

Scottish Life Sciences Strategy 2008



Achieving Critical Mass

2020 VISION

INDUSTRY FOREWORD



“Our objective is to make Scotland the best environment to locate and grow life sciences companies”

John Brown
Chair, Industry Advisory Group

Scotland is justly proud of its vibrant life sciences community with world renowned strengths in many areas.

The Scottish Life Sciences Strategy ‘2020 Vision: Achieving Critical Mass’ was launched in 2005, providing a roadmap for us to work together for the growth and development of the sector in Scotland.

The short term milestones from the original strategy have been met. It’s now time to take stock of Scotland’s recent achievements in the sector, our ‘foundations for success’, and to refresh our strategy which focuses on objectives relevant to our current environment in order to ensure we realise our vision.

In the last three years, there has been significant investment in our knowledge base, reinforcing Scotland’s commitment to scientific excellence. This excellence is being ever more successfully commercialised, with 20 new life sciences companies formed in 2007 alone. Several corporate spin outs demonstrate the sector’s increasing maturity and provide new opportunities for experienced management in Scotland. Established companies have shown continued sustainable growth, demonstrating that Scotland’s life sciences sector is moving towards critical mass. In the last year, many of our international life sciences companies based in Scotland have announced plans to expand their operations, demonstrating the attractiveness of Scotland as a location for life sciences activity.

At the core of the 2005 Strategy was the establishment of the **Life Sciences Alliance (LSA)**. The objective was to create a forum where all of the key stakeholders in our sector could interact to develop a shared set of actions. In 2008 the LSA retains a pivotal role in ensuring that we maximise our competitive advantages through collaboration.

As a small nation we can only succeed against global competition if we work together. The **Life Sciences Scotland** brand, promoting Scotland’s combined strengths, is being used by the whole life sciences community in Scotland as a visible sign of our common objectives and to promote Scotland’s capabilities in life sciences.

The objectives outlined in this refreshed strategy build on the current momentum in the sector, exploiting Scotland’s expertise for future growth. There is still significant opportunity for expansion in this competitive sector. This refreshed strategy focuses on the main themes which our extensive community consultation has identified as critical elements of a growth strategy.

People	we will attract the best and provide them with serial opportunities for employment
Technology	we will invest in innovation and develop a streamlined process for commercialisation
Capital	we will create an academic and business environment that sources of capital will seek to support
Infrastructure	we will provide facilities and communications to facilitate research and its exploitation
Collaboration	working together as Life Sciences Scotland will enable us to compete more effectively globally

This refresh of the Scottish Life Sciences Strategy highlights key steps which the life sciences community will take together to ensure Scotland maximises its return from market opportunities.

MINISTERIAL FOREWORD



Jim Mather
MSP, Minister for Enterprise, Energy and Tourism

I'm very pleased that the Life Sciences community has taken up the challenge of refreshing their Strategy for achieving critical mass by 2020.

They have already achieved the milestones set when the Strategy was first published in 2005 and it's time to move things on.

I am heartened by the level of aspiration and the recognition of the need to have an altruistic goal – Improving Health while Increasing Wealth – in their objectives along with the economic benefits. It is also good to see such a highly ambitious goal as being the Best Clinical Research Laboratory in the World.

The Life Sciences community is even making the sad reality of Scotland's poor health into a plus, while accentuating known advantages such as our reputation for integrity and reliability. It is not, however, resting on its laurels, and is looking for other opportunities in Life Sciences, particularly where it can benefit from industrial cross-pollination.

Life Sciences recognises that by being cohesive, co-operative and collaborative at home, it can be much more competitive abroad. I applaud this positive attitude and fully support it.

Collaboration takes many forms – between companies, between industry and academia, between multinationals and SMEs, between the public, private and voluntary sectors, with NHS Scotland.

On the Scottish Government's part, we are working to expand Scotland's areas of international comparative advantage by giving particular attention to building a critical mass of activity in key sectors such as Life Sciences including biotechnology and translational medicine. We can help to create the right environment for this competitiveness and growth, along with the technologies that contribute to sectoral development.

We have the people, the talent and potential to become one of the big success stories of the 21st century. I look forward to the Life Sciences industry working in continued partnership with the public sector and other organisations on the actions that deliver its key strategic aims in the next few years and beyond.

INTRODUCTION



“Scotland’s Life Sciences Alliance brings together all the key stakeholders to realise the shared vision of a vibrant and innovative life sciences community. The Life Sciences Alliance reflects the high level of co-operation between academia, government and the private sector which is a critical success factor enabling Scotland to compete globally.”

Tom Shepherd
Chair, Life Sciences Alliance

The Industry Advisory Group (IAG), along with members of the Life Sciences Alliance (LSA), instigated a refresh of the industry-led Scottish Life Sciences Strategy, which was published in 2005.

This update is necessary as the strategy has met the short-term milestones, and needs to evolve in line with the changing Scottish and international life sciences environment, as the industry in Scotland moves towards delivering its 2020 vision.

Much has been achieved over the past few years. The representative groups for the industry and wider interested organisations – IAG and LSA – have been set up and are playing leading roles in this strategy refresh. The infrastructure that lays the foundation for industry growth is being put in place – over £750m of private and public sector funding is going into projects across Scotland. Company growth has contributed to Scotland’s thriving life sciences industry, impacting significantly on the Scottish economy. The Life Sciences Intermediary Technology Institute (ITI) is now firmly established and has signed 5 license deals over the last 3 years. Furthermore, Seed, Co-Investment and Scottish Venture funds have been established within Scotland by Scottish Enterprise (SE) to leverage further growth and have invested over £40m into Life Sciences.

The sector recognises that much more needs to be done to enable Scotland to play to its research strengths applied to global markets in areas such as oncology, neuroscience, cardiovascular medicine, reproductive medicine and diabetes. These strengths also include leading edge research and company R&D in areas such as stem cell research, translational research, medical technologies, contract research and clinical trials, diagnostics and drug discovery.

Scotland seeks to sustain its growth and development in life sciences, and the attractiveness of this sector is recognised by other regions around the world. Therefore, it will be the collaborative nature of Scotland’s companies, academics, the health service and government that will underpin sustained competitiveness in life sciences.

Building on initial work of the IAG and LSA, a series of consultation workshops was held across the country to enable the wider life sciences community in Scotland to contribute to how the long-term objectives will be achieved, and what needs to be done to realise the 2020 vision. Each of the key stakeholder groups from across industry, academia, industry associations, the NHS and government has contributed to the process.

This strategy refresh therefore, builds on what has been achieved over recent years, and responds to the current environment, with objectives and an underpinning action plan to work towards achieving the 2020 Vision.

GLOBAL LIFE SCIENCES MARKET



There are significant global trends driving growth in the life sciences sector, including:

- a greater understanding of fundamental biology, which will lead to a new generation of personalised medicine
- translational medicine that offers wider opportunities for tackling major diseases
- opportunities for innovation in new therapeutic indications
- increasing focus on 'wellness' and prevention of illness, rather than cures alone, including increasing expectations from patients for side-effect free treatments
- more sophisticated technology in devices, and convergence in the application of these technologies
- focus on e-health and delivery of more personalised health care with a move away from Hospital care to primary and community care and remote patient monitoring.

Life sciences is not just about health. The definition of life sciences is constantly changing, with new sectors such as biofuels and functional foods now included in many analyses of the sector, whereas previously they were included in chemicals, energy or food. The recently published UK Life Sciences Marketing Strategy presented the following segmentation, size and growth for this industry.¹

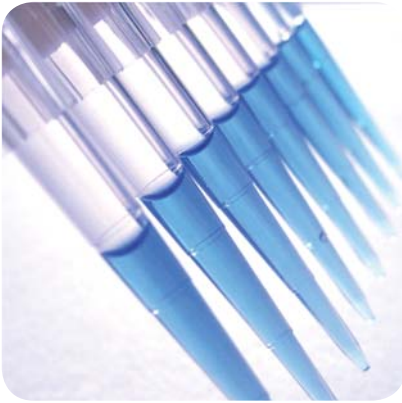
Sector	Size \$ (Year)	Growth % (Year)
Biotechnology	126.3 billion (2005)	+12.8 pa (2001-2005)
Pharmaceuticals	643 billion (2006)	+7 pa (2006)
Health care*	2.15 trillion (2006)	+6 pa (2007)

* Excludes pharmaceuticals

All life sciences sectors are growing. However, some are growing faster than others:

- biotechnology is the smallest sector in terms of market size, but has the fastest growth rate at 12.8% per annum between 2001-2005
- the pharmaceutical market is considerably larger than that of biotechnology, but has a smaller growth rate at 7% while
- health care, comprising both medical products and services, is more than twice the size of the other two sectors combined: medical devices, a single health care sub-sector, has a market size of approximately \$200b, which is substantially larger than the entire biotechnology market.

¹ UK Life Sciences Marketing Strategy, UKTI publication November 2007



A number of factors will influence this growth and the shape of the industry:

- ageing populations generating demand for new products and services
- price pressure by authorities on new drugs, devices and equipment with increasing emphasis on cost effective treatments
- greater use of generics as drugs come off patent
- more regulatory hurdles leading to increased time to market for new products and therefore higher developmental costs
- the growing trend by big pharma to undertake research as well as production in China and India, on both a cost and quality basis.

Scotland is not alone in further developing expertise in life sciences. Competition is global and will continue to challenge Scotland as it seeks to maintain a position in the top ranking life sciences communities.

While the global market will serve as a benchmark for Scotland, the Scottish sector will continue to excel in research capability and a talent to work in collaboration with like-minded organisations.

Scotland is therefore well placed to address these challenges with research strengths in so many areas including stem cells, translational medicine, medical technologies and contract research, combined with the ability of industry to collaborate with the NHS and academic institutions creating a highly valued offering.

Scotland's life sciences sector has traditionally focused on healthcare, however, there are significant opportunities for Scotland's expertise and capabilities to be applied to industrial, marine, environmental and veterinary biotechnology.

GROWTH IN SCOTLAND'S LIFE SCIENCES INDUSTRY



Scotland's thriving life sciences sector consists of 600 organisations - of which around 10% are academic - and over 30,500 employees across all of the main life sciences segments. This adds over £2.8billion to the Scottish economy annually, with a projected GVA growth rate of 7-8%, which is quadruple the average rate for Scotland².

Scotland has internationally recognised capabilities across life sciences including: drug discovery and development, contract research, medical technologies, stem cells, specialised biomanufacturing and bioinformatics. Scotland is home to one of the largest concentrations of pharmaceutical support networks in Europe, with more than 40 organisations working on clinical and non-clinical research.

20 new life science companies started trading in 2007 while the increasing numbers of corporate spin outs demonstrate the maturing of the life sciences sector in Scotland.

Since April 2007, a range of international life sciences companies - working with **Scottish Development International** - have announced plans to create around 1,150 new jobs, and safeguard a further 150 jobs in Scotland. Scottish Government RSA support has been a major factor in this positive development of the industry over the past year with the acceptance of RSA totalling £13.5m for projects with planned capital expenditure totalling £55m. These developments demonstrate Scotland's attractiveness as a location for life sciences activity.

GlaxoSmithKline (GSK), represents the most considerable investment of any pharmaceutical company into Scotland. GSK employs 1,200 people in Scotland and have continued to make significant investments into both of their Scottish sites in 2007. The Montrose site, which manufactures medicines used to combat flu, diabetes and respiratory disease, had a capital investment of £23m in 2007. At the GSK Irvine site, which had a capital investment of £15m in 2007, investment continues into the manufacture of antibiotics and also into antiviral medicines for the treatment of HIV, flu and malaria. The site is a recognised global "Centre of Excellence" in plant automation within the GSK manufacturing network. GSK has a history of supporting academia in Scotland with over 70 PhD studentships and 2 Chairs in recent years.

² ONS Stats 2005



“Our company has more than 50 employees, at least 50% of whom are PhD qualified, dedicated to providing the best drug discovery service in the industry. Based in Scotland which is recognised for its leading edge research we can ensure our organisation provides clients with a unique level of intellectual input.”

Stephen Hammond
Chief Executive, Scottish Biomedical

Schering-Plough, an innovative, science-centered, global health care company, acquired **Organon BioSciences** in November 2007. Schering-Plough has research centres around the world including the site at Newhouse in Scotland which employs over 300 people. Schering-Plough will continue Organon’s neuroscience research at the Newhouse site.

The thriving commercial sector is underpinned by a strong academic base, with fundamental and clinical expertise in a number of therapeutic areas including: cardiovascular disease, oncology, central nervous system diseases, diabetes, inflammation and infectious disease. Scottish universities are commercially focused and collaborate extensively with global biotechnology and pharmaceutical industries.

Given the size and resources in this global industry, Scotland recognises the benefits of all stakeholders working together in a collaborative environment towards a common purpose. Scotland’s success to date is testament to this collaborative effort – between industry, academia, NHSScotland, the Scottish Government and the Enterprise Networks. This collaboration can also be viewed through the positive impact of the **Life Sciences Scotland** brand, which was launched at BIO in May 2006 and is now helping to promote Scotland’s excellence in life sciences around the world.

GROWTH IN SCOTLAND'S LIFE SCIENCES INDUSTRY



"The Translational Medicine Research Collaboration represents a truly novel concept in industry-academic-government partnership, and we are delighted to be the major pharmaceutical partner in this relationship. Translational Medicine is key to the successful development of the next generation of innovative medicines which will truly make a difference for patients the world over."

Frank Walsh,
Executive Vice President,
Wyeth

Two significant recent collaborative highlights are major inward investments by Wyeth and Alexandria Real Estate Equities.

Wyeth – Translational Medicine Research Collaboration

This collaborative approach has brought together a unique Translational Medicine Research Collaboration (TMRC) between US pharmaceutical giant Wyeth, four Scottish universities, NHSScotland and Scottish Enterprise. The partnership is a world first in translational medicine, combining commercial; clinical and academic expertise to better understand a wide range of diseases such as diabetes, mental health, osteoporosis, cancer and stroke.

Wyeth is a company which epitomises the global excellence in worldwide R&D for which the pharmaceutical industry is renowned.

Alexandria Real Estate Equities, Inc (ARE) – Edinburgh BioQuarter

Edinburgh BioQuarter is a \$1bn+ partnership between Scottish Enterprise, University of Edinburgh and NHS Lothian to establish one of the world's top 10 destinations for life sciences research and development. Unique in the UK, BioQuarter combines a state-of-the-art teaching hospital, one of the world's top 20 life sciences universities and a major commercial science park - all in one location.

In May 2007, Alexandria Real Estate Equities (ARE) was announced as the preferred developer for the commercial science park. This is the first time that ARE has invested in property development outside North America. ARE are also the developers of leading destinations in North America – Mission Bay in San Francisco, Technology Square in Cambridge, Mass. and the newly-announced extension to MARS in Toronto.

Edinburgh BioQuarter will include Alexandria's unique range of state-of-the-art facilities and proprietary products and services designed to foster the development of a broad and diverse life sciences sector, which could lead to over 6,000 new jobs and an investment of around £350m over the next 10 years.



"We were attracted to Edinburgh BioQuarter due to its renowned medical institutions such as the Royal Infirmary of Edinburgh and the University of Edinburgh's College of Medicine and the Queen's Medical Research Institute. In choosing Edinburgh, we will be adhering to our strategy of developing in a community rich with reputable, highly recognisable research and academic entities, as well as a great talent pool and strong capital base – the anchors of a thriving life science community."

Joel S. Marcus,
Chief Executive Officer,
Alexandria Real Estate Equities, Inc (ARE)

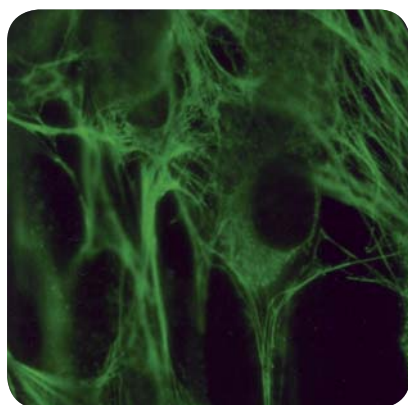
These projects highlight the significant public sector support invested into Scotland's life sciences sector – from concept to marketplace – with assistance for academics, SMEs and large international companies. This has helped to encourage the retention of multinationals and has created easier access to early stage funding.

Examples of Scotland's innovative funding pipeline include:

- **Scottish Enterprise Proof of Concept (POC) Programme** – currently supporting 200 innovative projects worth over £37m, leveraging over £200m and creating over 500 jobs to date. This programme is a unique Scottish initiative – now adopted by other countries – which makes the important step between scientific discovery and commercialisation easier for Scottish researchers.
- **R&D Plus** – launched in 2006, has provided £13m of grant support in nine projects which has leveraged over £100m in total investment from multinational companies. This not only creates new projects and product opportunities for Scotland, but also raises international profiles.
- **Scottish Health Innovations Limited (SHIL)** – has been established to support the identification, development and commercialisation of innovations arising within NHS Scotland. Out of the 484 disclosures made to the company to date, a total of 131 projects have been selected for development and commercialisation. 52 projects remain in development, some of which are already the subject of discussion with potential commercial partners. Five new companies have been created and a further 14 products have been licensed out from the portfolio.
- **Scottish Seed, Co-Investment and Venture Funds** – have invested more than £40m and leveraged over £90m in private investment. More than 26% of all deals done by The Scottish Enterprise Investment Team, to date, have been in the life sciences sector in Scotland.
- **Intermediary Technology Institute (ITI)** – established in 2003 (funded by SE), ITI Life Sciences is one of three Intermediary Technology Institutes that make up ITI Scotland. Their aim is to create new, market-driven technologies and stimulate business growth through the current company base as well as creation of new companies. ITI Life Sciences programmes are based on assessing future market needs, and identifying technology development opportunities to match. Collaborating with Scottish and international partners from industry, academia and the financial community, it has committed over £50m to R&D programmes in the sector. The innovative technologies created through the ITI programmes have already generated numerous patents, leading to commercial exploitation.

Together these initiatives have laid the foundations that ensure Scotland's attractiveness on a global scale.

SCOTLAND'S 2020 VISION



The 2020 vision for achieving critical mass in the life sciences sector in Scotland has guided the initial implementation of the original strategy and concrete steps have been taken to move towards achieving this vision, which states that Scotland will have:

A globally oriented, sustainable, fully connected life sciences sector built on collaborative action that exploits strengths in scientific excellence, financial services and innovative business models and develops, retains and builds upon Scotland's talents.

Experience of the initial phases of strategy implementation has reinforced the key elements of this vision:

Globally oriented maintains the focus of industry endeavours towards the international marketplace. The Scottish life sciences industry can only prosper through this global orientation, whether through selling products and services worldwide, or accessing funding to leverage this growth.

Sustainable means that foundations are being laid for the long term, with companies able to access resources to maintain growth, build market leading positions and contribute to growth of the Scottish economy.

Fully connected life sciences sector emphasises that maximising all Scotland's strengths, working toward common objectives, effectively utilising resources, and gaining mutual benefit from success in one company or area adds to the support of the industry overall. Connecting industry with academia and other sectors – such as financial services, the NHS and government – will further leverage growth.

Collaborative action underpins implementation of this strategy. By recognising that organisations have their own strategies to follow, but that through the IAG and LSA, the sector-wide ownership of the actions that underpin this life sciences strategy will support the growth necessary to achieve critical mass.

Finally, **exploiting strengths** illustrates that the sector is confident of the opportunities for growth in the Scottish life sciences industry, an awareness of the global opportunities, and that Scotland will achieve a depth of success to provide a sustainable future.

The following sections present the key result areas, including the objectives for the next 3-5 years in support of the 2020 Vision. The consultation workshops tested these objectives with key stakeholders in the life sciences community in Scotland and, importantly, developed the Action Plan through which the goals can be achieved and buy-in obtained from all key stakeholders.

KEY RESULT AREAS



In the original strategy, achieving critical mass was underpinned by four inter-related themes: the right people, the right resources, focus and collaboration.

These themes are still important while the focus of each theme can now be modified to reflect the changing environment and the current needs of the sector. The important areas of infrastructure and connectivity which were embedded within these themes also need to become more prominent to reflect ongoing activity. In moving forward, the themes and supporting objectives will be focussed on delivery of outcomes which will move Scotland toward achieving the 2020 vision.

This strategy refresh provides an opportunity to review the previous approach and develop new key result areas for delivering the 2020 vision for life sciences in Scotland:

- **People** – having the right skill mix, calibre and numbers to meet sectoral employment requirements, based on attracting, retaining and developing talent
- **Technology** – an environment conducive to developing the knowledge base and exploiting the transfer of technology between academia and business
- **Capital** – access to funding appropriate to organisational needs throughout their growth cycle
- **Infrastructure** – having the right facilities and assets to meet the needs of a growing sector
- **Collaboration** – working effectively to connect across organisational boundaries and align resources behind priority areas of strength.

Each of these five results areas are presented in turn and present the objectives that will help deliver the vision.

OBJECTIVES - PEOPLE



People are the cornerstone of any successful sector. For life sciences in Scotland to compete internationally, the best people in both business and research need to be attracted, retained and developed. The Scottish Life Sciences Community needs to:

- be the location of choice for leading entrepreneurs and academics
- provide an environment that encourages young people to select life sciences as a successful career of choice
- retain graduates, providing exciting and interesting career development opportunities emanating from the sector in Scotland
- attract individuals and companies who want to grow and develop their talents in Scotland.

Foundations of success

- Scotland produces a disproportionately high number of life science graduates compared to the rest of the UK, providing a highly skilled workforce and making it the ideal location for complex drug research and development.
- In a number of sectors, Scotland can now demonstrate new company formation, through corporate spin-outs; recycling existing people, skills and knowledge.
- **PPD** (Pharmaceutical Product Development), a leading global contract research organisation, announced that it will create 390 new jobs in North Lanarkshire doubling their workforce in Scotland.
- **Aptuit** recently acquired the Chemical and Pharmaceutical Development (CPD) business of Evotec AG and has expanded its GMP sterile pharmaceutical manufacturing facility in Glasgow, increasing its capacity in aseptic GMP pharmaceuticals manufacture.
- **Quintiles** announced £7.5m investment in its new Livingston facility, creating 150 new jobs.
- **Johnson & Johnson** continues to have a strong presence in Scotland, employing around 2,000 people, predominantly in manufacturing and research and development. **Johnson & Johnson Medical Ltd** is based in Livingston specialising in medical device and wound closure products, whilst **LifeScan Scotland Ltd** in Inverness has its field of expertise in self-monitoring blood glucose products.
- **Wyeth**, through the TMRC, will create 50 new jobs initially, rising to 150 over the next few years in addition to a number of spin-out companies for the sector.



OBJECTIVES

- **Attract and retain suitably qualified and experienced individuals in academia and business to grow and develop the life sciences sector in Scotland with a particular emphasis on R&D excellence and increased commercialisation outputs.**
- **Ensure that there are sufficient opportunities and critical mass to enable 'recycling' of skills and expertise in growth sectors within Scotland.**
- **With a particular emphasis on schools, raise awareness of the opportunities that exist within the Scottish life sciences sector and secondly support appropriate training in order to maximise potential.**

“Scotland has a great history of producing eminent scientists and global business leaders, our aim is to be even better.”

Dr Barbara Blaney
Director, BIA Scotland

OBJECTIVES - TECHNOLOGY



“Scotland’s life science research base is internationally recognised. What is distinctive about Scotland however is the open, collaborative and cross-disciplinary approach - such as in our Bioengineering department. It’s great that so many people in Scotland are highly skilled in more than one area i.e. engineering, electronics, medical sciences, as cross-disciplinary expertise is certainly where the future in med-tech lies.”

Professor Patricia Connolly
Director, Strathclyde Institute of Medical Devices

Exploitation of our intellectual capital, research excellence and intellectual property is essential to achieve the vision for 2020. The sector needs to:

- invest in the knowledge base in universities, research institutes, NHS and business to maintain and extend Scotland’s leading position in life sciences
- streamline the knowledge transfer process to optimise the commercial success of intellectual property
- focus on the sector strengths and foresight new technology and processes to develop a sustainable, leading international position
- narrow the gap between research excellence and the commercial output
- exploit the opportunities arising through the life sciences sector converging with other sectors.

Foundations of success

- The ongoing investment from the **Scottish Funding Council** and other funding partners is maintaining the leading position of Scotland’s academic knowledge base.
- Scottish Enterprise, Scottish Government and the University of Edinburgh announced a £60m **Scottish Centre for Regenerative Medicine** to be built as part of the Edinburgh BioQuarter.
- **Alba Bioscience Limited**, a spin-out from the Scottish National Blood Transfusion Service was acquired by Quotient BioResearch Limited and the existing management team. It aims to build a global group focused on the provision of high value-added products and services, with strong emphasis on its bio-manufacturing capabilities in the diagnostic industry.
- **Stem Cell Sciences** is to lead an EU-funded, multinational novel drug screening collaboration using stem cells. The project, named “NEUROscreen”, will use Stem Cell Sciences’ proprietary neural stem (NS) cell technology and has received an EU contribution worth £1.85m.
- **Novartis and Intercell** have entered into a first-of-its-kind partnership to accelerate innovation in vaccines development in infectious diseases. The partnership is centred around the shared vision of science in vaccines research, development and commercialisation, and will focus on the development of bacterial vaccine products derived from Intercell’s Antigen Identification Program (AIP®) as well as the use of Intercell’s adjuvant technology (IC31®) in selected new vaccines.
- The **Strathclyde Institute of Medical Devices (SIMD)** was launched in October 2006 in response to the recognition that effective innovation in medicine and health care technology is required to address the world’s health care problems in the 21st Century. The convergence of engineering, science and medicine is key, and SIMD is ideally placed to pioneer the complex, team approaches that will be needed to deliver new research and products to the health care end users, eg clinical staff and patients.



“We are delighted with the progress of our research programmes and the benefits we are already bringing to Scotland. Our initiatives have resulted in the formation of new companies, jobs and technologies which will help deliver on the promise of a ‘smart, successful Scotland’ and an increasing knowledge economy”.

Eleanor Mitchell
MD, ITI Life Sciences

- **Aircraft Medical**, the UK medical devices company, has achieved international recognition for its McGRATH® Series 5 Laryngoscope, the world’s first self-contained fully portable video laryngoscope. The company won the inaugural Medilink UK National Medical Technology Awards.
- In December 2007, Napier University launched the UK’s first **Biofuel Research Centre (BfRC)** to find sustainable alternatives to fossil fuel-based energy.

Intermediary Technology Institute (ITI) initiatives

- From the Transgenic and Safety Screening Models programme, **CXR Biosciences** and **Artemis Pharmaceuticals** have licensed technology aimed at developing new ways of testing novel compounds to see whether they are likely to work as drugs and be safe before they go into clinical trials in humans.
- **Cellartis** – a Swedish biotech company, entered into partnership with the Universities of Glasgow, Dundee and Heriot-Watt in a £9.5m R&D deal to produce human stem cells.

OBJECTIVES

- **Increase industry development and innovation opportunities to enhance attractiveness to investors.**
- **Increase the extent and proportion of intellectual property from leading academic research that attracts increased grant opportunities and can lead to commercial outcomes.**
- **Develop strategies for complementary technologies to increase the range of opportunities for life sciences and other converging industries in Scotland.**

OBJECTIVES - CAPITAL

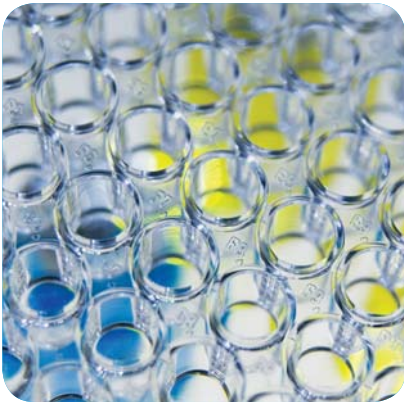


Without continued investment, the life sciences sector will fail. In an increasingly risk-averse investment marketplace, Scotland continues to benefit from substantial support from both the private and public sectors. The ambition is to create an environment that makes Scotland a premier location to invest in and grow life sciences companies. In order to compete in the global market it is imperative that organisations:

- have the right business models, the right proposition and the right assets to attract the right investment
- continue to identify areas where additional resources would have the most impact and enable highest return on investment
- have access to market and technology intelligence to support enterprise in Scotland throughout its growth and development cycle
- leverage the financial, legal and intellectual property expertise, for which Scotland is recognised.

Foundations of success

- **Bioequity** Europe's largest investment conference for the life sciences sector returned to Scotland in 2007. More than 600 venture capitalists converged with some of Europe's leading life sciences companies for the prestigious BioEquity Europe 2007 conference. This is the second time that Scotland has hosted the conference.
- **Aquapharm** secured second round investment of £4m.
- **Integrin Advanced Biosystems** acquired the entire share capital of Biobest Laboratories. The combined group will have turnover in excess of £3m and a combined staff of over 50.
- **Omega Diagnostics** completed a reverse takeover of Genesis-CNS in a transaction worth up to £6.7m.
- **Wideblue**, the Glasgow-based technology company, announced that it has raised £1.25m in venture capital funding to create a new company, **PWB Health Limited**.
- **C3 Amulet Ltd**, a Scottish software company, has won European backing for a €2.3m research project to develop a novel intensive care patient monitoring system.
- **Archangel Informal Investment** and **Braveheart Investment Group** lead a sophisticated angel network, and have invested in over 15 life sciences companies and continue to lead second round investments.
- **Wellcome Trust** has continued to back Scottish innovation including Aircraft Medical and CardioDigital.



OBJECTIVES

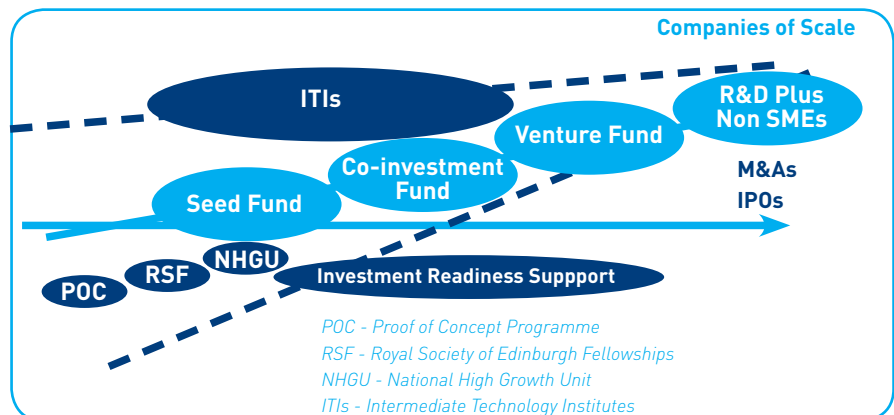
- **Develop further Scotland’s efficient and effective capital market that life sciences companies can tap into.**
- **Attract and secure investment aligned with sectoral strengths, aiming towards achieving critical mass.**
- **Continue to attract investment to improve the commercial exploitation of academic research and company R&D.**

Both public and private sector support is available across the entire spectrum of company growth, as shown below.

“Scotland is now leading the UK in assisting companies develop blue biotech and drive forward their innovations from the untapped potential of the oceans. Over the past 5 years, Aquapharm has had access to a wide range of innovative funding opportunities from both public and private sources. Most recently, Aquapharm completed its latest round of investment financing of £4 million - the lead for which was a European based VC.”

Andrew Mearns-Spragg
 CEO, Aquapharm Bio-Discovery Ltd

Managing the risk capital pipeline



OBJECTIVES - INFRASTRUCTURE

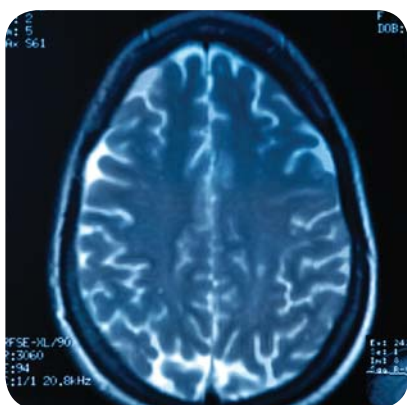


Life sciences companies not only require access to high quality specialist infrastructure, but they, like all industries, also require good physical transport infrastructure. While Scotland continues to offer a variety of life sciences facilities it is important to have:

- accommodation that is flexible enough to meet the needs of growing businesses while close to centres of excellence
- access to specialist support and biological services that understand life sciences
- availability of incubator provision together with business support to provide the right environment to grow and develop the future life sciences business base
- access to leading edge technologies such as imaging systems for research purposes and prototyping facilities for medical devices and equipment
- a voice with government to inform sectoral issues, for example transport infrastructure.

Foundations of success

- **Alexandria Real Estate Equities, Inc (ARE)** has joined a strategic alliance with Scottish Enterprise to develop and manage the **Edinburgh BioQuarter**, which offers potential to create 6,000 jobs. Working in partnership with NHSScotland, the University of Edinburgh and Scottish Enterprise, Alexandria will capitalise on the strong existing life sciences infrastructure to create a world-class destination that will connect Scotland to the world's most important life sciences markets.
- The £23M **Centre for Health Science** in Inverness is a focus for excellence in health care and biotechnology research, education, training and business development. It is the first of its kind in the UK and is a truly collaborative project involving NHS Education and Highlands, Centre for Rural Health, Universities of Highlands & Islands, Stirling, Aberdeen and Dundee, LifeScan Scotland Ltd (a Johnson & Johnson company) and Highlands and Islands Enterprise.
- **Tepnel Research Products and Services** has invested in a new £4m pharmaceutical testing facility as a key part of the strategic growth and development of its pharmaceutical and molecular genetics outsourcing business. The company already provides solutions to a range of pharmaceutical, biotechnology and life sciences companies operating in Scotland, as well as internationally.
- Scotland's medical imaging cluster is based around a significant academic and clinical network and Scotland's universities and NHSScotland continue to invest in the latest biomedical imaging techniques, which is becoming increasingly important for both translational and clinical studies.



"Ongoing large scale investment in clinical infrastructure, networking, imaging and informatics will allow Scotland to become a premier location for translational research and multi-centre clinical trials."

Professor Chris Packard
R&D Director, NHS Greater Glasgow and Clyde

OBJECTIVES

- Further develop facilities and business support to meet future sectoral demand.
- Develop a marketing campaign to promote Scotland's competitive advantage by demonstrating the close working and co-location of key stakeholders in academia, NHS and industry.
- Influence the regulatory and planning framework within which the industry needs to operate and inform the transport debate to ensure that the needs of the life sciences community are met.

OBJECTIVES - COLLABORATION



Achieving Scotland's vision for 2020 continues to require the combined efforts of the entire life sciences community. Scotland is a small nation, and the close proximity of major life sciences centres enables connectivity and collaboration. It has already been demonstrated that collaboration across the sector can provide innovative solutions for companies investing in Scotland. Through collaboration, Scotland can continue to compete effectively and maximise returns from global market opportunities. The sector needs to:

- further develop and sustain a spirit of collaboration across the stakeholder groups within Scotland and with international partners and companies
- maximise the use of networks of scientific excellence and linkages with NHSScotland as an important asset
- build on the work of the IAG and LSA to drive the sector toward achieving critical mass
- show the benefits of successful collaboration to local and international organisations, possible collaborators and potential investors.

Foundations of success

- The **Life Sciences Alliance** was formed in 2005, and through its many activities is playing an important part in bringing the Scottish life sciences community together to reach our common goal of building a successful, sustainable, world beating sector.
- The **Life Sciences Scotland** brand was launched in April 2006, reflecting Scotland's combined strengths. It is being promoted all round the world raising the profile of the breadth and depth of our capabilities.
- **Interface** is a central point for industry to access information about specialist expertise that is available at Scotland's universities and research institutes.
- **Wyeth** announced a £50m deal to create **the world's first Translational Medicine Research Collaboration** in Scotland. Wyeth is investing £33m over the next five years and working in partnership with Scottish Enterprise as well as four Scottish universities (Aberdeen, Dundee, Edinburgh and Glasgow) and NHSScotland.
- Well positioned trade and industry associations are in place to support new businesses, with the **Association of British Pharmaceutical Industry (ABPI) Scotland, Bioindustry Association Scotland (BIAS)** and **Medical Devices in Scotland (MDiS)** providing first class professional support.
- A number of local networking organisations exist to provide opportunities for cross sector collaborations – among these are **Nexus, BioDundee** and **Fusion**.
- **Scottish Universities Life Sciences Alliance (SULSA)** – Six Scottish universities (Aberdeen, Dundee, Edinburgh, Glasgow, St Andrews, and Strathclyde), in partnership with the Scottish Funding Council (SFC), have agreed to work together and pool their research excellence under the umbrella of SULSA. An investment of £27m from SFC and £57m from the universities will be used to fund a selection of research support posts over five years.



“From a standing start in April 2006, the Translational Medicine Research Collaboration, involving ten Scottish partners and Wyeth, has established almost 70 biomarker research programmes across Scotland, involving over 170 Scottish scientists, with total investment of circa £30m. The enthusiasm to work across Scotland has been outstanding. We are really beginning to see the benefits of Scotland’s flexibility to act as a ‘single research site’ to excel on the international stage.”

Professor Andrew Morris
 Professor of Diabetic Medicine, University of Dundee
 Chair, TMRC Steering Group

- **Scottish Stem Cell Network** has been established to bring together scientists, clinicians, health service, academia and funders from industry to establish Scotland as one of the pre-eminent destinations for developing stem cell technologies.
- The **Scottish Bioinformatics Forum** has been established to support both the academic research base and commercial organisations by actively promoting training and facilitating access to bioinformatics skills.

OBJECTIVES

- **Develop further the extent of effective collaboration between academia, NHSScotland, industry and the Government to produce tangible outputs.**
- **Enhance cross sector and international collaboration and adoption of industry specific public sector initiatives to ensure success.**
- **Optimise networks and expand the current central resource (lifesciencesscotland.com) to enhance and maximise knowledge exchange with respect to key areas of expertise and collaborative working.**

DELIVERY OF OBJECTIVES



This strategy refresh builds upon what has been achieved over the past few years in growing the life sciences industry in Scotland. It has been developed through a series of consultation workshops across Scotland, and therefore has wide ranging support and buy-in, not just from industry, but also academia, NHSScotland, industry bodies and government.

A series of clear objectives has been developed for each Key Results Area (KRA). To drive the delivery of these objectives we have agreed a 'champion' for each KRA as shown below;

KEY RESULTS AREA	CHAMPION
People	Industry Associations
Technology	Life Sciences Alliance
Capital	S. Govt/LSA/SE
Infrastructure	Life Sciences Alliance
Collaboration	Life Sciences Alliance

Underpinning this strategy is an **Action Plan** that shows how results will be delivered over the next 3-5 years in each of the key result areas and these champions will harness a broad range of capacity and capability across the life sciences community in Scotland to achieve these results.

Overall leadership in implementing the strategy rests with the Industry Advisory Group (IAG), supported by the Life Sciences Alliance (LSA). The IAG represents all aspects of the life sciences industry, while the LSA embraces the broader life sciences community in Scotland. Stakeholders who will take responsibility for implementation of the Action Plan include Bioindustry Association Scotland, Medical Devices in Scotland, Association of the British Pharmaceutical Industry, Scottish Enterprise, Scottish Development International and The Scottish Government.

Together, these groups provide the impetus for growth of life sciences in Scotland, uniquely positioned through the brand 'Life Sciences Scotland'.

The Life Sciences Alliance

The Life Sciences Alliance (LSA) is a group of senior representatives drawn from all sectors of the life sciences community in Scotland. The establishment of the Life Sciences Alliance was a specific objective arising out of the original strategy.

The remit of the Life Sciences Alliance is to oversee the implementation and forward development of the Scottish Life Sciences Strategy through constant engagement and dialogue with the life sciences community.

The connectivity achieved across the life sciences community in Scotland is demonstrated through the efforts of the Life Sciences Alliance stakeholders in working towards completion of the milestones set out in the original strategy including the development of a unified life sciences Scotland brand supported by the Life Sciences Scotland website. For current members of the LSA, please see www.lifesciencesscotland.com, and click on Life Sciences in Scotland.

Industry Advisory Group

The Life Sciences Industry Advisory Group (IAG) was established in February 2004 by the Scottish Executive's Enterprise Minister and represents all aspects of the life sciences industry in Scotland.

The IAG is a group of company CEOs drawn from across the breadth of the life sciences sector in Scotland including pharmaceuticals, biotechnology, medical devices and diagnostics, contract research organisations, specialist supply and support.

The IAG meets at least on a quarterly basis to discuss and address – in conjunction with government representatives – any key issues of national significance for the growth of the life sciences industry sector in Scotland. Membership of the IAG is on a rolling basis. For current members of the IAG, please see www.lifesciencesscotland.com, and click on Life Sciences in Scotland.

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