

biotech focus

Dundee: discovering life sciences

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Dundee is home to one of the most exciting life sciences clusters in the UK, with world-class companies, universities, research institutions and scientists all within a three mile radius.

Dundee – ‘City of Discovery’ – is one of Scotland’s major cities with a population of 142,000 (Figure 1). Steeped in history, Dundee is situated on the banks of the river Tay where it commands excellent communication links through road, rail, air and sea, being 90 min drive from 90% of the Scottish population including Edinburgh and Glasgow, on the main UK east-coast rail line, and having a city-centre airport with direct London flights. The scenic location gives rise to a high quality of life offering beautiful countryside, excellent cultural amenities and a wide range of sporting and recreational activities. Dundee is a lively hub of contemporary art and culture, and is large enough to have all the advantages of city life but compact enough to offer rewards, such as short commuting times. The cost of living is low – 19.2% cheaper than the rest of the UK on average, with house prices at a quarter of London and half of Edinburgh prices. According to the Lonely Planet Guide to Scotland, the people of Dundee are ‘among the friendliest, most welcoming and most entertaining people you’ll meet anywhere in the country’.

Dundee is a major player in the UK and European life sciences industry, with ~15% of the life sciences companies in Scotland located in the city and surrounding area. Dundee has been one of the few areas to maintain growth in this sector at an average rate of 10–20% per

annum and life sciences now account for 16% of the local economy. The life sciences sector in the area comprises biotechnology, pharmaceuticals, medical devices, diagnostics and contract research organisations. With 25 core life sciences companies (and a similar number of support organisations) and an internationally renowned academic sector, Dundee is the hub of Scotland’s life sciences cluster and currently employs 3,800 people, with a forecasted growth of 10% per annum over the next three years.

Academic Excellence

The success of Dundee’s life sciences sector can be largely attributed to the high quality of the city’s universities and research institutes.

The University of Dundee

The University of Dundee has powered its way to a position as one of Europe’s leading universities with an international reputation for excellence, particularly in the life sciences and laboratory-based medicine – both awarded the highest possible five-star rating for international excellence in research. For the past two years, the University of Dundee has been voted best scientific workplace in Europe in a poll conducted by The Scientist magazine. Over the past ten years, the university has more than doubled in size to 15,000 students and over 3,000 staff making it one the largest local employers. The University punches well above its weight in research, attracting nearly £150 million in the past three years in research income through grants. An annual turnover of £150 million

generates £234 million downstream for the economy. Excellence in research has led to a strong drive for commercialisation, particularly in the life sciences where several innovative knowledge transfer models have been successful. These include company-creation and collaborations, such as:

- the LINK programme with 15 major pharma companies, which has led to three new consortia and two spin-out companies;
- the Division of Signal Transduction Therapy, a unique collaboration to facilitate the development of novel drugs to treat diabetes and other global diseases with six of the world’s leading pharmaceutical companies. A new £15 million deal means that the companies jointly fund and share basic research likely to lead to the identification of new drug targets, and receive services relating to drug development and screening.
- 16 University spin-out companies over the past 10 years, nine of them in life sciences and medical devices.

Spin-outs from the university include Cyclacel, the biopharmaceutical company that designs and develops small-molecule drugs that act on key cell cycle regulators to stop uncontrolled cell division in cancer and other diseases involving abnormal cell proliferation. Cyclacel has recently merged with its New Jersey based rival, Xcyte, securing a sought-after Nasdaq listing. CXR Biosciences, a £4 million spin-out launched in 2002, applies molecular biology and postgenomic technologies to improve preclinical drug development and the safety assessment of chemicals. Axis Shield is one of Scotland’s most established and successful medical diagnostics companies, specialising in point-of-care diagnostics kits in areas such as cardiovascular and neurological diseases, rheumatoid arthritis and diabetes. IDMoS, the diagnostics company

**FIGURE 1**

Dundee: city of discovery. The RRS (royal research ship) Discovery, launched in 1901 and designed for Antarctic research, is a famous local landmark.

specialising in the detection and management of dental disease, successfully floated on the Alternative Investment Market in November 2004. [Table 1](#) contains an overview of successful companies in the Dundee area.

The University of Abertay Dundee

The University of Abertay Dundee is a centre of excellence in environmental sciences, being home to the Abertay Centre for the Environment (ACE), the Urban Water Technology Centre (UWTC) and a mathematical biology centre (SIMBIOS). These three groups can offer solutions to environmental problems for companies large and small, and SIMBIOS also offers assistance with research in areas like biomedical modelling, community and population dynamics, and molecular bioinformatics. Abertay has recently established a new Centre for Molecular and Cellular Biosensor Research (CMCBR) to develop high-throughput cell-based assays.

Scottish Crop Research Institute

The Scottish Crop Research Institute (SCRI) is the leading centre in the UK for research on potatoes, barley and soft fruit crops. In addition, the SCRI carries out research on a wide range of temperate, subtropical and tropical crops. The range of skills available – from fundamental studies on genetics and physiology, through to agronomy, pathology, and glasshouse and field trials – is unique within the UK research service. In the past five years, collaborative links have been maintained with over 300 institutions in 54 countries. Current commercial contracts include GlaxoSmithKline, McCain Potatoes and Walkers Snack Foods.

TABLE 1

Some of Dundee's life-science companies

Company	Expertise	URL
Alchemy Laboratories	Diagnostics, gold colloid technology	www.alchemylabs.co.uk
Axis-Shield	Medical diagnostics	www.axis-shield.com
CXR Biosciences	Preclinical drug development, toxicology	www.cxbiosciences.com
Cyclacel	Cancer research, biopharmaceuticals	www.cyclacel.com
Cypex	Biopharmaceuticals, contract services	www.cypex.co.uk
DDS Medicines Research	Clinical trials, contract services	www.ddsmr.com
IDMoS	Diagnostics, dental management system	www.idmos.com
Karl Storz UK	Medical devices	www.karlstorz-uk.com
Mylnefield Research Services	Agri-biotech	www.mrsltd.com
Pleiad Group	Consultancy services, product development	www.pleiad.com
Tayside Flow Technologies	Medical devices	www.tayflow.com
Upstate	Biopharmaceuticals, high throughput screening	www.upstate.com
WL Gore	Medical devices	www.gore.com

Leading Scientists

Some of the world's most cited scientists in their field of expertise have based themselves in Dundee, and their enthusiasm, energy and influence have been crucial to the growth of the life sciences sector in the city.

Sir Philip Cohen is Director of Research at the School of Life Sciences, Director of the MRC Protein Phosphorylation Unit and Co-Director of the Division of Signal Transduction Therapy at the University of Dundee. Sir Philip is the most cited bioscientist in Europe and is a world leader in the field of protein kinases. His team's research has led to the identification of several new protein kinases that are targets for the development of new drugs for diabetes. His collaboration with Upstate, a Dundee-based wholly owned subsidiary of Serologicals, has helped to significantly enhance the company's catalogue of screening products and services.

Roland Wolf is Director of the Biomedical Research Centre at the University of Dundee and has an international reputation for his work in the field of molecular pharmacology, specifically drug resistance in cancer patients. He is also co-founder of CXR Biosciences. Wolf has said, 'it is coming to the point now where people given the choice of Dundee or Cambridge are heading for Dundee'.

Dario Alessi was appointed Principal Investigator at the MRC Protein Phosphorylation Unit in 1997, where he studies the molecular mechanisms of the physiological effects of insulin and other growth factors. Moreover, he seeks to exploit his observations to develop novel treatments for diabetes and cancer. Alessi was the youngest ever winner of the Colwarth Medal for the UK's most promising young biochemistry researcher, and the first scientist in Scotland to be awarded the Eppendorf Young European Investigator Award. In 2005, Alessi and his colleagues discovered that the drug Metformin, which is commonly used to treat Type II diabetes, could possibly be used as an anti-cancer drug.

Dundee prides itself on its world-leading research centres. In 1997, the Wellcome Trust Biocentre opened at the University of Dundee (Figure 2). This facility was funded mostly by the Wellcome Trust, the £10 million donation is thought to be the largest single donation ever given to a Scottish Institution. The most recently opened research centre is the £20 million Centre for Interdisciplinary Research – also at the University of Dundee – which houses 250 scientists and support staff. The centre provides world-class facilities in medicinal and synthetic organic chemistry, computational chemistry and compound screening laboratories, aimed at disco-



FIGURE 2
The Wellcome Trust Biocentre, University of Dundee.

vering new drugs for the treatment of global parasitic diseases. Due to open in 2006, the £12.1 million Clinical Research Centre (CRC), at Ninewells Hospital, is aimed at harnessing Dundee's expertise in biomedical research to further the understanding of disease. The centre will attract international clinical academics researching disease prevention, diagnosis and early therapy in diseases including cancer, cardiovascular, diabetes and mental health.

Property and Infrastructure

Dundee has several locations that provide fit-for-purpose accommodation for the majority of the core life science companies. Dundee Medipark is a new 25 acre site on the campus of Ninewells Hospital and Medical School. Two young companies, Cypex, which manufactures high quality *in vitro* drug metabolism systems, and Alchemy Laboratories, specialising in gold colloid technology, are currently having purpose-built premises constructed at the Medipark, having grown out of their existing accommodation. Dundee Technology Park is the site of many life sciences companies in the area, and the Dundee Technopole (Figure 3) houses Cyclacel and CXR

Biosciences, as well as the University of Dundee Incubator facility, which offers fit-for-purpose accommodation for new technology companies, whether they are spin-outs from the University or not.

Industry Support

In 2003, three Intermediary Technology Institutes (ITIs) were formed in Scotland in the fields of energy, techmedia and life sciences. These ITIs have been given £150 million each to invest in research into innovative new technologies in the next 10 years. ITI Life Sciences has based its operations in Dundee. Companies can join ITI Life Sciences to take advantage of member benefits that include market foresighting information, access to a global network of companies and researchers, leverage of existing R&D spend, and participation in the ITI research programme. In addition, ITI Life Sciences identifies future emerging markets and business opportunities and can fund projects that they feel can develop commercially viable solutions to meet global market trends. Five projects have been announced so far, including a £5.5 million R&D programme between CXR Biosciences and the



FIGURE 3
The Dundee Technopole.

TABLE 2

Useful links

Organisation	URL
BioDundee	www.biodundee.co.uk
Dundee City Council	www.dundee.gov.uk
ITI Life Sciences	www.itilifesciences.com
Locate Dundee	www.locate-dundee.co.uk
Scottish Enterprise	www.scottish-enterprise.co.uk
Scottish Crop Research Institute	www.scri.sari.ac.uk
SMART and SPUR awards	www.scotland.gov.uk/innovationgrants
University of Abertay Dundee	www.abertay.ac.uk
University of Dundee	www.dundee.ac.uk

German company Artemis Pharmaceuticals to develop new screening and safety models to predict more accurately the effects of drug compounds and their breakdown products in the human body.

Dundee is an area that qualifies for regional selective assistance, a national grant scheme administered by the Scottish Executive. It is aimed at encouraging investment and job-creation in the areas of Scotland designated for regional aid under European Community law

(the assisted areas). Discretionary grants are offered for projects that involve an element of capital investment, will create or safeguard jobs and meet the necessary criteria. Several life sciences companies have benefited from this scheme. Scottish companies can also enter the SMART:SCOTLAND competition aimed at stimulating and creating new innovative businesses and to help existing small businesses improve their competitiveness by developing new products and processes to the benefit of the

Scottish economy. Support is made available at 75% of eligible project costs. The maximum award is £50,000. If a company wins a SMART award and successfully completes the project, they can then apply to the SPUR Programme for further support. This is non-competitive, and grants are available at 35% of the eligible project costs, to a maximum grant of £150,000. Both of these awards are administered by the Scottish Executive and are part-financed by the European Regional Development Fund.

Local Networking

Established in 1997, BioDundee is a partnership between public, private and academic sectors to promote the life sciences sector locally and internationally. It provides a local networking hub, including seminars, training opportunities and social events. Other activities include the publication of the BioDundee Update to over 14,000 global contacts and a local monthly newsletter. The BioDundee Annual Conference attracts 200 delegates from around the world who converge in Dundee to discuss and explore the hot topics of the moment. BioDundee also supports knowledge transfer and trade development activities and provides a focus for promoting the life sciences sector in the area. Weblinks for BioDundee, and other useful contacts are contained in Table 2.

It is the sense of community in Dundee, built up through the companies, Universities and initiatives such as BioDundee, coupled with the world class research which continually attracts top scientists to the area that have made it one of the most successful life sciences clusters in the UK.

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