Imperial College, led for the past 6 years by Sir Richard Sykes, the former head of Glaxo-Wellcome, is one of the leading research institutions in the country. The

London Development Agency has strongly committed to the sector by funding the London Biotechnology Innovation Centre bio incubator, which provides space and support for 20 early-stage bioscience enterprises and has close ties with the London Biotechnology Network (LBN). At over 2,000 members, LBN is one of the largest of its kind in Europe, providing the internationally renowned BioWednesday event series and the annual Genesis Conference.

UKTI interacts closely with the London cluster and its companies, and has recently worked with drug-delivery optimiser Lipoxen to successfully evaluate and advise on the Indian biotechnology market, resulting in a deal that doubled the company's size and placed it in a previously inaccessible trading zone.

### South East

Oxford is now a mature cluster with over 100 biopharmaceutical/healthcare companies including many that have developed drugs that are in advanced clinical trials (e.g. Oxford Biomedica, Chroma Therapeutics), plus significant inward investment from mainland Europe and the US and a steady rate of M&A. The venture capital investment tally of £145m in 2004-5, was one seventh of the UK total. Particular strengths are in drug development, devices and diagnostics. Oxford has 4 science parks, 2 of which are linked to the University, and a strong network of seed funding.

The University's highly active technology transfer office, ISIS Innovation, generates a steady rate of spin-out and IP deals. VASTox, a highly successful drug discovery company, is one of the latest spin-outs from Oxford University. A number of 'satellites' are also present, including Diagnox, a bioincubator with onsite networking, business mentoring and laboratory support that is run as a public-private partnership by Oxford Innovation with funding support from the South East England Development Agency (SEEDA). The Harwell site supports an incubator facility for spin-out companies – one of which, Etiologics, went on to sign deals with major global firms such as Astra-Zeneca, worth up to \$0.5bn.

The South East region is itself a mature cluster providing research sites for 3 of the top 10 major global pharma companies and concentrations of biotechnology firms around Slough and Southampton.

South East Healthcare Technology Alliance (SEHTA) has been set up by SEEDA to disseminate bioscience support services across the region, and a funding organisation,

the South East Growth Fund, to match private capital injection into growing companies. SEHTA supports the South East networks, Kent Bioscience Network, OBN, Thames Valley Life Science Network and Southern Bioscience.

### South West

South West has key strengths in drug discovery, vaccines and diagnostics. The Universities of Exeter, Plymouth, Bath and particularly Bristol actively exploit their bioscience IP; Bristol has its own bioincubator and has spun out 12 bioscience companies in the last decade. The Tetricus bioincubator in Wiltshire, has been home to a number of companies, spun out of research within the government's Health Protection Agency and the Defence Science and Technology Laboratory, key biosciences players in this region.

Success stories include GW Pharmaceuticals who in 2006 brought pain-reliever Sativex and its specialised dosing device through to market, and Acolyte, sold in March 2007 to 3M. The Porton, Wiltshire based incubator is closely linked to a network of seed funds and professional service providers via Sarum Enterprises and BioApproaches SW. The latter is an independent networking organisation delivering bioscience support services on behalf of the South West England RDA and working closely with UKTI. The South West is a rapidly developing cluster that has produced several mature bioenterprises over a short time span.

### North East

Major firms Avecia, GSK, Merck and Sanofi-Aventis support the North East bioscience economy, which is boosted by over 150 companies; principal regional strengths are clinical research and, more recently, small scale and emerging technology. Excellent medical research is being carried out in the region's universities and institutes, including the Institute for Ageing & Health, and the Life Knowledge Park. Process Engineering and chemistry, a critical part of the pharmaceutical supply chain between drug discovery and the clinic, are represented strongly in this region. The main support organisation is the Centre of Excellence for Life Sciences (CELS), put in place through EU funding and the North East RDA to support existing bioindustry and attract and develop new bioscience companies. CELS also provides mentoring and brings investment opportunities, as well as developing and running business incubator and bio-park facilities. CELS is part of an extensive network of academics and links with the healthcare and process industries via BioNET and the North East Process Industry Cluster (NEPIC).

### North West

North West England is the third largest bioscience cluster, with 7 global pharma companies generating exports worth £3.4bn. This is a mature cluster that supports the entire range of biotechnology enterprise from bioincubators through to the clinical and product end of the cycle. Particular strengths in biotechnology include biomanufacture

(antibodies, vaccines, stem cells), bio- and health informatics, clinical trials and medical imaging. Manchester has the UK's largest university and Astra-Zeneca's largest research facility while Liverpool houses the National BioManufacturing Centre. The UK Biobank Storage facility, the Wolfson Molecular Imaging Centre and the Core Technology Facility for post-incubator biotech and healthcare companies are also located in the North West. These projects are managed by BioNoW, the bio-cluster programme within the Northwest Regional Development Agency.

### East Midlands

The East Midlands is home to the Universities of Nottingham and Leicester, with exceptional biomedical research capabilities, and a major manufacturing and research site for Astra-Zeneca. Nottingham has long been associated with Boots pharmaceuticals R&D centre, purchased by BASF in the 1990s and then donated to Nottingham Trent University in 2001 to become the BioCity Nottingham innovation and incubation centre. BioCity Nottingham is an example of the application of commercial cluster policy, bringing together the academic strength of the 2 local universities and support from DTI, EU and the East Midlands Development Agency as well as commercial sponsors and an in-house business advisory team. By early 2007 Biocity housed over 40 companies either actively engaged in, or supporting, commercial bioscience and had initiated a third phase of development, becoming the UK's largest bioscience incubation centre.

Region	Key Strengths	RDA	Key Multipliers	Centres of Excellence
Cambridge	<ul style="list-style-type: none"> <li>fully established cluster.</li> <li>technology development</li> </ul>	East of England Development Agency	ERBI	<ul style="list-style-type: none"> <li>Sanger Centre</li> <li>Babraham Institute</li> <li>John Innes Centre</li> <li>Laboratory of Molecular Biology</li> </ul>
London	<ul style="list-style-type: none"> <li>finance capital</li> <li>world conference centre</li> <li>medical research</li> </ul>	London Development Agency	London Biotechnology Network	<ul style="list-style-type: none"> <li>London Bioscience Innovation Centre</li> <li>Imperial College</li> <li>Numerous medical schools, hospitals and institutes</li> </ul>
Oxford	<ul style="list-style-type: none"> <li>drug discovery</li> <li>diagnostics</li> <li>devices</li> </ul>	South East England Development Agency	South Healthcare Technology Alliance	<ul style="list-style-type: none"> <li>Weatherall Institute of Molecular Medicine</li> <li>Oxford Genetics Knowledge Park</li> <li>Diamond Synchrotron</li> <li>MRC Harwell</li> </ul>
North West	<ul style="list-style-type: none"> <li>biomanufacture</li> <li>bio- and health informatics</li> <li>clinical trials</li> <li>medical imaging</li> </ul>	Northwest Regional Development Agency	BioNoW	<ul style="list-style-type: none"> <li>National Bio-Manufacturing Centre</li> <li>UK Biobank Storage Facility</li> <li>Wolfson Molecular Imaging Centre</li> <li>Northwest Institute for Bio/Health Informatics</li> </ul>
South West	<ul style="list-style-type: none"> <li>drug discovery</li> <li>vaccines</li> <li>diagnostics</li> </ul>	South West England RDA	BioApproaches SW	<ul style="list-style-type: none"> <li>Health Protection Agency</li> <li>Defence Science and Technology Laboratory</li> </ul>
North East	<ul style="list-style-type: none"> <li>clinical research</li> <li>small &amp; large scale process</li> <li>emerging technology.</li> </ul>	North East RDA	BioNET North East Process Industry Cluster	<ul style="list-style-type: none"> <li>Centre of Excellence for Life Sciences</li> <li>Institute for Ageing &amp; Health</li> <li>Life Knowledge Park</li> </ul>
East Midlands	<ul style="list-style-type: none"> <li>biomedical research</li> <li>newly created cluster</li> </ul>	East Midlands Development Agency	BioCity (Nottingham)	<ul style="list-style-type: none"> <li>Institute of Pharmaceutical Sciences and Experimental Therapeutics</li> <li>Interdisciplinary Biomedical Research Centre</li> <li>Cancer Research Nottingham Centre</li> </ul>
Scotland	<ul style="list-style-type: none"> <li>scientific excellence</li> <li>financial services</li> <li>innovative business models</li> </ul>	Scottish Enterprise	Nexxus BioDundee Edinburgh BioAlliance	<ul style="list-style-type: none"> <li>Translational Medicine Research Collaboration</li> <li>Scottish Centre for Regenerative Medicine</li> <li>Centre for Biomedical Research</li> </ul>
Wales	<ul style="list-style-type: none"> <li>clinical research</li> <li>medical technology</li> <li>diagnostics</li> </ul>	Welsh Assembly Government	Wales Trade International	<ul style="list-style-type: none"> <li>Wound Healing Research Unit</li> <li>AberBioCentre</li> <li>Centre for Applied Marine Sciences</li> </ul>
Northern Ireland	<ul style="list-style-type: none"> <li>cancer biotech</li> <li>medical devices</li> </ul>	Invest Northern Ireland	Invest Northern Ireland	<ul style="list-style-type: none"> <li>Medical Polymers Research Institute</li> <li>Centre for Functional Genomic &amp; Molecular Biodiversity</li> <li>RTD Centres of Excellence in Proteomics</li> <li>Speciality Pharmaceuticals Centre</li> <li>Centre of Excellence for R&amp;D in Controlled Drug Delivery</li> </ul>

## Scotland

Scotland has a centuries-old record of world-class biomedical research; today, around 250 companies make up the life science sector in drug discovery and medical technologies, with many award-winning examples such as CXR Biosciences, first winner of UKTI's Innovation in Enabling Biotechnology Award, and Cyclacel, the first European spinout to raise more than \$100m in private equity. With a mature and established cluster already in place, in 2005 Scottish Enterprise in alliance with key stakeholders launched a national strategy to exploit Scotland's key strengths in scientific excellence, financial services and innovative business models, to create world-leading centres of excellence. Early successes include the Translational Medicine Research Collaboration between the four main Universities, Glasgow, Edinburgh, Aberdeen and Dundee, Scottish Enterprise and global pharmaceutical company Wyeth in a £100m deal. Edinburgh is famous for the first successful mammalian cloning, and this excellence in stem cell research has led to the launch of the £59m Scottish Centre for Regenerative Medicine. In addition, the Centre for Biomedical Research is a £600m public/private sector investment to create a flagship Life Science Campus that will house both academic and commercial research, attracting the world's best bioscience researchers and companies.

## Wales

The Wales biocluster is one of the most rapidly growing in the UK, with particular strengths in clinical research, medical technology and diagnostics.

The merger of Cardiff University with the University of Wales College of Medicine created one of the UK's largest research institutions, and Welsh Universities turn out 12,000 bioscience graduates per year. A focus on academic-commercial collaboration has attracted and retained multi-national names such as GE Healthcare, Convatec (Bristol Myers Squibb), Merck, Bayer, Ortho and Huntleigh Diagnostics, generating commercial opportunities for local SMEs and University spinouts.

Notable centres of excellence include the Wound Healing Research Unit at Cardiff, AberBioCentre at Aberystwyth and the Centre for Applied Marine Sciences at Bangor. Sector development is supported by "Team Wales", including the Welsh Assembly Government and International Business Wales.

Mentoring and signposting is provided by the regional business network, Technium, while Finance Wales provides funds to help innovative SMEs.

## Northern Ireland

In Northern Ireland approximately 50 biosciences companies generate turnover of

around £300m, including Almac Sciences, Radox Laboratories, and Warner Chilcott UK. Invest Northern Ireland (Invest NI) is the main biotechnology support agency, which has identified 2 key areas within life sciences, i.e. cancer biotech and medical devices. Other niche strengths include: tissue engineering; diabetes; bio-informatics; clinical trials; neurodegenerative diseases and infectious diseases.

Invest NI supports areas such as strategy development, people development, R&D and export. Within the biotech sector Invest NI is providing £7.7m of financial assistance to 5 Centres of Excellence and the Proof of Concept programme supports the pre-commercialisation of leading-edge technologies emerging from Northern Ireland's universities.

## Bioclusters have helped maintain the UK's bioscience lead

By playing to the key strengths intrinsic to the location, clusters of 'cooperative competition' have been built which attract the best innovators and entrepreneurs. The strengths of the clusters have enabled the UK to develop the most mature bioscience industry in Europe, second only to the US. From initial discovery to market, the UK has developed a strong high quality pipeline.



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