



LABOUR MARKET REVIEW SERIES: VOLUME 3

Biopharma

Collins McNicholas
Recruitment & HR Services Group

 **nibr**
National Institute for
Bioprocessing Research
and Training



Executive Summary

Ireland's biopharma industry:

Supports 60,000 jobs across Ireland directly and indirectly.

Over 25% of all PhD researchers working in the industry are in the biopharma sector.

The National Institute for Bioprocessing Research and Training, (NIBRT) trained over 4,700 people in 2019, across 19,000 learning days.

The global biologics market, which represents 20% of the global biopharma market, was valued at \$281.69 billion in 2019 and is projected to reach \$399.5 billion by 2025.

Biopharma exports in Ireland are worth €39 billion annually.

There is strong demand for engineering skills (process and chemical engineers and experienced team leaders), particularly in the areas of product and technology transfer, downstream processing and quality professionals.

28% of higher education enrolments in 2019 were in science, technology, engineering and maths (STEM) fields of study.

Given the strong supply of talent, the long history of pharmaceutical manufacturing, the commitment of government and industry, and the attractiveness of Ireland to highly skilled overseas workers, Ireland is in an excellent position to capitalise on the global expansion of the biopharmaceutical sector.

Introduction

There are over 30,000 people working in the biopharma industry in Ireland today, with the same number of jobs supported indirectly. Medical and pharmaceutical exports were approximately €80 billion in 2019, an increase from €69 billion in 2017. Almost half - €39 billion - is attributed to the biopharma industry.

Ireland has a strong tradition of pharmaceutical manufacturing, however, in the last 20 years there has been a rapid expansion of biologics production. In 2003, there were just two biologics manufacturing sites in Ireland and the market was extremely small. Today there are over 20 biologics manufacturing sites in the country. This transition, which will become more dominant in the future, is in line with global expectations for the industry. The global biologics market is worth \$281.69 billion and represents over 20% of the current biopharma market. However, the market is growing at twice the rate of the traditional pharmaceutical market, showing a growth rate of just over 11%. It is expected to reach \$399.5 billion by 2025. The importance of the global biologics market, in terms of the overall productivity and size, will only increase in the coming years.

Recent Investments

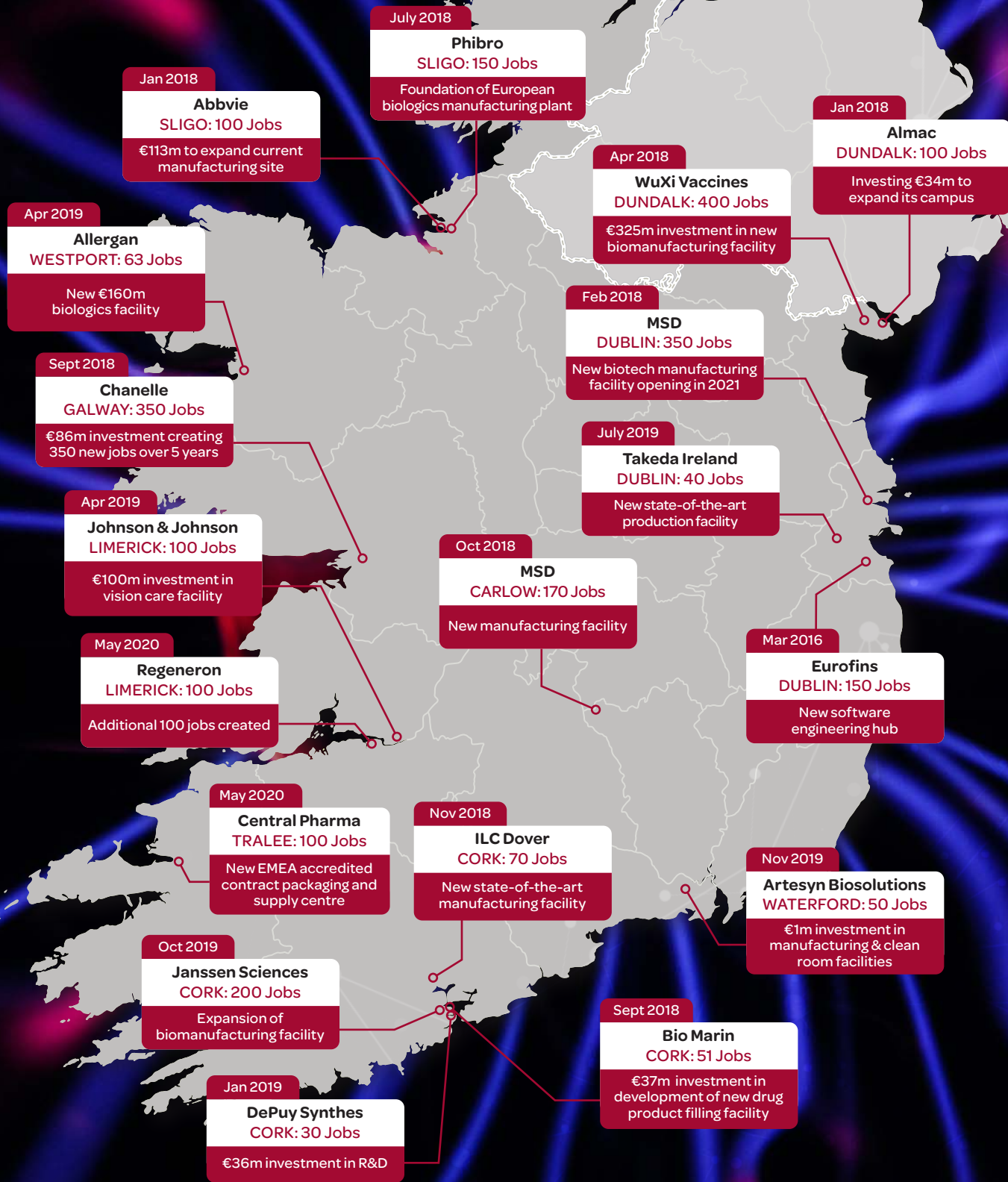
The manufacturing of biologics is a more complex process than the production of traditional pharmaceuticals. A significant investment is required to construct the facilities necessary for biologics production. There have been a number of these large-scale investments in Ireland in recent years that have covered both biologics-based manufacturing and sterile fill-finish facilities. These investments have generated a significant number of jobs in Ireland which are predominantly well-paid, highly skilled and most significantly, well distributed regionally. Recent job announcements are illustrated on the map opposite.

What is the difference between conventional pharmaceutical drugs and biologics?

A biologic is manufactured in a living system such as bacteria, yeast, or plant or animal cells. Biologics are much larger and much more complex than pharmaceutical drugs and therefore the manufacturing process is consequently a lot more complicated and sensitive, requiring a larger capital investment in its production facilities. The manufacturing process is intrinsically linked to the product and is largely fixed as a result. Also, Biologics are at greater risk of contamination in the production process.

Whereas a pharmaceutical drug is manufactured via chemical synthesis. It is a small molecule relative to a biologic. The end product is much more stable and the production process is more straightforward than for biologics. This gives greater flexibility in the production process. The end product can be analysed to determine its components making it easier to replicate. Generic counterparts are thus more common for conventional pharmaceutical drugs.

Major Job Announcements 2018-2020





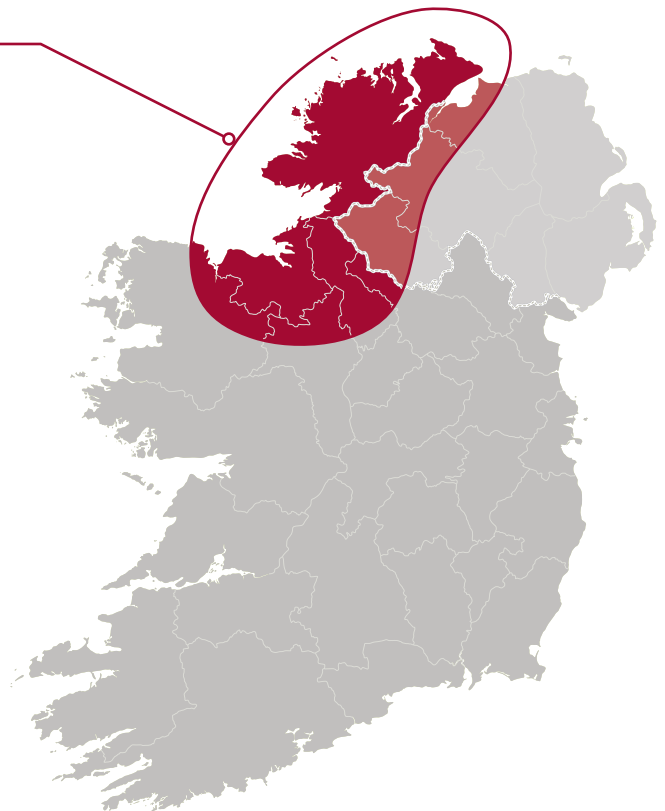
Regional Overview

Although Cork and Dublin feature most prominently as locations for biopharma plants, there are a number of regional locations across the country that have developed clusters of biopharma expertise. This regional diversity broadens the range of options for a company looking to set up a facility in Ireland. They can avail of a broad talent base, accessing the skills and experience they need almost anywhere in the country. The geographical spread of recent investments highlights this.

North West

Sligo, and the North West, represent an important regional cluster for the biopharma industry in Ireland. Abbvie in particular has a very strong presence in Sligo and currently operates two large manufacturing facilities in the county. Their €113 million expansion in 2018 saw their headcount increase by 100 people in order to take on the production of its new oncology products. On top of this they also acquired Allergan plc. in 2020, taking control of their operations in Westport and Galway.

There are a number of other pharmaceutical and medical device companies operating in the North West that further contribute to the life science expertise in the region. The animal health company, Phibro, announced 150 new jobs for Sligo in July 2018 along with plans to establish a biotech facility producing a range of innovative animal health vaccines.



West

Galway and Mayo are home to a long list of life sciences companies. As mentioned above, Abbvie completed its acquisition of Allergan's Westport and Galway sites in 2020. The Westport site invested over €160 million in a new biologics facility in April 2019 and has a headcount of almost 1,500.

Mylan operate two facilities in County Galway, in Inverin and Casla, and they are the largest employer in the Galway Gaeltacht. Chanelle Pharmaceuticals in Loughrea, [Ireland's largest indigenous drug company](#), announced an €86 million investment plan in 2018, creating 350 jobs over 5 years.

Charles River Laboratories also continue to operate in Mayo.

East

Dublin is the location for several shared services and operations centres in the biopharma sector. There has been continuous investment by biopharma companies in the Dublin region and organisations such as Pfizer, Roche, Novartis, Lilly, Allergan, Shire and Alexion each have sites in the capital. MSD is opening a new biotech manufacturing facility in Swords in 2021 to expand their current site, while Eurofins announced in January of 2019 that they are adding 150 new jobs in Sandyford with the establishment of a software hub to support their life sciences operations. Furthermore, last summer Takeda Pharmaceuticals announced 40 additional jobs and a €30 million investment in their new state-of-the-art manufacturing facility in Dublin.

The North East of Ireland has also benefited from several announcements in recent years. Almac announced a €34 million expansion to its campus in 2018, while in November 2019, Chinese organisation, WuXi Vaccines, confirmed plans to build a \$240 million vaccine production facility on the grounds of its recently established WuXi Biologics campus in Dundalk. This will bring the Wuxi Biologics and Wuxi Vaccines headcount to a total of 600 by 2024.

Midwest

The Midwest is a growing biopharma hub. Regeneron's state-of-the-art biopharma production facility in Limerick is the largest-scale bulk biologics production site in Ireland, and their sizeable investment in their operations here leaves their headcount at 8,100 people. Other companies in the region include Gencell Biosystems, Johnson & Johnson and Avara.

The Science Foundation Ireland Research Centre for Pharmaceuticals, based out of the University of Limerick, is a hub of Irish research expertise developing innovative technologies to address key challenges facing the pharmaceutical and biopharmaceutical industry.



South

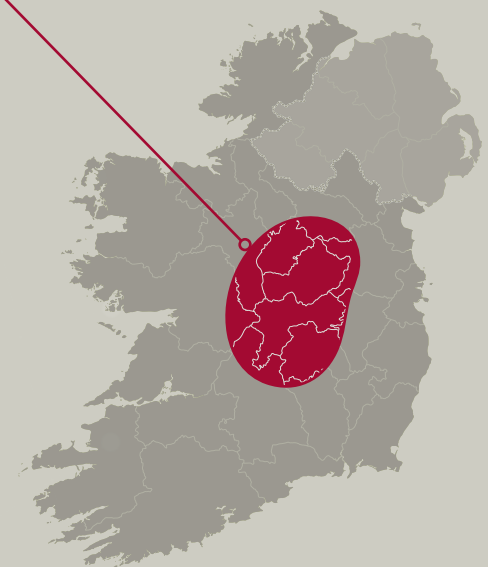
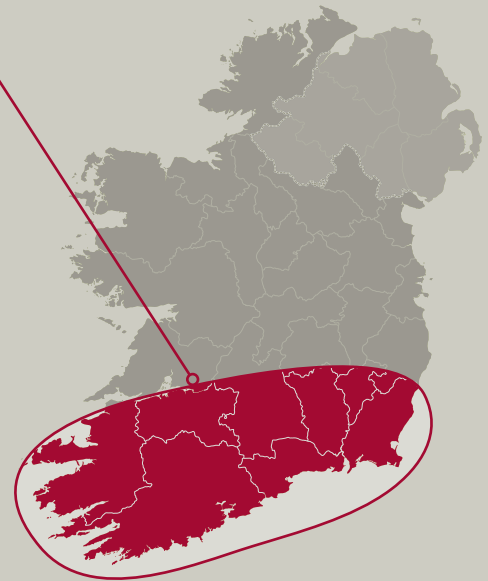
The southern region boasts a large number of the world's leading biopharma companies. Abbvie, BioMarin, Johnson & Johnson, Novartis, Lilly, and MSD are just a sample of the organisations based in Cork, and there are [over 10,000 people employed by pharmaceutical and medical device manufacturing companies](#) in the county. Lilly's biotech site based in Kinsale is the main centre for the manufacture and supply of active ingredients for their new biopharma medicines, while they also have a shared services centre in Little Island, Cork, employing a further 600 people. BioMarin, a biopharma company that focuses on rare and genetic diseases, employs approximately 370 people in Cork. Gilead's Cork plant manufactures drugs for the treatment of HIV and hepatitis. The unit employed just 60 people when it was acquired from Nycomed in 2007 and now employs over 400 people. Janssen Sciences also has a biopharmaceutical manufacturing facility based in Ringaskiddy and announced a further €300 million investment last year bringing the total staff numbers to 700 or so on site.

Kerry is home to another 500 employees in the industry with companies such as Astellas, Listal and Aenova Group. In the South East, Waterford has become a leading biopharma manufacturing hub in recent years. Eirgen Pharma, West, GlaxoSmithKline, Sanofi and Bausch Health Ireland all have significant operations in the county, as do Eurofins who have over 250 people onsite in Dungarvan. Artesyn Biosolutions also announced 50 new jobs in Waterford in November 2019 and committed to investing €1 million in manufacturing and clean room facilities.

Midlands

Athlone is the centre of the biopharma industry in the Midlands. Alexion's €100 million investment to construct a biologics manufacturing facility on their Athlone site took their headcount to almost 150 in 2019. They originally arrived in the Midlands in 2014 and have invested over €600 million in the region since then. Alkermes is a long-established global biopharma company also based in Athlone that develops innovative medicines designed to help patients with chronic conditions. Aerie Pharmaceuticals, an ophthalmic pharmaceutical, has [more than 70 people working out of its Athlone base](#). Jazz Pharmaceuticals is based in Monksland, west of Athlone Town, and employs over 50 people in manufacturing. The Almac Group also has a base in Monksland since 2017, while PPD Laboratories celebrated ten years in the region in 2020.

Nearby, Abbott Longford continues to manufacture diagnostic equipment at its 135,000 square-foot site and employs over 650 people, while the animal health company, Zoetis, operates out of Tullamore in Co Offaly since it [acquired Nextvet in 2017](#).





Talent and Graduate Output

Interest in STEM subjects has continued to increase in Ireland. The latest statistics from the Higher Education Authority show that one quarter of graduates are from this area. The same report shows that 28% of new entrants to third-level undergraduate courses were in STEM courses, indicating a slight increase in output over the coming years.

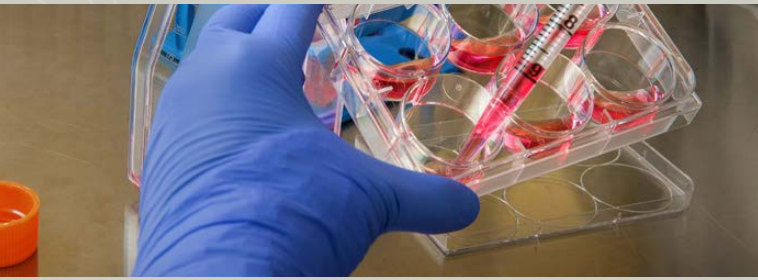
The Government initiated its 'Smart Futures' programme in 2012 with the aim of encouraging young people to pursue careers in STEM related industries. The programme has been very successful at increasing the number of secondary students taking higher level maths, with record numbers opting for the higher-level paper for both leaving and junior cert in recent years. The number of students sitting higher level Leaving Certificate maths has more than doubled since the introduction of the scheme in 2012. Over 18,000 students sat the higher-level paper in 2019 – an 8% increase on 2018.

There was an overall increase of 5% in the number of students sitting Leaving Certificate STEM subjects in 2019. It is graduates from these courses that form the technical backbone of the biopharma industry so growing the volume of applicants to these courses is an important step in providing sufficient talent for the industry. Increasing the number of students taking higher level maths will also lead to greater demand for STEM courses at third level.

The biopharma sector employs significantly more third level graduates than the average industry. According to the Expert Group on Future Skills Needs (EGFSN) there should be a sufficient supply of graduates in the medium term to meet industry demand. The EGFSN identified a short term need for a number of technicians and senior process scientists within the industry, but this is not expected to be a factor in the long term as there are an appropriate number of training places to overcome this minor deficit.

Science at Third Level

There has been a consistently high number of students taking science related courses in third level institutions. According to Higher Education Authority data for the academic year 2018/19, there were 34,272 students completing an honours degree in a STEM field of study and 28% of higher education enrolments were in STEM fields of study. This consistency indicates a continued high number of applicants and graduates to STEM courses at third level.



In fact, the most recent graduate data shows that in 2017 [Ireland produced more STEM graduates per 1,000 graduates than any other EU country](#). With 32.7 STEM graduates per 1,000, we were significantly higher than the EU average of 19.3. Along with the continued increase in Leaving Certificate students opting for STEM subjects there is a positive outlook in the trend of science graduates in the coming years. Over 9% of all graduates in 2017 were in science courses.

This is encouraging, as access to talent is a key differentiator in attracting foreign investment. Ireland needs to increase its output, but its ability to outperform its European rivals in this regard and its ability to attract international workers, should help Ireland remain competitive in attracting foreign investment.

The IMD World Competitiveness Centre, which ranks countries based on their economic development, attractiveness to overseas workers and retention of current workers, [placed Ireland in 8th position overall in a list of 63 countries](#). Impressively, we were listed as the number one country in attracting and retaining workers. Ireland was also third highest scorer in worker motivation, competency of senior managers and foreign high-skilled personnel, indicating that there is significant emphasis on career development and opportunities for international workers.

Given the expected growth of the number of job openings in the biopharma industry, more will need to be done to increase the number of enrolments in science courses if we wish to avoid a shortage of critical skills in the industry in the long term. The medium-term outlook is positive, and any minor shortfall can be met by recruiting international workers. As noted above, Ireland continues to be an attractive destination for international workers to relocate to.

Despite this, the government needs to do more to increase the number of students entering science courses at third level to ensure the biopharma industry is not constrained in its ability to grow. There has been a notable increase in the number of international students visiting Ireland. There were [over 14,000 international students enrolled in Irish third level institutions in 2019, an increase of 26% compared with the previous three years](#). This is compared to an increase of just 5% in the number of new Irish students in the same period. Health and Welfare courses are most popular for international students, but the STEM fields of study combined are the second most popular choice. There were over 4,000 international students in STEM courses in Ireland in the academic year 2018/19.

Skills in Demand

The skillset needed to work in a modern biopharma plant is evolving with the growing importance of biologics products. This must be provided for through third level Institutes. Biotechnology, biochemistry, microbiology, analytical chemistry, molecular cell biology, bioinformatics and bioanalytics, are all skills that are in demand. Given the increased numbers entering science courses at third level, the key will be directing them towards biopharma-related courses. This will ensure that graduates are equipped with the appropriate skills for the industry. A broad range of biopharma-related courses are available to students entering third level education at every major University in the country. Biopharma-related courses are also provided by many of the Institutes of Technology, such as [IT Sligo](#), which is partnered with [NIBRT](#) and [IT Carlow](#). Many of these Institutes are also active in providing fast-track, online courses that cater to the specific needs of biopharma companies. These courses, provided through [Springboard](#), the Government's job training initiative, are frequently used to upskill existing staff and will help to provide a significant boost to the number of professionals with biopharma-related skill sets in the future.



National Institute for Bioprocessing Research & Training

Key to the development of biopharma and bioprocessing expertise has been NIBRT, a global centre of excellence for training and research in bioprocessing. NIBRT is located in a new, world class facility in Dublin. This facility is purpose built to closely replicate a modern bioprocessing plant with state-of-the-art equipment.

NIBRT arose from an innovative collaboration between University College Dublin, Trinity College Dublin, Dublin City University and the Institute of Technology, Sligo. NIBRT was primarily funded by the Government of Ireland through Ireland's inward investment promotion agency, IDA Ireland (Industrial Development Agency), which is responsible for the attraction and development of foreign investment in Ireland.

NIBRT offers a quality training and research experience not previously possible anywhere in the world. It operates a number of different training programmes to prepare people for biopharma careers and has trained over [4,700 people in 2019 across 19,000 learning days](#). It collaborates with universities for both training and research purposes, is an active participant in the [Springboard conversion programmes](#) and partners with industry to design courses that meet the specific training needs of a company.

In 2020, NIBRT launched their [online academy](#) which offers 23 more courses in biopharmaceutical manufacturing that can be completed virtually on a PC or laptop. The NIBRT online academy is designed to assist the skills and career development of those

working in biopharma manufacturing. Courses are rich in multimedia content including 3D models, animations and virtual simulations that maximise the learning experience.

The primary focus is on the development of specific skills that will prepare someone for the demands of a modern biopharma plant. The transition from traditional pharmaceutical manufacturing to biopharma production requires a significant amount of retraining for professionals in the industry. This is particularly important at the operative level. Due to its greater sensitivity and complexity, biopharma production requires greater numbers of highly skilled professionals and correspondingly less personnel at an operative level. Continuing Professional Development (CPD) will be crucial for many employees who wish to continue working in this sector. The industry has been working with third level Institutes and training centres such as NIBRT to develop these programmes. This collaboration has extended to the development of modules within the degree and diploma courses offered to students by universities. Collaboration with the industry has led to the development of more practical research and manufacturing skills (in recent years), which has improved the standard of graduates even further.



Trends in the Biopharma Sector in Ireland

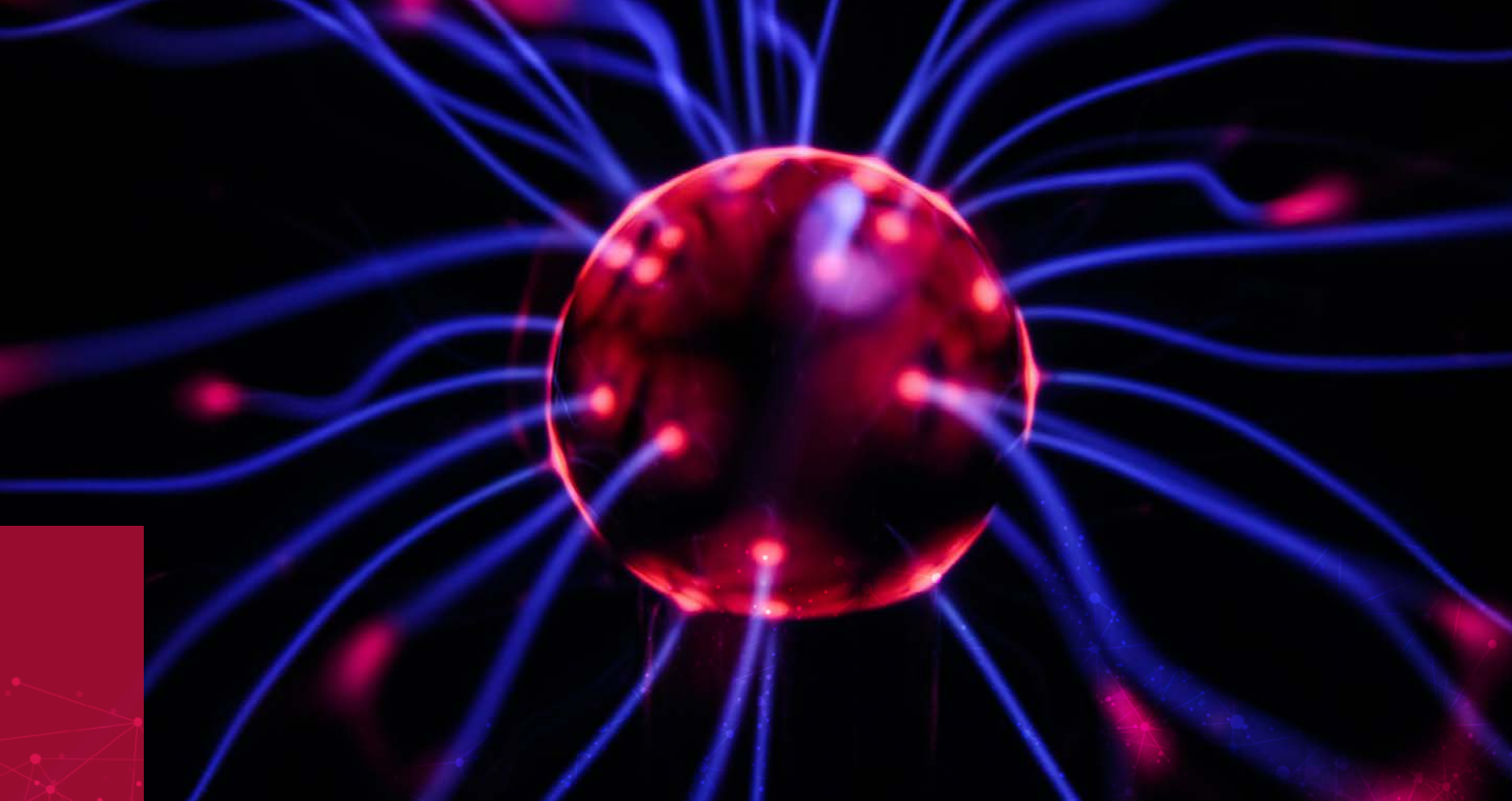
Research

Research and Development has played a significant role in the success of Ireland's pharmaceutical and biotechnology sector and will continue to do so. [The government has committed €8 billion to research funding to enhance Ireland's reputation as a growing R&D hub.](#) NIBRT is increasing operations annually to complete additional research and offer training to more people. The launch of their online academy in 2020 with an extra 23 courses only furthers their offering.

The EGFSN cited a need for increased partnership between academia and industry. Consequently, there has been a substantial increase in research funding and a growing partnership between Irish research institutes and biopharma companies. The Ion Channel Biotechnology Centre, the Shannon Applied Biotechnology Centre, the Pharmaceutical & Molecular Biotechnology Research Centre, the Bioscience Research Institute (BRI), the National Institute for Cellular Biotechnology, the Synthesis and Solid State Pharmaceutical Centre (SSPC) and NIBRT, all collaborate with industry to conduct research across a range of biotechnology and biopharma issues.



The increased investment in research in Ireland will be a great advantage in attracting additional investment to the country and in improving the quality of our graduates. Investment in our research facilities, the provision of R&D tax credits and the collaboration between industry and academia, has already generated more investment from international companies.



Industry Trends & Potential

The global biopharma industry continues to expand. Increasingly it will be the development of biologics that drives this growth. Biopharma research is opening up new treatment possibilities and with that comes new markets and new sources of revenue. Biopharma research has the potential to tackle many diseases that have not found adequate treatments through traditional pharmaceutical methods. There are over 5,000 potential biopharma medicines in the pipeline globally, according to research by PHRMA (Pharmaceutical Researchers & Manufacturers of America).



Due to the significant cost of developing a new drug, pharmaceutical companies are increasingly looking to mergers and acquisitions to expand their product offering. It is estimated that biopharma companies need to spend somewhere between \$2-4 billion on R&D annually. Companies in this industry spend approximately 20% of their revenue on R&D, therefore, biopharma companies must earn at least \$10 billion annually if they wish to maintain R&D expenditures and sustain a meaningful portfolio of drug development programmes. The volume of recent acquisitions and mergers, such as [Abbvie's purchase of Allergan](#), demonstrates this. Other notable mergers and acquisitions in the last few years include Sanofi's swift acquisition of three life sciences companies since 2018, [including U.S. biotech firm Synthorx Inc.](#), and Johnson & Johnson's \$30 billion takeover of biotech company Actelion. The pursuit of M&A opportunities, driven by the need for new drugs and the need to reduce costs in the face of an ever more stringent regulatory environment, will continue.

Conclusion

The global biopharma industry continues to expand rapidly across Ireland.

In recent years, Collins McNicholas has seen an upwards trend in highly qualified professionals being attracted away from larger urban centres towards more regional locations, such as Athlone, Westport, Sligo, Galway, Limerick, Carlow and Waterford, which are going through a period of positive and sustained growth.

Salaries and benefits packages in the industry have been subject to upward pressure in certain areas, most notably in Dublin and Cork. Many biopharma companies offer remuneration in the upper quartile of the salary scale.

We have seen a demand for engineering skills in the biopharma sector, in particular process engineers, chemical engineers and experienced team leaders. The areas of product and technology transfer, downstream processing and quality professionals are under increased pressure to locate talent. Opportunities for permanent and contracting roles are also prevalent across the industry today. Furthermore, upskilling is highly valuable for organisations within the biopharma industry.

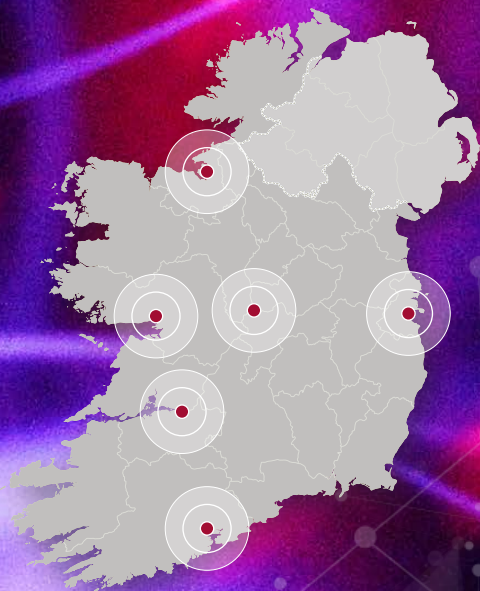
Biologics will continue to play an increasingly important role in the future of the pharmaceutical industry. The Irish government has recognised the potential of this industry and is providing the necessary support through research funding, training and incentives, to encourage further development of this sector in Ireland. Given the strong supply of talent, the long history of pharmaceutical manufacturing, and the commitment of government and industry, Ireland is in an excellent position to capitalise on this opportunity.

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