LIFE SCIENCE REIT

BIDWELLS

Cell and Gene Therapy

Scientific advances with real estate implications

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LIFE SCIENCES 2030

INTRODUCTION

The world's first mRNA vaccine for the treatment of cancer is within reach. In a US trial of 157 recovering skin cancer patients in December last year, researchers took DNA from their tumours and used it to create and administer 157 personalised vaccines.

The trial shots effectively taught their tumours to recognise cancer cells and attack them if they returned, reducing the chance of relapse or death by 44 per cent overall. It's this type of cell and gene therapy (CGT) that also gave birth to the Covid 19 vaccine in the UK.

With the CGT market forecast to grow from $5 billion in 2020 to $58 billion in 2026 (Evaluate Pharma, 2021) demand for the specialist laboratory and manufacturing space required to bring these breakthrough therapies to market is accelerating.

Last Summer Bidwells launched its *Life Sciences 2030* research programme with the goal to better understand evolutionary trajectories in the life science industry. CGT is one of the fastest growing areas of life science, both for the UK economy and the scientific advances on which we all depend.

We also found that despite differences in the biological processes of these cell, gene and RNA therapies, the laboratories carrying out the research remain largely the same. But there are challenges around their manufacturing supply chains. For some therapies, access to co-located clinics during development is critical too. We learned during the pandemic how vaccines require storage in extremely low temperatures.

These challenges require expertise to overcome. Access to talent is a challenge across research and development and it remains so in this highly specialised, highly trained field of research.

Overcoming these scientific and logistical challenges are critical to supporting the UK's claim to being a Scientific Superpower. The societal and economic rewards are too significant to not fully capitalise on. This report considers the ground breaking sector in more detail, the potential it presents, and the real estate response required to harness its full potential in the UK.

This paper has been written jointly with Tahrima Rahim, she is a Research Analyst at Ironstone Asset Management, the investment adviser to Life Science REIT.

Background to Cell and Gene therapies

Cell and Gene therapies (CGT) are currently tipping the scales as the fastest growing area within the therapeutics market.

The technical term for CGTs is Advanced Therapy Medicinal Product (ATMP) and they encompass cell therapies, gene therapies, RNA therapies or a tissue engineered product. The technology or science behind these therapies is what makes this mode of therapeutics so exciting. Compared to traditional medicines, they can be described as 'precision' therapies because they pinpoint the disease so specifically. Subsequently, they have the potential to permanently change the course of human diseases, such as cancer or genetic disorders.

- **Gene therapy** refers to gene editing and augmentation, which involves the replacement or repair of DNA to help the body regain functions or prevent dysfunctions caused by diseases, genetic disorders or viruses. This is similar to how Luxturna works to treat retinal dystrophy and works to eliminate symptoms.
- **RNA therapy** targets either proteins or nucleic acids (DNA or RNA). RNA therapy actually provides the blueprint to create a protein rather than targeting a protein and it is this type of technology which is behind the successful COVID-19 vaccine.
- **Cell therapy** uses specially grown or adapted human cells (from the patient or a donor) to replace depleted tissue or perform therapeutic functions. Common types of cell therapy treatments include stem cell transplant, which can create bone marrow.

The life science industry's silver lining from the pandemic was undoubtedly the success and the accelerated development of the mRNA COVID-19 vaccine. Although it may sound like an overnight success, the story of advanced therapies such as cell and gene therapy started as early as the 1990s when the first gene therapy clinical trial was launched. The hurdles in advanced therapies have since been numerous and ranged from challenges in precision dosing all the way to logistical barriers. The next real breakthrough only came in 2010 with Provenge in the treatment for prostate cancer.

The progress in the sector is further bolstered through the UK's commitment in becoming the 'gold standard' in genetic screening and testing. The Department of Health and Social Care launched Genomics England in 2013 to ensure the UK was placed as a global leader in the field of genetics and made genetic testing available for the general population. In October 2022, they launched a world-first genetic testing service for babies and children via the NHS. This is especially significant because the use of cell and gene therapies is dependent on whether the genetic basis of a particular disease is known and this can only be discovered through genetic testing.

Market value growth

Given the recent development of CGT technology, there is the potential to make step change advances and deliver new products to the market.

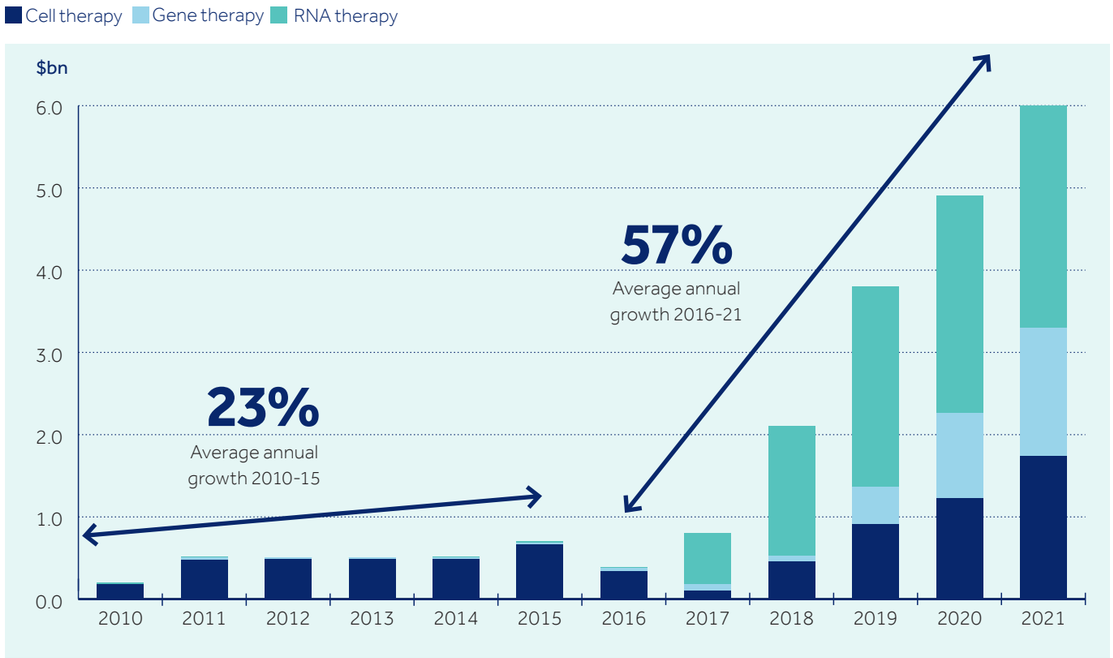
Evaluate Pharma (2021) forecast market growth from $5 billion in 2020 to $58 billion in 2026, a sharp increase from predictions just a year earlier. The pace of growth is significantly higher than expected across the pharmaceutical market as a whole .

RNA therapies which only commenced its growth trajectory in 2017 with advances in technology, have generated the highest revenues to date, expanding threefold in the five years to the end of 2021. These figures exclude mRNA vaccine revenues, which are expected to grow rapidly with recent scientific advances.

2022 saw greater caution in the venture capital (VC) funding market which has impacted upon the life science sector as a whole. The CGT sector has not been immune to the downturn.

However, the impact has proved markedly less pronounced with a drop of 11% in funding into the biotechnology sector in 2022 (includes CGT functions), compared with a fall of 68% in the life science sector as a whole (Beauhurst). This perhaps explains why funding levels in Oxford and Cambridge, where the CGT is well established, saw a lower level of decline than recorded for the UK as a whole in 2022 and actually saw their highest level of December fundings on record. Clearly, however, economic uncertainty persists. This has implications for investor perceptions of the sector, particularly in a higher interest rate environment which impacts on the relative appeal of the science sector amongst private equity investors. Nonetheless, CGT is considered an area of science with many years of advances ahead, which position it well for long term investment.

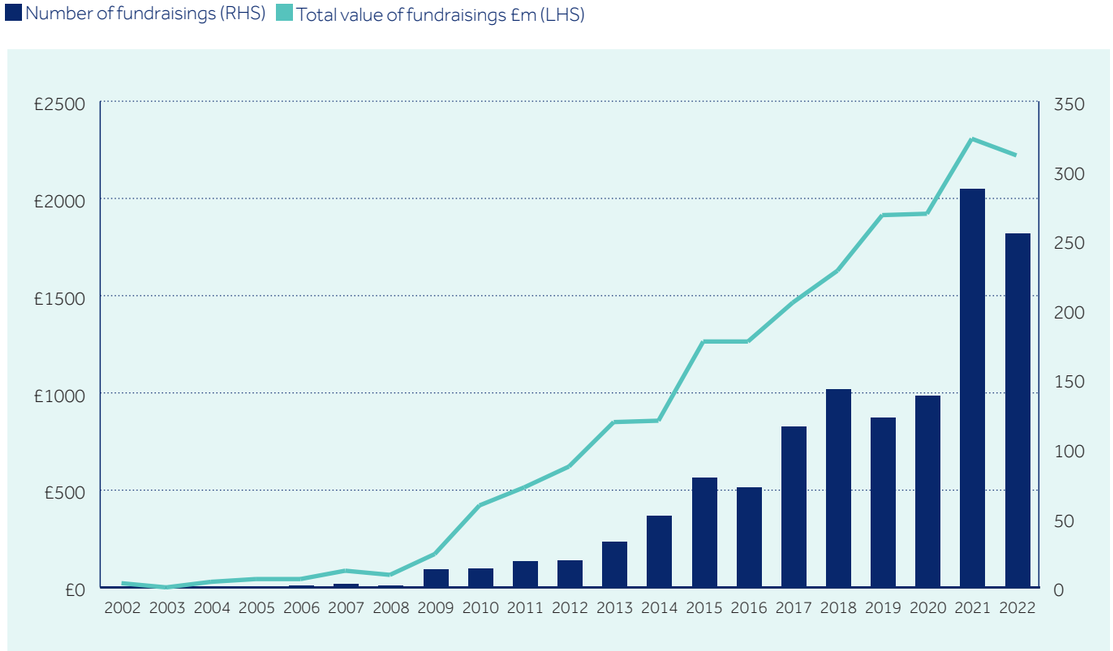
Global sales in cell, gene and RNA therapy



Source: IQVIA MIDAS MAT Q4 2021, company financial statements

Notes: Market sizes comprise of available data from company financial statements and MIDAS QTR database values, for products where such information is available. RNA therapy excluding mRNA vaccine revenues.

Biotechnology funding



Source: Beauhurst

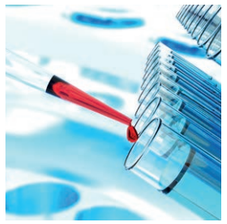
What are cell and gene therapies?

Many human diseases are caused by changes to the genome. The genome is essentially a blueprint of instructions for how the body should function in a healthy way. When a part of this blueprint is incorrect, or the genetic code is mutated, it can make a cell or a gene work incorrectly and cause a person to be unwell. These genetic mutations can either be inherited or acquired. For example, if it is inherited, a person might be born with a condition like sickle cell disease, or if it is acquired, a person might develop a mutation in their genome over the course of their life and develop cancer. CGT target these mutations at their root and seek to correct the gene responsible for causing the disease or symptom related to the disease. These revolutionary therapeutics are being used to save lives and treat diseases which were previously intractable.

Cell Therapy

Cells are the basic building blocks that come together to make up a living organism. The human body has hundreds of different cells each with specialised features to carry out specific functions. They can therefore be engineered or modified to combat diseases through exploiting their specialised features. Cell therapy aims to treat disease by transferring whole and healthy cells to replace the cells which are incorrectly working or they are used to provide the patient with extra immune support via the transfer of immune cells. Cells used in cell therapy are either autologous and come directly from the patient requiring the treatment, or allogenic, and are derived from a donor. Typically, an autologous cell therapy will be delivered back to the patient whereas an allogenic therapy will be created to treat many patients for the same disease.

Cancer immunotherapy is an example of cell therapy. It is when a cell from the immune system is engineered, in the laboratory, to recognise cancer cells. The engineered cells are then administered to the patient with the cancer and they notify the patient's immune system of the cancer by teaching the immune system how to recognise the cancer cells. The patient's own immune system then works to fight and attack the cancer. The ability to engineer cells for a specific function also forms the basis of regenerative medicine where tissues or organs are being grown in laboratories.



Gene Therapy

Genetic sequencing is when the genetic code is unravelled. By doing this, scientists can identify an abnormality in the code. Sometimes these abnormalities are harmless, but other times they can be the root cause of a disease or a symptom of a disease. Gene therapy is therefore used to prevent or treat disease by replacing or introducing the gene which is implicated in the disease. The correct version of a gene is created through 'gene editing' where the incorrect piece of DNA is deleted and the correct piece is added in. This is done via novel techniques such as TALENs or CRISPR-Cas9. The corrected version of the gene is then packed into a vehicle or vector and either injected directly into the patient or added to a sample of the patient's cells and then transferred back into the patient.

This technology was the basis behind the £2million Libmeldy therapy, developed by Orchard Therapeutics, and administered by the NHS to treat the fatal genetic metachromatic leukodystrophy disease in a baby in February 2023. The treatment took nearly 20 years to develop and its cost is reflective of the research and development challenges of the CGT environment.

RNA Therapy

RNA therapy is also a type of gene therapy but the way RNA therapy differs from gene therapy is ultimately in how it functions. Gene therapy is based on the double stranded DNA molecule, whereas RNA therapies are based around the single stranded RNA molecule. RNA is akin to a set of instructions for how DNA should function and they tend to work by gene silencing. If the disease or a symptom of the disease is being caused by a problem in a particular gene, the RNA therapy can send signals for that gene to be silenced (mRNA). It is indeed the mRNA based therapy which provided the basic building blocks for the COVID-19 vaccine.

This is undoubtedly the best success story for RNA vaccines in a time where previously their side effects were the biggest limiting factor. Following the great success for the COVID-19 vaccine, RNA therapies have seen huge increases in interest beyond the scientific community and are one of the most invested advanced therapies.

Challenges and Locational Considerations

Despite the differences in the biological processes of advanced therapies, the laboratories responsible for carrying out the research and developing cell, gene and RNA therapies are largely similar. Rather, the difference in requirements comes from a more logistical perspective.

For example, the need to ideally be co-located with a clinic or somewhere with easy patient access is specific to autologous treatments but unnecessary for other advanced therapies. As commercial success of cell and gene therapies grows, there is an increased appreciation of common bottlenecks in the development of the therapies and innovative ways of overcoming them.

The unique nature of cell and gene therapy development is also its Achilles' heel when it comes to challenges.

Supply chain

One of the first hurdles in the manufacture of advanced therapies starts with the supply chain. The basic building blocks of these therapies rely on 'plasmids'. Often this part of the development is outsourced to specialist companies, which are often located internationally. One of the lessons learned from the pandemic was how this bottleneck can impact the manufacturing process since no progress can be made without the initial plasmids.

Patient access

Both cell and gene therapies are underpinned by the need to access raw, patient material. Consequently, for some of these therapies, it will be critical that there is an easily accessible clinic or medical facility for patients co-located where the drug is being developed.

Logistics

Advanced therapies require storage in extremely low temperatures to ensure the integrity and quality of the medicine when delivered to the patient. Typically, laboratories have capabilities to store the drugs in -80C freezers, however, it is imperative they are also transported in these conditions. Logistically this can be expensive, especially when international transportation is involved and so there is a need to ensure local capabilities are in place for cell and gene therapy.

Expertise

All these challenges also share the common factor of expertise. Each of these elements must be addressed within the realms of Good Manufacturing Practices and in highly regulated and documented environments. The employees working across the lifecycle of these therapies typically hold Masters and doctorate degrees and work to support functions across research, discovery, process development and technology transfer. In order for each of these stages to run smoothly, the right expertise is required readily and at every level. Therefore, when certain functions are outsourced it can cause the entire process to slow down based on availability of talent.

Some larger biotechs provide apprenticeships and training programmes for those without the relevant backgrounds in order to overcome the challenges around expertise.

This was something the Rosalind Franklin Laboratory set out to achieve during the pandemic. Based in Leamington Spa, the laboratory was tasked with efficiently processing COVID-19 PCR tests for the country. The laboratory recruited new graduates, not necessarily in the sciences, and created training programmes on how to handle, process and work with stringent processes surrounding genetic testing. This also exemplifies the uniqueness of the skill to the therapy or technology in question – there becomes a need to specially train an individual in order to be tooled with the correct expertise.

Clusters of Excellence

Given the need for expertise and secure supply chains, all within an environment of highly regulated processes, an increasing number of companies are seeking to combine the manufacture and logistics elements in-house rather than outsource to external companies.

In the UK, clusters of expertise are evolving around resolving these challenges. The importance of having dedicated environments for this sector is heavily impacted by the novelty of the work. There is a need to house the right expertise together, with collaborators but also in close proximity to clinics and the right medical networks.

The government recognises the need for these clusters and so its national innovation agency, UK Research and Innovation (UKRI) has set up Cell and Gene Therapy Catapults across the country. Similarly, Medical Research Council, the Biotechnology and Biological Sciences Research Council and LifeArc have all come together to fund Innovation Hubs for Gene Therapies. The locations selected for these clusters were based on their existing expertise and work in the cell and gene therapy arena. These clusters also share a common goal – to be able to support the development of cell and gene therapies from the inception of an idea, all the way through to its manufacture and distribution. The table on the following page gives an insight into how individual entities within a cluster contribute to the overarching ecosystem.

Location of cluster	Set up by...	Notable company or entity	How the company supports the cluster
Oxford	Existing cluster	Moderna	The manufacturing capabilities will be a UK first and can rapidly scale up production of CGT
Oxford	Existing cluster	Bioescalator at University of Oxford	CGT spinouts with expertise from the University's academic research groups
Cambridge	Existing cluster	Bicycle Therapeutics	Develops clinical stage CGTs
Stevenage	CGT Catapult	GSK	Works across the entire lifecycle of CGT from idea generation to large scale CGT roll-out
London	CGT Catapult	Guys and St Thomas' Hospital	Provides easy access for patients and the medical expertise required for CGT
Canary Wharf	Canary Wharf Group	Genomics England	Attracts industries with an interest in genetics and CGT

Major CGT companies across the Oxford – Cambridge Arc

The Golden Triangle is home to one of the most established cell and gene therapy clusters.

Moderna, a keystone developer of the COVID-19 vaccine, have struck a deal with the UK government to establish their vaccine manufacturing facility in Harwell, Oxford. This will mean that the UK now has the capability to rapidly scale up production of a vaccine in times of need. Moderna will also significantly increase their research and development activities and set up relevant clinical trials to tie in with their expansion. Their strategic choice in location comes as no surprise given the Oxford's existing repertoire in the field.

Oxford boasts a wealth of expertise with the likes of Vaccitech and The Native Antigen Company. Back in March 2022, Nick Roesen, Chief Scientist of The Native Antigen Company, specifically chose Oxford Technology Park for his company's expansion.

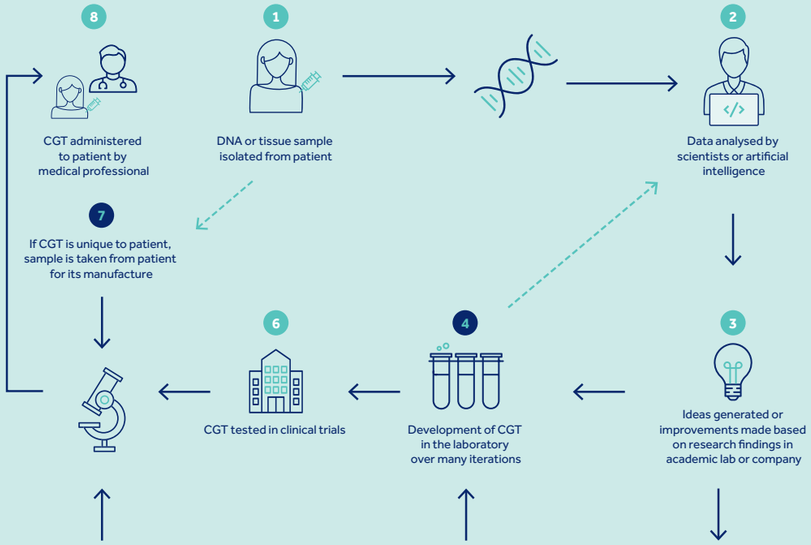
The Native Antigen Company discovered the structure of the COVID-19 antigen (an antigen is a protein structure unique and identifiable to a cell or virus) and they also provide antigens to research groups and pharmaceutical companies. The location offered his team the space to grow in an area nearby to which they were already based, thus mitigating the need to find new staff with similar expertise if the company chose to relocate beyond Oxford. Furthermore, its new laboratory space allowed flexibility to reconfigure parts of the laboratory to suit the variability in the work that they do, a real estate requirement which was critical for the company's operations.

Tying all these elements together, Vaccitech is a biotechnology company focussing on developing cell and gene therapies for an array of diseases. The company was founded by Dame Sarah Gilbert, Professor of Vaccinology at The University of Oxford and co-founder of the AstraZeneca COVID-19 vaccine. This cluster of excellence has capabilities from the very start of a cell and gene therapy's life cycle in academia through to antigen discovery, and then the development and manufacture of a vaccine as well as testing its efficacy in clinical trials , essentially marking the completion of the development of a vaccine. Furthermore, its location in the Arc allows for excellent collaboration capabilities. AstraZeneca played a crucial role in the development of the COVID-19 vaccine and its new campus in Cambridge allowed for collaboration with The University of Oxford seamlessly. Similarly, its collaboration with the ever-growing Bicycle Therapeutics offers expertise and support to the up and coming CGT company.

The Cambridge ecosystem is a natural hotbed for collaboration in the CGT sector given its Wellcome Sanger campus in Hinxton which carries out world class genetic research and sequencing of genomes (decoding and analysing genetic data) and houses the UK headquarters for genomics titan Illumina.

In between these two clusters is the Stevenage Cell and Gene Therapy Catapult. In July 2022, UBS Asset Management entered a joint venture with Reef to develop a 1.4 million square foot campus dedicated to laboratories and facilities supporting cell and gene therapy research and development. The catapult will seek to foster collaboration between industry and academia and help overcome the challenges of the CGT sector. Initially anchored by the pharmaceutical giant GSK, the biotech hub now attracts cell and gene therapy specialist companies such as Autifony Therapeutics and Achilles Therapeutics. These companies are further demonstrative of the importance of collaboration in this sector. Autifony was borne out of GSK's research endeavours in rare disease and Achilles is a spin-out of the University College London, commutable from the catapult in 30 minutes. Achilles Therapeutics specifically chose Stevenage for its expansion, because at the time, along with its commutability to London, no other site could offer the flexibility and size required for its manufacturing requirements.

Life cycle of CGT – using Oxford cluster as a case study



1. DNA or tissue sample isolated from patient.
2. Information about that piece of DNA or tissue can then be analysed by scientists or artificial intelligence to identify the cause of disease or how a particular disease might be treated. This will typically be done in a wet lab to initially extract the data from the patient sample.
3. Ideas generated or improvements made based on research findings in academic lab, for example, at The University of Oxford, or a company like Vaccitech.
4. Development of CGT will occur in the laboratory over many iterations. As part of the research process, there may be a discovery and subsequent development of a reagent or constituent part necessary for development or manufacture of CGT. For example, The Native Antigen Company develop antigens that are used in the research and development process of CGT.
5. Raw materials will need to be delivered in specified conditions so that they are received in their best working condition.
6. The final CGT product will be reviewed by NIHR and similar regulatory bodies and then tested in clinical trials at a clinical facility like The John Radcliffe Hospital.
7. Depending on the type of CGT therapy, it will either be manufactured in bulk and the therapy will be distributed accordingly, or if therapy is unique to the patient, a sample will be taken from the patient for its manufacture
8. CGT administered to patient by a medical professional at a clinical facility.

Emerging clusters

The explosive interest in the CGT market has also driven the growth of emerging clusters. Previously, Canary Wharf in London was synonymous with banks and the finance sector, however, with the news of Kadans entering a joint venture with Canary Wharf Group to develop Europe's largest commercial laboratories, this is set to change. The development will see 750,000 sq ft of laboratories within a 22-storey skyscraper, a structure reminiscent of laboratories in Boston rather than London.

The most unique feature of this particular emerging cluster is how it bucks the trend of the more traditional ecosystem. Canary Wharf does not sit co-located with any particular academic institution, nor has it traditionally housed the pharmaceutical industry, until very recently. The government owned company, Genomics England, took an 18,000 sq ft headquarters at Canary Wharf in the winter of 2022. Genomics England serves a strategic purpose to introduce genetic sequencing and CGT care into the NHS as well as act as a gold standard for genetic care globally. Its most recent milestone included introducing genetic testing for newborn babies in the UK via the NHS.

This development is further indicative of the UK's ambitions in respect to the CGT market. Genetic testing as a standard test for all, means that each patient will have the required medical report which can then inform doctors whether a patient will be suited to a particular CGT treatment. With an increased number of therapies being developed by the maturing CGT sector, the UK is positioning itself to become a leader in an industry which is advancing rapidly.

Evolution of CGT

The advances made in cell and gene therapies have had a domino effect on other life science sub-sectors. There is a requirement for a deeper understanding of genetics and proteomics (the study of proteins) for cell and gene therapies to truly impact medical intervention.

Historically, genetic changes and its impact on a person's health have been poorly understood. For example, if a patient underwent whole genome sequencing (an analytical technique to decode a person's DNA), and upon analysis the doctor noticed the patient had changes in their genetic code that were atypical of the general population, it would not always be apparent whether that change in their code was a significant enough difference to impact their health, or, whether it was something that bore no impact on their health ie. a silent mutation. Subsequently, the need to understand genetics and proteomics has given rise to many spin-outs and companies dedicated to improving our knowledge in these areas.

Most notable, is perhaps, Google's Alphafold study which seeks to understand the world of proteins and similarly Genomics England for the genetics counterpart. The requirements of these companies, although life sciences, may resemble that of a traditional tech company rather than laboratories. Such businesses rely on huge computational power and excellent connectivity to mine and process 'big data'.

It is this intersection between technology and medicine that has ultimately given rise to a new sub-sector of artificial intelligence and med-tech companies. Genomics England is partnered with many tech and AI research companies as well as larger biotechnology companies and the NHS. It will therefore act as a keystone life science company attracting like-minded industry and research to the area.

The tech industry's real estate demands are therefore suitably matched in city centre locations, whether Oxford or Cambridge, or Canary Wharf. Conveniently located amenities and a vibrant attractive environment hold strong appeal for companies. Accessibility is also essential. As an emerging cluster Canary Wharf has access to both strong public transport links, the convenience of London City Airport and a global city atmosphere. The location and features of this emerging cluster is therefore more strategic than it initially appears and is driven by the needs of the ever-evolving CGT market. Certainly, the success of CB1 in Cambridge evidences the appeal of city centre space for the tech sector.

While large pharmaceutical companies are increasingly seeking a presence in the CGT arena, the sector has to date been dominated by smaller specialist R&D companies which have grown rapidly, often supported by VC funding driving robust market valuations. The technology is relatively high risk but building knowledge over the last couple of years has supported investment and valuations, despite the long time frames to expected revenues.

Laboratory and office space

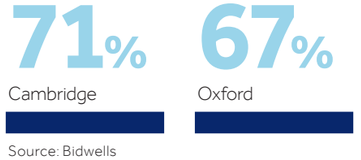
The long term potential of cell and gene therapeutics will inevitably result in significant demands on the real estate sector in locations of CGT expertise over the coming years. This is illustrated in both Oxford and Cambridge which have the academic expertise in CGT technology, as well as proximity to UCL, Imperial and research institutes such as the Wellcome Sanger Institute. Both clusters have seen a rapid expansion of companies working in these areas. Across Cambridge, 96% of laboratory take up in 2022 was by companies working the life science sphere, with CGT businesses dominating activity. By floorspace, 71% of 2022 lettings were by companies working in these areas. A similar picture of activity is seen in the Oxford cluster. In 2022, 67% of laboratory lettings (by floorspace) were CGT companies.

Notably the sector is increasingly represented in the office market. CGT comprised nearly 15% of Cambridge office lettings in 2022, a doubling of the 7% average between 2019-2021, in part reflecting the growing role of tech described above.

30% of Cambridge office floorspace take up in 2022 was by life science companies, and cell and gene therapy companies were responsible for half of this volume

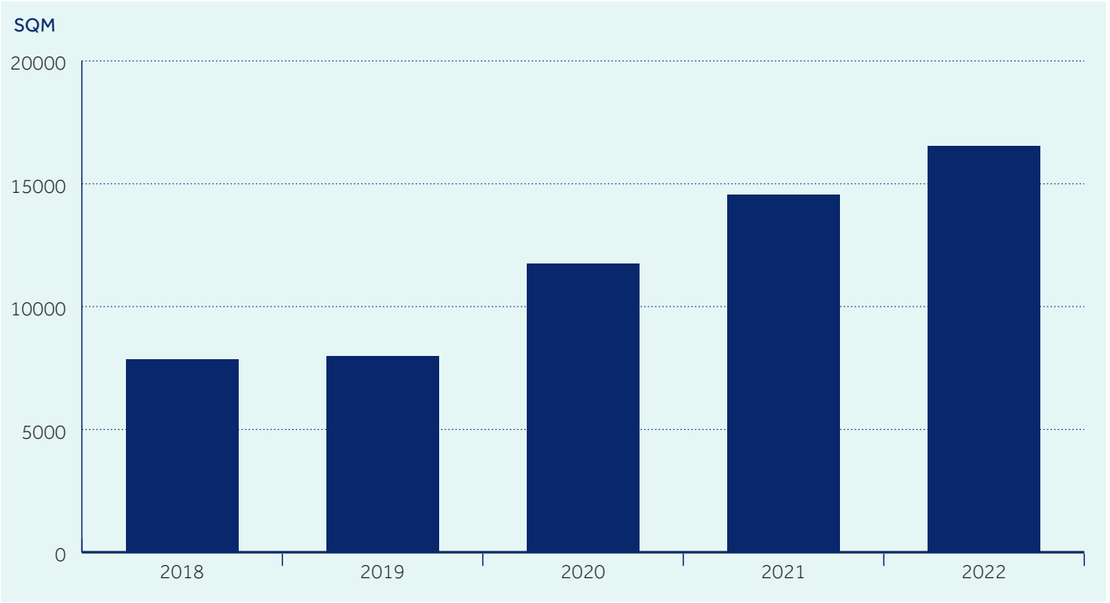
Source Bidwells

Proportion of lab take up by cell and gene therapy companies in 2022



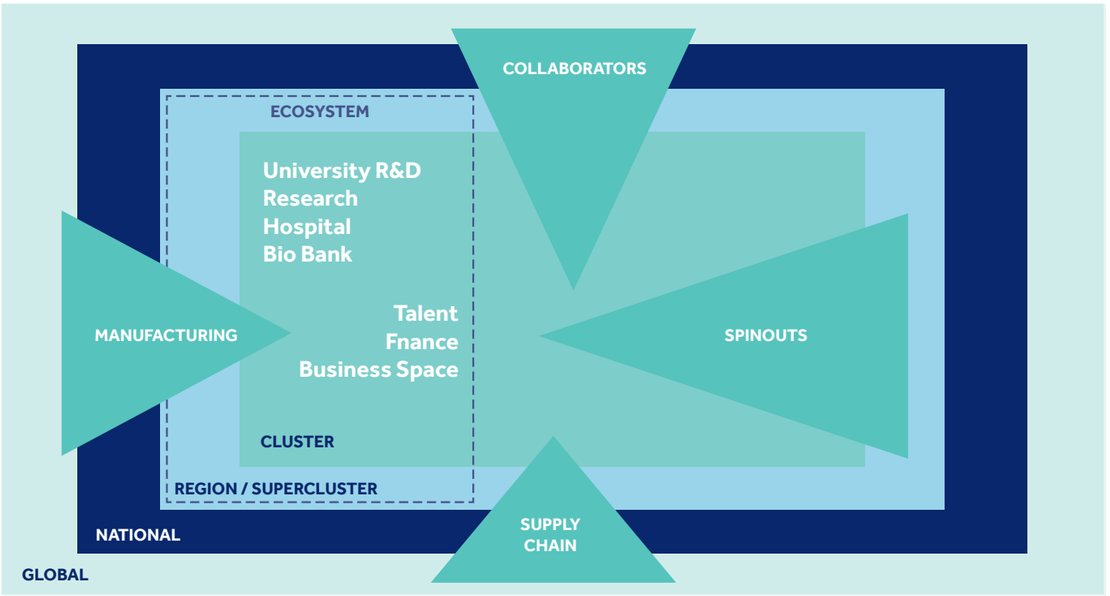
Source: Bidwells

UK cleanroom footprint for manufacturing cell and gene therapies



Source: Cell and Gene Therapy Catapult

Cell and gene therapy ecosystem



Source: Bidwells

Activity in both clusters included several larger lettings in both the office and laboratory markets, but there were also a significant number of companies at the initial fundraising stage, or with Series A or B funds. A number were spin outs from academic or research institutes, but a lower proportion than seen in the last couple of years.

GMP manufacturing space

Leaving aside the growing demand from office based CGT companies, the specialist nature of the space demanded by the sector presents a particular challenge. This includes growing demand for GMP manufacturing space.

Cell and gene therapy manufacturing capacity has grown rapidly over recent years, showing a 14% increase in 2022, recorded in the annual research by Cell and Gene Therapy Catapult. The expansion in GMP manufacturing sites has been widespread across the UK, highlighting the opportunity presented by the sector for all regions of the country. The East and South East represent nearly 40% of the country's cleanroom footprint. London has the highest number of sites and represents 12% of cleanroom footprint, but these facilities are generally located in hospitals and academic environments. Scotland now has 19% of sites, with 29% of the total footprint. The West Midlands cluster has also seen growth and represents 9% of cleanroom space and 11% of UK sites .

The Cell and Gene Therapy Catapult research finds the UK average national manufacturing capacity currently standing at 67%, which is not far from the 80-90% utilisation level generally considered to be full capacity. It is important that facilities across the UK keep pace, not only with the needs of those conducting trials, but to also to meet predicted requirements for the future, especially due to the long the
lead times for development.

Real Estate Demands

The CGT sector is both growing and evolving rapidly, although in real estate terms the CGT industry is still at an early stage.

While the property sector has quickly absorbed and understood the broad spectrum of requirements of companies working across the various facets of CGT, it is clear demand will evolve and change over the coming years.

Much like the traditional wet lab space, a typical CGT laboratory will have standard clean room requirements with air handling systems that meet ISO 14644-1 requirements, as well as HVAC and UPS systems capabilities.

Further capabilities will include the ability to store materials in appropriate temperatures whether that is cold rooms or liquid nitrogen facilities.

They will further benefit from office space that can support high compute power, excellent connectivity and data centre storage facilities.

With respect to how the space is configured, there will need to be an element of flexibility in reconfiguring the space to suit the business' evolving requirements and either expand or minimise certain areas depending on which operations are in demand.

Lastly, co-locating with a clinical and academic research facility can also benefit the efficiency of the business.

Depending on whether the CGT company is more focussed on research or manufacturing or AI, the space requirements will be a varied combination of the above. It is because of this, the CGT sector requires the benefits of a clustering ecosystem.

Start-ups

Requirements for small-scale laboratory space for early stage companies will continue to grow, but the specific nature of space needed is now well understood by specialists in the market. In particular, for small businesses, a degree of flexibility to reconfigure the space is important for their evolving needs.

Generally, the space would need to cater for wet lab capabilities or have specific storage solutions that can be maintained at specific temperatures.

Additionally, if the business is at an inflection point growth-wise, an increasingly common choice for these businesses is to have the option to expand into buildings within the same science park or locale. Smaller businesses especially benefit from working within an ecosystem and partnering with expertise from larger pharmaceutical companies or sharing facilities hosted by larger companies or the science park itself. Generally, these demands will remain focused on core clusters of expertise.

Larger companies

Large companies are growing their presence in the CGT sector, whether through organic growth or acquisitions or collaborations. This will bring activity in-house to some extent. Outsourcing large-scale manufacture of CGT and logistics and distribution is a common and expensive bottleneck in the CGT pipelines. Given the rapid pace of growth in the techniques and medical opportunity presented, this will provide a significant impetus to larger laboratory requirements, with new manufacturing capabilities which will come hand in hand with the relevant expertise required.

Larger companies and biotechs will enter strategic partnerships or acquisitions will be made to improve their manufacturing expertise in-house. Often these occur synergistically based on how the respective companies are co-located within the same ecosystem.

Furthermore, as CGT products are better refined, understood and more commonly produced, larger companies with clinical stage CGT products will seek to be better co-located with appropriate medical facilities that may be required in administering the CGT product.

Manufacturing facilities

As R&D advances, whether laboratory or office based, a corresponding expansion in manufacturing facilities will be needed. This is evidenced by the announcement that Moderna's UK Innovation and Technology Centre, which will include a manufacturing facility, is to open at the Harwell Campus in Oxford in 2025. Significantly, the analysis presented by Cell and Gene Catapult underlines the UK wide reach of manufacturing opportunities presented by the sector.

Office space

In parallel however, the sector will add to office based tech demand through the maturation of the medtech and artificial intelligence sectors overlapping the CGT territory. While this will have close links with CGT centres of excellence, the more traditional drivers of the tech sector are likely to dominate. Accessible locations, predominately city centre focused with the recruitment appeal will dominate. Proximity to R&D clusters will be important, but growth is likely to extend across the UK's cities.

With thanks to our co-author:

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Tahrima is a Research Analyst at Ironstone Asset Management. She has over 10 years' experience in the life sciences sector with deep sector knowledge of precision medicine, oncology and genetics. Previous roles have spanned academia, government and pharmaceutical industries. Notably, she was the Scientific Manager at Genomics England, where she developed strategy through close collaboration with industry leaders in the oncology sector, and a Research Scientist at the industry leading Barts Cancer Institute where she worked on pioneering gene editing techniques in blood cancer. She is published in Nature, BMJ and Blood. Tahrima holds a BSc (Hons) in Medical Genetics and a MSc (with Distinction) in Cancer Therapeutics both from Queen Mary, University of London.

References

1. https://www.gov.uk/guidance/advanced-therapy-medicinal-products-regulation-and-licensing#:~:text=Print%20this%20page-,Overview,a%20tissue%20engineered%20product
2. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920378/Genome_UK_-_the_future_of_healthcare.pdf
3. https://www.england.nhs.uk/2022/10/world-first-national-genetic-testing-service-to-deliver-rapid-life-saving-checks-for-babies-and-kids/
4. Verdin, P and Tsang, TM. 2021. Next-generation therapeutics thrust into the spotlight. www.nature.com
5. CAR-T Therapy. https://www.england.nhs.uk/cancer/cdf/car-t-therapy/.
6. Gene and Cell Therapy FAQs. American Society of Gene + Cell Therapy
7. "What is gene therapy?". British Society for Gene & Cell Therapy.
8. Catapult. Cell and Gene Therapy GMP Manufacturing in the UK. Capability and Capacity Analysis, November 16 2022.

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