

LIFE SCIENCES INDUSTRY: OPPORTUNITIES FOR UK-NL COLLABORATION



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Pioneers in international business

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EXECUTIVE SUMMARY

- In 2011 the UK biotechnology market reached a value of \$7.5 billion and by 2016 is forecasted to reach a value of \$9.5 billion.
- The UK accounts for almost 10% of the biotech market value in the whole of Europe and the UK's pharmaceutical market is ranked second in Western Europe and among the 10 largest in the world.
- The total UK Life Sciences industry generates a turnover of over £50 billion, employing 167,500 people in over 4,500 companies.
- The UK has 169 Universities of which 133 are in England. The student population is about 2.3 million with about 300,000 students coming from abroad and the biological sciences having by far the largest undergraduate population.
- The life sciences sector is dominated by small and mid-sized enterprises (SMEs) with nearly all SMEs being located in the Golden Triangle of Oxford, Cambridge and London, the North West of England and the Edinburgh-Glasgow region in Scotland.



- GlaxoSmithKline, AstraZeneca, Shire, Pfizer, Roche, Eisai, Eli Lilly, Amgen, Merial, and Novartis together accounted for almost £8 billion in R&D investment over 2009/2010.
- In a recent ranking of 142 countries on their innovation capabilities by INSEAD, WIPO, and Cornell University, Great Britain ended at number 3.
- Four of the universities in the Golden Triangle, the University of Cambridge, the University of Oxford, University College London, and Imperial College in London, are ranked among the top ten in the world and had a combined research income of over £1 billion over 2010/11.

- The Golden Triangle, with more than 500 companies, is the densest region in Europe for life sciences companies.
- Wellcome Trust and Cancer Research UK, both with headquarters in London, are two world leading charity organizations with Wellcome Trust awarding grants totaling a value of £599.5 million during 2012 and CRUK supporting cancer research with £350 million and funding 4,000 scientists, doctors and nurses across the UK over 2012/13.
- Scotland is the second largest life sciences region in the UK with 650 organizations that together employ over 32,000 people. During 2010 the Scottish life science companies contributed about £3 billion in turnover to the Scottish economy.
- In August 2011 the UK Government announced £800 million investment over 5 years from April 2012 to boost research and allow the development of ground breaking medicines, treatments and care for patients.
- With an unprecedented sequencing project by the NHS that will map DNA of up to 100,000 patients within three to five years the UK will be the first country in the world to introduce the whole genome sequencing technology within a mainstream health system.
- During 2011 the UK's Medical Research Council (MRC) committed around £70 million to support 1,900 PhD posts and 320 fellowships for both clinical and non-clinical scientists and the National Institute for Health Research (NIHR) committed a similar amount to support over 1,600 posts for research training in clinical and applied health research.
- From 2007 till 2010 the Technology Strategy Board (TSB), together with its partners and businesses, invested more than £2 billion in UK innovation and had investments in over 3,000 businesses on projects to move ideas and technologies closer to market.
- Tax incentives like the EU VAT cost-sharing exemption, the Patent Box, introduction of the Seed Enterprise Investment Scheme, and an increase of the level of super-deduction relief make the UK tax environment more attractive for companies and institutes operating in the life sciences.
- During 2012 five countries received 44% of the total global Foreign Direct Investment (FDI) inflow with the UK being at the fourth place, receiving FDI worth \$63 billion.



1 INTRODUCTION

Outside of Europe, some of the major hubs of pharmaceutical and biotechnology activity can be found in the United States, Japan, and Singapore and places like South Korea, Malaysia, Brazil, India and China are increasingly making the headlines when it concerns developments in the biotech and pharma sector. No wonder that many who are working in this sector in Europe focus their attention on North America and the Far East when exploring collaboration opportunities and ways to expand their client portfolio and this is no different in the Netherlands. There is, however, a very fertile life science community much closer to home that offers numerous opportunities to find collaborators, new clients, and funding, which is often overlooked: the United Kingdom. In 2011 the UK biotechnology market reached a value of \$7.5 billion and it is forecasted to reach a value of \$9.5 billion by 2016. The UK accounts for almost 10% of the biotech market value in the whole of Europe¹ and the UK's pharmaceutical market is ranked second in Western Europe and among the 10 largest in the world.² The UK Government's Office for Life Sciences which is part of the Department for Business, Innovation, and Skills, states on its website that the total UK Life Science industry generates a turnover of over £50 billion, employing 167,500 people in over 4,500 companies.³ For comparison, the Dutch

1 MarketLine Industry Profile, Biotechnology in the United Kingdom, July 2012, Ref #: 0183-0695, July 2012

2 Business Monitor, United Kingdom Pharmaceuticals & Healthcare Report Q2, 2013, ISSN 1748-2283, March 2013

3 <https://www.gov.uk/government/organisations/>

life sciences sector consists of some 900 companies that together employ about 55,000 people⁴.

This report is not an in-depth analysis of the UK Life Science sector and has intentionally been kept short to provide people interested with a quick overview of the UK life science landscape and a number of tools and resources that give access to more detailed information and that facilitate reaching out to those life science communities that are of interest to the reader. The report aims to give some insight into the biotech and pharma sector in the UK with an emphasis on the greater area of Oxford, Cambridge, and London, nicknamed by many in this area as The Golden Triangle, to encourage life science professionals, companies, institutes, and organizations in the Netherlands to have a closer look at their neighbor in the West, which then hopefully leads to fruitful interactions between Dutch life science professionals and their British counterparts.

2 UNIVERSITIES AND INDUSTRY

Universities And Funding For Higher Education

The UK has always had a strong influence on developments in the sciences across the world. With the Universities of Oxford and Cambridge, established around 1100 and 1200 respectively, being among the first, the UK now has 169 Universities of which 133 are in England. The student population is about 2.3 million with about 300,000 students coming from abroad and the biological sciences having by far the largest undergraduate population. This is quite different from the Netherlands where in 2012 a total of about 250,000 students attended its 13 Universities. It should be noted, however, that the Netherlands as well has 39 Universities for Applied Sciences which together were good for almost 425,000 students in 2012.⁵

The Higher Education Funding Council for England is responsible for distributing public money for higher education to universities and colleges in England. In 2012 they set up the UK Research Partnership

office-for-life-sciences

4 <http://nfia.com/lifesciences.html>

5 <http://www.nuffic.nl/bibliotheek/mobility-in-higher-education-in-the-netherlands-overview-2012.pdf>

Investment Fund to support investment in higher education research facilities. The fund will run for three years and distribute more than £300M over 16 Universities with Imperial College London (£35M), University College London (£21M), the University of Cambridge (£21M), the University of Manchester (£30M), and the University of Oxford (£55M) receiving the highest investments.⁶ The funding will be used to enhance research facilities, encourage strategic partnerships, stimulate additional investment, and strengthen the contribution of research to economic growth.

Life Science Industry

In the Netherlands companies like DSM⁷, FrieslandCampina⁸, Crucell⁹, Danone¹⁰, Pharming¹¹, Unilever¹² and Philips¹³ make strong contributions to the life science field, but the majority of companies is formed by SME's that often started their life in the academic environment. In a similar fashion, many new life science companies in the UK as well arise as spinouts from its Universities and they contribute to the group of small and mid-sized enterprises (SMEs) that form the bulk of commercial life science firms in the UK. Nearly all of these SMEs are located in the Golden Triangle of Oxford, Cambridge and London, the North West of England and the Edinburgh-Glasgow region in Scotland¹⁴ While the life science sector may be dominated by SMEs, some of the major players in the global life science sector have significant operations in Great Britain. Two of the ten leading pharmaceutical companies in the world by revenue, GlaxoSmithKline and AstraZeneca, have their headquarters in the UK. Together with Shire, Pfizer, Roche, Eisai, Eli Lilly, Amgen, Meril, and Novartis they accounted for almost £8 billion in R&D investment over 2009/2010 (GSK & AZ together accounting for more than 80%)¹⁵

6 <https://www.hefce.ac.uk/whatwedo/rsrch/howfundr/ukrpif201215/>

7 <http://www.dsm.com/corporate/about/business-entities.html>

8 <http://www.frieslandcampina.com/english/>

9 <http://www.crucell.com/>

10 <http://www.danone.com/en/>

11 <http://www.pharming.com/index.php>

12 <http://www.unilever.com/innovation/centres/vlaardingem/>

13 http://www.healthcare.philips.com/us_en/

14 Cogent, Semta & Skills for Health (2009) Life sciences & pharmaceuticals: A future skills review with recommendations to sustain growth in emerging technologies

15 "The Top 1,000 UK and 1,000 Global Companies by R&D



A Fertile Life Science Field

This mix of high level educational facilities, entrepreneurial activity, small & mid-sized companies, and global pharmaceutical industries is a prerequisite for a fertile life science field. Together with Governmental bodies and organizations that actively support and stimulate the life sciences (discussed below) the UK offers an excellent environment for the biotechnology and pharmaceutical sector to be a major player in the world. In fact, the UK Life Science Market is among the strongest and fastest-growing globally with the industry growing faster than the economy as a whole and with the commercial life science sector being the major source of jobs for high-skill and high-tech professionals.¹⁶ With the life science sector being a strong contributor to innovation it does not come as a surprise that the United Kingdom is one of the most innovative countries in the world. In a recent ranking of 142 countries on their innovation capabilities by INSEAD, WIPO, and Cornell University, Great Britain ended at number 3 after Switzerland (1) and Sweden (2) and just before the Netherlands that ended at position number 4.¹⁷

Investment". Department for Business, Innovation and Skills.

16 Life Science FDI Trends, OCO Global, 2013

17 <http://knowledge.insead.edu/innovation/the-worlds-most-innovative-countries-the-global-innovation-index-2013-2525>

3 THE GOLDEN TRIANGLE OF CAMBRIDGE, OXFORD, AND LONDON

Universities In The Golden Triangle

One of the things that make the Golden Triangle unique in the world is the fact that four of the universities in this region, the University of Cambridge, the University of Oxford, University College London, and Imperial College in London, are ranked among the top ten in the world.¹⁸ There is no other place in the world where so many high-ranked universities are located in such close proximity to each other. Overall, the UK has 29 higher education institutions in the global top 200. The Netherlands, taking into account that it is much smaller, is doing very well with 11 of its 13 Universities¹⁹ in the same top 200.²⁰

The big four Universities in the UK also have the highest total research income of British universities with the University of Oxford topping the list with over £375M in 2010/11, but with the other three following closely with almost £300M of research income each. For comparison, the next one on the list after the big 4 is the University of Manchester that had a research income close to £200M over that same period.²¹ It illustrates the research powerhouse that the Golden Triangle is.

Companies In The Golden Triangle

The Golden Triangle is also the densest region in Europe for life sciences companies. More than 500 companies operate in this region and the network of pharma and biotech companies continues to grow. Many of the companies are SMEs that can be found in clusters formed by science parks and incubators. This is very similar to the Netherlands where high concentrations of companies can be found in for example Utrecht Science Park²² TU/e Science Park in

Eindhoven²³, Amsterdam Science Park²⁴, Leiden Bio Science Park²⁵, Kennispark Twente²⁶, Technopolis Innovation Park in Delft²⁷, Business and Science Park Wageningen²⁸, Mercator Incubator Nijmegen²⁹ and the Zernike Science Park in Groningen.³⁰ Examples in the Golden Triangle are Babraham³¹, Granta Park³², and Chesterford Research Park³³ near Cambridge, the London Bioscience Innovation Centre (LBIC)³⁴, the Queen Mary Bioenterprises Innovation Centre³⁵, the Oxford Science Park³⁶, the Begbroke Science Park³⁷, BioPark at Welwyn Garden City³⁸, and the Bioscience Catalyst at Stevenage.³⁹ By sharing resources, companies that are part of the clusters can lower their operational costs and the close proximity of many other companies working in the life sciences promotes collaborations. The UK Government actively supports science parks and incubators through investments such as the recent £67M investment in 4 business ‘incubator’ centres in Oxford, announced on 28 January 2014 by Chancellor George Osborne.⁴⁰

A great overview of science parks throughout the UK can be found on the website of the United Kingdom Science Park Association, an organization that was founded in 1984 by the managers of the eight science parks that then existed (currently there are around a hundred).⁴¹

18 <http://www.topuniversities.com/university-rankings/world-university-rankings/2012>

19 <http://universiteiten-nederland.nl/> (Dutch)

20 <http://www.topuniversities.com/qs-world-university-rankings>

21 “Wealth check: Financial data for UK higher education institutions, 2010–11”. Times Higher Education. 12 April 2012.

22 <http://www.utrechtsciencepark.nl/>

23 <http://www.tue.nl/en/university/about-the-university/tue-science-park/>

24 <http://www.amsterdamsciencepark.nl/>

25 <http://www.leidenbiosciencepark.nl/>

26 <http://www.kennispark.nl/>

27 <http://www.scienceportholland.nl/technopolis/nl/>

28 <http://www.bspw.nl/>

29 http://www.ru.nl/mercator/science_park/mercator_technology/ (Dutch)

30 <http://www.zernikegroup.com/>

31 http://www.ukspa.org.uk/science_parks/content/1112/babraham_research_campus

32 <http://www.grantapark.co.uk/toc.cfm>

33 <http://www.chesterfordresearchpark.com/>

34 <http://www.lbic.com/clients>

35 <http://www.qmbioenterprises.com/tenants.aspx>

36 <http://www.oxfordsp.com/companies-list.asp>

37 <http://www.begbroke.ox.ac.uk/Business/TenantList.php>

38 <http://www.biopark.co.uk/BioPark/BioPark-tenants/Current-tenants/>

39 http://www.stevenagecatalyst.com/about/our_tenants/

40 <https://www.gov.uk/government/news/67-million-to-support-uks-world-leading-science-sector>

41 http://www.ukspa.org.uk/science_parks/



The Wellcome Trust And The Francis Crick Institute

Apart from the many companies and universities there are a range of organizations in the Golden Triangle supporting the life sciences in and outside the area. The Wellcome Trust⁴², for example, is one of the ten largest charity organizations in the world. During the fiscal year 2012 they awarded grants totaling a value of £599.5M that included science funding (£412.6M), their Genome Campus (£88.4M), technology transfer support (£62.8M), and funding for medical humanities and engagement (£35.7M).⁴³ The Wellcome Trust has its headquarters in the Euston Road area of London, around the corner from London's teaching hospitals and in the same area where the Francis Crick Institute is scheduled to open its doors in 2015.

The Crick Institute, formerly known as the UK Centre for Medical Research and Innovation, but then renamed to honor one of the UK's greatest scientists, is a partnership between six of the UK's most successful scientific and academic institutions: the Medical Research Council (MRC), Cancer Research UK, the Wellcome Trust, University College London (UCL), Imperial College London and King's College London. It has been established as a charity and should develop into a world-class research centre⁴⁴. The Crick Institute may also be housing the headquarters of 'Med City', a recently announced

42 <http://www.wellcome.ac.uk/>

43 <http://www.genengnews.com/insight-and-intelligenceand153/10-life-science-loving-charitable-funds-and-foundations/77899822/?page=2>

44 <http://www.crick.ac.uk/about-us/>

initiative backed with £1.1M seed investment by London's mayor Boris Johnson, to promote the UK capital as one of the leading medical research centers in Europe.^{45 46}

Cancer Research Uk

Another major charity organization that has its headquarters in London is Cancer Research UK (CRUK).⁴⁷ It is the world's leading cancer charity dedicated to saving lives through research. As mentioned above they are as well one of the main stake holders in the Francis Crick institute. Over 2012/13 they had an income of £537M of which £460M resulted from fundraising. More than £350M was used to support cancer research and they funded 4,000 scientists, doctors and nurses across the UK.⁴⁸ Apart from funding research an important activity of the organization is formed by outreach to inform public policy and keep cancer at the top of the national health and science agenda. A similar organization in the Netherlands is the Dutch Cancer Society (KWF Kanker Bestrijding) that during 2012 collected €146.3M of which €70.4M was used to support cancer-related research and education.⁴⁹

The Oxbridge Biotech Network And One Nucleus

Two organizations that actively support the life science community in the Golden Triangle are the Oxbridge Biotech Network (OBN) and One Nucleus. OBN is a membership organization supporting and bringing together emerging life science companies, corporate partners and investors in especially the greater Oxford area, but it also reaches out nationally and internationally.⁵⁰ It currently has close to 250 member companies and it is the organizer of BioTrinity, an annual Biopartnering and Investment Conference held in London that in 2013 attracted 877 delegates from 28 countries.⁵¹ Apart from BioTrinity OBN organizes a range of other events throughout

45 http://www.pmlive.com/pharma_news/london_plans_med_city_to_boost_uk_life_sciences_sector_492456

46 <http://www.telegraph.co.uk/finance/10192700/Londons-Medical-City-to-seal-golden-triangle-of-UK-research-centres.html>

47 <http://www.cancerresearchuk.org/>

48 Saving Lives Through Research, Annual Report and Accounts, Cancer Research UK, 2012/13

49 <http://www.kwf.nl/english/pages/default.aspx>

50 <http://www.obn.org.uk/>

51 <http://www.biotrinity.com/silverstripe/>

the year to provide the community with information relevant to the life sciences and opportunities for networking and partnering.

One Nucleus is a membership organization for international life science and healthcare companies that focuses on the greater Cambridge and London area. It was established in 1997 and formerly known as the Eastern Region Biotechnology Initiative (ERBI).⁵² Around 500 member organizations include pharmaceutical, biotech, medical device and diagnostic companies and associated technical and commercial service providers. It is One Nucleus' mission to maximize the global competitiveness of its members and it does this through organizing a variety of workshops, training sessions, networking and partnering events, and through providing expertise on topics such as drug development, commercialization, regulatory issues, and intellectual property protection. The Life Science Leadership Series⁵³ are well-known events in the Golden Triangle as are the annual, London-based 'Genesis' conferences that they started in 2000.⁵⁴ In 2013 Genesis attracted around 700 delegates representing almost 400 companies from 32 countries and this year's event had over a 1000 attendants.

4 SCOTLAND

After the Golden Triangle the second largest life science region in the UK and one of the largest in Europe can be found in Scotland. It was in Aberdeen where the first Medical School was established in the English speaking world with the founding of King's College in 1495.⁵⁵ Nowadays the Scottish life science sector comprises about 650 organizations that together employ over 32,000 people. During 2010 the Scottish life science companies⁵⁶ contributed about £3 billion in turnover to the Scottish economy.⁵⁷ The

⁵² <http://www.onenucleus.com/>

⁵³ <http://www.onenucleus.com/life-science-leadership-series>

⁵⁴ <http://www.genesisconference.com/>

⁵⁵ Carter, Jennifer (1994). *Crown and Gown: Illustrated History of the University of Aberdeen, 1495-1995*. Aberdeen: Aberdeen University Press.

⁵⁶ <http://apps.scottish-enterprise.com/search/supplierdirectoryatoz.aspx?viewtreeid=167406>

⁵⁷ Scotland Welcomes the World. Scottish Enterprise, Glasgow, SE/3623/Sep12. (<http://www.scottish-enterprise.com/-/media/SE/Resources/Documents/STUV/>



majority of Scotland's life science community, over 80%, is located in the greater area of Dundee, Edinburgh, and Glasgow, and shows a diverse variety of disciplines covering medtech, pharma services, stem cells, regenerative medicine, clinical and translational medicine, and animal health. Furthermore, Scotland shows emerging strengths in digital health, health informatics, and red (applied to medical processes), green (applied to agricultural processes), blue (related to use of marine and aquatic resources) and white (applied to industrial processes) biotechnology.⁵⁸ Some of the major international players in the life sciences that have significant operations in Scotland are Charles River Laboratories, Aptuit, GSK, Alere, Life Technologies, Quintiles, and Merck Millipore.

Scotland also has globally competitive clinical trial start-up times. Together with its unified healthcare provider (NHS) that provides unique health informatics/database information and 'Cradle to Grave' electronic record linkage in a stable population with high rates of morbidity and chronic disease, Scotland is an attractive place for drug developers to conduct their clinical studies. The Scottish Health Research Register (SHARE) is working to create a resource of up to 1,000,000 adults (about 25% of the Scottish adult population) who consent to the use of their electronic health records, in order to identify

[Scotland%20welcomes%20the%20world%20brochure.pdf](#)

⁵⁸ International Comparative Performance of Scottish Research Base in Life Sciences. Elsevier, 2013. (<http://www.scottish-enterprise.com/knowledge-hub/articles/insight/scottish-life-sciences-research-base>)

them as potentially eligible for research.^{59 60} The initiative could be compared with the Dutch project 'LifeLines' that aims to collect data and biomaterials of 165,000 people over three generations over a 30 year period to support international research into healthy ageing.⁶¹ Supporting organizations of LifeLines include the Dutch Government,⁶² the European Union,⁶³ the NWO (Netherlands Organisation for Scientific Research),⁶⁴ the University Medical Center of Groningen,⁶⁵ the Dutch Kidney Association (Nierstichting)⁶⁶ and the Dutch Diabetes Fund (Diabetes Fonds).⁶⁷

Universities In Scotland

Scotland has 19 Universities and Higher Education institutions which together generated £387M of knowledge exchange income over 2012/13.⁶⁸ During this same period, the University of Edinburgh (£199M), the University of Glasgow (£161M), the University of Strathclyde (£103M), the University of Dundee (£85M), and the University of Aberdeen (£81M) received the highest amounts of the more than £1.1B in grants that were distributed to institutions for Higher Education in Scotland. Over 2011/12 the 19 Scottish Universities and Higher Education Institutions combined had a research income totaling £610M which accounted for 13.5% of the UK's total research income.⁶⁹ A significant number of SMEs started as spin-out of one of Scotland's universities. When it comes to spin-outs, the University of Edinburgh and Strathclyde University are 4th and 5th in the UK with 69 and 60 spin-outs created since 2000⁷⁰.

59 http://nhsresearchscotland.org.uk/243_SHARE.html

60 <http://www.registerforshare.org/>

61 <https://www.lifelines.nl/home> (Dutch)

62 <http://www.rijksoverheid.nl/ministeries/vws> (Dutch)

63 http://europa.eu/index_en.htm

64 <http://www.nwo.nl/en>

65 <http://www.umcg.nl/EN/corporate/pages/default.aspx>

66 <http://www.nierstichting.nl/> (Dutch)

67 <http://www.diabetesfonds.nl/> (Dutch)

68 http://www.sfc.ac.uk/aboutus/council_funded_institutions/WhoWeFundUniversities.aspx

69 Scottish Funding Council, Annual Report 2012-13. (http://www.sfc.ac.uk/web/FILES/ReportsandPublications/SFC_Annual_Report_and_Accounts_2012-13.pdf)

70 Data from Scottish Enterprise (<http://www.scottish-enterprise.com/>)

Division Of Signal Transduction Therapy (DSTT) Consortium

Scotland is also home to some world class drug discovery consortiums involving globally operating pharma companies. An example is the Signal Transduction Therapy (DSTT) Consortium,^{71 72} a division of the University of Dundee that since its formation in 1998 received over £50M in funding from the pharma industry and that next to the University and the Medical Research Council (MRC) includes AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Janssen Pharmaceutica NV, Merck-Serono and Pfizer. The consortium conducts cell signaling research and encourages development of new drug treatments for global diseases such as cancer, rheumatoid arthritis, and Parkinson's Disease. Specifically the collaboration aims to target protein kinases and the ubiquitylation system in the development of these therapies.

European Lead Factory

Another example of a collaborative effort is the Screening Center for the European Lead Factory⁷³ that is based in BioCity Scotland.⁷⁴ This Screening Centre for a team of 30 international partners is part of a £100 M funding from the European Innovative Medicine Initiative (IMI).⁷⁵ IMI aims to speed up the development of better and safer medicines by supporting collaborative research projects and building networks of industrial and academic experts in order to boost pharmaceutical innovation in Europe. Another UK-based company highly involved is Sygnature Discovery Ltd.⁷⁶ in Nottingham. It is worth mentioning that of 13 universities, research organizations, public bodies, and non-profit groups participating in the European Lead Factory, 6 are based in the Netherlands. They are the Foundation Top Institute Pharma (Stichting Top Instituut Pharma),⁷⁷ Leiden University⁷⁸, Radboud University⁷⁹

71 <http://www.ppu.mrc.ac.uk/overview/DSTT.php>

72 <https://www.assaydepot.com/providers/university-of-dundee-dstt>

73 <http://www.imi.europa.eu/content/european-lead-factory>

74 <http://www.biocity.co.uk/locations/biocity-scotland>

75 <http://www.imi.europa.eu/>

76 <http://www.sygnaturediscovery.com/>

77 <http://www.tipharma.com/>

78 <http://www.leiden.edu/>

79 <http://www.ru.nl/english/>

in Nijmegen, the Dutch Cancer Institute (Stichting Het Nederlands Kanker Instituut)⁸⁰ in Amsterdam, the University of Groningen⁸¹ and the Free University of Amsterdam⁸². Furthermore, 2 of 10 of the participating SMEs, Syncom B.V. in Groningen⁸³ and Mercachem B.V. in Nijmegen⁸⁴, have their operations in the Netherlands.

Incubators, Science Parks & Innovation Centers

Similar to the Golden Triangle the majority of companies in Scotland are clustered. A range of incubators, science parks, and innovation centers provide the resources, infrastructure and stimulating environment needed for life science SMEs to be innovative, collaborate with other companies at national and international level, and keep operational costs low. The Edinburgh Bioquarter,⁸⁵ for example, brings together over 1,000 researchers around the Royal infirmary, the University of Edinburgh School of Medicine, the Queen Medical Research Institute, and the Scottish Centre for Regenerative Medicine. Other examples are West of Scotland Science Park,⁸⁶ Dundee Technology Park, Aberdeen S&T Park, and the Roslin BioCentre (famous for the world's first cloned sheep Dolly).⁸⁷

On April 23, 2013, First Minister of Scotland Alex Salmond announced three Innovation Centers: the Stratified Medicine Scotland Innovation Centre (SMS-IC) at the new South Glasgow Hospitals Campus, the University of Glasgow's Innovation Centre – Sensor and Imaging Systems and the University of Edinburgh's Digital Health and Care Innovation Centre.⁸⁸ ⁸⁹ The centers are expected to create over 2000 jobs over the next five years.

80 <http://www.nki.nl/>

81 <http://www.rug.nl/?lang=en>

82 <http://www.vu.nl/en/index.asp>

83 <http://www.syncom.nl/>

84 <http://www.mercachem.nl/>

85 <http://www.edinburghbioquarter.com/>

86 <http://www.ukspa.org.uk/members/wssp>

87 <http://www.roslinbiocentre.com/>

88 <http://www.scottish-enterprise.com/news/2013/04/new-innovation-centres-to-create-2000-jobs.aspx>

89 [http://www.news-medical.net/news/20130423/Stratified-Medicine-Scotland-Innovation-Centre-\(SMS-IC\)-receives-funding-from-the-Scottish-Funding-Council.aspx](http://www.news-medical.net/news/20130423/Stratified-Medicine-Scotland-Innovation-Centre-(SMS-IC)-receives-funding-from-the-Scottish-Funding-Council.aspx)



Supportive Organizations

Several organizations in Scotland actively support the life science sector. The Scottish Life Sciences Association (SLA) helps its 110 member companies to grow their businesses and it engages with the Government to grow the overall sector in Scotland.⁹⁰ The Scottish Universities Life Sciences Alliance (SULSA) was established in 2007 and is a partnership between the Universities of Aberdeen, Dundee, Edinburgh, Glasgow, St Andrews and Strathclyde, supported by the Scottish Funding Council. By recruiting international top researchers and funding world-class research facilities they aim to maintain and improve Scotland's global position in the life sciences.⁹¹ Life Sciences Scotland (LSS) represents the entire life sciences community in Scotland, from industry and academia to healthcare and Government.⁹² Their Life Science Advisory Board (LISAB) that is co-chaired by Government and industry defines and implements the life science industry's strategy for Scotland.⁹³ Scottish Enterprise⁹⁴ is Scotland's main economic development agency that together with its international arm, Scottish Development International (SDI),⁹⁵ offers tailored support to help businesses grow. The Scottish Enterprise plays a significant role in supporting the life science sector.

90 <http://www.scottishlifesciencesassociation.org.uk/>

91 <http://www.sulsa.ac.uk/>

92 <http://www.lifesciencesscotland.com/about.aspx>

93 <http://www.lifesciencesscotland.com/about/lisab.aspx>

94 <http://www.scottish-enterprise.com/about-us.aspx>

95 <http://www.sdi.co.uk/about-sdi.aspx>



5 UK GOVERNMENT INITIATIVES

Comparable to the Dutch Government that implemented its 'Topsectoren Beleid' (Top Sector Policy) that aims to support innovation and strengthen those sectors in which the Dutch take a leading position in the world,⁹⁶ ⁹⁷ the UK Government is committed to not only support innovation, but openly promote it by establishing a more progressive regulatory environment. During the last years they have announced a range of actions to make the UK a world-leading place for life sciences.

BRCs, BRUs And Translational Partnerships

In August 2011 the Government announced £800 million investment over 5 years from April 2012 to boost research and allow the development of ground breaking medicines, treatments and care for patients. This unprecedented investment consists of 31 awards that include funding for the creation of new Biomedical Research Centres (BRCs) and Units (BRUs) within the UK's leading teaching hospital-university partnerships,⁹⁸ and the establishment of new Translational Research Partnerships. BRCs drive life science innovation, bring new innovative advances in bio-medical research from bench to bedside, form an integral link with the NHS, and contribute to the UK's international competitiveness.⁹⁹ BRUs undertake

96 <http://www.rijksoverheid.nl/onderwerpen/ondernemersklimaat-en-innovatie/investeren-in-topsectoren> (Dutch)

97 <http://www.rijksoverheid.nl/onderwerpen/ondernemersklimaat-en-innovatie/investeren-in-topsectoren/life-sciences> (Dutch)

98 <http://www.aukuh.org.uk/>

99 <http://www.nihr.ac.uk/infrastructure/Pages/>

translational clinical research in priority areas of high disease burden and clinical need.¹⁰⁰

While BRCs work around various research themes, BRUs are focused on a specific disease area such as cardiovascular disease or dementia. The first BRCs and BRUs were set up by the National Institute for Health Research (NIHR) in 2007 and 2008, respectively, and funding for these ended in March 2012. In February 2011 an open competition was launched and on 18 August 2011, the NIHR announced the designation and funding of a second round of eleven BRCs and twenty BRUs that began operating on 1 April 2012.

The £800M investment also included funding for two new Translational Research Partnerships that bring together world-class investigators in the UK's leading academic and National Health Service (NHS) centers to support collaboration with the life sciences industry in early and exploratory development of new drugs and other interventions.¹⁰¹ One is focused on joint and related inflammatory diseases¹⁰² whereas the other focuses on inflammatory respiratory diseases.¹⁰³ The National Institute for Health Research Office for Clinical Research Infrastructure (NOCRI) is looking into other disease and therapeutic areas that may benefit from such partnerships and it is likely that more will be formed in the future with the BRCs and BRUs forming the pillars of such initiatives like for the first two partnerships.

Early Access Scheme

The UK's regulatory environment is already one of the fairest and most transparent in the world,¹⁰⁴ but due to the perceived shortcomings of the existing regulatory regime, the UK Government proposed the introduction of a new "Early Access Scheme" to

[infrastructure_biomedical_research_centres.aspx](http://www.nihr.ac.uk/infrastructure/infrastructure_biomedical_research_centres.aspx)

100 http://www.nihr.ac.uk/infrastructure/Pages/infrastructure_biomedical_research_units.aspx

101 http://www.nihr.ac.uk/industry/Pages/translational_research_partnerships.aspx

102 <http://www.nihr.ac.uk/files/pdfs/NOCRI/NIHR%20Translational%20Research%20Partnership%20-%20Joint%20and%20Related%20Inflammatory%20Diseases.pdf>

103 <http://www.nihr.ac.uk/files/pdfs/NOCRI/NIHR%20Translational%20Research%20Partnership%20-%20Inflammatory%20Respiratory%20Disease.pdf>

104 UK Pharmaceuticals & Healthcare Report Q2 2013, Business Monitor International Ltd, 2013

facilitate access to drugs which are not yet authorized.¹⁰⁵ In March 2012, to create more awareness of existing regulations, the Medicines and Healthcare Products Regulatory Agency (MHRA) started with a section on their website listing the EU and UK regulatory tools supporting patient access to innovative breakthrough products.¹⁰⁶ On 17 July 2012 they followed with the launch of a public consultation on the new “Early Access Scheme” proposed by the Government to facilitate access to newly developed drugs that have not yet been approved. The new regulations should increase the speed and efficiency of routes to market approval for innovative, breakthrough therapies.

European Bioinformatics Institute, Cell Therapy Catapult & Stratified Medicine

In their report ‘Strategy for the Life Sciences’, published in December 2011, the Government committed to invest £310M to support discovery, development and commercialization of research.¹⁰⁷ The investment included £100M for an unprecedented sequencing project by the NHS that will map DNA of up to 100,000 patients within three to five years.¹⁰⁸ The genome profile will give doctors a new, advanced understanding of a patient’s genetic make-up, condition and treatment needs and it will help scientists to develop new drugs and treatments (<http://www.genomicsengland.co.uk>).

With this initiative the UK will be the first country in the world to introduce the whole genome sequencing technology within a mainstream health system. The £310M investment also included £75M for the European Bioinformatics Institute in Cambridge¹⁰⁹ and £10M per annum for the Cell Therapy Technology and Innovation Centre in London, now known as Cell Therapy Catapult.¹¹⁰ £60M of the total investment was

105 <http://www.mhra.gov.uk/Publications/Consultations/Medicinesconsultations/MLXs/CON173755>

106 <http://www.mhra.gov.uk/Howweregulate/Medicines/Medicinesregulatorynews/CON143800>

107 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32457/11-1429-strategy-for-uk-life-sciences.pdf

108 <https://www.gov.uk/government/news/dna-tests-to-revolutionise-fight-against-cancer-and-help-100000-nhs-patients>

109 <http://www.ebi.ac.uk/>

110 <https://ct.catapult.org.uk/>



committed by the Medical Research Council (MRC) to support collaborations in stratified medicine (optimization of therapies for groups of patients based on their shared biological characteristics) between academia, industry and clinicians.¹¹¹

Access To Clinical Trial Data

In March 2012, to provide patients and the public with a portal to easily access information about clinical trials in the UK, the Government launched an enhanced web-based UK Clinical Trials Gateway through the NIHR.¹¹² The system uses information from the ISRCTN¹¹³ and the ClinicalTrials.gov¹¹⁴ registers. ISRCTN is a system for identification of randomized controlled trials worldwide and ClinicalTrials.gov is the registry and results database of publicly and privately supported clinical studies of human participants conducted around the world. The new UK Clinical Trials Gateway site has specifically been set up to ensure that patients from the UK can find out about research that is of particular relevance to them. Currently the NIHR is working together with the NHS to make the Gateway available through their websites NHS Choices¹¹⁵ and NHS Evidence¹¹⁶.

Experimental Resource Finder

Another helpful web-based tool that was set up for industry and academic investigators is the

111 http://www.mrc.ac.uk/Fundingopportunities/Calls/stratified_medicine/MRC008386

112 <http://www.ukctg.nihr.ac.uk/default.aspx>

113 www.isrctn.org

114 <http://www.clinicaltrials.gov/>

115 <http://www.nhs.uk/Pages/HomePage.aspx>

116 <https://www.evidence.nhs.uk/>

Experimental Medicine Resource Finder.¹¹⁷ It was set up by the NOCRI to provide information about experimental medicine resources in the UK. Researchers can use the site to access up-to-date information on over 50 major experimental medicine facilities with details of expertise, resources, techniques and technologies.

Attracting Talented Professionals

At any one time, the MRC supports around 1,900 PhD students and 200 postdoctoral fellows. In 2011 they committed around £70m to support 1,900 PhD posts and 320 fellowships for both clinical and non-clinical scientists.¹¹⁸ During the same year the NIHR committed a similar amount to support over 1,600 posts for research training in clinical and applied health research.¹¹⁹ ¹²⁰ In addition to these Governmental bodies other sources of funding for talented individuals are made available by charity organizations such as the Wellcome Trust¹²¹ and Cancer Research UK (CRUK) ¹²² that contributed £114M and £20M, respectively, in 2011 for fellowships and training grants.

Together with the Royal Society the Wellcome Trust has introduced the Sir Henry Dale Fellowships. These grants offer about £1M each to exceptional young biomedical researchers to allow them to establish themselves as independent investigators in Great Britain.¹²³ Furthermore, the NIHR is funding successful scientists in the early part of their career by awarding them with Research Professorships¹²⁴ to do translational research, either from bench-to-bedside or from campus-to-clinic. It should enable outstanding early career academics to spend a fixed 5 year period dedicated to translational research and it should accelerate the process in which scientific ideas are

117 <http://www.ukcrcexpmed.org.uk/Pages/Home.aspx>

118 <http://www.mrc.ac.uk/ResearchTrainingCareers/index.htm>

119 <http://www.nihrtcc.nhs.uk/nihrfellow/>

120 http://www.nihr.ac.uk/faculty/Pages/faculty_career_opportunities.aspx

121 http://www.nihr.ac.uk/faculty/Pages/faculty_career_opportunities.aspx

122 <http://www.cancerresearchuk.org/science/funding/find-grant/browse-by-funding-type/fellowships-and-training-grants/>

123 <http://www.wellcome.ac.uk/Funding/Biomedical-science/Funding-schemes/Fellowships/Basic-biomedical-fellowships/wtdv031823.htm>

124 <http://www.nihrtcc.nhs.uk/researchprofessor/>



turned into applications that benefit patients.

To attract top-talents research council institutes can themselves approve recruitment of top scientists without the need for additional Governmental approval as long as salaries do not exceed £100,000. Absence of Governmental intervention simplifies the process of attracting and hiring experienced professionals and shortens the time it takes to fill positions with highly skilled individuals.

Technology Strategy Board

The Technology Strategy Board (TSB) was established as a separate organization in 2007 and is a non-departmental public body sponsored by the Department for Business, Innovation and Skills.¹²⁵ They support businesses centered around innovation like start-ups and companies working at the forefront of research and translating new ideas into practical applications. The TSB's efforts accelerate and stimulate economic growth and have led to a wide variety of projects and life science initiatives. During the first three years after its inception, together with its partners and businesses, it invested more than £2bn in UK innovation and they had investments in over 3,000 businesses on projects to move ideas and technologies closer to market.¹²⁶ The TSB also developed and launched the Small Business Research Initiative (SBRI), a program that allows the public sector to engage with industry during the early stages of development. During the first three years

125 <https://www.innovateuk.org/>

126 Technology Strategy Board, Concept to Commercialisation, A strategy for business innovation, 2011-2015.

that the TSB was in operation, over £35m of contracts were awarded to more than 500 small and medium-sized companies. In the 2013 Budget the Government announced to expand the use of SBRI among key departments five-fold. The value of contracts made available through this route increased from £40 million in 2012-13 to over £100 million in 2013-14, and will increase to over £200 million in 2014-15.¹²⁷

Together with the research councils the TSB was also the driving force behind the catalyst initiative. Catalysts provide funding for research and development in a specific priority area to take projects from research as far as possible to commercialization. Examples are the Agri-Tech Catalyst¹²⁸ and the Biomedical Catalyst.¹²⁹ In a similar fashion the TSB has established a network of world-leading technology and innovation centers, the so-called Catapults. They have been created to transform the UK's capability for innovation in seven specific areas and help drive future economic growth.¹³⁰ The one that is of specific interest for the life sciences is the Cell Therapy Catapult.¹³¹ It was initiated in 2012, is based in the heart of London and aims to become a global leader in the development, delivery and commercialization of cell therapy.

Tax Incentives

The British Government introduced several new policies during the last years that make the tax environment more attractive for companies and institutes operating in the life sciences. In the Finance Bill of 2012 they introduced an EU VAT cost-sharing exemption that allows organizations like universities and colleges to form a group and set up an entity to act as service provider to the members of the group. If certain conditions are met, services provided to the group members are exempt from VAT, which can be a considerable cost saving, because VAT paid by an academic institution is often an irrecoverable cost.^{132 133}

127 <https://www.innovateuk.org/-/sbri>

128 <https://www.innovateuk.org/agri-tech-catalyst>

129 <https://www.innovateuk.org/biomedical-catalyst>

130 <https://www.innovateuk.org/-/catapult-centres>

131 <https://ct.catapult.org.uk/>

132 http://www.sghmartineau.com/publication_event/updates/the-VAT-cost-sharing-exemption-summer-2011.pdf

133 <http://www.hmrc.gov.uk/budget-updates/29nov11/vat-cost-sharing.pdf>



The Government also improved the R&D Tax Credit for SMEs by increasing the level of super-deduction relief available to 225% in April 2012 (after an earlier increase to 200% in 2011), and removing the minimum spend requirement. It reduces the company or organization's tax bill and incentivizes investments in research and development.¹³⁴

Another tax incentive for the innovative industries and complementary to the R&D tax incentives is the introduction of the Patent Box¹³⁵, a measure that reduces corporation tax on profits from patents. It has been implemented on 1 April 2013 and encourages companies to locate high-value jobs and activity associated with development, manufacture and exploitation of patents within the UK. The Patent Box allows a 10% tax rate on profits derived from any products that incorporate patents, which is considerably lower than the UK corporation tax rate that is currently 21%¹³⁶ (decreasing to 20% from April 2015).

In 2012 the Government also introduced a new Seed Enterprise Investment Scheme¹³⁷ (SEIS). It helps smaller, high-risk companies by offering a 50% income tax relief on investments. On top of that the Government offered a capital gains tax exemption on

134 <http://www.hmrc.gov.uk/ct/forms-rates/claims/randd.htm>

135 <http://www.hmrc.gov.uk/ct/forms-rates/claims/patent-box.htm>

136 <http://www.hmrc.gov.uk/rates/corp.htm>

137 <http://www.hmrc.gov.uk/seedeis/>



gains realized from the disposal of an asset in 2012/13 invested in SEIS in the same year.

6 FOREIGN DIRECT INVESTMENT

The UK is the number one destination for Foreign Direct Investment (FDI) in Europe. During 2012 five countries received 44% of the total global FDI inflow with the UK being at the fourth place, receiving FDI worth \$63bn (Other members of the top 5: China, \$253bn; US, \$175bn; Brazil, \$65bn; France, \$62bn. The Netherlands recorded a negative inflow of -0.2bn during the same period).¹³⁸ Data show that from 2007 till 2012 almost 300 projects in the UK were funded by foreign direct investment, which is quite a contrast when compared to the Netherlands where during the same time around 60 projects received such funding.¹³⁹ It is important to realize that the majority of these investments are not in life science ventures, but in projects that include airports, power plants, financial services, commodities, and infrastructure. The pharma and biotech sector, however, receives a significant part of FDI and this is expected to grow considerably in the future with ageing populations and developments in the life sciences that will have an increased focus on areas like stratified medicine and personalized health care. With the UK's infrastructure and climate of policies and regulations supporting entrepreneurial activity and helping innovative researchers and clinicians to bring their latest work faster and easier to

¹³⁸ Organization for Co-operation and Economic Development, FDI in figures, April 2013 (<http://www.oecd.org/daf/inv/FDI%20in%20figures.pdf>)

¹³⁹ Source: fDi Markets from the Financial Times, December 2012

market, the UK has become one of the top destinations for life science investment.

The UK has traditionally been the number one recipient of US investment, a pattern that continued in 2012 (with the UK receiving 26% of the US's rising number of projects). Great Britain was also the leading recipient of Japanese and French investments in 2012¹⁴⁰ and the UK is competing with Germany and France for the number 1 position when it comes to Chinese FDI. While Chinese investment in the EU was only representing 0.1% of total inward FDI flows over the 2005-2010 period (according to Eurostat data), Chinese interest in Europe as investment location has increased significantly during recent years and it is expected that China will be an important player when it comes to future FDI.^{141 142}

7 CONCLUDING REMARKS

In many ways the UK is at the forefront when it concerns developments in the life sciences and ideas for policies to stimulate and incentivize R&D heavy and innovative companies and institutes. In recent years the UK Government made significant investments in the life sciences industry and worked towards a more attractive climate of policies and regulations, attracting investment, companies, and top-talent, so the UK can remain one of the leading countries in the global life science field. The Netherlands is not alone in facing an ageing population where things like obesity, diabetes, cardiovascular diseases, age-related conditions such as rheumatoid arthritis and neurological diseases like Alzheimer's and Parkinson's, have an ever higher impact on society. With four of the top ten universities in the world located in the Golden Triangle of Oxford, London, and Cambridge, with over 4500 life science companies, and with a highly advanced National Health Service, Great Britain forms a powerhouse of research and innovative life science industries. When

¹⁴⁰ Ernst & Young's attractiveness survey UK 2013

¹⁴¹ <http://www.europeanchamber.com.cn/en/publications-chinese-outbound-investment-eu-european-union>

¹⁴² Conference on EU and the Emerging Powers European Parliament, Brussels, 29-30 April 2013. EU-China FDI in the 21st century: Who is ready for a "win-win" strategy? Thierry Apoteker, Sylvain Barthélémy, and Sandrine Lunven. April 2013. (http://www.usaintlouis.be/fr/pdf/150e/paper_apotheke_et_...pdf)

the life science community of the Netherlands is looking for collaborators, clients, funding, innovation, and stimulating policy and regulatory ideas, it should invest some time to have a closer look as to what is happening in the UK.

At the same time it would be of interest for the UK to have a closer look at the Netherlands. Apart from a strong academic environment with excellent science and a government that supports development of the life science sector, there are several life science areas in which the Netherlands is among the strongest in the world. With Philips they are one of the leading countries in the world when it comes to medical imaging¹⁴³ and they as well take a leading position when it comes to plant biotechnology and agricultural research with Wageningen University as the center of this focus.¹⁴⁴ Furthermore, companies like Danone and FrieslandCampina, together with institutes like NIZO¹⁴⁵ and TNO Innovation for Life,¹⁴⁶ put the Netherlands on the map when it comes to research in food biotechnology and nutrition. As mentioned earlier, the Netherlands plays a significant part in the European Lead Factory¹⁴⁷ and the country recently boasted a national genomics program and three large public-private programs on Pharmacotherapy, Translational Molecular Medicine and Regenerative Medicine worth over €1bn.¹⁴⁸ With healthy ageing being an important theme throughout the world it is also worth mentioning that the European Research Institute for the Biology of Ageing (ERIBA) is based in Groningen in the Netherlands.¹⁴⁹ In summary: Enough reasons for the UK and the Netherlands to explore opportunities to collaborate and learn from each other's knowledge and strengths.

If you would like to be kept informed about initiatives to bring the life science sectors of the Netherlands and the UK closer together, please send an e-mail

143 http://www.healthcare.philips.com/us_en/

144 <http://www.wageningenur.nl/en/wageningen-university.htm>

145 <http://www.nizo.com/home/>

146 <https://www.tno.nl/>

147 <http://www.imi.europa.eu/content/european-lead-factory>

148 <http://www.hollandtrade.com/sector-information/life-sciences/?bstnum=4929>

149 <http://www.umcg.nl/EN/Research/Eriba/Pages/eriba.aspx>

with 'Anglo-Dutch Life Sciences' in the subject line to lon-ea@minbuza.nl. To keep informed about what is happening in the greater Cambridge, London and Oxford area you may as well consider to become a member of the 'Golden Triangle Biotech' group on LinkedIn.

8 WEB-BASED TOOLS & RESOURCES

- **BioDundee** - Promoting the Dundee sector as a centre of world class life science activity - <http://www.biodundee.co.uk/>
- **BioIndustry Association** - Trade association for innovative enterprises involved in UK bioscience - www.bioindustry.org
- **BioNow** - Supporting business growth, competitiveness and innovation within the biomedical and life science sectors across Northern England - <http://www.bionow.co.uk/>
- **BioPartner UK** - An independent, accredited trade organization, promoting international partnering for trade, investment and collaborations with UK Life Science companies - <http://www.biopartner.co.uk/>
- **British Venture Capital Association** - Representative body for the UK private equity industry including VCs and Angels - <http://www.bvca.co.uk/>
- **Cogent** - Sector Skills Council (SSC) for the Chemicals, Pharmaceuticals, Nuclear, Life Sciences, Petroleum and Polymer Industries - http://www.cogent-ssc.com/general/about_cogent.php
- **Health Knowledge Transfer Network** - Connecting organizations to catalyze innovation in the health industries sector - www.healthktn.org
- **Life Sciences in the Netherlands** - Providing information about the Dutch Life Sciences Health Cluster - <http://www.lifescienceshealth.com/>
- **Life Sciences Outlook 2012 Dutch biotech companies: from start-up to exit** - Survey of the Dutch Biotech Industry - http://www.newsletter-nautadutilh.com/downloads/LifeSciences/NautaDutilh_Life_Sciences_Outlook_2012_Dutch_biotech_companies_from_start-up_to_exit_SINGLEPAGE_direct_download_version.pdf
- **Life Sciences Scotland** - Unifying the community and broadcasting Scotland's depth of expertise in Life Sciences across the world - <http://www.>

lifesciencesscotland.com/

- **London Life Science** - Online community of life science practitioners in and around London - <http://www.londonlifescience.com/>
- **Nederlandse Biotechnologische Vereniging (NBV)** – Member organization for professionals working in the biotech sector - <http://nbv.kncv.nl/over-nbv.7240.lynkx> (Dutch)
- **Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)** – Dutch Organisation for Scientific Research - <http://www.nwo.nl/en>
- **Netherlands Foreign Investment Agency** – Dutch Government Agency that helps foreign companies wishing to establish their business in the Netherlands - <http://nfa.co.uk/>
- **Office for Life Sciences** – Part of the Department for Business, Innovation and Skills - <https://www.gov.uk/government/organisations/office-for-life-sciences>
- **One Nucleus** – Member organization supporting the life science community with a focus on the greater London and Cambridge area - www.onenucleus.com
- **Oxbridge Biotech Network (OBN)** – Member organization supporting the life science community with a focus on the greater Oxford area - www.obn.org.uk
- **Scottish Development International** – Organization assisting in the growth of the Scottish economy, by encouraging inward investment and helping Scottish-based companies develop international trade - <http://www.sdi.co.uk/sectors/life-sciences.aspx>
- **Scottish Lifesciences Association** – With 110 member companies engaging with the Government to grow the life science sector in Scotland - <http://www.scottishlifesciencesassociation.org.uk/>
- **Technology Strategy Board** - Non-departmental public body sponsored by the Department for Business, Innovation and Skills that stimulates and supports business-led innovation - <https://www.innovateuk.org/>
- **UK Innovation Forum** – Stimulating collaborations between companies and British Universities to encourage commercialization of technological innovations - <http://uk-if.org/>

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About BioFrontline Ltd

BioFrontline Ltd (www.BioFrontline.com) assists life science enterprises, including those focusing on platform technologies, medical devices, and therapeutics, to commercialize and develop their products and services in the US, Europe and Asia. BioFrontline Ltd has several clients throughout the world and has successfully mediated deal negotiations with some of the leading pharmaceutical industries. With an extensive, global network of high level professionals in the life sciences, consultants,

and contacts on the investment side, BioFrontline Ltd helps BioPharma and related companies with know-how and with expanding and growing their business nationally and internationally.

About The Embassy Of The Netherlands

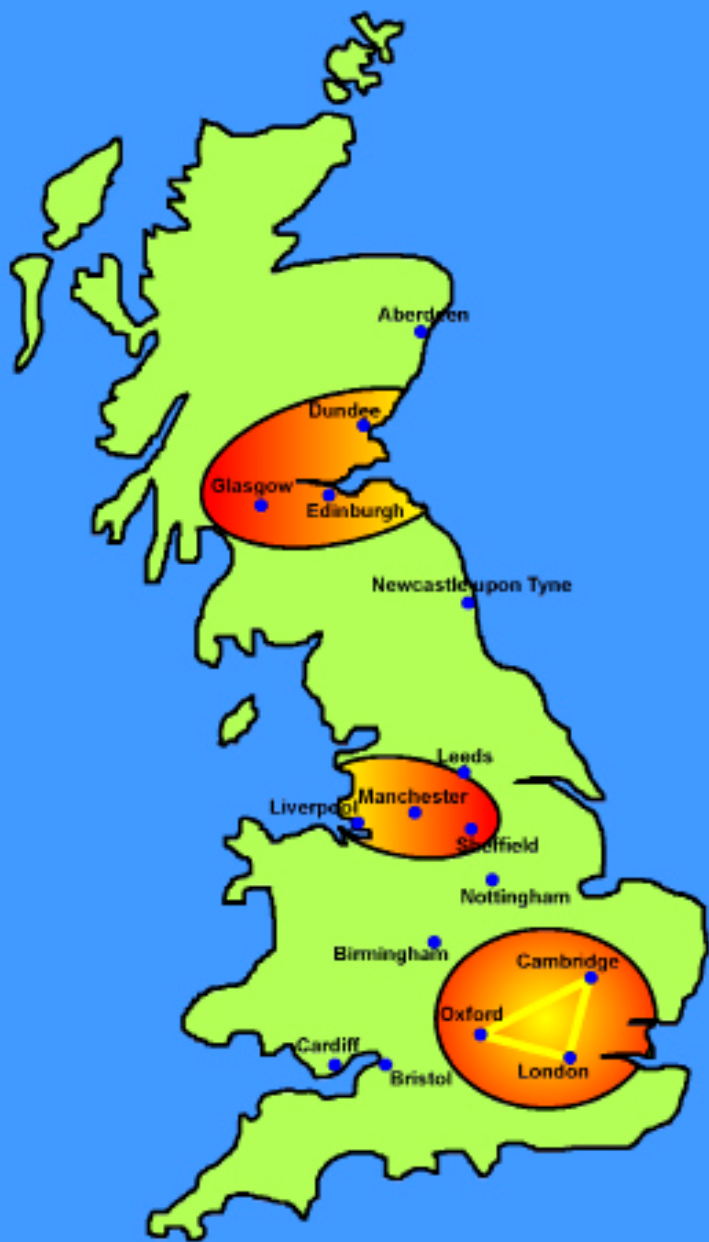
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150 Embassy of the Kingdom of the Netherlands, 38 Hyde Park Gate, London SW7 5DP. <http://unitedkingdom.nlembassy.org/>

151 <http://www.government.nl/ministries/bz>



Life Sciences in the United Kingdom

Highest concentrations of Life Sciences activity are found in the Golden Triangle of Oxford, Cambridge and London, the North West of England and the Edinburgh-Glasgow region in Scotland as indicated on the map.

Pharmaceuticals, medical biotechnology and medical technology sectors together comprise around 4,500 firms, employing 167,500 staff, with an R&D spend of nearly £5 billion and an annual turnover of over £50 billion.

There are approximately 200 diagnostics companies in the UK, generating a turnover of over £1 billion.

Of the top 50 global pharmaceutical companies, 37 have sites in the UK and represent 83% of the total pharma sector.

The UK has the largest biopharmaceutical pipeline in the EU, with 20% of biopharmaceuticals in development originating in the UK.

With more than 900 medical biotechnology companies and over 3100 medical technology companies, the UK has one of the largest Life Sciences sectors in Europe.

NIHR Clinical Research Networks supported the practical delivery of 3,200 clinical studies in 2010-11 through the recruitment of over 500,000 patients.

* Information obtained from UK Trade & Investment

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