Rude Health

finnCap Life Sciences quarterly sector note

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Cell and Gene Therapy (CGT)

- **The AIM Healthcare index has risen 6% YTD in 2020,** significantly outperforming the AIM All Share (-7%). AIM Healthcare also outperformed the larger cap FT All Share Health and World Health indices (+2% and +5%, respectively), which have been assisted by the defensive nature of the large cap sector against the backdrop of the COVID-19 pandemic. Fifteen finnLife 50 stocks have exhibited double-digit percentage increases YTD in 2020, a further six have exhibited triple-digit percentage increases, and one has posted a quadruple-digit rise, namely Synairgen* (+2,390%), followed by Avacta* (+654%), Omega Diagnostics* (+322%), Tiziana Life Sciences (+283%), e-Therapeutics (+265%), Oncimmune* (+209%) and Open Orphan* (+189%). We remain optimistic for the sector in 2020 given the expected inflection points and superior growth.
- **Cell and Gene Therapy:** Few technologies in the life sciences sector hold as much promise as Cell and Gene Therapy (CGT). Rather than just treating a disease and its symptoms, this technology can target the underlying cause of a disease, with long-term benefits and curative potential. CGT has been seen as the 'future' of medicine for many years, and now we are closer than ever to that future becoming a reality. Multiple products are already approved (market estimate of c.$1bn in 2018), representing only the tip of the iceberg in relation to the massive pipeline of upcoming therapies (FDA expects to approve 10-20 products per year by 2025), bolstered by the influx of funding and M&A ($49bn in 2018-19) activity within this space.
- **Rewards of innovation:** The potential of cell and gene therapy is not easily realised, and the technology presents great challenges. However, these challenges are being tackled by innovative companies within this space. Those companies will be well placed for pharma's next 'wave of innovation' and the 'land grab' that follows. If CGT does become the backbone of treatment regimes in the future, similar to the rise of monoclonal antibodies, then these companies are developing technology and expertise in a critical sector of the life sciences industry, which should confer a competitive advantage as the sector matures further. Now is a good time to invest in the 'future'.
- **Report highlights:** We look at the universe of companies we follow, highlighting ones with a presence in CGT. Companies are categorised into those which focus on cell therapy, gene therapy or both. In addition, they can also be categorised into therapy developers, service companies, or both, enabling investors with different risk appetites to participate in this exciting space.
- **CGT stocks to focus on** include Maxcyte (MXCT-GB), which provides its Flow Electroporation technology for next-gen cell engineering and is also developing its own CAR-T therapy platform; Horizon Discovery (HZD-GB), which provides CRISPR screening as a service; ReNeuron (RENE-GB), which has two stem cell therapy candidates in clinical development; Silence Therapeutics (SLN-GB), which is in pre-clinical development for siRNA's to selectively inhibit genes; and Avacta* (AVCT-GB), with its AffyXell stem cell joint-venture and various CGT research collaborations. Investors who wish to avoid exposure to individual company risk should look at Syncona (LSE-SYNC), Arix (LSE-ARIX) or Malin Corporation (MLC) which have exposure across a number of platforms.

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Cell and Gene Therapy (CGT)

Few technologies in the life sciences sector hold as much promise as Cell and Gene Therapy (CGT). Rather than just treating a disease and its symptoms, these therapies have the potential to target the underlying cause of a disease. Due to significant scientific advances, the sector is in the midst of accelerated growth. Market estimates for 2018 ranged from $536m[1] to $1.07bn[2], and forecasts for 2026 range from $5.55bn[1] to $35.4bn[3]. In January 2019, the FDA announced that by 2020 onwards, it anticipates that it will receive more than 200 CGT investigational new drug (IND) applications per year, in addition to the 800 active cell-based or directly administered gene therapy INDs that it already had on file at the time.

By 2025, the FDA predicts that it will be approving 10 to 20 CGT products a year, comparing the current activity to the accelerated development of monoclonal antibody drugs in the late 1990s – which have now become the backbone of modern treatment regimens[4]. finnCap estimates that monoclonal antibodies will generate c.$156bn of revenues in 2020, implying a ten-year CAGR of 15%.

Unsurprisingly, Big Pharma does not want to miss out on this next wave of innovation, and M&A activity in the space has increased exponentially. In 2014-15, M&A deal values in this sector were $5bn, and in 2018-19, this surged 880% to a combined two-year total of £49bn[5]. The cell therapy, gene therapy and tissue engineering sector raised $2.9bn in venture capital in 2018 – twice the 2017 amount.

Figure 1: Selected recent M&A's in cell and gene therapy

Deal date	Target	Acquirer / Collaborator	Deal value	Description
Feb 2020	Sangamo	Biogen	$350m	Collaboration for gene therapies in neurology, initially focused on ST-501 for tauopathies including Alzheimer's disease and ST-502 for synucleinopathies including Parkinson's disease. Biogen will pay Sangamo $350m upfront, including a license fee and an equity investment in Sangamo stock.
Jan 2020	Audentes Therapeutics	Astellas	$3bn	Acquired to 'accelerate and expand' Astellas' efforts in genetic medicines, making use of Audentes' expertise in AAV-based gene therapy manufacturing.
Dec 2019	Spark Therapeutics	Roche	$4.8bn	Intention to strengthen Roche's presence in gene therapy. Spark is the only company to have commercialised a gene therapy in the US, which was approved by the FDA to treat a rare form of inherited vision loss in December 2017. Spark entered into a Luxturna licensing and supply agreement with Novartis in January 2018.
Sep 2019	Vertex Pharma	Semma Therapeutics	$0.95bn	Vertex acquired Semma for its preclinical stage cell-based therapy for Type 1 diabetes.
Aug 2019	Bayer	Blue Rock	$1.0bn	Bayer acquired remaining 59.2% holding, valuing deal at c.$1bn. Preclinical stem cell company developing engineered cell therapies in neurology, cardiology and immunology, using a proprietary induced pluripotent stem cell (iPSC) platform.
June 2019	Nightstar	Biogen	$0.8bn	Clinical-stage gene therapy company. Biogen's motivation was to acquire its two mid-to-late stage gene therapy assets for rare retinal diseases, NSR-REP1 and NSR-RPGR.
May 2019	Paragon Bioservices	Catalent	$1.2bn	Paragon is a leading viral vector development manufacturing partner for gene therapies.
May 2018	AveXis	Novartis	$8.7bn	Acquired for its gene therapy technology. At the time, AveXis was undergoing several clinical studies for the treatment of spinal muscular atrophy (SMA), and its lead candidate was AVXS-101, which was approved in May 2019, as Zolgensma.
Jan 2018	Juno Therapeutics	Celgene	$9bn	Acquired for its CAR-T technology. Celgene was then acquired by BMS for $74bn in November 2019. BMS submitted a BLA for Juno's lead candidate (lisocabtagene maraleucel) for large B cell lymphoma with a PDUFA date of 17 August 2020.
Aug 2017	Kite Pharma	Gilead	$11.9bn	Gilead acquired Kite for its CAR-T technology, and stated that the move immediately positioned Gilead as a leader in cell therapy. Kite's lead candidate was FDA-approved as Yescarta (axicabtagene ciloleucel) for B cell lymphoma in August 2017.

Source: finnCap

1 https://www.grandviewresearch.com/industry-analysis/gene-therapy-market

2 https://bisresearch.com/industry-report/cell-gene-therapy-market.html

3 https://www.coherentmarketinsights.com/press-release/cell-and-gene-therapy-market-to-surpass-us-354-billion-by-2026-1275

4 https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-and-peter-marks-md-phd-director-center-biologics

5 https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/life-sciences/life-sciences-pdfs/ey-firepower-report-2020-how-will-deals-done-now-deliver-what-the-health-ecosystem-needs-next-v2.pdf

What is Cell Therapy?

Cells are the functional units that work together to form organs and tissues. Cell therapy is the use of cells that are either from the patient themselves (autologous) or from a donor (allogeneic) to treat disease. Cells used for cell therapy may or may not be genetically altered. It is sometimes easier to remove cells from the body, treat them with gene therapy, and then place those cells back into the patient, rather than treating cells inside the body. Thus, cell and gene therapy are often linked together.

What is Gene Therapy?

Genes are the working subunits of DNA. Genes are located on chromosomes, which are thread-like structures in the nucleus. Every cell contains 46 chromosomes, grouped in 23 pairs. All genes together are called the genome.

Each gene contains a set of instructions, and often these are instructions on how to code proteins – a process that is carried out by RNA. Genetic diseases are caused by errors, or mutations, in genes that result in a loss or change of function of RNA or proteins.

Humans have two copies of each gene, one inherited from their mother and one from their father. Dominant mutations cause disease when only one of the copies possess the mutation, while recessive mutations only cause disease if both copies possess the mutation. For diseases caused by recessive mutations, as long as an individual has one healthy copy of the gene (called 'wild type'), they will be healthy but are termed 'carriers'.

Gene therapy is the use of genetic material to treat genetic diseases. This could involve adding a wild type copy of the gene (gene addition) or altering a gene with a mutation (gene editing). To introduce the gene into the genome inside cells, vectors, both viral vectors, such as adeno-associated virus (AAV) vectors, and non-viral vectors, such as electroporation (electrical pulse), are used. The advent of safe and effective vectors for the delivery of gene therapy products is the innovation that has led to the surge of activity in the gene therapy sector.

Figure 2: Selected recent product approvals/filings in the CGT sector

FDA Approval/ BLA filing date	Brand name (generic name)	Developer (marketed by)	Indications	Type of Therapy	Description
BLA filing: Dec 2019	(valoctocogene roxaparvovec)	BioMarin	Haemophilia A	One-time AAV-based gene therapy.	BioMarin submitted a Biologics License Application (BLA) in December 2019. If approved, it would be the first gene therapy for haemophilia. Potential to cure haemophilia, with a potential price tag of more than $1m. FDA final decision expected by 21 August.
BLA filing: Dec 2019	(lisocabtagene maraleucel; liso-cel)	Juno Therapeutics (Bristol-Myers Squibb)	Large B cell lymphoma	CAR-T cell therapy (one-time infusion). Targets the CD19 antigen.	Bristol-Myers Squibb submitted a BLA in Dec 2019. FDA final decision expected by August 17. Prior to takeover by BMS, Celgene had forecast that liso-cel would become a $3bn therapy.
Approved May 2019	Zolgensma (onasemnogene abeparvovec-xioi)	AveXis (Novartis)	Children aged under two with spinal muscular atrophy (SMA)	One-time AAV-based gene therapy	AAV-based gene therapy which delivers a functional copy of human SMN gene into the target motor neuron cells. One-time injection results in expression of the SMN protein in a child's motor neurons, which improves muscle movement, function and survival of a child with SMA. Priced at $2.1m (£1.6m) in the US, making it the most expensive drug course of treatment ever.
Approved Aug 2018	Onpattro (patisiran)	Alnylam Pharma	Polyneuropathy caused by hereditary transthyretin-mediated amyloidosis	siRNA therapy administered via infusion every three weeks	First FDA approval of a small interfering ribonucleic acid (siRNA) treatment. Gene silencing drug which encases the siRNA into a lipid nanoparticle to deliver drug directly into the liver to alter or halt the production of disease causing proteins.

Source: finnCap

Figure 3: Selected recent product approvals/filings in the CGT sector (cont'd)

FDA Approval/ BLA filing date	Brand name (generic name)	Developer (marketed by)	Indications	Type of Therapy	Description
Approved Dec 2017	Luxturna (voretigene neparvovec-rzyl)	Spark Therapeutics (Novartis)	Confirmed biallelic RPE65 mutation-associated retinal dystrophy	One-time AAV-based gene therapy.	The first *in-vivo* gene therapy approved by the FDA. Injected under the retina. Luxturna carries a functioning RPE65 gene and delivers it directly to retinal cells to replace a faulty one. These cells then produce the normal protein that converts light to an electrical signal in the retina to restore patient vision loss. Luxturna uses an AAV, which has been modified using recombinant DNA techniques, as a vehicle to deliver the normal human RPE65 gene to the retinal cells to restore vision. The first UK patient was treated in Feb 2020.
Approved August 2017	Kymriah (tisagenlecleucel)	Novartis	Acute lymphoblastic leukaemia (ALL) and large B cell lymphoma	CAR-T cell therapy (one-time infusion). Targets the CD19 antigen.	World's first CAR-T therapy. A dose of Kymriah is a customised treatment created using a patient's own T cells. The T cells are collected and sent to a manufacturing centre where they are genetically modified to include a new gene that contains a specific protein (a chimeric antigen receptor or CAR) that directs the T cells to target and kill cancer cells that have a specific antigen (CD19). The modified cells are infused back into the patient to kill the cancer cells.
Approved October 2017	Yescarta (axicabtagene ciloleucel)	Kite Pharma (Gilead)	Large B cell lymphoma	CAR-T cell therapy (one-time infusion). Targets the CD19 antigen.	Has the same mechanism of action as Kymriah. Was the first CAR-T therapy to be approved for large B-cell lymphoma.

Source: finnCap

Industry attractions

We outline the key reasons why we consider the CGT sector to be an attractive one for investment:

- **Pharma's next 'wave' of innovation.** CGTs can be potentially curative/one-off treatment options as they usually target the underlying cause of disease. In the long term, these therapies could become the backbone of treatment regimens, and solutions to various unmet needs.
- **Deals.** Big Pharma had to play catch-up with monoclonal antibody technology, and seem determined not to make the same mistake with CGT, as reflected in the high deal activity and high deal values seen within this space (Figure 1).
- **Sector maturation.** Advances in the sector mean that the CGT sector is beginning to mature beyond the R&D stage and into commercialisation, with some products already approved, and with a very large future pipeline of therapies.
- **Revenue.** Therapies in this space can command high prices, allowing for high revenue generation, even from rare diseases and limited patient populations.

Challenges of CGT

The novelty of CGT also presents new, unique challenges:

- **Manufacturing challenges.** CGTs are usually personalised therapies as opposed to drugs that can be batch-produced for distribution to multiple patients. Consequently, it is difficult to manufacture these therapies in a reliable and cost-effective manner.
- **Reimbursement.** Healthcare providers are not used to paying large up-front fees for treatments with long-term benefits/curative potential.
- **Risks.** CGT therapies can present with different, and greater, risks than conventional therapies. For example, gene therapies could possibly cause tumours if new genes are inserted at the wrong location in the DNA.

Cell and Gene Therapy: finnCap's position

Cell and gene therapy has been seen as the 'future' of medicine for many years, and now we are closer than ever to that future becoming a reality. Multiple products are already approved, representing only the tip of the iceberg in relation to the massive pipeline of upcoming therapies, bolstered by the influx of funding and M&A activity within this space. CGT therapies can treat the underlying causes of disease, with durable results and curative potential. This potential is not realised easily, and CGT therapies present challenges on par with its lofty promises. Overall, while CGT therapies are likely to be safer than conventional therapies due to their precisely targeted nature, their mechanisms of action may also open the door to greater risks. In addition, their complex nature presents considerable manufacturing challenges, leading to CGT therapies consistently ranking top amongst lists of the most expensive treatments in the pharmaceutical industry.

However, these challenges are being tackled by the innovative companies within this space. This report highlights some of the diverse approaches being taken to provide CGT therapy, and support in the development of such therapies. The key attraction to investing in these companies is that they will be well placed for pharma's next 'wave' of innovation, and the 'land grab' that follows. If CGT does become the backbone of treatment regimes in the future, similar to the rise of monoclonal antibodies, then these companies are developing technology and expertise in a critical sector of the life sciences industry, which should confer a competitive advantage as the sector matures further. Indeed, Big Pharma has realised this, which is why many of the companies discussed in this report will also be attractive M&A targets and collaborative partners. In addition, if these CGT companies are able to demonstrate efficacy and safety, they will be able to command a high price for their therapies and generate large revenues – even from rare diseases and limited patient populations. Thus, now is a good time to invest in the 'future'.

We have looked at the universe of companies we follow and outlined those that have a significant presence in the cell and gene therapy space (Figure 4). CGT companies can be categorised into groups relating to whether they focus on cell therapy, gene therapy / gene delivery, or a combination of both. In addition, these companies can be categorised into businesses, which develop therapies, or are service companies, or are companies which engage in both.

Figure 4: Selected CGT companies segmented by sector

Cell Therapy	Gene Therapy/ Gene Delivery	Cell and Gene Therapy
Maxcyte	4basebio	Horizon Discovery
Achilles Therapeutics	Freeline	Oxford Biomedica
Autolus	Gyroscope	Avacta*
Hemogenyx	SwanBio	
Quell Therapeutics	LogicBio	
ReNeuron	Silence Therapeutics	

Key: Developer of therapies; Service company; Both developer and service company

Source: finnCap

The following tables summarise the CGT companies covered within this report. The companies are listed in alphabetical order, with a description of their activities within the CGT space, development stage and milestones.

Figure 5: CGT Companies and Milestones (Part 1)

Company	Description	CGT Development stage	CGT milestones
4basebio (4BSB-ETR)	Has developed a synthetic *in vitro* process for producing large amounts of DNA resulting in a faster, lower cost and safer process – which would ultimately help reduce the extremely high costs for gene therapies.	Developing TruePrime technology	Continued development of TruePrime proprietary synthetic DNA manufacturing technology. Alongside this, they will continue to focus on a buy and build strategy.
Achilles Therapeutics (Private company, Syncona cell therapy portfolio company)	Focus is on developing personalised T cell therapies guided by the DNA sequence of each patient's tumour.	Pre-clinical development	Targeting lead indications in non-small cell lung cancer and melanoma, currently in pre-clinical development.
Arix Bioscience (LSE: ARIX)	Global venture capital company focused on cutting edge advances in life sciences.	Portfolio companies in a range of stages.	See milestones for individual portfolio companies.
Autolus Therapeutics (NASDAQ: AUTL). Syncona and Arix portfolio companies	Applying a broad range of technologies to build a pipeline of precisely targeted T cell therapies.	Phase I/II (five programmes)	CAR-T Pivotal Phase I/II AUTO-1 trial in ALL to complete in H1 2021, with approval targeted in 2022. Will drive Phase I/II AUTO3 trial in DLBCL to proof-of-concept in 2020-21 and prepare for pivotal study Broad pre-clinical pipeline, with some programmes transitioning to clinical stage in 2020.
Avacta (AIM: AVCT-GB)	Developer of Affimer biotherapeutics and reagents. Part of AffyXell JV, which will develop MSCs that are primed to produce Affimer proteins.	Early (developing Affimers against targets)	AffyXell JV: Development of Affimer proteins against severe inflammatory and autoimmune disease targets. Progress in OncoSec research collaboration to combine Affimer platform with TAVO electroporation gene delivery technology. Progress in Moderna exclusive license agreement
Freeline (Private company, Syncona gene therapy portfolio company)	Focused on AAV gene therapy, where the therapy delivers a functioning gene to the liver.	Phase I/ II (FLT190a for Haemophilia B)	Progressing lead programme FLT190a, which received Orphan Drug Designation in May 2020 from the FDA for patients with Fabry disease. Trial has a primary completion date of December 2021.
Gyroscope Therapeutics (Private company, Syncona gene therapy portfolio	Focus is on retinal AAV gene therapy, with curative potential.	Phase I/II: GT005	Phase I/II trial of GT005 in dry AMD patients has a primary completion date of June 2021.
HemoGenyx (AIM: HEMO-GB)	Pre-clinical stage biopharmaceutical company developing treatments for the treatment of blood diseases. Has constructed HEMO-CAR for the AML.	Pre-clinical development	The company is undertaking further engineering of HEMO-CAR, including testing of a safety switch within the technology that is designed to control the level of activity of the CAR-T cells.
Horizon Discovery (AIM: HZD-GB)	Gene editing company which designs and engineers genetically modified-cells for research and clinical applications. Is also a market leader in CRISPR screening.	Leader in CRISPR screening.	650 CRISPR screens completed since 2013, of which 215 were in 2019 – growth rate starting to climb as pharma embraces it, representing a high growth opportunity for HZD.
LogiBio (NASDAQ: LOGC. Arix Bioscience portfolio company)	Genome editing company focused on developing therapies to durably treat rare diseases in paediatric patients using its proprietary technology platform, GeneRide.	LB-001: IND submission placed on a clinical hold by FDA	IND submission for a Phase I/II trial for LB-001 placed on a clinical hold by the FDA in February 2020. LogicBio are in discussions with the FDA, which will continue through mid-2020 and plan to provide an update after these have concluded.
Malin Corporation (Euronext Dublin: MLC)	Malin invests in highly innovative life sciences companies, with a focus on oncology, immunology and genetic diseases where it believes healthcare technologies will deliver transformative treatments for patients.	Portfolio companies are in a range of development stages	See milestones for individual portfolio companies
Maxcyte (AIM: MXCT-GB)	Partners with pharma companies to provide its proprietary Flow Electroporation technology, for drug discovery and licenses it for cell therapy. Is also developing its own CAR-T therapy platform CARMA, under its CARMA Cell Therapies subsidiary –with lead candidate MCY-M11 currently in a Phase I trial.	One of the leaders in cell engineering services. MCY-M11: Phase	The Phase I dose escalation study of MCY-M11 is a dose escalation study that will treat four cohorts. Fourth dosing cohort commenced in March 2020. Preliminary clinical results expected in H2 2020. Primary completion date of the trail is December 2020. Maxcyte is seeking investors and partnerships for its CARMA subsidiary.
Oxford Biomedica (LSE: OXB)	Cell and gene therapy contract manufacturing development organisation that develops the LentiVector gene delivery platform and is also developing therapy candidates.	Multiple service partnerships in place. Product candidates range from pre-clinical to Phase I/II	Multiple partnerships in place with related milestones, e.g. March 2020 Juno Therapeutics deal with $86m milestone related payments and $131m in sales-based milestone payments. Multiple pre-clinical and clinical milestones for product candidates. The programme in the furthest stage of development is SAR422459, in partnership with Sanofi and currently in Phase II development.
Poseida Therapeutics (Private company, in IPO registration process. Malin Corporation asset)	Clinical stage biopharmaceutical company focused on cell and gene therapy, for high unmet medical need.	Multiple programs, lead CAR-T program is in Phase II.	Lead CAR-T programme is P-BCMA-101, currently in a Phase II trial for multiple myeloma, with a primary completion date of December 2021.
ReNeuron (AIM: RENE-GB)	Stem cell company with two clinical stage therapeutic candidates.	Phase II (two programmes)	Retinitis Pigmentosa: further data read-outs in 2020. Will seek approval to commence pivotal study in H1 2021. Stroke disability: PISCES pivotal data read-out expected mid-2021

Source: finnCap

Figure 6: CGT Companies and Milestones (Part 2)

Company	Description	CGT Development stage	CGT milestones
Silence Therapeutics (AIM: SLN-GB	Designs short interfering RNA (siRNA) molecules against a target gene, to selectively inhibit the gene, thus 'silencing' production of disease-causing proteins.	Pre-clinical development	SLN360: IND submission to FDA planned for later this year, with a view to generating interim data by mid-2021. SLN124: therapy was due to enter a Phase Ib study in Q1 2020, although patient recruitment has been paused due to COVID-19, and SLN now expects to report interim data in H1 2021. SLN500: IND/CTA filing planned for 2021.
SwanBio Therapeutics (Private company, Syncona gene therapy portfolio company)	Focused on gene therapies for neurological disorders.	Pre-clinical development	Company's first programme is in preclinical development for an inherited neurodegenerative disease.
Syncona (LSE: SYNC)	FTSE 250 healthcare company that builds and funds life science companies in innovative areas of science. Six out of nine companies in its portfolio are CGT companies.	Portfolio companies are in a range of development stages	See milestones for individual portfolio companies.
Quell Therapeutics (Private company, Syncona cell therapy portfolio company)	Employing proprietary technologies to genetically enhance T regulatory cells to enable their suppressive potential to be focused precisely where it is needed.	Pre-clinical development	Lead program is QEL-001, which aims to enable liver transplant patients to live with their transplanted liver without taking immunosuppressive medication. Currently in pre-clinical development and progressing towards Phase I.

Source: finnCap

We include a table of company valuation metrics in Figure 7.

Figure 7: Peer group comparable multiples

		Price	EV	M. cap	EV/Sales (x)			EV/EBITDA (x)		EV/EBIT (x)		P/E (x)	
Ticker	Company	l/c	£m	£m	FY1	FY2	FY3	FY1	FY2	FY1	FY2	FY1	FY2
SYNC-GB	Syncona GBP	2.4	1,589	1,595								46.6	8.8
OXB-GB	Oxford BioMedica	8.07	576	662	8.2	6.4	5.9		73.9		728.0		308.7
AUTL	Autolus Therapeutics ADR	12.6	453	658	488.9	418.5	53.6						
SLN-GB	Silence Therapeutics	4.9	332	403	34.6	22.2	9.5						
AVCT-GB	Avacta Group	1.3	148	324	65.7								
MLC-IE	Malin Corp	4.4	227	199									
HZD-GB	Horizon Discovery Group	1.1	159	173	2.5	2.3			270.3				
LOGC	LogicBio Therapeutics	7.1	137	165									
MXCT-GB	MaxCyte	2.4	129	146	7.1	6.0	4.6		486.1				
ARIX-GB	Arix Bioscience	0.9	57	115	12,555.9	22,057.0							
RENE-GB	ReNeuron Group	1.3	28	40	10.8	21.9	91.0						
HEMO-GB	HemoGenyx	0.1	27	32									
	maximum				***12,555.9***	***22,057.0***	***91.0***	***0.0***	***486.1***	***0.0***	***728.0***	***46.6***	***308.7***
	minimum				***2.5***	***2.3***	***4.6***	***0.0***	***73.9***	***0.0***	***728.0***	***46.6***	***8.8***

Source: FactSet, finnCap

Cell Therapy

Cell therapy is the use of cells that are either from the patient themselves (autologous) or from a donor (allogeneic) to treat disease. Cells used for cell therapy may or may not be genetically altered.

Different modalities of therapy can fall under the cell therapy umbrella. One of the most exciting of these is CAR-T therapy, a new form of treatment that was first introduced to the market in late 2017, with the approval of Yescarta (axicabtagene ciloleucel). This is a rapidly growing sector and we discuss various companies that already are or are aiming to be players within this space, including Horizon, Maxcyte, Oxford Biomedica, Hemogenyx and Autolus. Companies are also developing non-CAR-T related T cell therapies, including Achilles Therapeutics, which is developing clonal neoantigen T cell therapies, and Quell Therapeutics, which is developing genetically enhanced T regulatory cells.

The selected businesses, from the universe of companies that we follow, that are discussed in this section are listed in the table below.

Figure 8: Selected UK Cell Therapy Companies

Company	Selected Cell Therapy Area	Description
Horizon (AIM: HZD-GB) and Celyad	CAR-T Therapy	HZD's shRNA technology was used to generate Celyad's CYAD-02, which is in a Phase I trial for AML and MDS, and expects to report preliminary data during H2 2020. Primary completion date of the trial is December 2021. HZD received its first milestone payment for the successful IND filing for CYAD-02.
Maxcyte (AIM: MXCT-GB)	CAR-T Therapy	Developing its own CAR-T therapy platform CARMA, under its CARMA Cell Therapies subsidiary –with lead candidate MCY-M11 currently in a Phase I trial. The Phase I dose escalation study of MCY-M11 is a dose escalation study that will treat four cohorts. Fourth dosing cohort commenced in March 2020. Preliminary clinical results expected in H2 2020. Primary completion date of the trail is December 2020.
Hemogenyx (AIM: HEMO-GB)	CAR-T Therapy	Has constructed HEMO-CAR for the AML. The company is undertaking further engineering of HEMO-CAR, including testing of a safety switch within the technology that is designed to control the level of activity of the CAR-T cells.
Oxford Biomedica (LSE: OXB)	CAR-T Therapy	Developer of LentiVector delivery platform. Sole manufacturer of the lentiviral vector used in Kymriah, and has a licence and clinical supply agreement with Juno Therapeutics to support its CAR-T and T cell therapy programmes.
Avacta (AIM: AVCT-GB)	CAR-T Therapy	Research collaboration with Memorial Sloan Kettering Cancer Center to evaluate use of Avacta's Affimer technology in novel CAR-T therapy.
Poseida Therapeutics	CAR-T Therapy	Lead CAR-T programme is P-BCMA-101, currently in a Phase II trial for multiple myeloma, with a primary completion date of December 2021.
Autolus (Syncona and Arix portfolio company)	CAR-T Therapy	CAR-T Pivotal Phase I/II AUTO-1 trial in ALL to complete in H1 2021, with approval targeted in 2022. Will drive CAR-T Phase I/II AUTO3 trial in DLBCL to proof-of-concept in 2020-21 and prepare for pivotal study. Broad pre-clinical pipeline, with some programmes transitioning to clinical stage in 2020.
ReNeuron (AIM: RENE-GB)	Stem Cell Therapy	Two clinical stage stem cell therapies: Retinitis Pigmentosa: further data read-outs in 2020. Will seek approval to commence pivotal study in H1 2021. Stroke disability: PISCES pivotal data read-out expected mid-2021.
AffyXell Therapeutics (Avacta JV)	Stem Cell therapy	Avacta will develop Affimer proteins against several inflammatory and autoimmune disease targets, which will be transferred to the JV to be incorporated into MSCs. In the longer term, there is potential for AffyXell to address oncology uses for the Affimer-enabled cell and gene therapies.
Achilles Therapeutics (Syncona portfolio company)	Other T cell therapies	Developing clonal neoantigen T cells. Targeting lead indications in non-small cell lung cancer and melanoma, currently in pre-clinical development.
Quell Therapeutics (Syncona portfolio company)	Other T cell therapies	Employing proprietary technologies to genetically enhance T regulatory cells. Lead program is QEL-001. Currently in pre-clinical development and progressing towards Phase I.

Source: finnCap

Another cell therapy modality is stem cell therapy, which has been seen as an upcoming and potentially transformative technology for many years. However, despite much initial hype, the industry failed to live up to those lofty expectations, although this may be beginning to change with companies like ReNeuron, and AffyXell Therapeutics (a joint venture between Avacta and Daewoong Pharmaceutical).

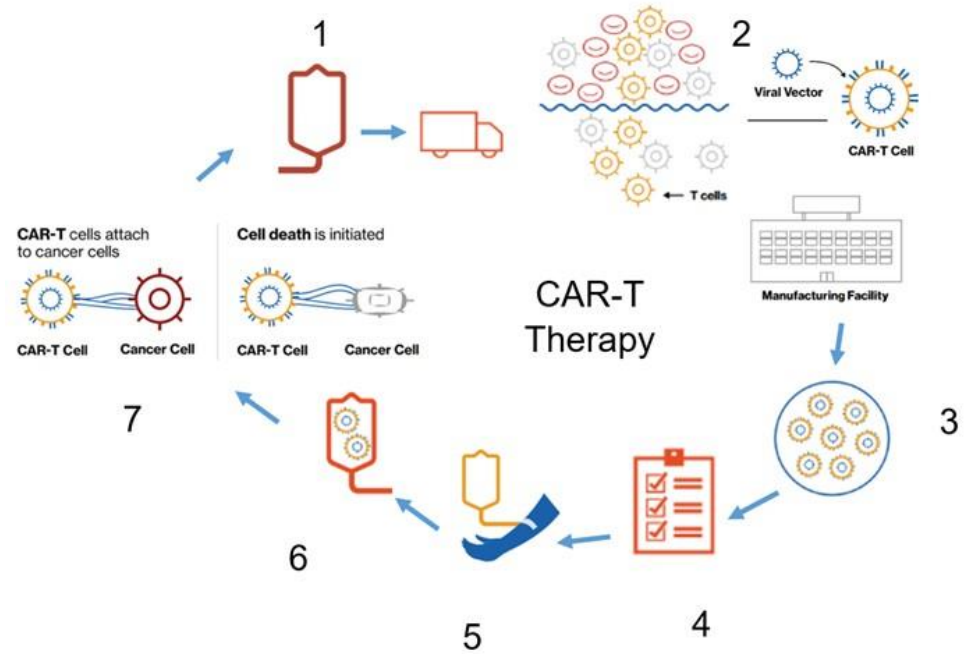
Finally, given the burgeoning cell therapy industry, there is also a need for service providers within the space. Maxycyte, for example, has developed a proprietary technology platform for cell engineering, which allows companies to develop next-generation cell therapies based on its technology. Similarly, Oxford Biomedica's LentiVector delivery platform is utilised by companies such as Novartis and Juno Therapeutics for their CAR-T programmes.

CAR-T Therapy

Chimeric antigen receptor T cell (CAR-T) therapy uses a patient's own immune system to fight certain types of cancer. T cells are a type of white blood cell which play a key role in the immune system and are responsible for directly killing cancer cells.

To produce a CAR-T therapy, a patient's T cells are extracted and reprogrammed outside the body to recognise and fight cancer cells expressing a particular antigen (Figure 9).

Figure 9: How CAR-T therapy works



Source: Novartis, finnCap

1.) Leukapheresis: A specialised blood filtration process in which a patient's white blood cells, including T cells, are extracted. The T cells are then cryopreserved and sent to a manufacturing facility for reprogramming.

2.) Reprogramming T cells: Patient's T cells are genetically modified, using an inactive viral vector, to include a new gene that contains a specific protein (a chimeric antigen receptor or CAR) that recognises cancer cells expressing a specific antigen (e.g., CD19).

3.) Expansion: The newly created CAR-T cells are expanded to produce enough cells for treatment.

4.) Quality Check: Quality testing occurs in order to deem the cells viable. The CAR-T cells are then cryopreserved and shipped back to the treatment centre.

5.) Lymphodepleting chemotherapy: Given to the patient to reduce level of white blood cells and help the body accept the reprogrammed CAR-T cells.

6.) Cell infusion: CAR-T cells are delivered into the patient's blood.

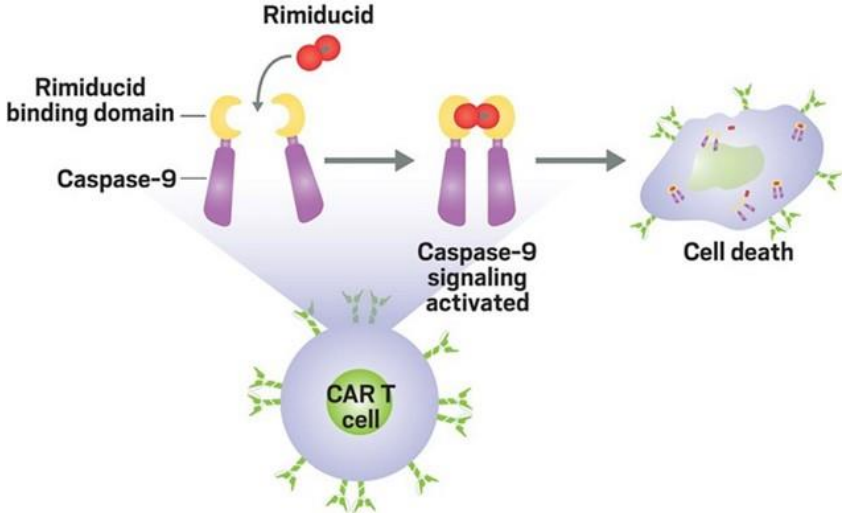
7.) Cell death: CAR-T cells recognise the CD19 antigen on cancer cells and attach to them, which may initiate cell death. This may also release cytokines that promote expansion of the CAR-T cells. A population of CAR-T cells may remain to potentially monitor and detect new CD19 expressing target cells.

Marketed CAR-T therapies have demonstrated sustained responses in heavily pre-treated patient populations who have a poor prognosis and limited alternative treatment options after a one-time infusion. However, their disadvantages include the two-step autologous process, the time needed for cell expansion (which can take two weeks) and the safety risks, which include cytokine release syndrome (CRS). CRS occurs because CAR-T cells release molecules called cytokines as they attack tumours, which promote inflammation and recruit more immune cells to the attack. However, when this process happens too quickly, it can cause CRS, which is a life-threatening immune flare-up.

Next-Generation CAR-T Approaches

Work is already underway to improve CAR-T technology with regards to its efficacy, safety and convenience. For example, in order to tackle the approach of CRS, companies are developing 'safety switches' to eliminate CAR-T cells. Bellicum Pharmaceuticals has developed a 'safety switch', which is described in Figure 10. Whether this technology will lead to safer CAR-T therapies is yet unproven, but Bellicum's lead candidate (BPX-601) is a Phase I/II trial in pancreatic cancer with a primary completion date of February 2022.

Figure 10: Bellicum Pharmaceuticals: CAR-T Safety Switch



Source: Bellicum Pharmaceuticals

Bellicum's approach uses two proteins located inside the CAR-T cell that dimerise when exposed to a small-molecule drug called rimiducid. Rimiducid activates a protein called caspase-9, which starts the process of CAR-T suicide.

Other next-gen approaches include allogeneic or 'off-the-shelf' CAR-T therapy. For example, Celyad released interim clinical efficacy data for an off-the-shelf non-gene edited CAR-T therapy (CYAD-01) in solid tumours in November 2019. The results showed that six out of 12 patients in the trial had seen their tumours shrink thus far and with no evidence of the therapy causing graft-versus-host disease in patients. Instead of inserting a gene that codes for an antibody in the T cell, like traditional CAR-T approaches, Celyad's technology inserts genes that code for Natural Killer (NK) receptors (such as NKG2D). NK receptors do not bind with a specific antigen but with ligands. Celyad's allogeneic platform is based around the engineering of T cells from healthy donors that, in addition to CARs, also express T Cell Receptor Inhibitory Molecules (TIMs). TIMS inhibit T Cell Receptor (TCR) function, allowing T cells to persist when injected into a patient. This avoids a severe rejection response when T cells from a donor are injected into a patient as TCRs are largely responsible for that process.

Horizon and Celyad: Next-Generation NKG2D-based CAR-T Therapy

Horizon Discovery (AIM: HZD-GB) is a gene editing company which designs and engineers genetically modified cells for research and clinical applications. In October 2018, Celyad announced an exclusive agreement with Horizon to use the company's Short Hairpin RNA (shRNA) technology to generate Celyad's second non-gene-edited allogeneic platform (CYAD-02), and further advance Celyad's approach to off-the-shelf CAR-T cells. The shRNA technology licensed by Celyad is the same as that deployed in HZD's range of SMARTvector products and is designed to deliver efficient target knock-down with high specificity. HZD views its shRNA technology as a rival to gene-editing approaches for cell therapy.

CYAD-02 is an all-in-one vector approach in patient's T-cells to express both:

- NKG2D CAR, a receptor expressed on NK cells that binds to eight stress-induced ligands expressed on tumour cells.
- HZD's shRNA SMARTvector technology - to knockdown expression of NKG2D ligands (MICA and MICB) on the CAR-T cells.

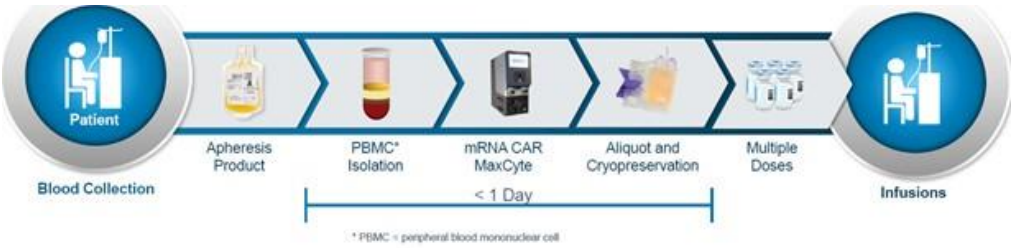
Celyad dosed the first CYAD-02 patient in January 2020 in a Phase I trial for Acute Myeloid Leukaemia (AML) and Myelodysplastic Syndromes (MDS). The company expects to report preliminary data during H2 2020. HZD received its first milestone payment for the successful IND filing for CYAD-02.

Maxcyte's CARMA Technology: Potential to Disrupt CAR-T Therapy

Maxcyte's (AIM: MXCT-GB) CARMA platform, being developed under the company's subsidiary CARMA Cell Therapies, is an innovative approach to CAR-T therapy. Maxcyte is developing autologous mRNA-based CAR-T therapies using this platform, and its lead candidate is MCY-M11.

CAR-T therapies such as Yescarta and Kymriah use viral vectors, which deliver DNA to the cell's nucleus and result in permanent integration. CARMA therapy is non-viral and delivers mRNA directly to the cytoplasm, which results in transient expression, and therefore allows potentially for more control over activity and the potential for less toxicity. In addition, while existing CAR-T therapies can take two weeks to manufacture (Figure 11), CARMA can be manufactured in one day, allowing for potential lower cost of goods and faster treatment for patients. Finally, while existing CAR-T therapies only target liquid tumours, the mRNA approach can be applied to both solid and liquid tumours.

Figure 11: How CARMA therapy works



Source: Maxcyte

The CARMA process is similar to the one described in Figure 9. A patient's blood is collected through apheresis. Peripheral blood mononuclear cells (PBMCs), which are a combination of different immune cells, are isolated. The PBMCs are then loaded with the mRNA CAR, and then aliquoted into multiple doses and cryopreserved. Crucially, this whole process takes less than a day. Moreover, the CARMA platform is agnostic in terms of target.

MCY-M11

Maxycyte's lead CARMA candidate is currently in a Phase I trial for advanced ovarian cancer and peritoneal mesothelioma. MCY-M11 targets mesothelin, which is a protein that shows evidence of playing a role in cell adhesion, tumour invasion and metastasis. There is low expression of mesothelin on normal tissues and it is over-expressed in multiple cancers, including pancreatic, ovarian, breast, lung and colorectal cancer. The Phase I trial is a dose escalation study that will treat four cohorts. The fourth dosing cohort commenced in March 2020, as expected. Preliminary clinical results for the trial are expected to be announced in H2 2020. There have been no dose-limiting toxicities or related serious adverse events observed in the three completed cohorts.

Hemogenyx: Potential 'tunable' CAR-T for AML

Hemogenyx (AIM: HEMO-GB) is a pre-clinical stage biopharmaceutical company developing treatments for the treatment of blood diseases. It has constructed HEMO-CAR-T for acute myeloid leukaemia (AML), using the company's proprietary humanised monoclonal antibody against a target on the surface of AML cells. Hemogenyx has demonstrated *in vivo* that HEMO-CAR was able to programme human T cells into HEMO-CAR-T cells to identify and destroy human AML derived cells.

The company is undertaking further engineering of HEMO-CAR, including testing of a safety switch within the technology that is designed to control the level of activity of the CAR-T cells. The aim of this is to turn HEMO-CAR-T cells into a "tunable and controllable drug".

Oxford Biomedica: CAR-T Partnerships

Oxford Biomedica (LSE: OXB) is a cell and gene therapy contract manufacturing development organisation, which develops the LentiVector delivery platform and is also developing CGT product candidates. OXB has strong partnerships in place with a range of Big Pharma companies, providing them with access to intellectual property, production facilities, expertise and product/technology rights, which in turn creates multiple income streams for OXB.

For example, OXB has had a partnership with Novartis in place since 2014. OXB is the sole manufacturer of the lentiviral vector used in Kymriah, and in December 2019 Novartis extended the commercial and clinical supply agreement by five years for both Kymriah and undisclosed CAR-T products. The agreement guarantees a minimum of $75m in manufacturing revenues in addition to other financial terms.

In March 2020, OXB signed a new licence and clinical supply agreement with Juno Therapeutics, which grants the company a non-exclusive licence to OXB's LentiVector platform for application in CAR-T and TCR-T programmes. The agreement put in place a five-year clinical supply agreement which may be extended further. OXB received an upfront payment of $10m in cash and potentially up to $86m in milestone-related payments, and $131m in sales-based milestone payments and an undisclosed royalty on net sales of products sold by Juno.

Avacta: Affirmer CAR-T Research Collaboration

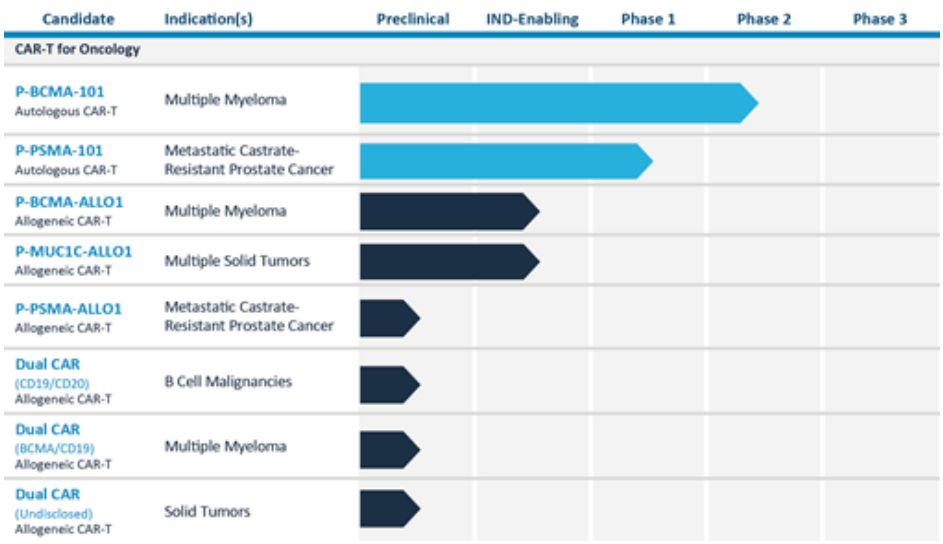
Avacta (AIM: AVCT-GB) has a research collaboration with Memorial Sloan Kettering Cancer Center (MSK) to evaluate the use of Avacta's Affimer technology in novel CAR-T therapy. The simple structure and biophysical properties of Affimers potentially provide significant advantages over antibody fragment technology currently used in CAR-T cell modification and the collaboration intends to find a new class of CAR-T therapy that incorporates Affimer molecules. As part of the collaboration, Avacta is developing Affimer molecules that bind different regions of CD19, while MSK will construct CAR-T cells incorporating these Affimer molecules and test their anti-tumour function *in vitro* and in *in vivo* animal efficacy models.

Poseida Therapeutics: Differentiated CAR-T Products

Poseida Therapeutics is a clinical stage biopharmaceutical company focused on cell and gene therapy for high unmet medical need. The company is one of Malin Corporation's priority assets, and Malin holds 23% equity in the company. In June 2020, Poseida announced the closing of a $110m Series D financing round, with the company's total funding now totalling over $300m since its inception in 2014. Its $142m Series C round was led by Novartis. Also in June, Poseida filed with the US SEC for an IPO, offering to raise up to $115m.

Figure 12 shows Poseida's CAR-T pipeline. Its lead programme is P-BCMA-101, currently in a Phase II trial for multiple myeloma, with a primary completion date of December 2021.

Figure 12: Poseida Therapeutics CAR-T pipeline

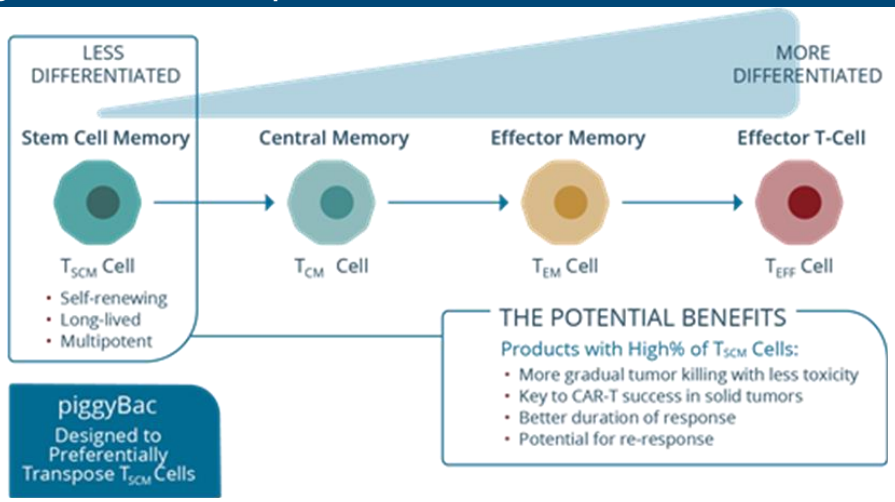


Source: Poseida Therapeutics

Poseida claims that it is developing differentiated CAR-T products, developed using its PiggyBac DNA modification system. Patients receiving today's CAR-T therapies, which are largely comprised of modified T effector cells, have the potential to relapse unless their initial dose is capable of eliminating every cancer cell in the body. Poseida's CAR-T products are primarily composed of the earliest stage T cells, known as stem memory T cells or TSCM cells. TSCM cells are long-lived, self-renewing and multipotent, with the capacity to reconstitute the entire spectrum of T cell subsets, including T effector cells. They have been shown in clinical trials to have potential to survive for years after engraftment, providing long-lived T cell immunity against some infectious diseases.

Because of their unique properties, TSCM cells are potentially safer and more effective than current CAR-T products, and these advantages are highlighted in Figure 13.

Figure 13: Poseida Therapeutics – Overview of TSCM Cells



Source: Poseida Therapeutics

Autolus: Pipeline of Precisely Targeted T Cell Therapies

Autolous is part of both Syncona's (LSE: SYNC) and Arix Bioscience's (LSE: ARIX) portfolio. The company is applying a broad range of technologies to build a pipeline of precisely targeted T cell therapies. It has five programmes in Phase I/II development, with three focusing on B cell malignancies and six programmes in pre-clinical development. Lead programme AUTO1 is a CAR-T therapy for adult ALL patients, which has orphan drug designation from the FDA. Autolus filed a potential pivotal study CTA in the UK in November 2019 and US IND in Q1 2020, with a BLA filing targeted for Q4 2021. The AUTO3 programme is developing a CAR-T therapy for DLBCL, and a decision for triggering Phase II initiation is planned for mid-2020.

Stem Cell Therapy

Stem cells have three defining properties that set them apart from other cells:

- **Unspecialised:** Stem cells do not have any tissue-specific functions.
- **Capable of specialisation:** Stem cells have the ability to differentiate into specialised cell types.
- **Self-renewal:** Stem cells are capable of dividing and renewing themselves for long periods.

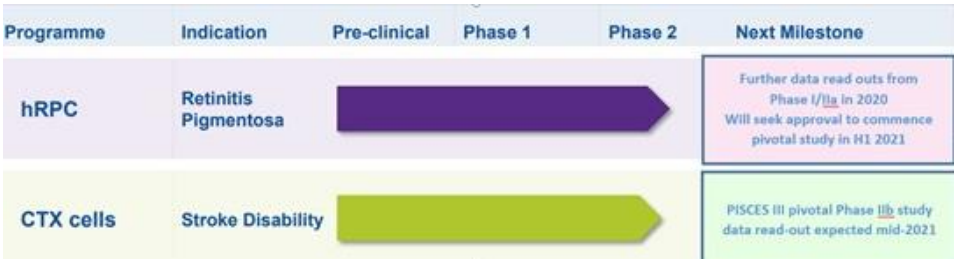
Types of stem cells include:

- **Embryonic stem cells:** Capable of generating all the specialised tissues that make up a human body. Only found during the first stages of development.
- **Adult stem cells:** Relatively rare, undifferentiated cells found within specific differentiated tissues, where their primary role is to maintain and repair the tissue. Types of adult stem cells include mesenchymal stem cells, haematopoietic stem cells and neural stem cells.
- **Induced pluripotent stem cells (iPSCs):** Created in a lab, these are adult stem cells that have been reprogrammed to enter an embryonic stem cell-like state. Discovered in 2007.

ReNeuron: Clinical Stage Stem Cell Therapies

ReNeuron (AIM: RENE-GB) is a stem cell company with two clinical stage therapeutic candidates targeting unmet needs. The cells can be administered 'off-the-shelf' to any eligible patient (allogeneic), which has clear health economic attractions as it does not require a two-step process involving the extraction and expansion of an individual's own cells. ReNeuron's pipeline can be seen in Figure 14.

Figure 14: ReNeuron Pipeline



Source: ReNeuron, finnCap

hRPC platform

ReNeuron is developing its human retinal progenitor cell line (hRPC) platform for the treatment of retinal diseases. A Phase II trial in retinitis pigmentosa (RP), a blindness-causing disease, is currently underway. Pre-clinical models show that the hRPCs differentiate into functional photoreceptors and integrate into retinal layers. A cryopreserved formulation allows for global shipping and storage, and ReNeuron has partnered with Fosun Pharma for China.

The RP clinical programme has been granted Orphan Drug Designation in both Europe and the US, as well as Fast Track designation in the US. In October 2019, positive interim data was announced which showed a group of subjects who had a successful surgical procedure, with sustained clinically relevant improvements in visual acuity compared with baseline. Interestingly, each patient was essentially placebo-controlled as one eye was treated while the other was not. Visual acuity was measured by the number of letters read on a standardised eye chart.

- There were 8 patients who had a successful surgical procedure in the Phase 2a cohort, and one-month follow up data showed that the mean change in visual acuity from baseline in the treated eye was +11.4 letters compared to +0.3 letters in the untreated eye.
- Subsequent long-term efficacy data from the study, announced in June 2020, continued to show a meaningful clinical effect from the therapy at all time points out to 18 months post-treatment.
- In the four patients with 12 months follow-up data, the mean change in the treated eye was +13.4 letters compared to +4.6 letters for the untreated eye.
- In the one patient with 18 months data, the change in visual acuity was 17 letters.

CTX platform

The immortalised neural progenitor cell line (CTX) is being developed as a therapy for patients left disabled by a stroke. CTX cells are cryopreserved and have a 12-month shelf life. As with the hRPCs, ReNeuron have partnered with Fosun Pharma for China.

A Phase II trial is currently underway. Previously released data from the trial has shown clinically meaningful improvements in disability scales out to 12 months post-implantation. Data read-out from the pivotal PISCES Phase IIb portion of the study is expected mid-2021.

Avacta and Daewoong Joint Venture: AffyXell Therapeutics

Avacta (AIM: AVCT-GB) is a developer of cancer immunotherapies, combining its two proprietary platforms: Affimer biotherapeutics and pre|CISION tumour chemotherapy. Daewoong Pharmaceutical is a leading pharma company in South Korea. AffyXell is a joint venture (JV) in South Korea between the two companies.

Daewoong will license out their mesenchymal stem cell (MSC) technology to the JV. Daewoong's MSCs are derived from embryonic stem cells and iPSCs and can be mass-produced, allowing for 'off-the-shelf' allogeneic therapies. Avacta will license its Affimer technology to the JV. Affimer technology is a novel class of biotherapeutic based on the naturally occurring human protein called Stefin A. An Affimer is a small protein that is capable of binding to and capturing a target molecule in the same way an antibody does. However, Affimers have a number of advantages over antibodies, including being smaller, cheaper and easier to manufacture.

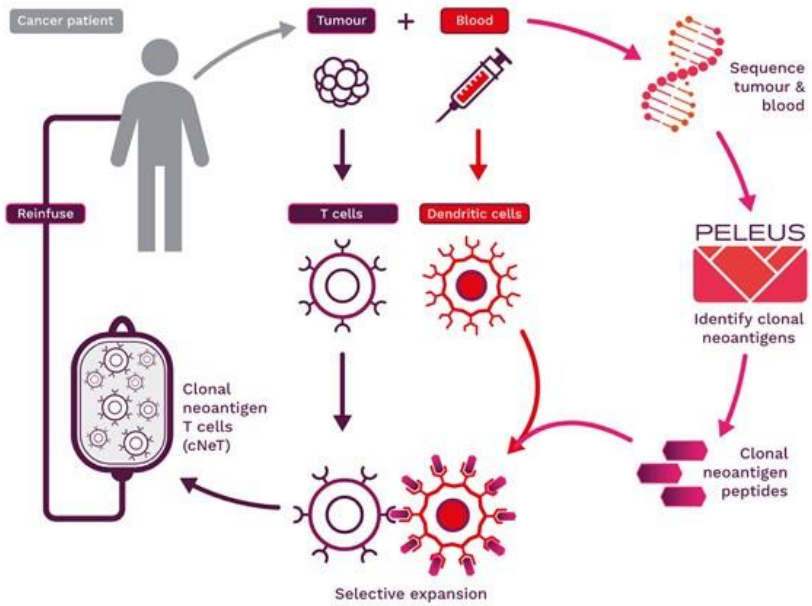
The JV will develop a new class of MSCs that are primed to produce Affimer proteins, which are designed to enhance the immune-modulatory effect when administered to patients by reducing inflammatory and autoimmune responses. Avacta will develop Affimer proteins against several inflammatory and autoimmune disease targets, which will be transferred to the JV to be incorporated into MSCs. In the longer term, there is potential for AffyXell to address oncology uses for the Affimer-enabled cell and gene therapies.

Avacta holds a 45% equity interest in the JV, and its R&D costs will be fully covered by the JV, which is funded by Daewoong. In addition, Avacta retains the rights to commercialise Affimer proteins outside the field of cell therapies. Daewoong will provide the JV with access to its proprietary technology for generating MSCs from a single donor to treat a large number of patients. The JV opens up the opportunity for Avacta to enter the cell therapy space without any financing cost. Given the high deal values placed on novel cell therapy platforms, there is potentially very significant value residing in this JV, which is arguably not fully reflected in the current value of Avacta.

Achilles Therapeutics: clonal Neoantigen T Cells (cNeT)

Achilles Therapeutics is part of Syncona's portfolio. Its focus is on developing personalised T cell therapies guided by the DNA sequence of each patient's tumour. It combines genomics with a clinically validated cell therapy approach. Achilles is targeting lead indications in non-small cell lung cancer and melanoma, currently in pre-clinical development. The company's proprietary process is described in Figure 15.

Figure 15: Achilles Therapeutics: Generating clonal neoantigen T cells (cNeT)



Source: Achilles Therapeutics

- A tumour sample is taken from the patient and processed to isolate T cells. The T cells used by Achilles are tumour infiltrating lymphocytes (TIL), which are T cells that have left the blood stream and infiltrated a tumour.
- A blood sample is taken from the patient and processed to isolate monocytes, a type of white blood cell. These monocytes are then used to generate dendritic cells, which are a type of immune cell that shows antigen to T cells in order to activate them.
- A portion of the tumour cell and blood sample is used to generate DNA samples for sequencing. The DNA sequence from the tumour is compared to the DNA sequence of healthy blood cells in order to identify mutations in the tumour DNA that are unique to the cancer.
- The PELEUS platform uses proprietary software to analyse tumour mutations and identify clonal neoantigens. These are mutations that (1) occur in a gene encoding a protein; (2) are displayed on the surface of the tumour cell where they can be recognised by a T cell; and (3) are present in every cancer cell (clonal).
- Peptides are manufactured which each contain a clonal neoantigen in their amino acid sequence.
- The dendritic cells take up the clonal neoantigen peptides and display them on their cell surface so they can be recognised by T cells.
- The T cells and dendritic cells are mixed together and when a T cell encounters a dendritic cell displaying clonal neoantigen that matches its T cell receptor, the T cell receives a signal to start proliferating. This step ensures that only T cells that specifically target clonal neoantigens are expanded to high levels.
- The resulting clonal neoantigen T cells (cNeT) are fitter and more active than conventional TIL. They also have the capacity to expand further once they are re-infused into the patient.

Quell Therapeutics: Genetically Enhanced T Regulatory Cells

Quell Therapeutics is part of Syncona's cell therapy portfolio. Quell is employing proprietary technologies to genetically enhance T regulatory cells, to enable their suppressive potential to be focused precisely where it is needed. It seeks to treat conditions including solid organ transplant rejection, autoimmune and inflammatory diseases and is currently in preclinical development. Its lead program is QEL-001, which aims to enable liver transplant patients to live with their transplanted liver without taking immunosuppressive medication.

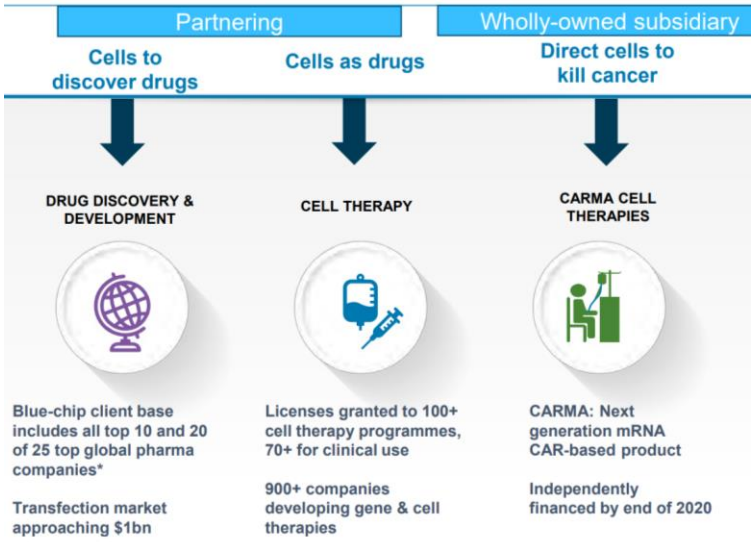
Maxcyte: Flow Electroporation for next-generation cell engineering

MaxCyte's business model revolves around its cell-engineering enabling technology, which it offers both as a service to pharma and biotech companies as well as on license (Figure 16.)

The CARMA platform was discussed above; however, MaxCyte's core business is as a cell therapy company that is driving the next generation of cell therapy based on its technology – Flow Electroporation.

Flow Electroporation is a proprietary technology for cell engineering, enabling the transfection of virtually any molecule (e.g. DNA, RNA) to any cell at any scale. MaxCyte provides its technology, including instruments and single-use disposables, to customers to aid in drug discovery and development. It also licenses the technology to companies who can use it to reprogram cells to be used as therapies for which MaxCyte receives upfront and milestone payments as well as royalties on future product sales. As of July 2020, the company reports that the potential value of pre-commercial milestones from signed deals exceeds $800m.

Figure 16: Maxcyte business model



Source: MaxCyte

Flow Electroporation is based on a fundamental principle of cell membranes – the reverse permeability of membranes in the presence of an electrical field – thereby creating an universal, non-viral, transfection technology. It allows almost any molecule – such as DNA, RNA or proteins – to be delivered into any cell. The technology causes minimal cell disturbance, routinely resulting in cell viabilities and transfection efficiencies over 90%, exceeding those of other transfection methods. The main steps for performing electroporation are:

- Cell preparation: Cells are harvested from culture and suspended at high density in the MaxCyte Electroporation Buffer, which is a physiologically balanced salt solution that contains no biological agents. This same buffer is used for all cell types. The cells are mixed with chosen loading agents (e.g. DNA, RNA, protein etc.) and transferred to sterile processing assemblies (Pas).
- Electroporation: MaxCyte Scalable Transfection Systems come pre-loaded with a variety of electroporation protocols that are optimised for individual cell types. The user transfers the PA to the instrument, selects the appropriate protocol and clicks start to begin.
- Post-electroporation cell handling: after electroporation, the cells are transferred from the PA to a sterile, multi-well dish and allowed to recover for 30-40 minutes at 37°C. The cells can either be cultured for immediate use or cryopreserved.

Overall Flow Electroporation allows for high efficiency, reproducible and scalable cell engineering.

Gene therapy / gene delivery

Gene therapy is the use of genetic material to treat genetic diseases. This could involve adding a wild type copy of the gene (gene addition) or altering a gene with a mutation (gene editing). To introduce the gene into the genome inside cells, vectors – both viral vectors, such as adeno-associated virus (AAV) vectors, and non-viral vectors, such as electroporation (electrical pulse) – are used. The advent of safe and effective vectors for the delivery of gene therapy products is the innovation that has led to the surge of activity in the gene therapy sector.

Viral vectors are common because viral pathogens have evolved to transduce human cells and possess natural mechanisms for crossing the plasma membrane. Companies developing gene therapies using AAV vectors include Freeline and Gyroscope therapeutics, while Oxford Biomedica users a lentiviral vector. Figure 17 provides a comparison of selected viral vectors.

Figure 17: Comparison of selected viral vectors

Vector	Tropism	Inflammatory potential	Main advantages	Main limitations
AAV	Broad	Low	Non-inflammatory, non-pathogenic	Small packaging capacity
Lentivirus	Broad	Low	Persistent gene transfer in most tissues	Integration has possibility of inducing oncogenes in some applications
Retroviral	Dividing cells only	Low	Persistent gene transfer in dividing cells	Only transduces dividing cells, integration has possibility of inducing oncogenes in some applications
HSV-1	Strong for neurons	High	Large packaging capacity, strong tropism for neurons	Inflammatory, transient transgene expression in cells other than neurons

Source: finnCap, Nature Reviews

Some companies are developing proprietary solutions and platforms for gene therapy/delivery. LogicBio, for example, has developed GeneRide for integrating therapeutic genes precisely into the chromosome.

One revolutionary new technology in the gene therapy space is CRISPR (clustered regularly interspaced short palindromic repeats), which represents a potentially easier, cheaper and more efficient method of modifying and editing DNA as well as turning on or off genes without altering their sequence.

Another promising therapeutic modality is that of RNA therapies – an area that showed much promise but lost the interest of Big Pharma soon after the challenges of delivering the RNA molecules to the target tissues became apparent. Companies such as Silence Therapeutics, Moderna Therapeutics and BioNTech are working to overcome these challenges.

As the gene therapy market begins to expand, 4basebio believes that it can tackle a key bottleneck, which is the need for large quantities of DNA. Using its TruePrime technology, the company has developed a synthetic *in vitro* process for producing DNA at scale and of high purity.

The selected businesses, from the universe of companies that we follow, that are discussed in this section are listed in the table below.

Figure 18: Selected UK Gene Therapy companies

Company	Selected Gene Therapy Area	Description
Horizon Discovery (AIM: HZD-GB)	CRISPR screening	A market leader in CRISPR screening, with over 650 screens completed since 2013. The number of screens Horizon are performing each year is increasing as the technology is embraced by biopharma companies, and represents a high growth opportunity for the company.
LogicBio (Arix Bioscience portfolio company)	Gene therapy development (using proprietary GeneRide platform).	Developing therapies to durably treat rare diseases in paediatric patients using proprietary GeneRide technology platform, which integrates therapeutic genes in the chromosome at a precise location. IND submission for a Phase I/II trial for LB-001 placed on a clinical hold by the FDA in February 2020.
Freeline (Syncona portfolio company)	AAV gene therapy development, to deliver functioning gene to the liver.	Progressing lead programme FLT190a for Haemophilia B, which received Orphan Drug Designation in May 2020 from the FDA for patients with Fabry disease. Trial has a primary completion date of December 2021.
Gyroscope Therapeutics (Syncona gene therapy portfolio company)	AAV retinal therapy with curative potential	Targeting dry age related macular degeneration, where there are currently no treatments. Their lead asset GT005 is in an ongoing Phase I/II trial in dry AMD patients, with a primary completion date of June 2021.
SwanBio Therapeutics (Syncona portfolio company)	Gene therapies for neurological disorders	Company's first programme is in preclinical development for an inherited neurodegenerative disease.
Oxford Biomedica (LSE: OXB-GB)	Develops LentiVector gene delivery platform and gene therapy candidates.	The programme in the furthest stage of development is SAR422459, in partnership with Sanofi and currently in Phase II development.
4basebio (4BSB-ETR)	Developing TruePrime technology	Developing platform for producing large amounts of DNA; alongside this, they will continue to focus on a buy and build strategy.
Avacta and OncoSec (AIM: AVCT-GB)	Research collaboration to combine Affimer platform with TAVO electroporation gene delivery technology.	The collaboration is evaluating the benefits of delivering Affimer protein genes directly into tumours using the OncoSec technology, with the long-term aim of developing gene delivered Affimer immunotherapies.
Silence Therapeutics (AIM: SLN-GB)	Designs short interfering RNA (siRNA) molecules against a target gene, to selectively inhibit the gene.	Various programmes in pre-clinical development, including SLN360, for which IND submission to FDA planned for later this year, with a view to generating interim data by mid-2021.
Avacta (AIM: AVCT-GB) and Moderna	Moderna is developing mRNA medicines to produce proteins to combat a range of diseases	In February 2019, Moderna entered into an exclusive license agreement with Avacta, with respect to certain Affimers, with Avacta to receive payments upon future development clinical development milestones and royalties in connection with future product sales.

Source: finnCap

CRISPR

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) is a revolutionary new technology that is an easier, cheaper and more efficient method of modifying DNA than previous strategies. While no commercial CRIPSR therapies are yet available, 2019 saw results from the first human clinical studies, demonstrating that CRISPR gene therapy is safe in humans. 2020 represents the first time a CRISPR-Cas9 gene therapy was inserted directly into the body in a landmark clinical trial. While previous trials used CRISPR to edit the genomes of cells that had been removed from the body, this trial involved injection of a CRISPR-Cas9 therapy directly into the eye.

Figure 19 describes how the technology works. Cas9 is the enzyme that is used most often, but other enzymes can also be used.

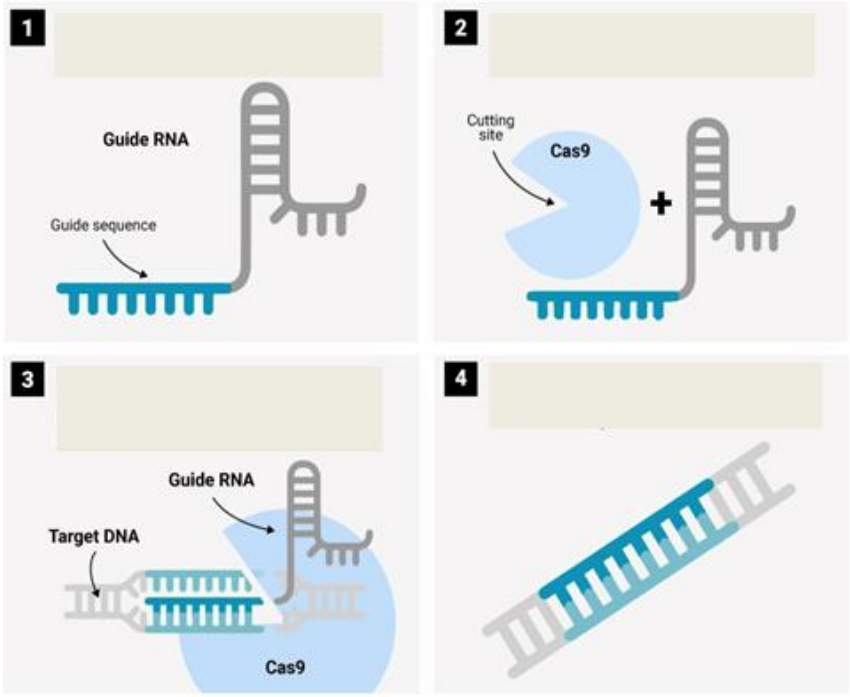
1) Scientists create a genetic sequence called a 'guide RNA' that matches the piece of DNA they want to modify.

2) The guide RNA is added to a cell, along with an enzyme called Cas9.

3) The Cas9/RNA guide structure combs through the sequence of DNA in the target genome looking for a match. Once it finds the matching sequence, the Cas9 enzyme cuts the DNA.

4) The cell can repair the cut in two ways. If no other DNA material is available, the cell will join the two cut ends together, and some DNA material will be lost, disrupting the function of the gene that was cut. Alternatively, if additional DNA material is provided, the cell uses the replacement DNA to repair the cut.

Figure 19: Achilles Therapeutics: Generating clonal neoantigen T cells (cNeT)

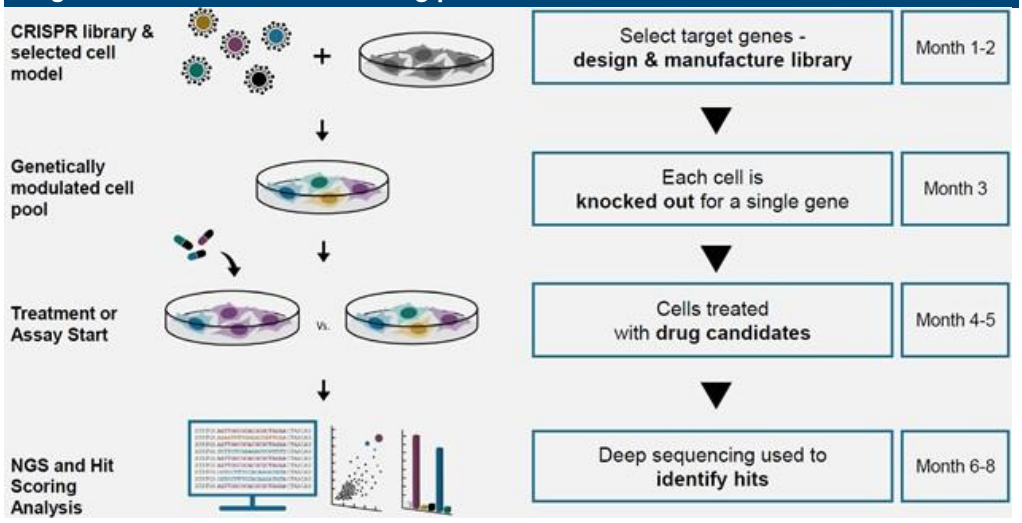


Source: Nature News, Carl Zimmer, Business Insider

Horizon Discovery: CRISPR Screening Leader

Horizon Discovery (AIM: HZD-GB) is a gene editing/gene modulation company, providing such services to pharmaceutical customers, and is a market leader in CRISPR screening. It has completed over 650 CRISPR screens since 2013, with 215 of these screens occurring in 2019. CRISPR screening (Figure 20) allows biopharma companies to find novel drug targets, identify mechanisms of drug resistance, repurpose therapies for new indications and stratify patients for clinical trials. The number of screens that Horizon is performing each year is increasing as the technology is embraced, and represents a high growth opportunity.

Figure 20: The CRISPR screening process



Source: Horizon Discovery

Given that it takes 6-8 months for the screening experiment to produce a result, it is critical that screening experiments are designed correctly, which is why pharma clients prefer to come to a company with extensive experience of carrying out tests, such as Horizon.

As discussed in Figure 19, CRISPR is a method of making cuts at specifically targeted sites in DNA. When such cuts are produced, the cell use its DNA repair systems to mend the cuts, and commonly this results in mutations that 'knock out' the targeted gene.

The basic premise behind CRISPR screening is to knock out every gene that could be important, but knock out only one gene per cell so that the result is a population of cells with a different gene knocked out in each cell in the dish. Some cells will die while others will survive, with some cells growing better and becoming the predominant cell type.

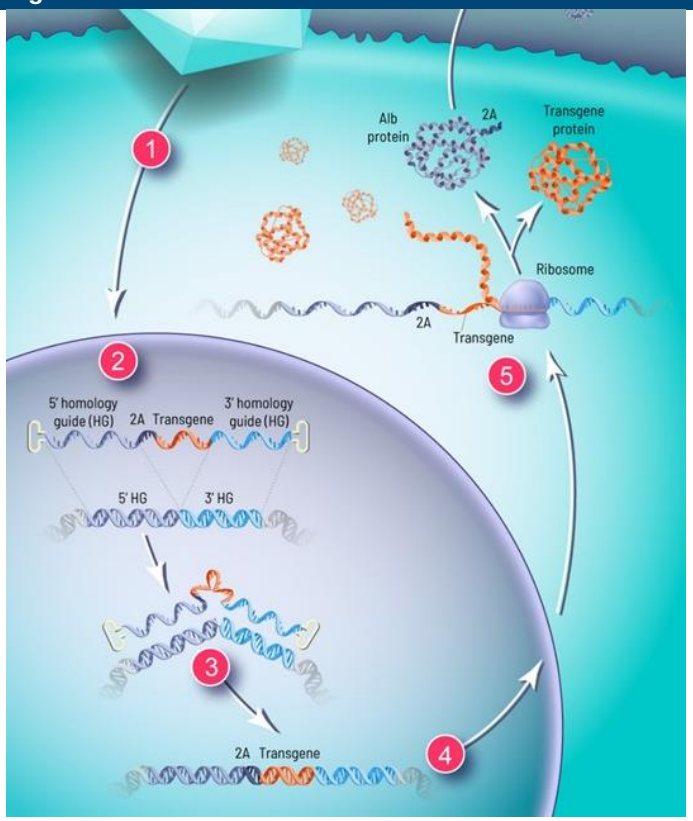
This mixed population of cells can be treated with drug candidates. Subsequently, next-generation sequencing (NGS) can be performed on the remaining population of cells to determine which genetic sequences are present and which are depleted or absent, therefore elucidating which genes provide a positive or a negative effect.

In the context of preclinical drug development, using this technology researchers can more quickly identify compounds that will be successful in clinical trials, or more easily identify ideal patient candidates, or patients to exclude in a trial, reducing the risk of late-stage trial failure.

LogicBio Therapeutics: GeneRide

LogicBio (an Arix Bioscience portfolio company) is a genome editing company focused on developing therapies to durably treat rare diseases in paediatric patients using its proprietary technology platform, GeneRide, which is described in Figure 21.

Figure 21: LogicBio: How GeneRide works



Source: LogicBio

Unlike CRISPR, which uses an engineered nuclease (e.g. Cas9) to cut a patient's DNA and remove or insert a target gene, the GeneRide platform does not use exogenous nucleases but instead leverages the body's natural DNA repair processes to integrate corrective genes. LogicBio claims that this reduces the risk of off-target and potentially dangerous changes to the patient's DNA, and reduces the risk of immune reactions.

Arguably, CRISPR presents with risks of off-target cuts, and uncontrolled deletions, or insertions, and also the risk of provoking immune responses.

GeneRide integrates therapeutic genes in the chromosome at a precise location, ensuring that it remains integral to the patient's DNA, carrying through to successive generations when the cells divide. The company hopes that a single treatment early in a child's life could deliver lifelong benefits. LogicBio's lead candidate, LB-001, has received orphan and rare paediatric disease designation from the FDA for treatment of methylmalonic academia (MMA). In February 2020, the FDA placed a clinical hold on the IND submission for a Phase I/II trial for LB-001 pending the resolution of certain clinical and non-clinical questions. LogicBio is in discussions with the FDA, which will continue through mid-2020, and plans to provide an update after these have concluded.

1) A synthetic viral vector delivers the therapeutic gene, known as the transgene, to the nuclei of the patient's cell via an infusion.

2) Two 'homology guides' – strands of DNA that precisely match a specific stretch of the patient's genome – flank the transgene. Upon sensing the DNA in the nucleus, the cell's natural DNA repair machinery responds and integrates the transgene at a specific site in the patient's genome.

3) The transgene is inserted in the same place every time at the gene that corresponds to the DNA sequence encoded in the homology guides. For LogicBio's liver-targeted therapies, the location for integration is the albumin locus.

4) There is expression of the corrective transgene that the patient has been lacking, without disrupting albumin production.

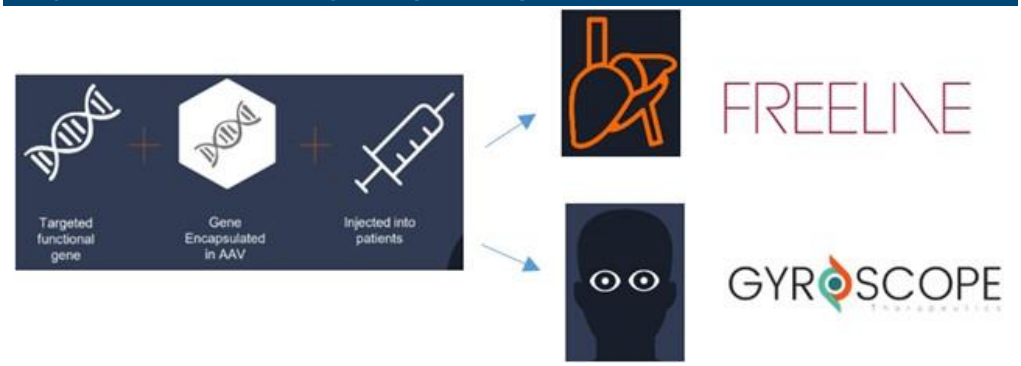
5) By using 2A peptide, LogicBio is able to efficiently produce albumin and the transgene as two separate proteins, and modify albumin with a small tag that allows the company to monitor GeneRide activity in a non-invasive manner. Shortly after treatment, the modified cells begin producing the therapeutic protein to combat the disease.

LogicBio claims that its GeneRide platform has advantages in terms of durability, precision and safety over traditional gene therapies. However, these claims have yet to be substantiated, and the Phase I/II trial of LB-001, once started, will be the first step towards this.

Syncona: Gene Therapy Portfolio

Synona has built a portfolio of gene therapy companies (Figure 22).

Figure 22: Freeline and Gyroscope Therapeutics mechanism of action



Source: Syncona, finnCap

Freeline: Focus is on systemic AAV gene therapy, where the therapy delivers a functioning gene to the liver. The protein is then sent into circulation where it can reach targeted cells throughout the body. Lead programme is FLT190a for Haemophilia B,

currently in Phase I/II, with a primary completion date of December 2021. There are other programmes in Fabry disease, Gaucher and Haemophilia A. FLT190a, received Orphan Drug Designation in May 2020 from the FDA for patients with Fabry disease.

Gyroscope Therapeutics: Focus is on retinal AAV gene therapy, which may stimulate a patient's cells to produce the proteins needed to restore the mutated gene in the eye, with curative potential. It targets dry age-related macular degeneration, where there are currently no treatments. Their lead asset GT005 is in an ongoing Phase I/II trial in dry AMD patients, with a primary completion date of June 2021.

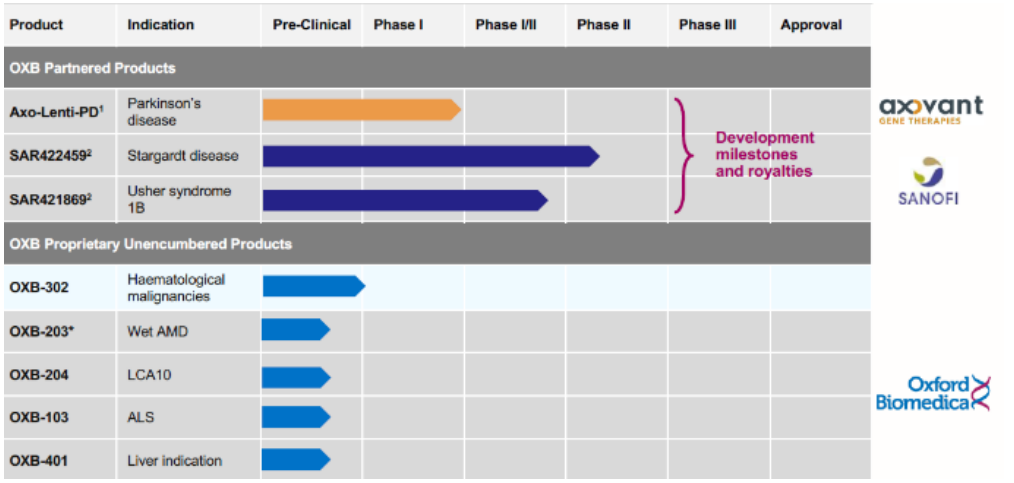
SwanBio Therapeutics: Focused on gene therapies for neurological disorders. The first programme is in preclinical development for an inherited neurodegenerative disease with no available therapies, and thus high unmet need.

Oxford Biomedica: Gene Therapy Pipeline

In addition to its cell therapy partnerships, discussed earlier, OXB also has a gene therapeutics pipeline, shown in Figure 23.

OXB's LentiVector platform is the first commercially approval lentiviral-based gene delivery system. Lentiviral vectors can deliver large therapeutic payloads (up to 10kb) into target cells. Permanent modification of dividing and non-dividing cells is achieved through gene integration and long-term expression. Their lack of pre-existing immunity makes them safe to use.

Figure 23: Oxford Biomedica Gene Therapeutics Pipeline



Source: Oxford Biomedica, finnCap

OXB has one programme in partnership with Axovant and two programmes with Sanofi. OXB also has various proprietary programmes in development, which are in earlier stages of development.

- **Axo-Lenti-PD** is being developed for Parkinson's disease. The second-generation gene therapy utilises OXB's LentiVector platform technology to deliver three genes that encode key dopamine synthesis enzymes. When injected into the brain's striatum, the therapy genetically modifies cells to produce dopamine, replacing that which is lost during the course of the disease. Unlike current drug treatment, which loses efficacy with long-term use, Axo-Lenti-PD is designed to provide patient benefit for a number of years following a single administration. OXB is working on regulatory approval for a planned three-cohort Phase I/II study.
- **SAR422459**, being developed for Stargardt disease, uses LentiVector technology to deliver a corrected ABCR gene via a single administration directly to the retina, which offers a potentially long-term or permanent correction. The therapy is licensed to Sanofi which has progressed the product into Phase II development.
- **SAR4211869**, being developed for Usher syndrome type 1B, uses LentiVector technology to deliver a corrected version of the MYO7A gene to retinal cells with a

single administration intended to provide potentially longer-term or permanent stabilisation of ocular function. It is licensed to Sanofi, which is currently conducting a Phase I/II study.

4basebio: Enabling Gene Therapies

Expedeon AG rebranded as 4basebio after selling its immunology and proteomics business to Abcam in a €120m deal, which was completed in January 2020. 4basebio will focus on gene therapies and gene vaccines, and the money from the Abcam deal provides them with the opportunity to push the business forward.

As the gene therapy market begins to expand, 4basebio believes that it can tackle a key bottleneck, using its TruePrime technology. As DNA becomes a therapeutic agent, there is a need for large quantities of DNA. It is currently manufactured through a microbial fermentation process, and there are safety constraints in terms of the contaminants being produced and global capacity constraints on the ability to make adequate quantities of DNA. In addition, the DNA product created by fermentation-based approaches contains both the human DNA of interest as well as contaminant bacterial DNA, which is immunogenic and also typically contains antibiotic resistant genes. Widespread use of such DNA, therefore, poses concern.

4basebio has developed a synthetic *in vitro* process for producing large amounts of DNA, and no bacteria enters the process, resulting in a faster, lower-cost and safer process, which would ultimately help reduce the extremely high costs for gene therapies. Alongside this, the company will continue to focus on a buy and build strategy.

Avacta and OncoSec: Electroporation Gene Delivery Research Collaboration

In January 2018, Avacta entered into a research collaboration with OncoSec Medical Incorporated. The aim of the collaboration is to combine Avacta's Affimer platform with OncoSec's gene delivery technology, TAVO (previously called ImmunoPulse). The programme is evaluating the benefits of delivering Affimer protein genes directly into tumours using the OncoSec technology, with the long-term aim of developing gene-delivered Affimer immunotherapies.

TAVO (tavokinogene telseplasmid) is a DNA-based interleukin-12 (IL-12), a naturally occurring protein in the body with immune-stimulating functions. OncoSec aims to administer TAVO directly into tumours using its proprietary electroporation (EP) gene-delivery system, which employs a series of momentary energy pulses, which are designed to increase the permeability of the cell membrane and facilitate uptake of IL-12 coded DNA into cells. This non-invasive method is easy to perform and avoids systemic toxicity issues historically associated with IL-12 usage. Clinical studies have shown that TAVO induces local expression of IL-12, converting immunologically suppressed "cold tumours" into T-cell inflamed "hot tumours", which is fundamental to generating objective responses in tumours.

RNA Therapies

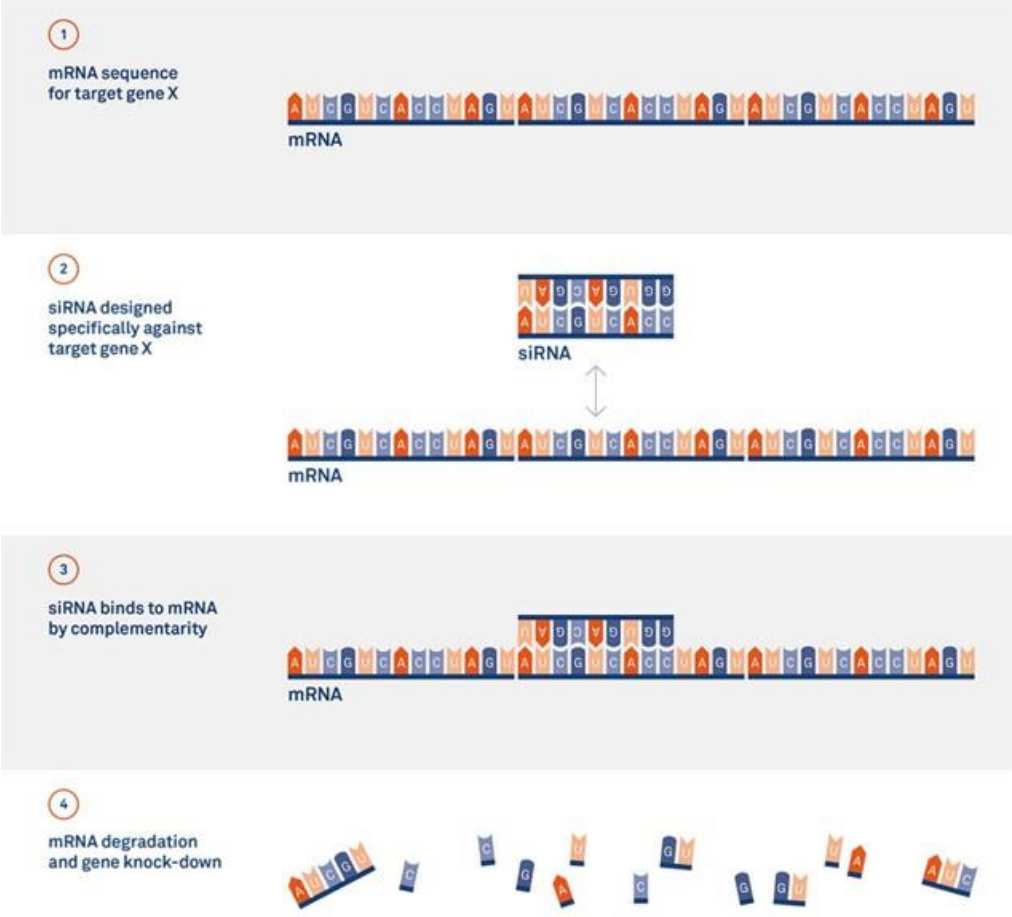
The biological pathway of RNA interference showed much therapeutic promise after it was recognised with a Nobel Prize in 2006. However, Big Pharma lost interest soon after as the challenges of delivering the RNA molecules to the target tissues became apparent. However, companies such as Silence Therapeutics (AIM: SLN-GB) are overcoming these challenges. SLN state that its technology can selectively inhibit any gene in the genome, thus 'silencing' production of disease-causing proteins in a process described in Figure 24.

Silence Therapeutics: 'Silencing' disease-causing proteins

SLN designs short interfering RNA (siRNA) molecules against a target gene. Once inside the cells, the siRNAs are recognised by the cellular machinery, which removes one of the strands (passenger strand) of the siRNA and allows the other strand (guide strand) to find its target mRNA and bind to it. This specific binding triggers the endogenous pathway of

RNA interference, whereby the cellular machinery will degrade the target mRNA and prevent it from being translated into functional proteins (Figure 24).

Figure 24: RNA Interference mechanism of action



Source: Silence Therapeutics

Delivery to the cells can be achieved using one of three delivery systems:

- **GalNAc-siRNA conjugates:** GalNAc (N-Acetylgalactosamine) is a naturally occurring sugar that binds to the asialoglycoprotein receptor (ASGPR), which is highly expressed in the membrane of liver cells. Coupling GalNAc sugars to stabilised siRNA molecules allows them to target liver cells, being shuttled into the cytoplasm as a result of the GalNAc-ASGPR binding. GalNAc-siRNA conjugates can be administered subcutaneously and therefore are a patient-friendly solution for liver-centric disease areas. GalNAc-siRNA drugs are SLN's core focus.
- **Lipid nanoparticles:** capsules made of a combination of lipids. While these require intravenous administration, they allow for efficient siRNA delivery without requiring extensive chemical modification of the cargo siRNA and have shown promising results in the clinic.
- **Naked siRNA:** chemically modified siRNA, able to target certain kidney cells without the need for a delivery system. They are designed to retain stability in the bloodstream without stimulating the immune system. Naked siRNAs can be administered intravenously or intravitreally (in order to target the eye).

Silence Therapeutics Pipeline

- **SLN360** is being developed for the treatment of cardiovascular disease (CVD) with high lipoprotein(a). Lp(a) is expressed predominantly in the liver and is a major untreated risk factor in CVD, and SLN is developing SLN360 as a LPA silencing siRNA

that would provide a specific, durable and safe approach for reducing Lp(a) levels in high-risk patients. This asset is now SLN's highest priority development programme and it intends to submit an IND application with the FDA later this year with a view to generating interim data by mid- 2021.

- **SLN124**, which is being developed for iron overload disorders, works by inhibiting Transmembrane Protease Serine 6 (TMPRSS6). TMPRSS6 inhibition induces hepcidin expression, which reduces absorption of dietary iron and the release of iron from cellular storage, thereby reducing circulatory iron levels. The therapy was due to enter a Phase Ib study in Q1 2020, although patient recruitment has been paused due to the COVID-19 outbreak. SLN now expects to report interim data in H1 2021.
- **SLN500,** which is being developed for complement-mediated diseases, activates the complement system, which is a pathologic feature of several orphan indications. Proof of mechanism has been achieved in mice and an IND/CTA filing is planned for 2021.

SLN has also out-licensed its sIRNA stabilisation technology (AtuRNAi) to Quark Pharmaceuticals. Quark's product candidate, QPI-1002, utilises this technology and SLN is eligible to receive 1.5%-4% royalties on this candidate from Quark plus milestones, or 15% of the clinical, regulatory and commercial milestone payments and royalties received by Quark from its partner Novartis. QP-1002 is an siRNA targeting the p53 gene and has completed a Phase III trial for the prevention of delayed graft function (DGF), and a Phase II trial in acute kidney injury, These studies were completed in 2018, although no data has been released. Data from the Phase I trial in DGF showed that QPI-1002 significantly reduced the risk of DGF, increased dialysis-free survival time in the first post-transplant month and reduced the mean duration of dialysis. The safety profile of QPI-1002 was consistent with that expected for the condition under study, and no dose-limiting toxicities were reported.

Avacta and Moderna: mRNA/Affimer Exclusive License Agreement

In 2015, Avacta and Moderna Therapeutics entered into a collaboration, licensing and option agreement, under which Moderna made an upfront payment of $0.5m to gain exclusive access to Affimer technology against certain targets. Moderna had the option to enter into exclusive license agreements for selected Affimer candidates.

In February 2019, Moderna exercised this option with respect to certain Affimers, with Avacta to receive undisclosed payments upon future development clinical development milestones and royalties in connection with future product sales. This development not only demonstrated Avacta's ability to generate a series of effective Affimers to a chosen target, which are likely to have undergone extensive preclinical testing by Moderna, but also provides further external pharma validation and endorsement of the technology.

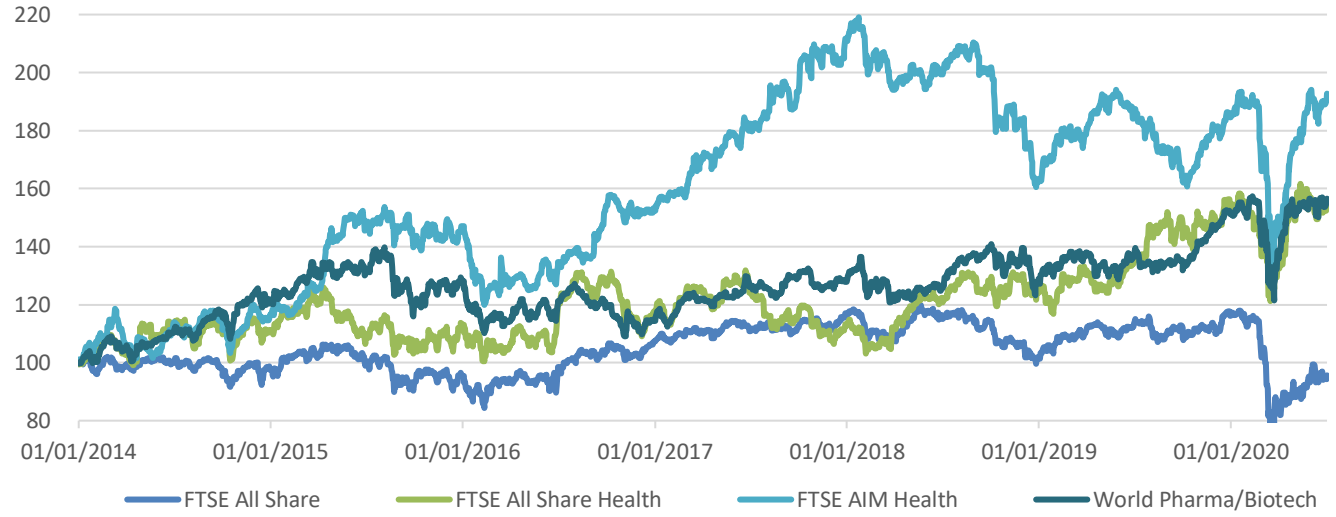
Moderna is developing mRNA medicines to produce proteins, in this case an Affimer, which could be expressed intra-cellularly and bind to a potential therapeutic target of interest.

Sector outlook

The AIM Healthcare Index has outperformed all comparator indices over the past six years (Figure 25), rising by a CAGR of 10.8%, which compares with 0.7% for the AIM All Share, -0.7% for the FT All Share and 7.4% for the World Pharma/Biotech Index.

In March 2020, all of these indices plummeted as the severity of the COVID-19 pandemic, as a global crisis, became apparent. However, they recovered during Q2, with AIM Healthcare rising 30.9% during the quarter, which compares with 33.9% for the AIM All Share Index, 15.4% for the All Share Index and 15.3% for the World Health Index, illustrating the resilience of the AIM Health sector.

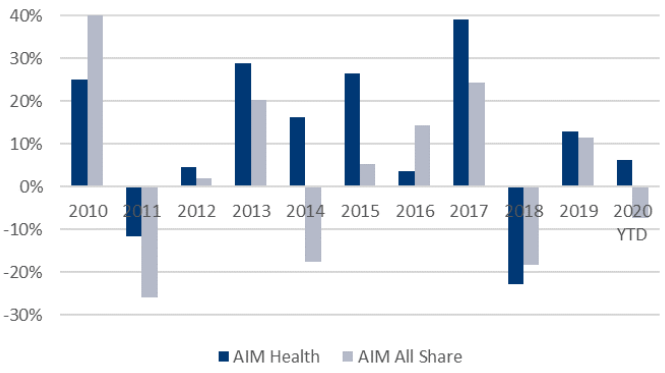
Figure 25: AIM Healthcare performance – relative to other comparator indices



Source: finnCap

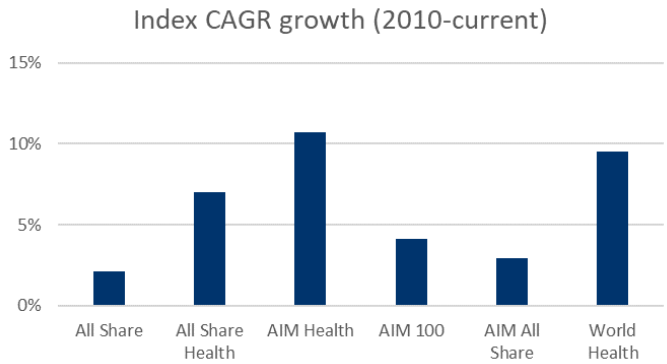
The AIM Healthcare Index has risen by 6% YTD 2020, significantly outperforming the broader AIM All Share, which declined by -7% (Figure 26). It also outperformed the larger-cap FT All Share Health and World Health indices, which have risen by 2% and 5%, respectively. All of these health indices have been boosted by the increased prioritisation of health amidst the COVID-19 pandemic, and the global search for treatments and vaccines. The AIM Healthcare Index has outperformed all comparator indices over the past six years, rising by a CAGR of 11%, which compares with 3% for the AIM All Share, 2% for the FT All Share, 7% for the FT All Share Health and 10% for the World Pharma/Biotech Index (Figure 27).

Figure 26: AIM Health vs AIM All Share growth



Source: finnCap

Figure 27: Annualised growth in indices (2010-YTD)



Source: finnCap

We remain optimistic for the future growth of the AIM Healthcare index.

Recent research highlights

Figure 28: Recent significant research

Date	Company	Research Type	Title	Author
22/07/20	Tristel	Company Note	FY 2020 trading update – net COVID-19 benefit	Mark Brewer
21/07/20	SDI Group	Company Note	FY 2020 – introducing 2021 and 2022 forecasts	Mark Brewer
20/07/20	Synairgen	Company Note	COVID-19 treatment – positive Phase II data	Mark Brewer
15/07/20	Allergy Therapeutics	Company Note	FY 2020 trading update – above market earnings	Mark Brewer
14/07/20	Omega Diagnostics	Company Note	FY 2020 results – multiple upcoming newsflow	Mark Brewer
25/06/20	Angle	Company Note	ANGLE - Prelims – back in the saddle post-COVID disruption	Mark Brewer
24/06/20	Open Orphan	Company Note	Open Orphan - FY 2019 results	Mark Brewer
22/06/20	Omega Diagnostics	Company Note	Omega Diagnostics - £8m fundraise with Open Offer of up to £3m	Mark Brewer
17/06/20	genedrive	Flashnote	genedrive - Conversion of $8m convertible bond	Mark Brewer
16/06/20	Circassia Group	Company Note	Circassia Group - FY 2019 results	Mark Brewer
15/06/20	Evgen Pharma	Company Note	Evgen Pharma - FY 2020 results	Mark Brewer
11/06/20	Byotrol	Company Note	Byotrol - Introducing FY 2021 forecasts	Mark Brewer
09/06/20	Omega Diagnostics	Company Note	Omega Diagnostics - Additional Mologic agreement and trading update	Mark Brewer
05/06/20	Avacta	Company Note	Avacta - Fundraise of £48m – pursuing multiple opportunities	Mark Brewer
03/06/20	Omega Diagnostics	Flashnote	Omega Diagnostics - COVID-19 – UK rapid test consortium update	Mark Brewer
01/06/20	LiDCO	Company Note	LiDCO - AGM trading update	Mark Brewer
26/05/20	Open Orphan	Company Note	Open Orphan - Funding for COVID-19 challenge model	Mark Brewer
26/05/20	Synairgen	Company Note	Synairgen - FY 2019 results and COVID-19 trial update	Mark Brewer
21/05/20	Shield Therapeutics	Company Note	Shield Therapeutics - FY 2019 results	Mark Brewer
12/05/20	genedrive	Company Note	genedrive - £7m placing to fund COVID-19 tests	Mark Brewer
06/05/20	Avacta	Company Note	Avacta - FY 2019 results – building substantial incremental value	Mark Brewer
05/05/20	Cambridge Cognition	Company Note	Cambridge Cognition - FY 2019 results – good Q1 2020	Mark Brewer
30/04/20	Synairgen	Flashnote	Synairgen - COVID-19 trial (SG016) update	Mark Brewer
29/04/20	Destiny Pharma	Company Note	Destiny Pharma - FY 2019 results – COVID opportunities and implications	Mark Brewer
27/04/20	Byotrol	Flashnote	Byotrol - Positive FY trading update	Mark Brewer
23/04/20	SDI Group	Flashnote	SDI Group - Trading and COVID-19 update	Mark Brewer
17/04/20	Circassia Pharmaceuticals	Company Note	Circassia Pharmaceuticals - Strategic shift	Mark Brewer
08/04/20	Avacta	Flashnote	Avacta - COVID-19 rapid POC test for population screening	Mark Brewer
06/04/20	Avacta	Flashnote	Avacta - An additional £3.75m raised by way of Placing	Mark Brewer
02/04/20	Avacta	Flashnote	Avacta - Subscription raising £2m	Mark Brewer
02/04/20	Omega Diagnostics	Flashnote	Omega Diagnostics - China approval and trading update	Mark Brewer
30/03/20	Bioventix	Company Note	Bioventix - Interims – pre-COVID growth	Mark Brewer
26/03/20	Synairgen	Company Note	Synairgen - £14m placing to fund COVID-19 activities	Mark Brewer

Source: finnCap

All finnCap research is available ***here***

Industry indicators

FDA approvals

In H1 2020, there were 24 new drug approvals comprised of 18 NDAs and 6 BLAs, of which one was a biosimilar approval. This represents a good H1 for approvals – especially when considering the impact of the COVID-19 – and compares to 20, 21 and 24 approvals in the first half of 2019, 2018 and 2017, respectively.

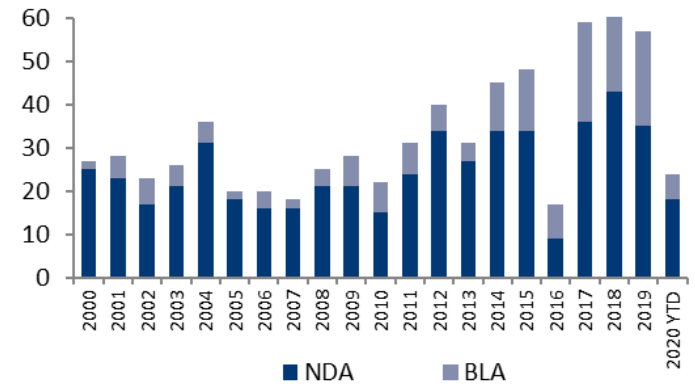
Figure 29: Recent product approvals (NDA, BLA including biosimilars) since last edition of Rude Health

Brand	Generic name	NDA/BLA	Indication	Company	Approval
Ayvakit	avapritinib	NDA	Gastrointestinal stromal tumor (GIST)	Blueprint Medicines	09/01/20
Tepezza	teprotumumab-trbw	BLA	Thyroid eye disease	Horizon Therapeutics Ireland	21/01/20
Tazverik	tazemetostat hydrobromide	NDA	Epithelioid sarcoma, follicular lymphoma.	Epizyme Inc	23/01/20
Nexletol	bempedoic acid	NDA	Atherosclerotic cardiovascular disease (ASCVD), heterozygous familial hypercholesterolemia (HeFH)	Esperion Theraps Inc	21/02/20
Vyepti	eptinezumab-jjmr	BLA	Migraine	Lundbeck Seattle Biopharmaceuticals, Inc.	21/02/20
Barhemsys	amisulpride	NDA	Postoperative nausea and vomiting (PONV)	Acacia Pharma Ltd	26/02/20
Nexlizet	bempedoic acid; ezetimibe	NDA	Atherosclerotic cardiovascular disease (ASCVD), heterozygous familial hypercholesterolemia (HeFH)	Esperion Theraps Inc	26/02/20
Nurtec Odt	rimegepant sulfate	NDA	Migraine	Biohaven Pharm	27/02/20
Sarclisa	isatuximab-irfc	BLA	Multiple myeloma	Sanofi Aventis Us	02/03/20
Isturisa	osilodrostat phosphate	NDA	Cushing's disease	Recordati Rare	06/03/20
Zeposia	ozanimod hydrochloride	NDA	Multiple sclerosis (RRMS)	Celgene Intl	25/03/20
Koselugo	selumetinib sulfate	NDA	Neurofibromatosis type 1 (NF1)	Astrazeneca Pharms	10/04/20
Tukysa	tucatinib	NDA	HER2-positive breast cancer	Seattle Genetics	17/04/20
Pemazyre	pemigatinib	NDA	Cholangiocarcinoma	Incyte Corp	17/04/20
Trodelvy	sacituzumab govitecan-hziy	BLA	Triple-negative breast cancer	Immunomedics Inc	22/04/20
Ongentys	opicapone	NDA	Parkinson's disease	Neurocrine	24/04/20
Tabrecta	capmatinib hydrochloride	NDA	Non-small cell lung cancer (NSCLC)	Novartis Pharm	06/05/20
Retevmo	selpercatinib	NDA	Non-small cell lung cancer, medullary thyroid cancer, other thyroid cancers	Loxo Oncology Inc	08/05/20
Qinlock	ripretinib	NDA	Gastrointestinal stromal tumor (GIST)	Deciphera Pharms	15/05/20
Artesunate	artesunate	NDA	Malaria	Amivas	26/05/20
Nyvepria	pegfilgrastim-apgf	Biosimilar	Febrile neutropenia	Hospira Inc	10/06/20
Uplizna	inebilizumab-cdon	BLA	Neuromyelitis optica spectrum disorder	Viela Bio	11/06/20
Zepzelca	lurbinectedin	NDA	Small cell lung cancer (SCLC)	Jazz	15/06/20
Dojolvi	triheptanoin	NDA	Long-chain Fatty Acid Oxidation Disorders	Ultragenyx Pharm Inc	30/06/20

Source: finnCap

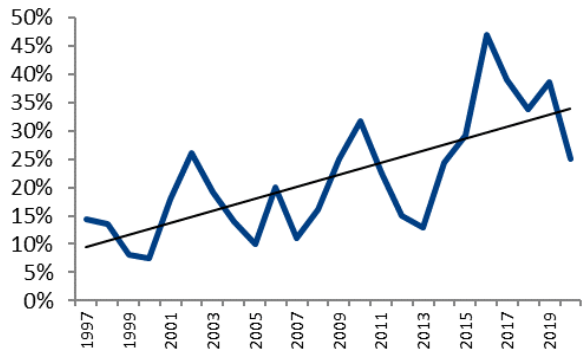
As a relative proportion of total drug approvals, 39% of drugs approved in 2019 were biologics, which compares with 34% in 2018. In H1 2020, 25% of approvals were BLAs.

Figure 30: FDA approvals



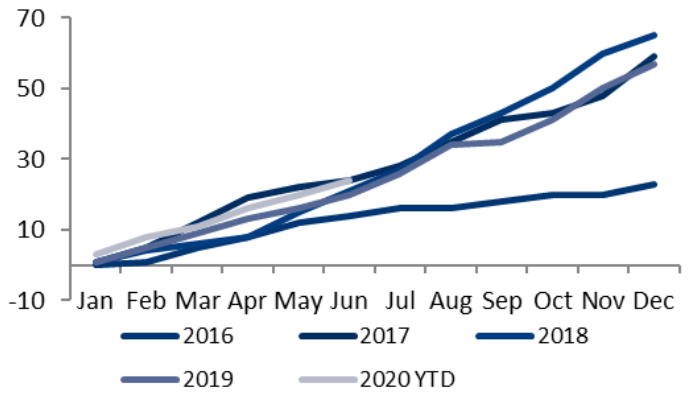
Source: finnCap, FDA

Figure 31: Biologics (BLA) approvals (as % of total)



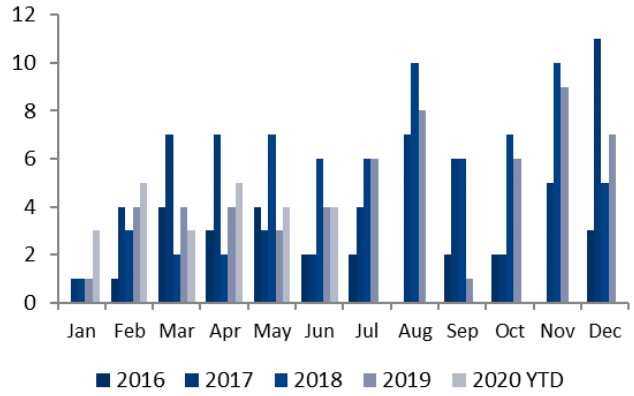
Source: finnCap, FDA

Figure 32: Drug approvals (NDA, BLA and biosimilars)



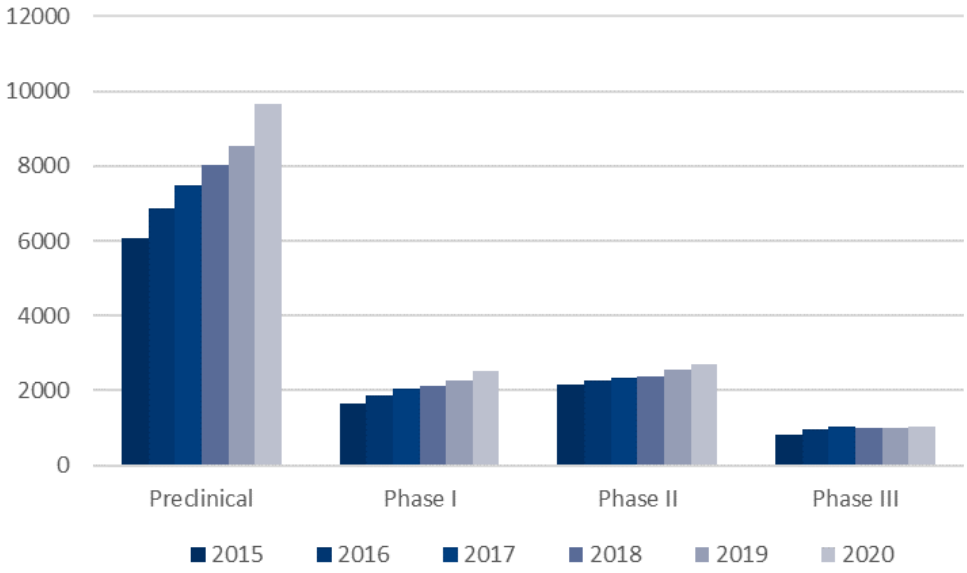
Source: finnCap, FDA

Figure 33: Drug approval per month (2016-2020YTD)



Source: finnCap, FDA

Figure 34: Global R&D pipeline as at the end of 2019



Source: PharmaIntelligence, 2020

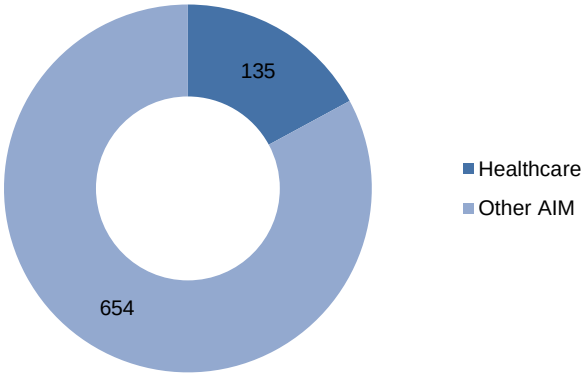
Capital market indicators

Secondary Healthcare fundraises

In H1 2020, a total of £528m was raised in the healthcare sector for companies listed on AIM, representing 19.1% of total AIM secondary fund raises. This half year compares with £340m in full year 2019 (10.2% of total AIM).

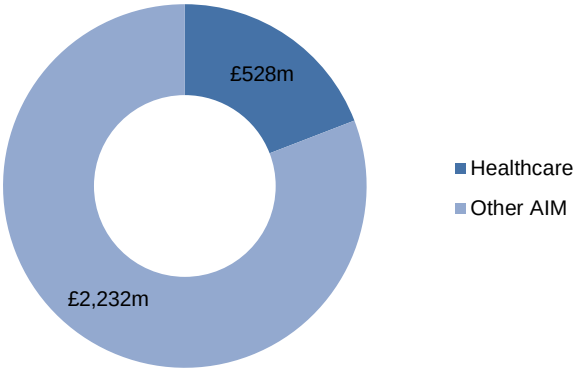
Key secondary fund raises in H1 2020 included Hutchinson China Meditech (£110m), Abcam (£110m), Avacta (£48m), Maxcyte (£25m) 4D Pharma (£22m) and Silence Therapeutics (£17.41m).

Figure 35: AIM secondary raises (H1 2020) – n = 789



Source: LSE AIM Website, July 2020

Figure 36: AIM secondary raises H1 2020 – £2,760m



Source LSE AIM Website, July 2020

Primary Healthcare IPOs

During H1 2020, there were 9 IPOs on the AIM market, which compares to 20 and 64 in full year 2019 and 2018, respectively. Of these, only one was in the healthcare sector – a reverse takeover of hVIVO by Open Orphan. No new money was raised, and as such healthcare did not account for any of the £75m of fund raised at IPO in H1 2020 on the AIM market.

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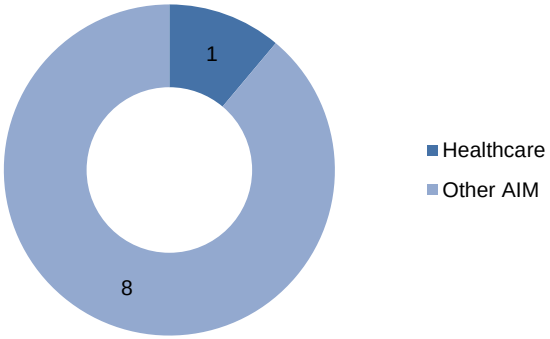
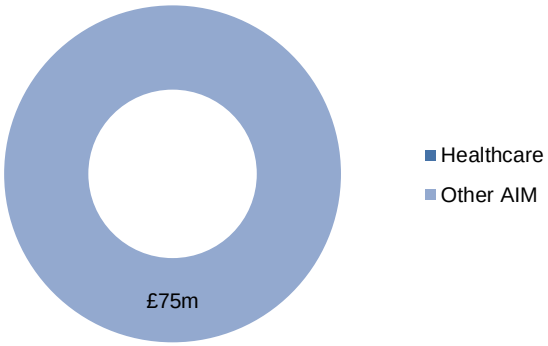
Figure 37: Number of AIM IPOs H1 2020 – n = 9



Source: LSE AIM Website, July 2020

Figure 38: Funds raised at IPO H1 2020 – £75m



Source: LSE AIM Website, July 2020

FX rates

In the immediate aftermath of the Brexit vote (24 June 2016), Sterling fell c.11-12% against the US$ and Euro, declining again (c.14%) in September/October 2016 as fears of a hard Brexit permeated the market. Although Sterling strengthened against the US$ during 2017 as these fears receded, subsequent weakness has reflected concerns over economic growth with £/$ falling to 1.20 in Q3 2019 again as fears over a hard Brexit returned to the fore given the political impasse in government during 2019. Sterling is currently trading in a fairly consistent range of US$1.20-1.30 and €1.10-1.20.

Figure 39: GBP/USD

Source: FactSet

Figure 40: GBP/EUR

Source: FactSet

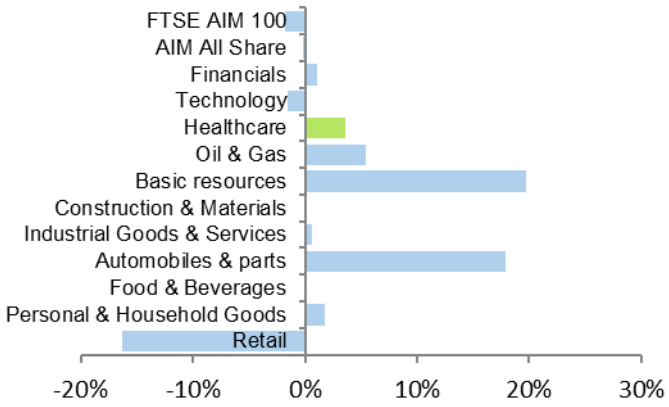
FTSE AIM sector performance

Healthcare AIM has risen 21.4% in the past three months versus 18.2% for FTSE AIM 100 and 19.3% for the AIM All Share (Figure 42).

Healthcare AIM has also outperformed the FTSE AIM 100 and AIM All Share in the past month (Figure 41), rising 3.5%, 0.1% and 1.5%, respectively.

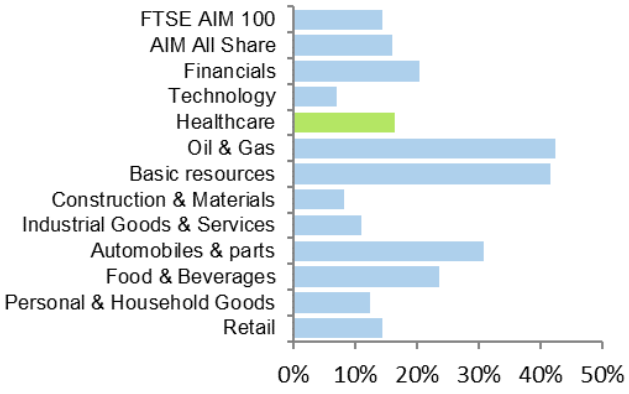
Healthcare AIM marginally outperformed the broader AIM indices in 2019, having risen by 13%, which compared with 12% for both the FTSE AIM 100 and AIM All Share.

Figure 41: FTSE AIM All Share sector performance (1M)



Source: FactSet

Figure 42: FTSE AIM All Share sector performance (3M)



Source: FactSet

Key sector news & upcoming events

Figure 43: Recent sector news

Date	Company	Event	Comment
14/07/2020	Moderna	Phase I Results	mRNA-1273, a vaccine candidate against COVID-19, showed that it was generally safe and well-tolerated with no serious adverse events reported through day 57. mRNA-1273 induced binding antibodies to the full-length SARS-CoV-2 Spike protein(s) in all participants after the first vaccination
14/07/20	Janssen	FDA approval	FDA approved TREMFYA (guselkumab) for adult patients with active psoriatic arthritis (PsA). REMFYA is the first treatment approved for active PsA that selectively inhibits interleukin (IL)-23.
13/07/2020	Novacyt	H1 trading update	H1 2020 revenue of £63.3m, a 900% increase from £6.3m in H1 2019. NCYT estimates EBITDA profitability over £41m, following successful launch of one of the world's first molecular tests for COVID-19 in January 2020.
13/07/20	4D pharma	Fundraise	£7.7m fundraise at 35p per share, to progress ongoing clinical development, strengthen balance sheet and fund its general working capital needs.
13/07/2020	Pfizer	FDA fast track designation	Pfizer and BioNTech announced that two of the companies' four investigational vaccine candidates from their BNT162 mRNA-based vaccine programme (BNT162b1 and BNT162b2) being developed to protect against COVID-19, received fast track designation from the FDA. The therapies are in Phase 1/2 trials.
08/07/20	AstraZeneca	EU approval	EU approval of Lynparza for BRCA-mutated metastatic pancreatic cancer, representing the only PARP inhibitor approved in this disease.
03/07/2020	Gilead	EC authorisation	EC granted conditional marketing authorisation for Veklury (remdesivir), the first approved treatment for COVID-19 in the EU.
02/07/20	Omega Diagnostics	Indian approval	ODX's CE-Marked Mologic ELISA antibody test has been approved for testing of COVID-19 in India. Omega will use its direct sales team in India to establish commercial roll-out in the region
26/06/2020	Bristol-Myers Squibb	EU approval	EC approval of Reblozyl (luspatercept) for treatment of transfusion-dependent aneemia in patients with myelodysplastic syndromes or beta thalassemia. Reblozyl is the first and only erythroid maturation agent approved in the EU, representing a new class of therapy.
19/06/20	Merck	Acquisition	Merck completed acquisition of Themis, a privately-held company focused on vaccines and immune modulation therapies for infectious diseases and cancer. An initial focus of this agreement is acceleration of the development of a measles vector-based SARS-CoV-2 vaccine candidate.
19/06/2020	Omega Diagnostics	Fundraise	£11 fundraise, which will be used to exploit COVID-19 testing opportunities, scale-up manufacturing, improve margin of VISITECT CD4 products and expand lateral flow product portfolio.
16/06/20	Midatech Pharma	FY 2019 Results	Results for year ended 31 Dec 2019: total gross revenue of £0.7m (2018: £1.9m), cash and deposits at 31 Dec of £10.9m (2018: £2.3m), net loss from continuing operations of £9.1 (2018: £10.4m).
16/06/2020	Oxford Biodynamics	Interim results	Interim results for the 6 months ended 31 March 2020 showed revenues of £0.2m (H1 2019: £0.6m), an operating loss of £2.4m (H1: £1.7m) and cash of £13.9m as at 31 March 2020 (31 March 2019: £16.9m).
15/06/20	AstraZeneca	Agreement	Agreement with Europe's Inclusive Vaccines Alliance (IVA) to supply up to 400m doses of the University of Oxford's COVID-19 vaccine, at no profit, with deliveries starting by the end of 2020.
11/06/2020	Pfizer	FDA approval	FDA approval for Nyvepria (pegfilgrastim-apgf), a biosimilar to Neulasta (pegfilgrastim). Nyvepria is indicated to decrease the incidence of infection as manifested by febrile neutropenia in patients with non-myeloid malignancies receiving anti-cancer drugs associated with a clinically significant incidence of febrile neutropenia
10/06/20	Bristol-Myers Squibb	FDA approval	FDA approval of Opdivo (nivolumab) for the treatment of patients with advanced oesophageal squamous cell carcinoma (ESCC) after prior fluoropyrimidine- and platinum-based chemotherapy
10/06/2020	AbbVie	Collaboration	AbbVie and Genmab announced a broad collaboration agreement to jointly develop and commercialise three of Genmab's early-stage investigational bispecific antibody candidates and enter into a discovery research collaboration for future differentiated antibody therapeutics for cancer.
04/06/20	Avacta	Fundraise	£48m fundraise, with £38m to go towards accelerated expansion of pipeline of differentiated cancer therapies, and £10m towards rapid scale-up of diagnostics business.

Source: finnCap

Figure 44: Recent sector news (continued)

Date	Company	Event	Comment
02/06/2020	Sanofi	EU approval	EC approval of Sarclisa (isatuximab), combination with pomalidomide and dexamethasone (pom-dex), for adults with relapsed and refractory multiple myeloma.
26/05/20	Merck	Collaboration	Merck and IAVI, a non profit scientific research organisation, announced a collaboration to develop a COVID-19 vaccine candidate which will use the recombinant vesicular stomatitis virus (rVSV) technology that is the basis for Merck's Ebola Zaire virus vaccine, ERVEBO (Ebola Zaire Vaccine, Live).
19/05/2020	Roche	FDA approval	FDA approved Tecentriq (atezolizumab) as a first-line monotherapy for adults with metastatic NSCLC whose tumours have high PD-L1 expression, as determined by an FDA-approved test.
08/05/20	AbbVie	Acquisition	Completion of transformational acquisition of Allergan. Creates biopharmaceutical company with leadership positions in key therapeutic areas: Immunology, Hematologic Oncology, Neuroscience, and Allergan Aesthetics
06/05/2020	Novartis	FDA approval	FDA approved Tabrecta (capmatinib), the first and only therapy approved to specifically target metastatic NSCLC with a mutation that leads to MET exon 14 skipping (METex14).
05/05/20	genedrive	Fundraise	£7m fundraise at 80p per share, with additional £1m by way of a broker option. Net proceeds will support rapid development and scale-up of the Genedrive SARS-CoV-2 assays
28/04/2020	Novartis	Q1 2020 results	Net sales of $12.3bn (+13% cc), net income of $2.2bn, (+24% cc), benefitting from COVID-19 forward purchasing. Manageable disruption to clinical trials and minimal disruption to ongoing regulatory submissions
17/04/20	Horizon Discovery	Fundraise	£6.9m fundraise at 102p per share, to strengthen balance sheet, working capital and liquidity position.
22/05/2020	Open Orphan	Fundraise	£12m fundraise at 11p per share to accelerate development of a COVID-19 challenge model, ramp up COVID-19 testing, expand lab testing services to third parties, and strengthen balance sheet.
14/05/20	Indivior	Q1 2020 results	In line with expectations, total net revenue of $153m, reported operating loss of $189m, cash balance at end of Q1 of $912m.
01/05/2020	Maxcyte	Fundraise	£25.1m gross proceeds from placing and subscription, which was significantly oversubscribed.
23/04/20	Janssen	Collaboration	Collaboration between Janssen and Emergent BioSolutions to support the manufacturing of its lead COVID-19 vaccine candidate. First in a series of prospective collaboration agreements to further J&J's goal to supply more than 1bn doses of the vaccine globally
14/04/2020	GSK and Sanofi	Collaboration	GSK and Sanofi announced a collaboration to develop an adjuvanated vaccine for COVID-19. Sanofi will contribute its S-protein COVID-19 antigen while GSK will contribute its pandemic adjuvant technology.
14/4.20	Silence Therapeutics	FY 2019 Results	2019 loss of £19.6m (2018: £18.4m), due to increased R&D spend. 2019 net cash inflow of £1.7m (2018: £16.8m outflow) was driven primarily by receipts from Mallinkrodt totalling $22m, offset by increased outflows corresponding to increased activity on SLN360 and SLN124.
09/04/2020	Advanced Oncotherapy	Fundraise	c.£15m fundraise at 25p per share to progress the assembly, documentation, verification and validation activities in order to obtain regulatory approval of Advanced Oncotherapy's first LIGHT system.
04/04/20	Novo Nordisk	EU approval	Rybelsus (oral semaglutide) received EV approval for the treatment of adults with insufficiently controlled type 2 diabetes to improve glycaemic control as an adjunct to diet and exercise. Rybelsus is the first and only oral glucagon-like-peptide-1 (GLP-1) receptor agonist.
02/04/2020	Amgen	Strategic partnership	Amgen and Adaptive Biotechnologies announced a collaboration to address the COVID-19 pandemic. The companies will combine expertise to discover and develop fully human neutralizing antibodies targeting SARS-CoV-2 to potentially prevent or treat COVID-19.
01/04/20	GSK	Disposal	GSK completed divestment of Horlicks and other consumer healthcare nutrition products in India and certain other markets.

Source: finnCap

Figure 45: Upcoming events in the smaller healthcare company space

Date	Company	Event	Comment
August	Shield Therapeutics	Interims	
September	Avacta	Interims	
22 September	Cambridge Cognition	Interims	
September	Omega Diagnostics	Prelims	
September	InnovaDerma	Prelims	
September	Byotrol	Prelims	
September	Destiny Pharma	Interims	
September	Open Orphan	Interims	
September	Circassia	Interims	
September	Synairgen	Interims	
19 October	Bioventix	Full year results	
October	Tristel	Prelims	
August	Shield Therapeutics	Interims	
September	Avacta	Interims	

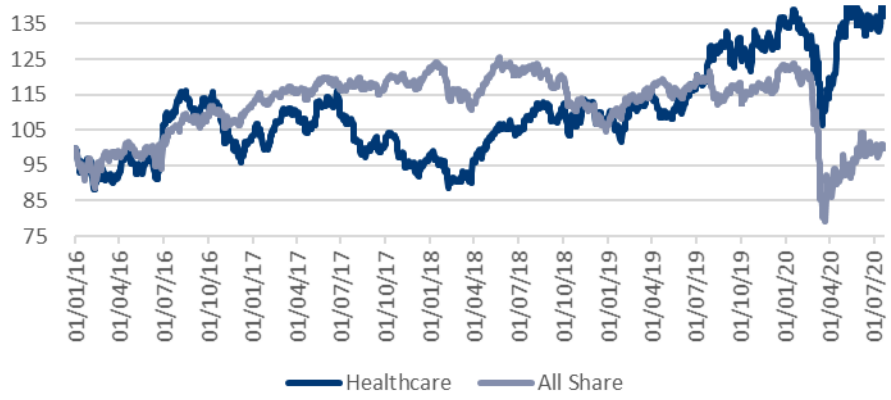
Source: finnCap

Healthcare sector performance

On 23 March 2020, the first day of the UK's lockdown amidst the COVID-19 pandemic, both the Large-Cap Healthcare index (as defined by finnCap) and the FTSE All Share index plummeted (-3% and -4%, respectively). The former was more resilient than the latter, with the FTSE All Share reaching its lowest point of the measured period (January 2016 onwards). In addition, while the Large-Cap Healthcare index experienced a swift 'V-shaped' recovery, the FTSE All Share Index has not yet recovered fully from the downturn.

The Large-Cap Healthcare index has risen by 2% YTD, compared to a -18% decline for the FTSE All Share index, and a 5% and 18% rise for the World Pharma/Biotech and NASDAQ Biotech index, respectively. Key performances within the Large-Cap index included Indivior (+123%) and AstraZeneca (+16%), although overall performance was hampered by Spire Healthcare Group (-40%) and Mediclinic International (-29%).

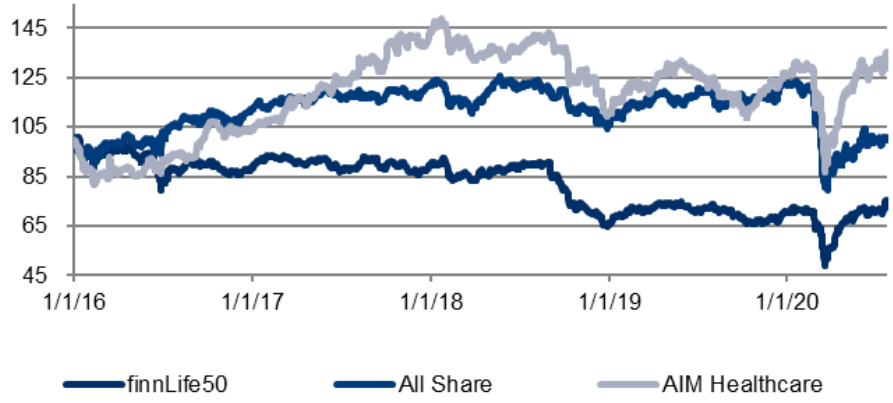
Figure 46: Healthcare Large Cap vs FTSE All Share Index



Source: FactSet, finnCap research
Note: Index comprises AZN, BTG (to 30/9/19), CTEC (from 201/10/6), GSK, GWP (to 5/12/16), HIK, INDV, MDC, SHP (to 7/1/19), SN., SPI and UDG).

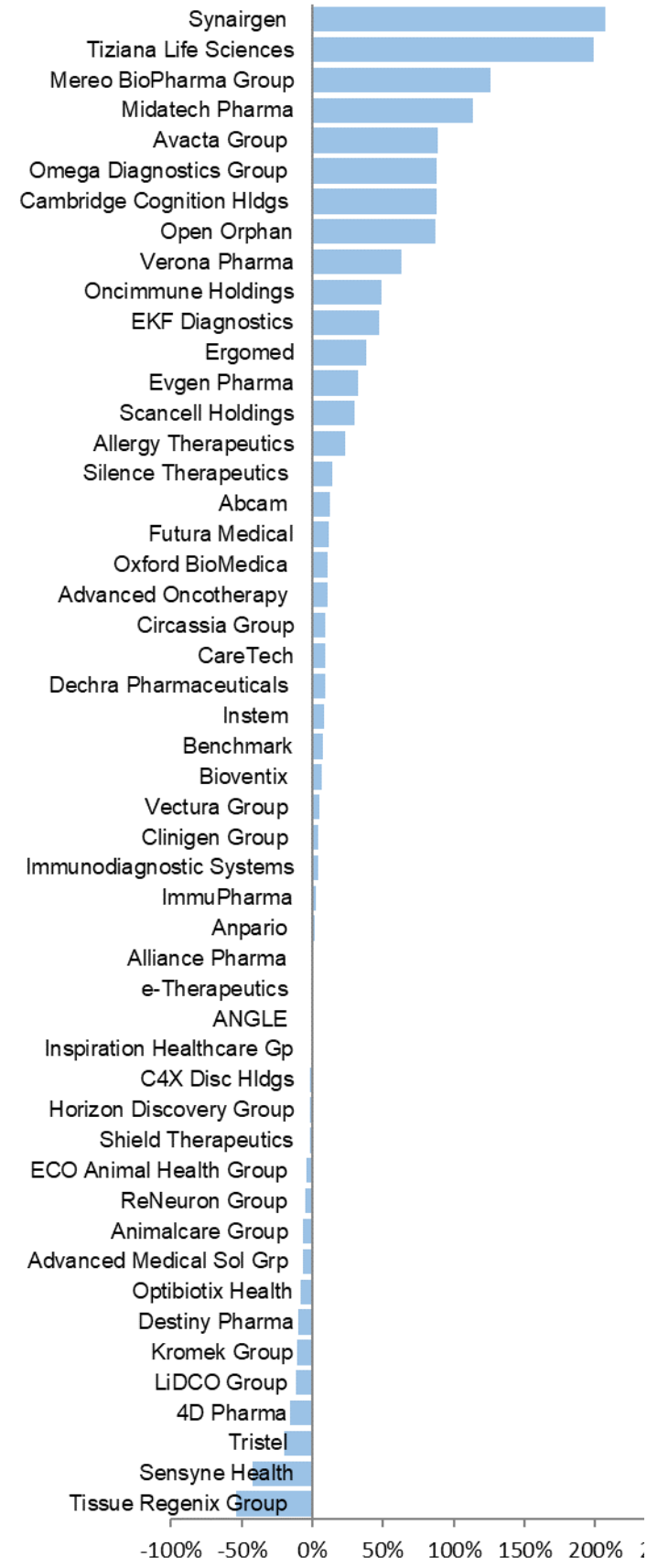
The AIM Healthcare index, in contrast, has risen by 6% in 2020 YTD. The finnLife 50 index also rose by 6%, with particularly strong performances from Synairgen (+2,930%), Avacta (+654%), Omega Diagnostics (+322%) and Tiziana Life Sciences (+283%).

Figure 47: finnLife 50 index vs FTSE All Share Index and AIM Healthcare



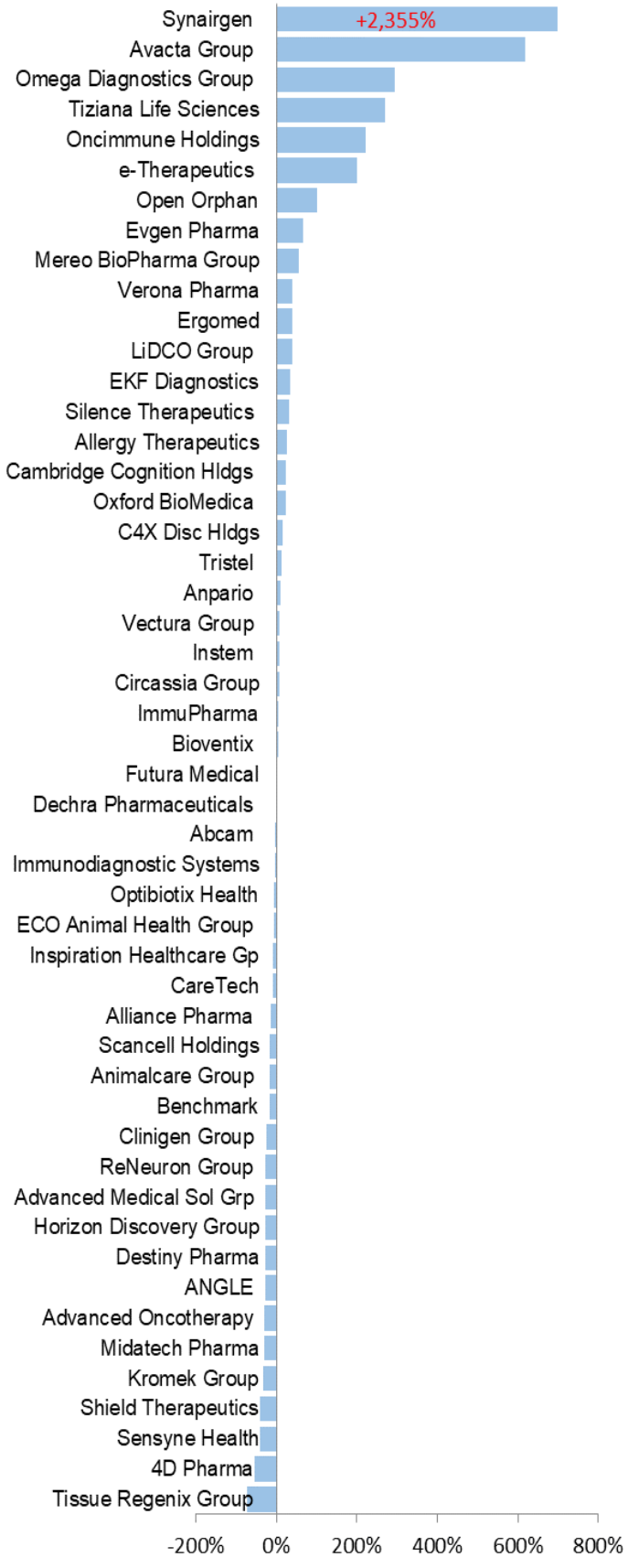
Source: FactSet, finnCap research
Note: Index comprises ABC, AGL, AGY, AMS, ANCR, ANP, APH, AVCT, AVO, BMK, BVXP, C4XD, CIR, CIRC (removed 11/17), CLIN, COG, CREO (from 3/18), CTH, DDDD,DEST, DPH, EAH, EKF, ERGO, ETX, EVG, FUM, HZD, IDH, IHC (from 11/17), IMM (from 11/17), INS, KMK, LID, MPH, MTPH, ODX, OPTI, ORPH, OXB, QP (removed 3/18), RENE, SCLP, SENS, SLN, SNG, STX, SUN, TILS, TRX, TSTL, VEC, VRP.

Figure 48: finnLife 50 – three-month performance



Source: FactSet, finnCap

Figure 49: finnLife 50 – six-month price performance



Source: FactSet, finnCap

Figure 50: Healthcare sector comparables

Company	Enterprise Value (m) £ fx	Market Cap (m) £ fx	EV/Sales (x) FY1	EV/Sales (x) FY2	EV/EBITDA (x) FY1	EV/EBITDA (x) FY2	EV/EBIT (x) FY1	EV/EBIT (x) FY2	P/E (x) FY1	P/E (x) FY2	Dividend Yield (%) FY1	Dividend Yield (%) FY2	Share Price YTD %
Roche Holding	255,712	247,988	4.6	4.4	11.3	10.6	13.1	12.2	16.9	16.0	2.7	2.8	*8.7*
Novartis	185,875	154,128	4.7	4.3	13.5	12.1	15.5	13.8	15.3	13.8	3.6	3.7	*-10.4*
Novo Nordisk B	124,789	124,414	7.8	7.2	16.8	15.5	18.3	16.9	24.3	21.3	2.0	2.2	*12.6*
AstraZeneca	133,407	120,558	6.1	5.4	19.0	15.8	22.1	17.9	28.8	22.9	2.4	2.5	*20.8*
Sanofi	120,648	106,703	3.4	3.1	11.1	9.6	13.0	11.6	15.6	14.1	3.4	3.6	*4.0*
GlaxoSmithKline	117,330	82,624	3.0	2.9	9.6	9.4	11.5	11.0	14.2	14.0	4.8	4.8	*-6.7*
Bayer	89,931	56,397	2.1	1.9	7.9	6.8	11.7	9.4	9.0	8.0	4.6	4.9	*-13.5*
Merck	56,029	45,085	3.4	3.2	13.0	11.4	23.1	19.1	19.4	17.2	1.2	1.2	*8.0*
Grifols A	24,075	16,800	4.0	3.7	14.6	12.6	18.6	15.7	25.8	21.0	1.5	1.8	*-14.3*
Vifor Pharma	8,194	7,794	4.4	4.0	13.8	11.9	20.6	17.1	27.2	22.3	1.3	1.4	*-19.9*
ALK-Abello B	2,434	2,355	5.7	5.1			299.0	69.6	772.4	100.3	0.0	0.6	*7.8*
Large cap European Pharma													
average			***4.5***	***4.1***	***13.1***	***11.6***	***42.4***	***19.5***	***88.1***	***24.6***	***2.5***	***2.7***	***-0.2***
median			***4.4***	***4.0***	***13.2***	***11.7***	***18.3***	***15.7***	***19.4***	***17.2***	***2.4***	***2.5***	***4.0***
Large cap US Pharma													
Johnson & Johnson	325,294	313,902	4.9	4.4	14.6	12.5	16.4	13.8	19.1	16.5	2.6	2.8	*2.4*
Merck	178,951	160,830	4.5	4.2	11.0	9.6	13.0	11.5	15.0	13.4	3.0	3.2	*-12.2*
Pfizer	196,410	160,640	4.7	5.1	12.8	12.6	12.4	13.5	14.0	13.8	4.2	4.3	*-7.5*
AbbVie	140,262	141,760	5.3	4.2	10.0	7.9	10.9	8.4	9.7	8.3	5.0	5.2	*13.9*
Eli Lilly	133,265	126,709	7.0	6.4	20.0	17.1	22.7	19.3	24.4	20.9	1.8	2.0	*26.3*
Amgen	141,701	121,291	6.8	6.6	12.6	12.1	14.3	13.9	16.6	15.3	2.4	2.7	*7.2*
Bristol-Myers Squibb	132,393	109,010	3.9	3.5	8.4	7.1	9.4	7.7	9.7	8.1	3.0	3.1	*-5.9*
Gilead Sciences	81,099	77,564	4.0	3.9	7.7	7.7	8.5	8.4	11.5	11.4	3.5	3.7	*19.3*
3M	89,410	73,342	3.5	3.3	13.9	12.7	17.0	15.3	19.7	17.9	3.7	3.7	*-9.4*
Zoetis A	59,073	54,811	11.7	10.6	28.2	24.1	32.1	27.3	43.2	36.3	0.5	0.6	*9.3*
Biogen	40,938	36,697	3.2	3.0	5.9	6.0	6.3	6.3	8.5	9.1	0.0	0.0	*-5.0*
Teva Pharmaceutical Inds	31,526	10,740	2.2	2.0	8.0	7.3	8.6	7.9	4.9	4.7	0.0	0.0	*23.5*
Mylan	16,778	6,932	1.7	1.5	5.6	4.9	6.1	5.4	3.9	3.7	0.0	0.0	*-16.4*
Perrigo	8,900	6,365	2.1	1.9	11.5	10.3	13.0	11.7	14.5	13.4	1.6	1.7	*13.3*
average			***4.7***	***4.3***	***12.1***	***10.9***	***13.6***	***12.2***	***15.3***	***13.8***	***2.2***	***2.4***	***4.2***
median			***4.2***	***4.1***	***11.2***	***10.0***	***12.7***	***11.6***	***14.3***	***13.4***	***2.5***	***2.7***	***4.8***
Large Cap Pharma - Japan/other													
Chugai Pharmaceutical	62,478	64,390	11.2	10.2	27.0	23.7	29.3	24.9	40.3	34.3	1.0	1.2	*56.7*
Takeda Pharmaceutical	79,352	43,042	3.0	2.8	9.5	7.7	31.1	16.4	64.9	19.1	4.9	4.9	*-14.3*
Daiichi Sankyo	38,266	40,084	5.5	5.2	34.3	33.2	52.1	49.0	66.9	68.1	0.9	1.0	*14.9*
Astellas Pharma	24,859	23,892	2.2	2.1	8.6	7.6	11.3	9.9	15.5	13.9	2.4	2.6	*-7.6*
Otsuka Holdings	17,879	18,302	1.6	1.5	8.2	8.0	11.2	11.2	16.3	17.0	2.2	2.2	*-7.2*
Eisai	17,116	18,162	3.3	3.2	17.0	18.2	22.5	21.9	28.5	30.7	1.9	1.9	*3.7*
average			***4.5***	***4.2***	***17.5***	***16.4***	***26.3***	***22.2***	***38.7***	***30.5***	***2.2***	***2.3***	***7.7***
median			***3.2***	***3.0***	***13.3***	***13.1***	***25.9***	***19.1***	***34.4***	***24.9***	***2.1***	***2.1***	***-1.7***

Source: FactSet

Figure 51: Healthcare sector comparables (cont'd)

Company	Enterprise Value £m	Market Cap £m	EV/Sales (x) FY1	EV/Sales (x) FY2	EV/EBITDA (x) FY1	EV/EBITDA (x) FY2	EV/EBIT (x) FY1	EV/EBIT (x) FY2	P/E (x) FY1	P/E (x) FY2	Dividend Yield (%) FY1	Dividend Yield (%) FY2	Share Price YTD %
Global MedTech & Diagnostics													
Thermo Fisher Scientific	139,853	124,582	6.4	6.0	25.4	22.5	28.1	24.8	30.3	26.4	0.2	0.2	*21.7*
Danaher	126,559	107,920	7.5	6.5	28.9	23.7	42.3	34.1	38.3	32.2	0.4	0.4	*24.4*
Medtronic	118,091	105,485	5.3	4.8	19.2	15.1	22.9	18.3	25.2	20.0	2.3	2.4	*-13.1*
Siemens	117,467	83,051	1.4	1.9	11.9	14.6	17.3	22.4	17.4	20.6	3.4	3.3	*-3.8*
Intuitive Surgical	59,588	60,541	18.5	14.6	57.5	38.4	61.0	39.8	75.2	50.5	0.0	0.0	*10.1*
Becton, Dickinson	74,041	60,378	5.5	5.3	18.3	17.8	22.0	21.6	23.5	24.4	1.3	1.3	*-1.8*
Stryker Corp	64,005	57,727	5.8	4.8	23.6	16.8	26.4	18.7	30.5	21.9	1.2	1.4	*-8.0*
Illumina	44,136	44,990	15.3	12.5	45.5	34.7	53.0	39.8	63.9	50.0	0.0	0.0	*15.6*
Boston Scientific	50,545	42,982	6.3	5.0	25.6	16.3	33.6	19.7	39.7	22.3	0.0	0.0	*-16.6*
Edwards Lifesciences	37,262	36,636	10.6	8.8	34.6	26.5	37.8	28.6	45.8	34.9	0.0	0.0	*-4.7*
Baxter Intl	38,414	35,543	3.9	3.6	16.2	14.2	21.1	18.2	26.5	22.9	1.1	1.2	*4.7*
Agilent Technologies	24,562	23,246	5.8	5.6	22.5	22.0	24.9	24.4	30.4	29.6	0.7	0.8	*10.6*
Zimmer Biomet Holdings	28,106	22,295	5.6	4.3	21.8	12.9	31.4	16.6	34.0	17.7	0.7	0.8	*-9.7*
Smith & Nephew	15,728	14,347	4.3	3.6	17.7	12.5	32.1	18.4	30.6	19.9	1.4	1.9	*-10.5*
bioMerieux	14,644	14,283	5.2	4.9	23.4	21.7	34.3	32.0	47.7	43.3	0.3	0.3	*67.0*
Hologic	15,374	12,747	5.6	5.6	17.5	17.4	19.2	18.6	25.9	25.1	0.0	0.0	*18.5*
Sysmex	12,174	12,417	5.4	4.9	20.6	18.2	30.5	26.6	48.4	41.1	0.9	0.9	*7.2*
EXACT Sciences	11,921	11,695	12.2	8.3		217.2					0.0	0.0	*5.9*
DiaSorin SpA	8,750	8,897	11.3	10.6	28.1	26.1	33.9	30.6	45.6	42.6	0.7	0.8	*54.4*
QIAGEN	9,693	8,761	7.0	6.4	18.3	16.2	22.7	20.1	28.4	28.0	0.0	0.0	*42.4*
DENTSPLY SIRONA	8,962	7,825	3.4	2.8	19.2	12.9	27.0	15.7	32.5	20.0	0.8	0.9	*-20.9*
Carl Zeiss Meditec	7,380	7,205	5.1	5.0	25.3	27.3	29.9	34.7	51.2	52.5	0.7	0.7	*-22.3*
Getinge B	5,471	4,783	2.2	2.2	9.9	10.3	15.9	16.5	18.0	19.9	1.2	1.4	*14.4*
Ion Beam Applications	229	211	0.8		19.7		24.9				1.0		*-39.8*
average			***6.7***	***6.0***	***23.9***	***28.5***	***30.1***	***24.6***	***36.8***	***30.3***	***0.8***	***0.8***	***6.1***
median			***5.6***	***5.0***	***21.8***	***17.8***	***28.1***	***22.0***	***31.5***	***25.7***	***0.7***	***0.8***	***5.3***

Company	Enterprise Value £m	Market Cap £m	EV/Sales (x) FY1	EV/Sales (x) FY2	EV/EBITDA (x) FY1	EV/EBITDA (x) FY2	EV/EBIT (x) FY1	EV/EBIT (x) FY2	P/E (x) FY1	P/E (x) FY2	Dividend Yield (%) FY1	Dividend Yield (%) FY2	Share Price YTD %
UK Healthcare													
Advanced Medical Sol Grp	412	463	4.2	3.3	18.9	11.9	23.6	13.7	35.8	21.6	0.8	0.9	*-27.4*
CareTech	834	457	1.9	1.7	9.9	8.7	13.1	11.8	10.6	9.5	2.7	2.5	*-9.2*
Creo Medical Group	165	318											*11.6*
Bioventix	211	216											*25.4*
Tristel	211	206											*18.2*
EKF Diagnostics	194	202	3.1	3.5	8.0	12.2	9.5	16.8	14.3	27.2	2.3	2.4	*29.6*
Medica Group	141	145	3.4	2.6	14.8	9.3	16.7	13.2	22.8	15.1	1.7	1.9	*-20.0*
Open Orphan	23	84	3.7	2.6		14.8		20.1			0.0	0.0	*178.0*
Advanced Oncotherapy	99	81	1.4	-0.2							0.0	0.0	*-33.8*
Immunodiagnostic Systems	44	68											*-13.9*
Omega Diagnostics Group	54	64							143.1		0.0		*153.1*
Kromek Group	55	58	3.4	2.4	78.4	16.7					0.0	0.0	*-33.8*
SDI Group	58	53	2.6		10.9		14.3		17.7		0.0		*-29.7*
Polarean Imaging	33	52											*45.5*
Inspiration Healthcare Gp	17	43	1.4		12.0		29.2		17.9				*-6.2*
Sensyne Health	2	41	3.8	1.9							0.0	1.1	*-54.3*
Totally	21	31	0.2	0.1	4.1	2.8	6.6	4.1	16.3	6.9	3.0	3.0	*27.6*
Integumen		20											*9.6*
LiDCO Group	16	17	1.8		16.7						0.0		*45.9*
Surgical Innovations Grp	13	13											*-22.0*
Collagen Solutions	8	13											*-16.2*
Cambridge Cognition Hldgs	8	12								190.0	0.0	0.0	*35.7*
Deltex Medical Group	7	7	1.4	1.3	7.9	7.6	31.6	17.0		13.0	0.0	0.0	*-7.1*
NetScientific	1	4											*-22.2*
average	***114***	***111***	***2.5***	***1.9***	***18.2***	***10.5***	***18.1***	***13.8***	***34.8***	***40.5***	***0.7***	***1.1***	***11.9***
median	***44***	***56***	***2.6***	***2.2***	***11.5***	***10.6***	***15.5***	***13.7***	***17.8***	***15.1***	***0.0***	***0.9***	***-6.7***
maximum	***834***	***463***	***4.2***	***3.5***	***78.4***	***16.7***	***31.6***	***20.1***	***143.1***	***190.0***	***3.0***	***3.0***	***178.0***
minimum	***1***	***4***	***0.2***	***-0.2***	***4.1***	***2.8***	***6.6***	***4.1***	***10.6***	***6.9***	***0.0***	***0.0***	***-54.3***

Source: FactSet

Figure 52: Healthcare sector comparables (cont'd)

Company	Enterprise Value £m	Market Cap £m	EV/Sales (x) FY1	EV/Sales (x) FY2	EV/EBITDA (x) FY1	EV/EBITDA (x) FY2	EV/EBIT (x) FY1	EV/EBIT (x) FY2	P/E (x) FY1	P/E (x) FY2	Dividend Yield (%) FY1	Dividend Yield (%) FY2	Share Price YTD %
UK Pharmaceuticals & Biotechnology													
Hikma Pharmaceuticals	5,661	5,204	2.9	2.7	10.5	9.4	12.8	11.4	17.9	15.8	1.7	1.8	*13.4*
Abcam	2,868	3,007	11.3	10.5	35.9	35.3	43.8	48.9	53.7	62.3	0.8	0.8	*2.9*
Hutchison China MediTech	2,676	2,984	16.3	13.0							0.0	0.0	*10.5*
Clinigen Group	1,300	962	2.6	2.4	10.6	9.3	12.6	10.4	12.1	10.8	1.0	1.1	*-21.7*
Vectura Group	540	601	3.1	2.2	13.2	7.0	19.5	8.4	19.6	19.6	0.0	0.0	*7.9*
Alliance Pharma	463	401	3.3	2.8	12.4	10.3			16.1	13.9	2.1	2.4	*-10.2*
Silence Therapeutics	297	364	23.8	17.6							0.3	0.5	*25.7*
Renalytix AI	327	348	43.9	12.2		84.5		29.6		363.9	0.0	0.0	*60.7*
Avacta Group	150	326	65.1								0.0		*659.4*
Tiziana Life Sciences	233	283											*314.6*
Ergomed	247	254	2.9	2.4	15.9	13.7	20.4	17.3	23.6	20.8	0.0	0.0	*33.8*
Benchmark	286	247	2.6	2.6	29.7	46.1					0.0	0.0	*-15.8*
Bioventix	211	216											*25.4*
Summit Therapeutics	48	196											
Horizon Discovery Group	152	166	2.5	2.3		264.7					0.0	0.0	*-29.7*
ECO Animal Health Group	154	159	2.0	1.8	14.6	11.8	24.9	17.7	29.0	23.1	0.2	0.2	*13.5*
Mereo BioPharma Group	57	154	49.9										*28.2*
Yourgene Health	101	111	7.5	5.4	471.6	41.1		105.9	109.8	212.5	0.0	0.0	*34.0*
Verona Pharma	88	108									0.0	0.0	*63.7*
Animalcare Group	115	98											*-7.1*
ANGLE	71	97											*-10.7*
Allergy Therapeutics	67	91	0.8	0.8	12.7	130.3	21.0		30.2		0.0	0.0	*39.0*
Anpario	61	82	2.3	2.1	12.2	10.9	15.8	14.0	19.7	18.5	2.4	2.5	*4.4*
Oxford BioDynamics	42	56											*-48.5*
Synairgen	38	55									0.0		*521.3*
4D Pharma	24	53											*-59.4*
Redx Pharma	43	52											*233.3*
e-Therapeutics	29	50											*287.9*
Optibiotix Health	45	46											*-20.5*
ReNeuron Group	23	44	13.3	69.6							0.0	0.0	*-7.9*
Sensyne Health	2	41	3.8	1.9							0.0	1.1	*-54.3*
Genedrive	30	37	22.6	14.7							0.0	0.4	*215.6*
IXICO	27	33	3.8	4.3	50.9	42.0	76.3	81.9	75.6	67.7			*-21.5*
Futura Medical	25	33									0.0	0.0	*-4.5*
Eden Research	15	28											*-16.8*
Scancell Holdings	18	25									0.0	0.0	*-26.2*
SkinBioTherapeutics	21	24											*30.2*
ImmuPharma	18	24	222.4	246.1							0.0	0.0	*-19.5*
Tissue Regenix Group	3	23											*-67.0*
Sareum	17	19											*62.0*
Fusion Antibodies	14	17	3.8	3.5									*-12.7*
Evgen Pharma	8	13									0.0	0.0	*31.7*
Proteome Sciences	22	12											*39.1*
Midatech Pharma	(1)	8											*-64.3*
ValiRx	1	3											*-51.7*
average	***370***	***381***	***22***	***20***	***58***	***51***	***27***	***35***	***37***	***75***	***0***	***0***	***50***
median	***48***	***82***	***4***	***3***	***14***	***24***	***20***	***18***	***24***	***21***	***0***	***0***	***6***
maximum	***5661***	***5204***	***222***	***246***	***472***	***265***	***76***	***106***	***110***	***364***	***2***	***3***	***659***
minimum	***-1***	***3 0***	***1***	***1***	***11***	***7***	***13***	***8***	***12***	***11***	***0***	***0***	***-67***

Source: FactSet

finnCap Life Sciences coverage summary

Allergy Therapeutics* — Corp

Analyst	**Mark Brewer**
Ticker	**AGY-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	636.2
Next Results	FY Sept
Price	**14.3p**
Target price	40.0p
Upside	181%
Market Cap	**£90.7m**
Net debt/(cash)	-£33.2m
Other EV adjustments	£12.3m
Enterprise value	£69.8m

Share price performance

%	1M	3M	12M
Actual	3.6	6.5	21.3

Description: Specialty pharma company focused on treatment of allergies using immunotherapy vaccines

Comment Phase III PQ Grass allergy trial to start in Q3 2020, as two-stage process with results expected end 2022. Cash sufficient to complete Grass study; underpinned by market share gains and c.7-8% annual sales growth.

Key estimates		2018A	2019A	2020E	2021E	2022E
Year end:		Jun	Jun	Jun	Jun	Jun
Revenue	£m	68.3	73.7	78.2	83.0	87.0
Adj EBITDA	£m	-3.7	1.8	8.2	0.1	-2.1
Adj EBIT	£m	-5.7	-0.3	4.5	-3.8	-6.0
Adj PBT	£m	-5.9	-0.4	4.3	-3.8	-6.0
Adj EPS	p	-1.0	-0.2	0.5	-0.8	-1.1
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-12.1	-250.1	15.6	0.0	0.0
P/E (adj)	x	-13.6	-78.5	30.3	-18.7	-12.7
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-7.0%	2.5%	10.0%	-5.6%	-5.6%

ANGLE* — Corp

Analyst	**Mark Brewer**
Ticker	**AGL-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	172.8
Next Results	H1 Sept
Price	**55.0p**
Target price	135.0p
Upside	145%
Market Cap	**£95.0m**
Net debt/(cash)	-£18.8m
Other EV adjustments	£0.0m
Enterprise value	£76.2m

Share price performance

%	1M	3M	12M
Actual	-7.6	-17.9	-27.4

Description: Offering precision medicine solutions in the liquid biopsy market using a CTC capture system, Parsortix.

Comment Change of year end to December. Await De Novo filing in Q3 2020 and completion of ovarian cancer enrolment by year-end 2020.

Key estimates		2017A	2018A	2019A	2020A	2021E
Year end:		Apr	Apr	Apr	Dec	Dec
Revenue	£m	0.5	0.6	0.7	0.6	U/R
Adj EBITDA	£m	-6.7	-7.8	-9.6	-6.6	U/R
Adj EBIT	£m	-7.2	-8.6	-10.6	-7.4	U/R
Adj PBT	£m	-7.2	-8.6	-10.5	-7.4	U/R
Adj EPS	p	-8.4	-7.6	-6.3	-3.6	U/R
DPS	p	0.0	0.0	0.0	0.0	U/R
Key valuation metrics:						
EV/EBIT (adj)	x	-10.6	-8.9	-7.2	-10.3	U/R
P/E (adj)	x	-6.6	-7.3	-8.7	-15.2	U/R
Dividend Yield	%	0.0%	0.0%	0.0%	0.0%	U/R
Free cash Yield	%	-8.2%	-9.1%	-9.1%	-9.4%	U/R

Avacta* — Corp

Analyst	**Mark Brewer**
Ticker	**AVCT-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	208.0
Next Results	H1 Sept
Price	**131.5p**
Target price	Under review
Upside	n/a
Market Cap	**£273.5m**
Net debt/(cash)	-£10.5m
Other EV adjustments	£0.0m
Enterprise value	£263.0m

Share price performance

%	1M	3M	12M
Actual	-5.4	42.2	401.0

Description: Developer of Affimer biotherapeutics and research reagents

Comment £48m funding of which £10m raised to fund expansion of Diagnostics business, including COVID-19 antigen test, and £35m to accelerate Therapeutics' pipeline of assets.

Key estimates		2016A	2017A	2018A	2019A	2020E
Year end:		Jul	Jul	Jul	Dec	Dec
Revenue	£m	2.2	2.7	2.8	5.5	4.9
Adj EBITDA	£m	-4.7	-6.0	-7.4	-14.1	-8.7
Adj EBIT	£m	-5.4	-7.6	-10.2	-18.0	-10.9
Adj PBT	£m	-5.3	-7.5	-10.2	-18.1	-10.8
Adj EPS	p	-6.3	-8.9	-12.3	-11.9	-3.9
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-48.8	-34.6	-25.7	-14.6	-24.1
P/E (adj)	x	-21.0	-14.8	-10.7	-11.0	-33.6
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-3.2%	-2.3%	-2.9%	-5.6%	-2.5%

Bioventix* Corp

Analyst	**Mark Brewer**
Ticker	**BVXP-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	5.1
Next Results	FY Oct
Price	**4,200.0p**
Target price	3,750.0p
Upside	-11%
Market Cap	**£215.9m**
Net debt/(cash)	-£5.5m
Other EV adjustments	£0.0m
Enterprise value	£210.4m

Share price performance

%	1M	3M	12M
Actual	-0.7	2.4	14.3

Description: Development of monoclonal antibodies for use in immunodiagnostics

Comment Early evidence of US Troponin uptake in FY 2019 and continued strong Vitamin D sales underpin our expectations. Progressing pollution exposure assay towards commercial kit manufacture during H2 CY 2020.

Key estimates Year end:		2017A Jun	2018A Jun	2019A Jun	2020E Jun	2021E Jun
Revenue	£m	7.2	8.8	9.3	10.1	11.1
Adj EBITDA	£m	5.8	7.0	7.1	7.9	8.7
Adj EBIT	£m	5.8	7.0	7.1	7.8	8.5
Adj PBT	£m	5.8	7.0	7.1	7.8	8.6
Adj EPS	p	96.0	110.9	114.7	124.8	136.8
DPS	p	91.0	116.0	120.0	89.0	98.0
Key valuation metrics:						
EV/EBIT (adj)	x	36.4	30.2	29.8	27.0	24.6
P/E (adj)	x	43.8	37.9	36.6	33.7	30.7
Dividend yield	%	2.2%	2.8%	2.9%	2.1%	2.3%
Free cash yield	%	1.8%	2.7%	2.7%	2.7%	3.1%

Byotrol* Corp

Analyst	**Mark Brewer**
Ticker	**BYOT-GB**
Life Sciences	
Shares in issue (m)	430.9
Next Results	FY Aug
Price	**6.0p**
Target price	9.0p
Upside	49%
Market Cap	**£26.0m**
Net debt/(cash)	-£1.7m
Other EV adjustments	£0.0m
Enterprise value	£24.3m

Share price performance

%	1M	3M	12M
Actual	0.0	1.7	170.2

Description: Development of products based on proprietary antimicrobial technology

Comment Set to benefit from secular shift towards the importance of infection prevention, as a result of the COVID-19 pandemic. In early discussions with parties in the US to license Byotrol24.

Key estimates Year end:		2017A Mar	2018A Mar	2019A Mar	2020E Mar	2021E Mar
Revenue	£m	3.1	1.8	5.7	6.0	10.0
Adj EBITDA	£m	0.1	-1.3	1.0	0.3	1.1
Adj EBIT	£m	-0.0	-1.5	0.6	-0.1	0.8
Adj PBT	£m	-0.0	-1.5	0.6	-0.2	0.7
Adj EPS	p	-0.0	-0.3	0.1	-0.0	0.2
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-1,390.6	-16.7	39.4	-285.4	31.9
P/E (adj)	x	-527.0	-17.6	44.4	-145.6	35.8
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-0.2%	-6.2%	0.3%	-2.7%	3.6%

Cambridge Cognition* Corp

Analyst	**Mark Brewer**
Ticker	**COG-GB**
Healthcare Equipment & Services	
Shares in issue (m)	24.2
Next Results	FY Mar
Price	**38.0p**
Target price	75.0p
Upside	97%
Market Cap	**£9.2m**
Net debt/(cash)	-£0.9m
Other EV adjustments	£0.0m
Enterprise value	£8.3m

Share price performance

%	1M	3M	12M
Actual	1.3	81.0	-39.7

Description: Neurosciences digital healthcare company.

Comment H1 2020 contract wins provide further evidence of the focused strategy to grow its recently developed product range (eCOA and digital solutions).

Key estimates Year end:		2017A Dec	2018A Dec	2019A Dec	2020E Dec	2021E Dec
Revenue	£m	6.7	6.1	5.0	6.2	7.2
Adj EBITDA	£m	0.0	-1.4	-2.8	-0.5	0.1
Adj EBIT	£m	-0.1	-1.5	-3.0	-0.7	0.0
Adj PBT	£m	-0.1	-1.5	-3.0	-0.7	0.0
Adj EPS	p	-0.3	-6.4	-10.5	-1.3	0.2
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-123.6	-5.5	-2.8	-12.3	2,333.7
P/E (adj)	x	-141.0	-6.0	-3.6	-28.4	159.9
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-7.3%	-7.3%	-26.1%	-15.0%	0.7%

Circassia Group* — Corp

Analyst	**Mark Brewer**
Ticker	**CIR-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	375.2
Next Results	H1 Oct
Price	**27.5p**
Target price	Under review
Upside	n/a
Market Cap	**£103.2m**
Net debt/(cash)	-£12.0m
Other EV adjustments	£0.0m
Enterprise value	£91.2m

Share price performance

%	1M	3M	12M
Actual	12.9	-1.6	49.9

Description: Specialty pharma company focused on respiratory disease

Comment Transfer of COPD therapeutic assets to AstraZeneca in May 2020. Remaining NIOX business provides an attractive investment opportunity post the COVID-19 pandemic.

Key estimates Year end:		2017A Dec	2018A Dec	2019A Dec	2020E Dec	2021E Dec
Revenue	£m	46.3	48.3	62.4	U/R	U/R
Adj EBITDA	£m	-29.8	-30.1	-25.3	U/R	U/R
Adj EBIT	£m	-30.6	-30.7	-26.1	U/R	U/R
Adj PBT	£m	-31.4	-28.6	-32.9	U/R	U/R
Adj EPS	p	-8.7	-5.6	-5.9	U/R	U/R
DPS	p	0.0	0.0	0.0	U/R	U/R
Key valuation metrics:						
EV/EBIT (adj)	x	-3.0	-3.0	-3.5	U/R	U/R
P/E (adj)	x	-3.1	-4.9	-4.7	U/R	U/R
Dividend Yield	%	0.0%	0.0%	0.0%	U/R	U/R
Free cash Yield	%	-56.5%	-39.1%	-34.3%	U/R	U/R

Destiny Pharma* — Corp

Analyst	**Mark Brewer**
Ticker	**DEST-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	43.9
Next Results	H1 Sept
Price	**31.0p**
Target price	250.0p
Upside	706%
Market Cap	**£13.6m**
Net debt/(cash)	-£7.5m
Other EV adjustments	£0.0m
Enterprise value	£6.1m

Share price performance

%	1M	3M	12M
Actual	-16.2	-12.7	-54.4

Description: Destiny Pharma is a proprietary antimicrobial company whose lead asset XF-73 is in P2b trials

Comment Phase IIb study (post-surgical infection prevention) is two thirds enrolled and expected to complete by end 2020, with cash runway that extends into Q4 2021.

Key estimates Year end:		2017A Dec	2018A Dec	2019A Dec	2020E Dec	2021E Dec
Revenue	£m	0.0	0.0	0.0	0.0	0.0
Adj EBITDA	£m	-2.5	-5.3	-5.4	-5.9	-4.2
Adj EBIT	£m	-2.5	-5.4	-5.4	-5.9	-4.2
Adj PBT	£m	-2.5	-5.3	-5.3	-5.9	-4.2
Adj EPS	p	-5.4	-8.8	-8.9	-9.9	-7.3
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-2.4	-1.1	-1.1	-1.0	-1.5
P/E (adj)	x	-5.7	-3.5	-3.5	-3.1	-4.2
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-16.0%	-34.9%	-34.3%	-39.6%	-25.8%

Evgen Pharma* — Corp

Analyst	**Mark Brewer**
Ticker	**EVG-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	132.6
Next Results	H1 Dec
Price	**11.2p**
Target price	25.0p
Upside	124%
Market Cap	**£14.8m**
Net debt/(cash)	-£4.1m
Other EV adjustments	£0.0m
Enterprise value	£10.7m

Share price performance

%	1M	3M	12M
Actual	4.9	28.2	-35.4

Description: Clinical stage drug development company focussed on development of sulforaphane-based compounds.

Comment Completing both the CMC and extended toxicology packages for a tablet formulation that will enable dosing of >28 days, for use in Phase II breast cancer trial, which is in final phase of design, and investigator-led studies.

Key estimates Year end:		2018A Mar	2019A Mar	2020A Mar	2021E Mar	2022E Mar
Revenue	£m	0.0	0.0	0.0	0.0	0.0
Adj EBITDA	£m	-2.9	-3.0	-3.0	-3.8	-1.6
Adj EBIT	£m	-2.9	-3.0	-3.0	-3.8	-1.6
Adj PBT	£m	-2.9	-3.0	-3.0	-3.8	-1.6
Adj EPS	p	-2.8	-2.4	-1.8	-2.3	-1.1
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-3.7	-3.6	-3.6	-2.8	-6.5
P/E (adj)	x	-3.9	-4.7	-6.1	-4.9	-10.0
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-15.9%	-15.5%	-17.4%	-23.0%	-7.1%

genedrive* Corp

Analyst	**Mark Brewer**
Ticker	**GDR-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	52.0
Next Results	FY Oct
Price	**81.0p**
Target price	Under review
Upside	n/a
Market Cap	**£42.1m**
Net debt/(cash)	-£5.5m
Other EV adjustments	£0.0m
Enterprise value	£36.6m

Share price performance

%	1M	3M	12M
Actual	-35.7	-1.8	362.9

Description: Molecular diagnostic company with point-of-care PCR technology

Comment COVID-19 test has indicative orders, pending regulatory approvals. New US DoD contract expected autumn 2020. AIHL test on track to launch in autumn 2020. COVID-19 PoC test on track to launch end of 2020.

Key estimates		2018A	2019A	2020E	2021E	2022E
Year end:		Jun	Jun	Jun	Jun	Jun
Revenue	£m	1.9	2.4	1.0	2.7	6.5
Adj EBITDA	£m	-5.1	-4.3	-5.0	-4.2	-1.1
Adj EBIT	£m	-5.3	-4.4	-5.1	-4.4	-1.3
Adj PBT	£m	-5.7	-4.9	-6.4	-5.4	-2.3
Adj EPS	p	-23.9	-13.6	-14.6	-8.2	-2.9
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-6.9	-8.3	-7.2	-8.3	-29.3
P/E (adj)	x	-3.4	-5.9	-5.5	-9.9	-27.8
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-6.1%	-8.8%	-9.6%	-8.8%	-1.7%

InnovaDerma* Corp

Analyst	**Mark Brewer**
Ticker	**IDP-GB**
Life Sciences	
Shares in issue (m)	14.5
Next Results	FY Sept
Price	**61.5p**
Target price	Under review
Upside	n/a
Market Cap	**£8.9m**
Net debt/(cash)	-£1.3m
Other EV adjustments	£0.0m
Enterprise value	£7.6m

Share price performance

%	1M	3M	12M
Actual	-16.9	41.4	-30.5

Description: InnovaDerma is a manufacturer of topical and life science products.

Comment FY trading update indicated revenues of c.£13.4m (+4%), driven by Skinny Tan and despite retail weakness due to COVID-19. Year end cash of £1.3m implied £0.9m cash generation in H2.

Key estimates		2017A	2018A	2019A	2020E	2021E
Year end:		Jun	Jun	Jun	Jun	Jun
Revenue	£m	8.9	10.7	12.9	U/R	U/R
Adj EBITDA	£m	1.0	0.8	1.4	U/R	U/R
Adj EBIT	£m	1.0	0.7	1.4	U/R	U/R
Adj PBT	£m	1.0	0.7	1.4	U/R	U/R
Adj EPS	p	4.5	3.0	7.0	U/R	U/R
DPS	p	0.0	0.0	0.0	U/R	U/R
Key valuation metrics:						
EV/EBIT (adj)	x	7.4	11.4	5.4	U/R	U/R
P/E (adj)	x	13.8	20.6	8.8	U/R	U/R
Dividend Yield	%	0.0%	0.0%	0.0%	U/R	U/R
Free cash Yield	%	-9.5%	-22.0%	2.8%	U/R	U/R

LiDCO* Corp

Analyst	**Mark Brewer**
Ticker	**LID-GB**
Healthcare Equipment & Services	
Shares in issue (m)	244.2
Next Results	H1 Oct
Price	**7.2p**
Target price	12.0p
Upside	68%
Market Cap	**£17.5m**
Net debt/(cash)	-£1.4m
Other EV adjustments	£0.0m
Enterprise value	£16.1m

Share price performance

%	1M	3M	12M
Actual	0.0	-7.7	45.9

Description: Medical devices for patient monitoring in surgery

Comment Record Q1 FY 2021 with revenues of £4.4m, boosted by COVID-19 sales. Is well positioned to explore sales & marketing opportunities in its key markets as hospitals exit lockdown and reps are able to access hospitals.

Key estimates		2018A	2019A	2020A	2021E	2022E
Year end:		Jan	Jan	Jan	Jan	Jan
Revenue	£m	8.3	7.3	7.5	9.0	U/R
Adj EBITDA	£m	-1.3	-1.2	-0.2	1.2	U/R
Adj EBIT	£m	-2.1	-2.0	-1.1	-0.3	U/R
Adj PBT	£m	-2.1	-2.0	-1.1	-0.3	U/R
Adj EPS	p	-0.8	-0.7	-0.4	-0.0	U/R
DPS	p	0.0	0.0	0.0	0.0	U/R
Key valuation metrics:						
EV/EBIT (adj)	x	-7.6	-8.1	-14.6	-62.7	U/R
P/E (adj)	x	-8.8	-9.7	-19.0	-202.9	U/R
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	U/R
Free cash yield	%	-9.6%	-8.6%	-0.9%	0.6%	U/R
Pre-tax-ROCE	%	-25.3%	-30.5%	-19.7%	-4.7%	U/R

Omega Diagnostics* — Corp

Analyst	**Mark Brewer**
Ticker	**ODX-GB**
Healthcare Equipment & Services	
Shares in issue (m)	150.4
Next Results	H1 Dec
Price	**62.0p**
Target price	Under review
Upside	n/a
Market Cap	**£93.2m**
Net debt/(cash)	-£7.1m
Other EV adjustments	£0.0m
Enterprise value	£86.1m

Share price performance

%	1M	3M	12M
Actual	26.0	3.8	521.5

Description: Diagnostics company focused on allergy, autoimmune and infectious diseases

Comment £11m fundraise to scale manufacturing, expand its lateral flow portfolio of global health tests and exploit the opportunities for COVID-19 testing – the test is being evaluated in 18 countries, including approval in India.

Key estimates Year end:		2017A Mar	2018A Mar	2019A Mar	2020A Mar	2021E Mar
Revenue	£m	14.2	13.6	9.8	9.8	12.6
Adj EBITDA	£m	1.5	-0.3	0.1	0.9	1.6
Adj EBIT	£m	1.2	-0.7	-0.2	-0.1	0.9
Adj PBT	£m	1.1	-0.7	-0.3	-0.4	0.7
Adj EPS	p	1.1	-0.9	-0.4	0.8	0.4
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	73.3	-122.0	-417.9	-598.8	96.2
P/E (adj)	x	57.0	-69.4	-154.1	81.1	138.6
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-0.7%	-4.4%	-2.5%	-1.7%	-2.4%

Oncimmune Holdings* — Corp

Analyst	**Mark Brewer**
Ticker	**ONC-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	63.3
Next Results	FY Aug
Price	**119.0p**
Target price	150.0p
Upside	26%
Market Cap	**£75.3m**
Net debt/(cash)	£0.1m
Other EV adjustments	£0.0m
Enterprise value	£75.4m

Share price performance

%	1M	3M	12M
Actual	-10.9	31.5	20.8

Description: Commercial stage immune biomarker company for screening and detection of cancer.

Comment Acceleration in EarlyCDT Lung revenues and an enlarging pipeline of contracts within the ImmunoINSIGHTS services business. Registration for EarlyCDT Lung in Russia expected Q3 CY 2020.

Key estimates Year end:		2019A May	2020E May	2021E May	2022E May	2023E May
Revenue	£m	0.2	1.2	6.2	8.1	8.6
Adj EBITDA	£m	-7.9	-7.3	5.5	-0.5	-0.7
Adj EBIT	£m	-8.2	-7.8	5.0	-1.0	-1.2
Adj PBT	£m	-8.1	-8.2	4.4	-1.4	-1.7
Adj EPS	p	-11.0	-10.9	6.5	-1.5	-1.8
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-9.2	-9.7	15.0	-76.7	-63.4
P/E (adj)	x	-10.8	-10.9	18.4	-80.0	-65.2
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-10.0%	-11.2%	5.6%	-2.2%	-2.8%

Open Orphan* — Corp

Analyst	**Mark Brewer**
Ticker	**ORPH-GB**
Healthcare Equipment & Services	
Shares in issue (m)	663.9
Next Results	FY Jun
Price	**12.6p**
Target price	19.0p
Upside	51%
Market Cap	**£83.5m**
Net debt/(cash)	-£12.1m
Other EV adjustments	£0.0m
Enterprise value	£71.4m

Share price performance

%	1M	3M	12M
Actual	4.4	64.4	80.9

Description: Specialist CRO providing virology and vaccine challenge study and viral laboratory services

Comment COVID-19 challenge model expected to launch by end of CY 2020. Antibody testing service launched June 2020. Expected to monetise Imutex and other non-core assets in 2020.

Key estimates Year end:		2017A Dec	2018A Dec	2019A Dec	2020E Dec	2021E Dec
Revenue	€m			25.7	30.0	44.1
Adj EBITDA	€m			-10.1	-0.7	9.2
Adj EBIT	€m			-12.8	-2.8	7.2
Adj PBT	€m			-13.6	-3.2	6.9
Adj EPS	c			-2.7	-0.6	1.0
DPS	c			0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x			-6.2	-28.4	10.8
P/E (adj)	x			-5.1	-24.7	13.3
Dividend yield	%			0.0%	0.0%	0.0%
Free cash yield	%			-16.4%	-4.2%	8.5%

OptiBiotix* — Corp

Analyst	**Mark Brewer**
Ticker	**OPTI-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	79.3
Next Results	FY Apr
Price	**50.0p**
Target price	Under review
Upside	n/a
Market Cap	**£39.7m**
Net debt/(cash)	-£1.3m
Other EV adjustments	£0.0m
Enterprise value	£38.3m

Share price performance

%	1M	3M	12M
Actual	-7.4	-19.4	-30.6

Description: A life sciences company focussed on the science and modulation of the human microbiome.

Comment With over 50 manufacturing and distribution agreements in place, and expectation for more to come, we should begin to see the fruits of this activity but visibility is still difficult to predict.

Key estimates Year end:		2016A Nov	2017A Nov	2018A Nov	2019E Nov	2020E Nov
Revenue	£m	0.3	0.2	0.5	U/R	U/R
Adj EBITDA	£m	-1.4	-1.9	-1.2	U/R	U/R
Adj EBIT	£m	-1.5	-2.1	-1.4	U/R	U/R
Adj PBT	£m	-1.5	-2.4	-1.8	U/R	U/R
Adj EPS	p	-1.3	0.0	0.0	U/R	U/R
DPS	p	0.0	0.0	0.0	U/R	U/R
Key valuation metrics:						
EV/EBIT (adj)	x	-25.9	-18.5	-28.0	U/R	U/R
P/E (adj)	x	-38.5	n/m	n/m	U/R	U/R
Dividend Yield	%	0.0%	0.0%	0.0%	U/R	U/R
Free cash Yield	%	-3.5%	-4.4%	-4.0%	U/R	U/R

SDI Group* — Corp

Analyst	**Mark Brewer**
Ticker	**SDI-GB**
Healthcare Equipment & Services	
Shares in issue (m)	97.5
Next Results	H1 Dec
Price	**56.5p**
Target price	100.0p
Upside	77%
Market Cap	**£55.1m**
Net debt/(cash)	£4.0m
Other EV adjustments	£0.0m
Enterprise value	£59.1m

Share price performance

%	1M	3M	12M
Actual	13.0	6.6	6.2

Description: Manufacture and distribution of digital imaging and sensor control technology

Comment Trading has begun to normalise post-COVID disruption and expect that FY 2021 will be at least in line with FY 2020 results. Buy and build strategy is expected to continue.

Key estimates Year end:		2018A Apr	2019A Apr	2020A Apr	2021E Apr	2022E Apr
Revenue	£m	14.5	17.4	24.5	26.7	28.0
Adj EBITDA	£m	3.1	3.9	6.0	6.1	6.5
Adj EBIT	£m	2.3	3.1	4.6	4.7	5.1
Adj PBT	£m	2.3	3.0	4.3	4.4	4.9
Adj EPS	p	2.4	2.8	3.4	3.7	4.1
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	25.2	19.1	12.8	12.5	11.5
P/E (adj)	x	23.3	19.9	16.5	15.4	13.8
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	3.2%	4.0%	5.5%	5.8%	6.9%

Shield Therapeutics* — Corp

Analyst	**Mark Brewer**
Ticker	**STX-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	117.1
Next Results	H1 Oct
Price	**101.1p**
Target price	350.0p
Upside	246%
Market Cap	**£118.4m**
Net debt/(cash)	-£9.8m
Other EV adjustments	£0.0m
Enterprise value	£108.6m

Share price performance

%	1M	3M	12M
Actual	10.5	-1.6	-42.2

Description: Shield's lead product Feraccru is a novel approved treatment for Iron Deficiency Anaemia (IDA)

Comment Licensed Fraccru/Accrufer in China ($11.4m upfront, $51.5m milestone payments and tiered double digit royalties) with prospect of more substantial payment terms for US license (late-stage discussions).

Key estimates Year end:		2018A Dec	2019E Dec	2020E Dec	2021E Dec	2022E Dec
Revenue	£m	11.9	2.9	3.8	12.6	20.2
Adj EBITDA	£m	-1.8	-6.0	-5.7	1.9	6.6
Adj EBIT	£m	-2.3	-6.6	-6.2	1.4	6.0
Adj PBT	£m	-2.3	-6.5	-6.2	1.4	6.0
Adj EPS	p	0.9	-4.6	-4.8	1.4	5.1
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-47.1	-16.6	-17.5	77.6	18.0
P/E (adj)	x	110.0	-21.9	-21.1	72.7	19.6
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-3.0%	-4.9%	-4.1%	1.9%	5.5%

Synairgen* Corp

Analyst	**Mark Brewer**
Ticker	**SNG-GB**
Pharmaceuticals & Biotechnology	
Shares in issue (m)	149.4
Next Results	H1 Sept
Price	**221.0p**
Target price	360.0p
Upside	63%
Market Cap	**£330.2m**
Net debt/(cash)	-£0.3m
Other EV adjustments	£0.0m
Enterprise value	£329.9m

Share price performance

%	1M	3M	12M
Actual	426.2	281.0	1900.0

Description: Respiratory drug discovery and development with a focus on virology

Comment Very positive results from Phase II trial of SNG001 in hospitalised COVID-19 patients. Synairgen will now discuss with regulators on the way to progress SNG001 as rapidly as possible.

Key estimates Year end:		2016A Dec	2017A Dec	2018A Dec	2019A Dec	2020E Dec
Revenue	£m	0.0	5.0	0.1	0.0	0.0
Adj EBITDA	£m	-3.3	1.8	-4.0	-4.5	-12.9
Adj EBIT	£m	-3.3	1.7	-4.0	-4.7	-13.0
Adj PBT	£m	-3.3	1.7	-4.0	-4.7	-13.0
Adj EPS	p	-2.9	2.1	-3.4	-3.4	-7.3
DPS	p	0.0	0.0	0.0	0.0	0.0
Key valuation metrics:						
EV/EBIT (adj)	x	-100.3	190.9	-81.8	-70.1	-25.4
P/E (adj)	x	-75.8	107.7	-65.7	-64.2	-30.2
Dividend yield	%	0.0%	0.0%	0.0%	0.0%	0.0%
Free cash yield	%	-0.9%	0.6%	-1.3%	-0.9%	-3.9%

Tristel* Corp

Analyst	**Mark Brewer**
Ticker	**TSTL-GB**
Healthcare Equipment & Services	
Shares in issue (m)	44.6
Next Results	FY Oct
Price	**420.0p**
Target price	450.0p
Upside	7%
Market Cap	**£187.2m**
Net debt/(cash)	-£6.2m
Other EV adjustments	£0.0m
Enterprise value	£181.0m

Share price performance

%	1M	3M	12M
Actual	-4.5	-15.2	40.7

Description: Manufactures and sells proprietary products for disinfection and infection control

Comment Positive trading update for year ending June 2020, driven by net benefit from COVID-19 related sales and a strong international performance. Has filed Duo OPH with Canada Health.

Key estimates Year end:		2017A Jun	2018A Jun	2019A Jun	2020E Jun	2021E Jun
Revenue	£m	20.3	22.2	26.2	31.6	34.5
Adj EBITDA	£m	5.3	6.2	7.1	9.9	10.8
Adj EBIT	£m	4.0	4.6	5.5	7.2	7.4
Adj PBT	£m	4.0	4.7	5.6	6.8	7.0
Adj EPS	p	8.1	8.8	10.7	12.3	12.7
DPS	p	4.0	4.6	5.5	6.3	6.5
Key valuation metrics:						
EV/EBIT (adj)	x	45.0	39.0	32.6	25.1	24.4
P/E (adj)	x	52.0	47.6	39.2	34.2	33.2
Dividend yield	%	1.0%	1.1%	1.3%	1.5%	1.6%
Free cash yield	%	1.8%	1.6%	2.2%	2.8%	3.4%

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