

Ireland BIOTECHNOLOGY



An Introduction to the Biotechnology Sector in Ireland

Invest | Innovate | Inspire

Invest Innovate Inspire

A unique feature of the Irish business environment is the productive collaboration between industry, academia and Government agencies. These stakeholders work together as a national team to consolidate Ireland's position as a knowledge-based economy and as a prime location for Research, Development and Innovation (RD&I). Ireland continues to be a vanguard of industrial development, receiving top global recognition from organizations including The Heritage Foundation, the Economist Intelligence Unit, Harvard Business Online, and AT Kearney.

The life sciences sector in Ireland continues to thrive, both with Irish and overseas companies. Ireland is now in a leadership position in many key business segments. Most of the world's leading life science companies have significant operations in Ireland along with a thriving and growing domestic sector. This concentration of activity and expertise in Ireland is supported by a high level of government funding through Science Foundation Ireland, IDA Ireland and Enterprise Ireland.

Today, Ireland is a global competitor for Research, Development and Innovation investment from multinational

companies. This is a result of a concerted effort through government policy to build a substantial foundation of world-class science and technology in Ireland's academic institutions and, in particular, the encouragement of strong business and academic collaborations.

Over the last number of years, Ireland has secured over \$5 billion of investment from global companies such as Allergan, Bristol-Myers Squibb, Genzyme, Gilead, Centocor, Merck, Wyeth, Pfizer and Schering-Plough. Irish companies such as Elan, Trinity Biotech, Merrion and Opsona, to name a few, are at the forefront of innovation in Ireland.

Developing the Cluster

Ireland has grown a globally significant Life Sciences industry, with over 170 companies employing 40,000 people and generating \$46 billion in exports each year. This represents 42% of exports from Ireland.

Ireland has recently secured in excess of \$5 billion of investment in the life sciences sector from companies such as Allergan, Bristol-Myers Squibb, Genzyme, Gilead, Centocor, Merck, Wyeth, Pfizer and Schering-Plough. Merck & Co Inc, the seventh largest pharmaceutical company in the world, commenced construction of a \$300 million strategic vaccine facility in Ireland. Pfizer is investing \$260 million building a biopharmaceutical development and manufacturing facility.

The satisfaction of industry leaders with their decision to establish substantial operations in Ireland has resulted in several examples of multiple investments. Highlights of these include Abbott and Johnson & Johnson with six operations and Wyeth with four. In addition, Pfizer operates five manufacturing sites along with a corporate bank and a European financial shared services center in Ireland.

Venture Capital Funding

Ireland is better positioned than most countries in terms of availability of finance for suitable life science companies. Irish venture capital companies have over \$950 million to invest in Irish firms.

Under the 2007-2012 Seed and Venture Capital Programme, the Government, through Enterprise Ireland, is investing \$175m, which will leverage an

estimated investment of \$1bn in start-up, early stage and development stage businesses.

Companies raised €288m in 2009, up 18.6% on the previous year according to the Irish Venture Capital Association (IVCA) Venture Pulse survey. This strong performance was against a backdrop of a severe shortage of credit and the global banking crisis. The number of companies that raised funds in 2009 was 139 compared to 93 in 2008 and 82 in 2007.

Budgetary changes in taxation have made Ireland a prime location for the establishment of global Venture Capital and Research & Development operations according to a new report by PricewaterhouseCoopers.

“The changes have particular significance for global Venture Capital companies as the Irish Government has now introduced highly attractive tax incentives for carried interest. Ireland is now one of the most attractive countries in the world for this type of VC investment.”

“Taken together with the Irish Government’s commitment to the 12.5% corporate tax rate plus its incentives in the area of intellectual property and R&D, these additional taxation measures have positioned Ireland to the forefront of countries for IP development and management.”





Invest

Our commitment to Science, Technology & Innovation has led to the creation of world-class centers of expertise and excellence and a cluster of leading biopharma, pharma and medical technology companies.



Innovate

We have an international reputation for innovative high technology products & services. Our reputation is based upon knowledge, flexibility and the ability to deliver.

Research, Development and Innovation (RD&I)

The Government of Ireland's strategy for Science, Technology and Innovation (2006-2013) provides for investment which will:

- Double the number of PhD graduates
- Promote greater commercialization of ideas and know-how of universities and public research institutions
- Increase participation in the fields of science
- Increase translational research activity
- Allocate significant resources to support enterprise R&D

Ireland is an exciting place to carry out research in the areas of bioscience and bioengineering – across a broad range of disciplines that underpin the study of gene expression, protein synthesis and characterization, protein signalling, neuroscience, immunology, DNA, RNA, genomics, chemistry, biosensors, drug delivery and bioremediation. Research in these disciplines will critically influence healthcare, diagnostics, pharmaceuticals, environmental management, agriculture, marine science, medical devices, consumer goods and the food and drinks businesses.

Science Foundation Ireland (SFI) currently funds over 550 principal investigator-led research groups, with almost half working in the Life Sciences and related fields.

The commitments to Life Sciences research activities funded by SFI have reached in excess of \$800 million and indirectly employ well in excess of 1,000 scientific researchers within Ireland in areas as diverse as agriculture and food, sensors/ devices, molecular and cell biology, microbiology, nanotechnology and bioinformatics/ systems biology.

An integral part of SFI investment is to focus research in areas of strategic importance to Ireland. The SFI Strategic Research Clusters (SRCs) and Centres for Science Engineering and Technology (CSETs) encourage collaboration with industry around strategic areas of research. Ten of the SRCs exist within the Life Sciences space, including the Solid State Pharmaceuticals Cluster (SSPC) in Limerick, the Network of Excellence in Functional Biomaterials (NFB) and Glycoscience Research Clusters in Galway and the Irish Drug Delivery Network and BioNanoInteract Clusters at University College Dublin. Between them, these clusters alone have over 30 industry partnerships with a diverse range of international companies, including Medtronic, Boston Scientific, Pfizer and GlaxoSmithKline. SFI most significant awards are CSETs. To-date SFI has supported ten CSETs – four in the Lifesciences and six in the ICT sector.

Research, Development and Innovation (continued)

Examples of SFI CSETs in the Life Science sector are;

Alimentary Pharmabiotic Centre (APC)

University College Cork - www.ucc.ie/research/apc

The goals of the APC include investigating the means by which intestinal bacteria influence health and disease; developing new therapies for debilitating gastrointestinal diseases (such as gastroenteritis, *C. difficile*, ulcerative colitis and Crohn's disease); exploring commercial opportunities in both the pharma and functional food sectors; and positioning Ireland at the forefront of this exciting new area.

Collaborating partners: Alimentary Health, GlaxoSmithKline and Teagasc (the Irish agriculture and food development authority).

Biomedical Diagnostics Institute (BDI)

Dublin City University - www.bdi.ie

BDI is carrying out cutting-edge research to develop the next generation of biomedical devices that will directly affect the quality of people's lives worldwide over the coming decades. The diagnostic devices and sensors will aim to detect minute concentrations of disease related molecules in biological samples like blood, saliva and breath.

Collaborating Partners: Åmic AB (recently acquired by J&J Ortho-Clinical Diagnostics), Analog Devices Inc., Becton Dickinson and Co., Biosurfit S.A., Enfer Technologies Ltd., Hospira Inc., Inverness Medical Innovations Inc., Millipore.

Regenerative Medicine Institute (REMEDI)

National University of Ireland, Galway - www.remedi.ie

REMEDI is a world class biomedical research centre focusing on gene therapy and stem cell research. In state of the art facilities, researchers work together to combine the technologies of gene therapy and adult stem cell therapy with the aim of regeneration and repair of tissues. The unique feature of the research carried

out at REMEDI is the novel integration of both therapies in a complementary research and development programme.

Collaborating Partners: Medtronic and Smith & Nephew.

Systems Biology Ireland (SBI)

University College Dublin www.ucd.ie/sbi

Systems Biology Ireland will build the foundations of the science through the development of platforms and expertise in systems biology by focusing on defined scientific projects. In an effort to solve critical biological and biomedical problems, SBI research projects will be driven by the need to address biological questions for tangible benefits. In order to achieve a systems level understanding, the conceptual framework to rationalise complex biological relationships will come from mathematical modelling.

Collaborating Partners: Ark Therapeutics, Hewlett Packard, Servier, Agilent Technologies, Siemens Ireland and Protagen AG

Commercialization and Campus Innovation

Enterprise Ireland, the Irish development agency responsible for supporting indigenous industry, has made significant investments in initiatives and research projects to strategically commercialize biotechnology research from colleges and institutes in Ireland. Its Lifesciences Group supports the commercialization of applied bioresearch into technologies that will either form the basis of new start-up companies or will be licensed to established companies.

Examples of spin out companies from such research include Opsona Therapeutics and Berand Neuropharmacology.

Opsona Therapeutics is a drug development company, focused on novel therapeutic and preventative approaches to autoimmune and inflammatory diseases. The company was founded in 2004 with three of Trinity College Dublin's respected immunologists. The company is specifically interested in drugs which modulate the immune system and its signalling, specifically Toll-Like Receptors

(TLR). The company has signed some significant partnering and collaborative deals, such as with Wyeth.

Berand Neuropharmacology from University College Dublin focuses on the evaluation of promising drugs directed against neurodegenerative conditions, such as Alzheimer's disease and schizophrenia.

Incubation Centers

Incubation Centers enable those with cutting edge ideas to test out the market potential of those ideas in a supportive business-orientated environment. Experience has shown that up to 20% of high potential companies in Ireland have their origins on campus.

An Enterprise Ireland supported bio-incubation facility has been established at St. James's Hospital, Dublin. Designed to facilitate the translation of science and research into products that are used to diagnose and treat disease, the bio-incubator is one of six that have recently come on stream providing professional research and commercialization services, as well as access to financial, legal and marketing advice.

BioPharma Campus, Galway

Another interesting development is the pre-approval for a fully permitted, 67 acre BioPharma campus in Galway on the west coast of Ireland. The site includes planning permission for water purification buildings, waste water treatment facilities, a laboratory, fermentation, purification and fill finish buildings, along with all other ingredients necessary to implement a fully operational BioPharma campus. The flexibility of the planning permission allows for any combination of buildings to be erected and significantly removes risks to a project. With a high quality manufacturing environment, supported by a university city, and the ability to avail of low corporation tax, this option will likely prove enticing for any new strategic business investment.

Competence Centers

Competence Centers, a joint initiative from Enterprise Ireland and IDA Ireland, are collaborative entities established and led by industry that are resourced by highly qualified researchers associated with research institutions who will undertake market focused strategic research and development for the benefit of industry. This 'competence center' model facilitates groups of companies, operating in the same business area, coming together to define a common research interest that could positively impact on the development of their business.

Tax and intellectual property

Ireland's intellectual property laws provide companies with incentives to innovate. The Irish tax system offers huge support to turn brilliant ideas into the finished article. A highly competitive corporate tax rate of 12.5% is a major incentive. No tax is paid on earnings, up to €5 million, from intellectual property where the underlying research and development work was carried out in the European Economic Area (EEA).

Success through People

In Ireland, the importance of the personal touch can rarely be overstated. Human engagement is a national habit, a central part of everyday life. As a result of this high level connectivity, Ireland is a global center for science and innovation based activities.

Developing and maintaining a skilled life sciences workforce is a major priority for Ireland. The share of the 25-34 year olds completing college education in Ireland today is 40%, as compared to an OECD average of 31%. The International Institute for Management Development, Switzerland 2008 yearbook, rates Ireland's education system as one of the best in the world with Human Development Index, Higher education achievement, and Funding for technological development listed as infrastructural strengths.

Recognizing the need to continually innovate in this dynamic area, the Government of Ireland established a National Bioprocessing Research, Education, Training and Service facility (NIBRT). This followed wide consultation in the US and Europe with businesses and academia in the biotechnology field, where it is accepted that bio-pharma globally is restricted by skills shortages and technical bio-processing challenges. Taking into account the key educational and industrial issues identified, it is anticipated that the facility, with a capital investment of almost \$80 million, will generate a substantial workforce with highest levels of best practice skills across the spectrum of bioprocessing activities readily applicable in a real-time scale-up environment.

Additionally, in conjunction with academic institutions, NIBRT will focus on academic/industry collaborative

research with an emphasis on advancing knowledge in bioprocessing technologies and techniques and the technical problems of scale-up and related issues.

Ireland has always had talented scientists, and this local talent is now being complemented by some of the world's leading life sciences researchers. International researchers have come here, attracted by the 'buzz' of activity, as well as the funding and facilities.

This is a small, sociable country, with networking opportunities second to none, and with easy access to decision makers at all levels of government and industry. This means that problems can be resolved quickly, with people in authority always ready to listen. Academic researchers, industry and government agencies, all in close partnership, are working to realize the ambition of seeing Ireland recognized as an internationally renowned location of excellence in life sciences research, entrepreneurship and business development.

In Ireland, the importance of the personal touch can rarely be overstated. Human engagement is a national habit, a central part of everyday life. As a result of this high level connectivity, Ireland is a global center for science and innovation based activities. Ireland produces success through people.



A close-up photograph of a scientist in a laboratory. The scientist is wearing safety glasses and a white lab coat. They are holding a test tube with a blue cap that contains a red liquid. The background is a bright blue wall with a white dot pattern. The overall image has a halftone or dot-matrix texture.

Inspire

We have an appetite for knowledge
and a passion for life

Our Formula for Success

Ireland provides a world class research landscape, a cluster of biopharma, pharma, and medical device and diagnostic companies, a business friendly environment, a commitment to the development of the Biotechnology sector and an innovative talent pool. To find out how you can apply this formula to your business, talk to us or visit our website at www.biotechnologyireland.com

Enterprise Ireland

Enterprise Ireland is responsible for the development and promotion of the indigenous business sector. Its mission is to accelerate the development of world class Irish companies to achieve strong positions in global markets resulting in increased national and regional prosperity. It facilitates collaborative links between enterprise and the research community that lead to the practical application of research in business, yielding benefits to both groups.

IDA Ireland

IDA Ireland is the Irish Government's inward investment promotion agency responsible for the attraction and development of foreign direct investment in Ireland. In partnership with a wide array of national stakeholders, IDA continues to position Ireland as the innovation led and knowledge based economy of choice for global investment.

Science Foundation Ireland

Science Foundation Ireland (SFI) is the national foundation for excellence in scientific research. SFI is investing in academic investigators and research teams who are most likely to generate new knowledge, leading edge technologies and competitive enterprises in the fields of science and engineering which underpin the broad areas of Biotechnology; Information and Communication Technology and sustainable energy and energy efficient technologies.

The Irish Bioindustry Association

The Irish Bioindustry Association (IBIA) is the leading representative body for the biotechnology industry in Ireland. It is affiliated to the Irish Business and Employers Confederation (IBEC). The main aim of the IBIA is to promote, support and encourage the further development of the biotech sector in Ireland.





Ireland

We are a politically stable, open economy, which is flexible and fast moving. We can quickly adapt to meet the demands of a fast moving life sciences sector.



Head Office The Plaza, East Point Business Park, Dublin 3, Ireland
New York Ireland House, 345 Park Avenue, 17th Floor, New York, NY 10154-0037

Tel: +353 1 727 2000
Tel: +1 212 371 3600

www.enterprise-ireland.com



Head Office Wilton Park House, Wilton Place, Dublin 2, Ireland
Chicago 77 West Wacker Drive, Suite 4070, Chicago, IL 60601-1629
New York 345 Park Avenue, 17th Floor, New York, NY 10154-0004

Tel: +353 1 603 4000
Tel: +1 312 236 0222
Tel: +1 212 750 4300

www.idaireland.com



Head Office Wilton Park House, Wilton Place, Dublin 2, Ireland

Tel: +353 1 607 3200

www.sfi.ie



**IRISH BIOINDUSTRY
ASSOCIATION**

Head Office Confederation House, 84-86 Lower Baggot Street, Dublin 2, Ireland.

Tel: +353 1 605 1616

www.ibia.ie



www.biotechnologyireland.com