

Outlook for 2023

Biotechs remain central to novel drug development

In what has been a particularly tumultuous year for the biotech sector, with patient enrolment (resulting from the global pandemic) and funding challenges for small biotechs, there are very few healthcare investors who will look back on 2022 with a positive sentiment. Although we anticipate the current market conditions to persist going into 2023, we are likely to see more M&A activity in the sector, with increased urgency from both biotechs (funding) and large-cap pharma (growth). We continue to view robust innovation as the focal point.

A recap and look forward to a new year

This outlook intends to reconcile the analysis from our previous [healthcare themes](#) reports, which we started in July 2022. The sentiment that ran, and continues to run, through our industry reports revolves around several points which, we believe, provide insight into the current market and how it will likely unfold in the new year:

- We believe the majority of innovative therapies will stem from smaller, more agile/entrepreneurial biotechs. For some large cap pharmaceutical companies, up to [80% of launched products](#) were found to originate from third party biotech's and institutions.
- Large-cap pharma companies have accumulated notable cash balances. Acquisitions and partnerships are likely to pick up, in our view, with large-cap pharma companies seeking to employ its dry powder seeking growth to offset pending patent expirations. Conversely, biotechs will require funding to advance their clinical assets as private and public markets are increasingly limited. The quality of assets and commercial potential will be critical, in our view.
- Disease-altering or new mechanisms of action in attractive indications (market opportunity and pricing) will remain key differentiators, in our view. We have covered several interesting areas to date, including oncology vaccines, women's health, the central nervous system, cell and gene therapy, acute myeloid leukaemia and drug delivery technologies.
- The pharma industry continues to evolve and based on the macro pressures, we are likely to see different approaches to drive efficiency and expedite drug discovery efforts, with an increasing focus on machine learning technology applications.

Edison themes



6 January 2023

Advancements in drug development continue to rely heavily on highly focused and specialised technology developed by smaller and nimbler biopharma companies. Mechanisms will continue to evolve and fuel advancements in personalised and targeted treatments and combination therapies with more broad-based offerings in large pharma portfolios.

Edison themes

As one of the largest issuer-sponsored research firms, we are known for our bottom-up work on individual stocks. However, our thinking does not stop at the company level. Through our regular dialogue with management teams and investors, we consider the broad themes related to the companies we follow. Edison themes aims to identify the big issues likely to shape company strategy and portfolios in the years ahead.

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Companies mentioned in this report (Edison clients in bold)

Actinogen Medical (ACW: ASX)

Allogene Therapeutics (ALLO: NASDAQ)

Amgen (AMGN: NASDAQ)

Beam Therapeutics (BEAM: NASDAQ)

Biogen (BIIB: NASDAQ)

bluebird bio (BLUE: NASDAQ)

Bristol-Myers Squibb (BMY: NYSE)

Context Therapeutics (CNTX: NASDAQ)

CRISPR Therapeutics (CRSP: NASDAQ)

Eisai (ESALY: OTC)

Eli Lilly (LLY: NYSE)

IRLAB Therapeutics (IRLABA: Nasdaq Stockholm)

Johnson & Johnson (JNJ: NYSE)

Mendus (IMMU: STO)

Merck & Co (MRK: NYSE)

Novartis (NVS: NYSE)

Oryzon Genomics (ORY: BME)

Pfizer (PFE: NYSE)

Roche Holding (RO: SIX)

Vertex Pharmaceuticals (VRTX: NASDAQ)

Voyager Therapeutics (VYGR: NASDAQ)

Ultimovacs (ULTI: NO)

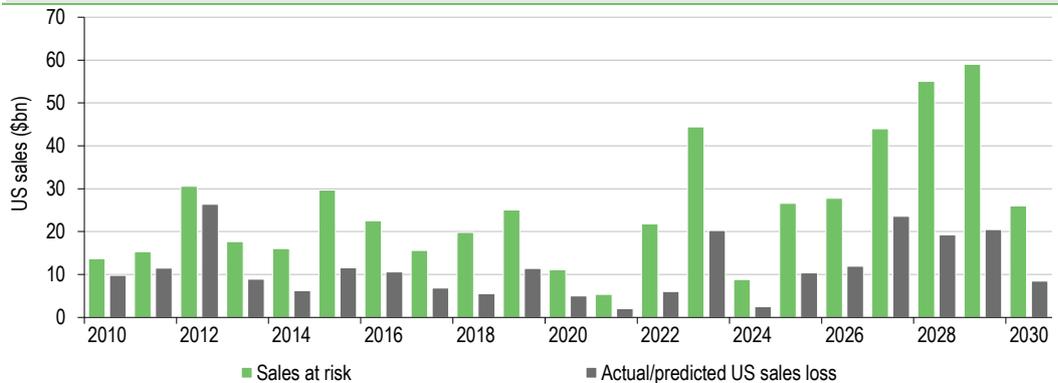
Biotechs remain the backbone of innovation

Despite the current macroeconomic environment, robust scientific innovation in drug discovery and development has continued. Most innovative discoveries are fostered over a decade or more and the core value is the niche expertise gathered to conduct proof-of-concept and animal studies before reaching the clinical trials phase, which incurs an incremental seven to 10 years on average. Navigating new, unfamiliar and highly specialised areas in an effort to land the next big clinical breakthrough requires methodical diligence, patience and an entrepreneurial spirit, attributes possessed by many small biotechs. Conversely, large corporations have the financial resources and platforms to commercialize innovative therapies. This dichotomy is most apparent when reviewing the roughly 2,000 active clinical trials operated by large cap pharma where up to 70% (EvaluatePharma) of the developmental candidates (Phase I, II and III) can trace their roots back to biotech originators.

Increased urgency is likely to steer transactions

Large-cap pharma companies need to allocate capital for external acquisitions, partnerships and in-house R&D to replenish drugs that will no longer be major products due to the emergence of generic competition and the expiration of drug patents. The increasing expirations are often referred to as a patent cliff, reflecting the revenues at risk, as shown in Exhibit 1. Successful strategies allow large-cap pharma companies to evolve their product portfolios and generate returns on invested capital.

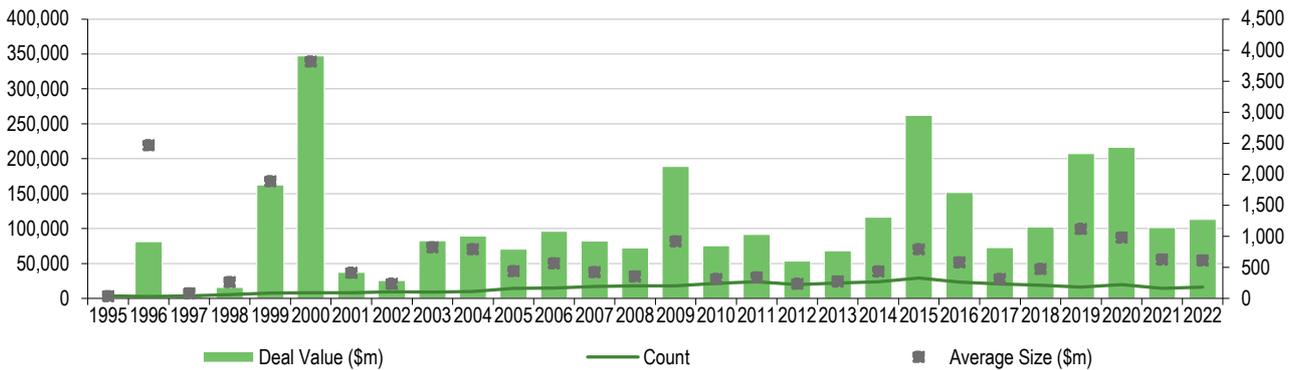
Exhibit 1: Pending large-cap pharma patent expirations



Source: Edison Investment Research, EvaluatePharma

Despite being relatively cash rich, supported by favourable demographics and overall business conditions and the additional revenues generated during the COVID-19 pandemic, large pharma/biotech companies were somewhat restrained when it came to M&A/licensing activity in 2022. While the end of 2022 saw a pick-up in activity, observed by Amgen's [\\$28bn acquisition](#) of Horizon and Johnson & Johnson's [\\$19bn acquisition of Abiomed](#), total M&A and licensing deal value in the pharma/biotech industry significantly lags previous years (Exhibit 2). With large-cap pharma companies holding relatively large cash positions (Exhibit 3), the need among them for new sources of revenue to offset patent expirations and a rightsizing of the market that will likely provide better visibility of the assets with the greatest clinical potential (albeit with more limited access to capital), we believe 2023 will be a busy year for biotech M&A.

Exhibit 2: M&A activity



Source: Edison Investment Research, EvaluatePharma

Exhibit 3: XBI Index and large-cap pharma cash balance



Source: Edison Investment Research, Bloomberg. Note: Gross cash value based on top 20 selected large cap pharma companies.

Discovery platforms

The concept of machine learning in drug discovery has generated much hype in recent years. On the face of it, the idea of harnessing big data and complex quantum computing algorithms to expedite drug discovery sounds appealing. However, for many investors, the concept of machine learning is akin to that of a black box, with only a handful of people – often the designers – truly understanding its inner workings. The biggest question is whether machine learning actually delivers clinical candidates. According to Swedish biotech IRLAB Therapeutics’ proprietary Integrative Screening Process (ISP) research platform, the answer appears to be yes. IRLAB’s ISP platform is at the heart of its drug discovery engine, enabling the discovery of new drugs for CNS-related diseases.

The pharma industry continues to evolve, and we are likely to see more applications of machine learning, whether it is in clinical trials or discovery. Albeit in the early stages, these platforms and technology applications are expected to reduce time to market while increasing efficiencies. Due to current funding challenges, methodologies that claim to de-risk or expedite drug candidate selection and development are likely to gain renewed interest.

Events in Alzheimer’s underpin need for new targets

2022 brought its fair share of ups and downs for the indication which breakthroughs have eluded for so long, Alzheimer’s disease (AD). In what some have hailed as a landmark victory for the field, Biogen and Eisai’s lecanemab scored a [Phase III win](#), with the drug reporting a slowdown in

disease progression in patients with mild AD by 27% versus placebo. The positive result was a much-needed boost for Biogen, which will be hoping that lecanemab does not follow in the footsteps of the [Aduhelm controversy](#). However, it will require a change in policy from the Centers for Medicare & Medicaid Services (CMS) which, following the FDA approval of Aduhelm based on debatable efficacy findings, restricted coverage of anti-amyloid monoclonal antibodies to clinical trial settings. Advocacy groups are now [lobbying](#) the CMS to reverse these reimbursement restrictions if lecanemab receives full FDA approval (decision set for early 2023) and, in our view, this will be critical if the anti-amyloid field is to progress.

However, with the highs of lecanemab came the lows of Roche's gantenerumab, the [Phase III failure](#) of which dealt yet another major blow to anti-amyloids, casting serious doubt on AD antibodies targeting the fibril component of β -amyloid plaques, in contrast to lecanemab, which targets the protofibril component. All eyes are now on the key readouts from Eli Lilly's Phase III TRAILBLAZER-ALZ 2 donanemab study, which will determine whether it will challenge lecanemab on the AD stage or follow a more cumbersome clinical path. Lecanemab may also yet face challenges as regulators scrutinise its data following reports of a third patient death in December 2022, which may be [linked to the drug](#).

Regardless of the fate of anti-amyloids, there is clearly a need for greater innovation in the AD space. In our view, this may come in the form of a transition to the identification of new AD disease-modifying targets. While big pharma companies' anti-amyloids are likely to continue to make headlines, new targets are already the subject of earlier-stage clinical investigations being undertaken by biotechs (Exhibit 4). These early biotech studies should not be overlooked as, in our view, this is where true innovation lies. One positive readout may play a critical role in determining the future direction of the AD field and, with a string of biotech readouts going after new AD targets on the horizon, we will monitor this space closely in 2023. For a more detailed analysis of the neuroscience landscape please see our [recent report](#).

Exhibit 4: Selected AD trials of note in 2023

Company	Drug	Target/technology	Clinical status	Upcoming events
Eli Lilly	Donanemab	Anti-amyloid antibody	Phase III	Top-line readouts expected Q23
Anavex Life Sciences	Blarcamesine	SIGMAR1 small molecule agonist	Completed Phase II/III	Regulatory discussions in 2023 on clinical next steps
Cassava Sciences	Simufilam	Altered Filamin A (FLNA) targeting small molecule antagonist	Two ongoing Phase III studies: REFOCUS-ALZ , RETHINK-ALZ	Ongoing patient recruitment
Vivoryn Therapeutics	Varoglutamstat	Multi-upstream AD pathway targeting (amyloid and tau) small molecule inhibitor of QPCT and QPCTL	Phase II	US study status update Q123
Actinogen	Xanamem	11 β -HSD1 inhibitor	Phase IIb planning underway	Expected to start H1 CY23
AC Immune (Roche/Genentech)	Semorinemab	Anti-tau antibody	Phase II	Awaiting further company communication – expecting Phase II open label extension biomarker data in 2023
Lexeo Therapeutics	LX1001	APOE2 gene therapy	Phase I/II	Awaiting further company communication

Source: Edison Investment Research

CGTs: Blockbuster price tags, but not always sales

In what may be considered a major step forward for the cell and gene therapy (CGT) field, 2022 saw FDA approval of three new gene therapies and, with that, the title of the world's most expensive drug changing hands three times. In 2023, we may very well see this change again, as three more gene therapies head to the regulators in a bid to make it onto the growing list of genetic medicines. CRISPR Therapeutics and Vertex's gene editing therapy CTX001 may represent a further breakthrough for CGTs as approval would mark the first ever CRISPR gene-editing technology to get approved. Today's approved gene therapies focus on the delivery of new whole

genes. However, many are heralding gene-editing (CRISPR/Cas9) technologies, which aim to change an individual's underlying DNA to fix a defective gene, as the future of CGTs. Whole gene viral vector delivery may be considered less durable than gene editing because, when cells multiply, the therapeutic gene is not replicated, becoming diluted and losing efficacy over time, something which gene editing aims to circumvent. With CTX001 potentially going directly up against bluebird bio's Skysona in the blood disorder beta-thalassemia, it will make for an interesting battle, pitting the old versus the new.

Exhibit 5: Approved 2022 gene therapies and upcoming FDA reviews

Company	Drug	FDA approval	Approval indication	List price (cost per patient) US\$	Est. global sales 2028 US\$*
CRISPR Therapeutics/ Vertex	CTX001	Biologics licence application submission expected Q123	Beta-thalassemia and sickle cell disease	2.0m (est) per treatment	1.0bn
Sarepta Therapeutics/ Roche	SRP-9001	Review expected May 2023	Duchenne muscular dystrophy	No estimates	2.2bn
BioMarin	Roctavian**	Review expected March 2023	Haemophilia A	1.9–2.5m (est) per treatment	1.4bn
CSL Behring	Hemgenix	November 2022	Haemophilia B	3.5m per treatment	No estimates
bluebird bio	Skysona	September 2022	Cerebral adrenoleukodystrophy (rare disease)	3m per treatment	21m
bluebird bio	Zynteglo	August 2022	Beta-thalassemia	2.8m per treatment	391m

Source: Edison Investment Research, [FDA cell and gene therapy approvals](#). Note: *According to Evaluate Pharma. **Approved in EU.

However, one thing we do not anticipate changing for the foreseeable is the hefty price tag that come with CGTs, and the uphill struggles that biopharma companies will continue to face in payer negotiations. With bluebird bio's 2022 gene therapy approvals only expected to reach combined peak sales of c US\$410m by 2028 (source: EvaluatePharma), it provides a reality check that [reimbursement woes](#) may mean multimillion-dollar drugs do not necessarily translate into multibillion-dollar sales.

On the cell therapy front, CAR-Ts are leading the way. With Johnson & Johnson's (J&J) Carvykti and Bristol-Myer Squibb's Abecma and Breyanzi all expected to achieve blockbuster status and J&J backing up its drug with impressive [long-term follow-up data](#), there is little doubt about the effectiveness of the treatments. However, with these patient-specific treatments (autologous) having proved their clinical utility, we believe attention is set to shift to donor-derived (allogenic), off-the-shelf CAR-T therapies that aim to provide patients with more immediate access to treatment.

Again, biotechs are making strides in this area and 2022 was brought to a historic close with the approval of the world's [first off-the-shelf T-cell therapy](#), Ebvallo, from Atara Biotherapeutics. In our view, it is only a matter of time before we see the first 'off-the-shelf' CAR-T approval and Allogene Therapeutics is the one to watch. In October 2022, it initiated what is believed to be the industry's [first](#), potentially registrational [Phase II](#) allogenic CAR-T study in a subset of large B-cell lymphoma. While readouts from the study are not expected any time soon, Allogene is targeting patient enrolment to be completed by H124.

Allogene is also making inroads into solid tumour indications, something which CAR-Ts have, so far, struggled to crack. While it is still very early days, the company claims that [33% response rates](#) achieved from its Phase I study in renal cell carcinoma represent one of the first clinical signs of an allogenic cell therapy achieving a positive impact on solid tumours. Positive results in this trial would mark one of the most significant breakthroughs for off-the-shelf therapies. For a more detailed analysis of the CGT landscape please see our [recent report](#).

Brighter days ahead for cancer vaccines

For cancer vaccines, 2022 finished with positive news as the immunotherapeutic class continues to make something of a clinical comeback in the oncology treatment landscape. Merck and Moderna released some highly encouraging results in [December 2022](#) from a Phase II study investigating the [jointly developed](#), personalised mRNA vaccine (mRNA-4157/V940) in combination with Merck's immune checkpoint inhibitor (ICI) goliath, Keytruda, for the treatment of melanoma. Notably, the combination therapy reduced the risk of tumour recurrence, or death, in patients by 44% compared to Keytruda alone. The announcement followed shortly after Merck had shored up its commitment to the programme, having [exercised its licensing option](#) in October 2022 to progress development, triggering a \$250m payment to Moderna. With the partners now looking to initiate a Phase III study in melanoma in 2023 and the intention of moving into [additional tumour indications](#), it certainly feels as though cancer vaccine technology is moving in the right direction and has the big pharma backing to support it.

However, while such a personalised approach may grant higher efficacy, as drugs are tailored to an individual's specific disease profile, it is likely that, from a cost and manufacturing perspective, patient-specific vaccines will [encounter the same issues](#) that have plagued patient-specific cell therapies. Even today, those who may be considered the big pharma leaders in personalised cell therapies [continue to struggle](#) with production bottlenecks and timely supply of treatments, a serious issue for patients with aggressive cancers. Such constraints have led to some biotechs [making strategic decisions](#) to focus on more universal treatments. The reality is that, today, the operational infrastructure to accommodate the mass production of personalised treatments is simply not in place and may not be for quite some time. In the case of cancer vaccines, which aim to target larger patient populations across a broad range of indications, we believe the companies investigating more universal approaches looking to provide timelier, upfront access to treatment for patients are the ones to watch.

2023 is set to be a big year of readouts for Ultimovacs and its off-the-shelf, universal cancer vaccine candidate, UV1. The Scandinavian biotech's lead asset has already notched up some [encouraging long-term survival data](#) from a Phase I study in melanoma and a handful of Phase II readouts across various solid tumour indications are expected throughout the year (Exhibit 6).

Exhibit 6: Upcoming cancer vaccine trial readouts in 2023

Company	Vaccine	Indication	Clinical status	Upcoming events
Ultimovacs	UV1	Malignant melanoma	Phase II	Top-line readouts expected H123
Ultimovacs	UV1	Pleural mesothelioma	Phase II	Top-line readouts expected H123
Ultimovacs	UV1	Head and neck cancer	Phase II	Top-line readouts expected end 2023
Ultimovacs	UV1	Ovarian cancer	Phase II	Top-line readouts expected end 2023
Ultimovacs	UV1	Non-small cell lung cancer	Phase II	Top-line readouts expected end 2024
Mendus	DCP-001	Acute myeloid leukaemia	Phase II	Median relapse-free survival data in 2023

Source: Edison Investment Research

The end of 2022 also brought more positive readouts for vaccines in the form of Mendus's off-the-shelf, cell-based vaccine, DCP-001. At the 64th American Society of Hematology Annual Meeting, the company reported positive top-line readouts from its Phase II study in acute myeloid leukaemia (AML) scoring significantly [improved survival rates](#) over existing AML maintenance therapy. The DCP-001 data could, in our view, help support potential licensing/acquisition opportunities for Mendus and we look forward to seeing the next steps for this promising treatment. For more details of our view on cancer vaccines, please see our [recent report](#).

A more Immediate focus on viral vectors and LNPs

With the approvals of Zynteglo, Skysona and Hemgenix more than doubling the number of gene therapies on the market in 2022, J&J's Carvykti adding to the growing CAR-T cell therapy list and numerous approval decisions on the horizon in 2023, we do not anticipate a slowdown in CGT development activity anytime soon. Despite various high-profile [patient events](#) concerning safety and substantial [costs](#) calling into question the commercial tenability of large-scale manufacturing, viral vectors continue to be the front runner in CGT drug delivery technologies, bridging the transition of CGT treatments from the clinic to market. The clinical pipeline is packed with candidates utilising viral vector-based platforms, so the technology is likely to be in use for the foreseeable future, at least for the next wave of genetic medicines.

Yet there are those committed to tackling the current issues with viral vectors head on through the development of modified versions of the technology. Despite having a preclinical pipeline, Voyager Therapeutics' TRACER AAV discovery platform has caught the attention of some big players by securing licensing option deals with Pfizer and Novartis. The Novartis deal signed in [March 2022](#) saw Voyager receive a \$54m upfront payment, while Pfizer exercised part of its licensing option in [October 2022](#), triggering the receipt of a further \$10m. The Pfizer decision provides external validation for the company's platform, which could be further bolstered if Novartis chooses to exercise its own option, with a decision expected in [March 2023](#).

Following viral vectors, lipid nanoparticles (LNPs) appear to be finding their place in the world of RNA medicines. The COVID-19 pandemic brought about a surge of research and funding that not only accelerated the development of RNA therapeutics, evidenced by the success of the mRNA vaccines, but also marked an additional clinical milestone by furthering the application of LNPs. One such company to look out for is Beam Therapeutics, which is at the forefront with its next-generation RNA therapeutic pipeline, which utilises LNPs. Pfizer paid \$300m upfront to Beam in [January 2022](#) in a deal covering three discovery-stage programmes that will investigate Beam's proprietary mRNA/LNP gene editing technology in rare liver, muscular and CNS diseases. Merck also stepped up its interest in LNP technology [in 2022](#) with a \$150m investment into Orna Therapeutics' discovery-stage mRNA vaccine technology and a further commitment of \$100m in series B financing. The pandemic triggered a period of heightened investment which saw an increasing number of companies step up resources in RNA development and we believe it is likely that the momentum will continue into 2023. To see our analysis on drug delivery platforms as well as emerging technologies in the space, see [our recent report](#).

Scope for innovation in women's cancer

Despite the successes of modern women's cancer therapies, significant unmet medical need remains, such as a lack of effective therapeutics targets in some tumours (triple negative breast cancer, high-grade serous ovarian cancer), therapeutic resistance (anti-oestrogen resistance) and toxicity issues. 2022 brought some progress in new targeted therapies coming to market, with the [approval](#) of Daiichi Sankyo and AstraZeneca's antibody drug conjugate, Enhertu, as the first HER2-directed therapy to be approved in the United States for the treatment of HER2 low metastatic breast cancer (mBC).

However, with many large pharmaceutical programmes focusing on the development of therapies to treat established targets (such as HER2), the later-stage clinical pipeline (Phase III) is awash with 'me-too' drugs. Highly differentiated drugs that act through new mechanisms of action in women's oncology are more likely to be found earlier in the development pipeline (Phase I and II) and concentrated in smaller biotech companies. We expect important breakthroughs from biotechs

targeting new, less clinically validated mechanisms that could quickly become the subject of licensing/partnership/acquisition deals.

Context Therapeutics is doing just that with its lead clinical candidate, ONA-XR, targeting the progesterone receptor (PR) in PR positive mBC patients, which it believes could overcome anti-oestrogen resistance and enhance existing hormone therapy regimens. There are currently no PR-targeting drugs approved for the treatment of mBC and, to our knowledge, ONA-XR is the only fully selective PR antagonist in clinical development. In [December 2022](#), Context reported encouraging preliminary survival data from its Phase II study in mBC investigating ONA-XR in combination with the oestrogen receptor-targeting therapy fulvestrant, with further updates expected in Q423. Context also initiated a critical Phase Ib/II study in [November 2022](#) combining ONA-XR with elacestrant (developed by the Menarini Group) in mBC. With elacestrant having [demonstrated better efficacy](#) than fulvestrant (standard of care) in a Phase III mBC study, we view this trial as a key value proposition for the company and eagerly await initial data in Q423. For a more detailed view on the women's oncology landscape, please see our [recent report](#).

The need remains in AML

AML treatment is still highly reliant on intensive chemotherapy, meaning large numbers of the AML patient population are left underserved by such treatment regimens (c 80% of new AML patients are aged over 65 and are highly unlikely to be fit for chemotherapy). Additionally, the heterogeneous nature of AML means that even with the approval of more sophisticated and targeted therapies like Xospata, they may not be suitable or effective for many AML patients. The potential commercial opportunities in AML are therefore considerable, given the distinct unmet medical needs. In line with our existing sentiment, we believe the AML development pipeline will become an increasingly innovative space, to which smaller biotechnology companies will be significant contributors.

Oryzon Genomics finished 2022 on a positive note when it presented [encouraging data readouts](#) from the Phase IIa ALICE trial investigating its lead oncology asset iadademstat in combination with azacitidine for the treatment of AML in newly diagnosed elderly/unfit patients. Oryzon intends to keep up the clinical pace of iadademstat in AML with the initiation of a Phase Ib study in a subset of relapsed/refractory AML patients (FLT3+), an indication that may represent a sizable opportunity in a market segment with less overall competition. Management had communicated that the study would be initiated by end 2022, so we expect patient enrolment to commence imminently.

2022 also saw some notable licensing activity on AML assets by large pharmaceutical companies for considerable amounts. Bristol-Myers Squibb's strategic partnership with Century Therapeutics, [worth up to c US\\$3bn](#) in payments and milestones (excluding royalties), will look to develop off-the-shelf immune cell therapies (CAR-T, NK cells) to treat a range of solid tumours and blood cancers that include AML. Gilead also signed a licensing deal with MacroGenics [worth up to c \\$1.7bn](#) in total payments and milestones (excluding sales royalties), investigating the bispecific antibody Phase I candidate, MGD024, to treat AML and various other haematological malignancies. For a more detailed analysis of the AML landscape, see our [recent report](#).

Not out of the woods, but optimism going into 2023

It could be argued that the macroeconomic fallout experienced in 2022 hit the biotech sector harder than any other industry. With more than [100 biopharma companies](#) trimming costs through staff reductions in an effort to extend cash runways, one of the [weakest periods](#) of biotech IPOs experienced in the last five years and downward spiralling valuations, even the most optimistic

observer would struggle to put a positive spin on the year. We do not expect a complete turnaround in 2023 but rather a stabilisation partially benefitting from strategic investments and partnerships.

It is highly likely that current market conditions, accompanied with rising costs of capital, will persist, at least for the interim period, yet even in these challenging times there is cause to be optimistic. The current climate has triggered a period of (perhaps necessary) right-sizing, with valuations readjusting, companies revisiting their strategies and trimming clinical pipelines. Lower valuations combined with many big pharma companies' ambitions to replenish their pipelines and being relatively cash rich has also meant that the stage is [potentially set in 2023](#) for an uptick in M&A activity. The end of 2022 may have given us a taste of things to come, with Amgen winning its battle to secure the [\\$28bn takeover](#) of Horizon. However, this is not to say that double-digit billion-dollar deals will be the norm, with Novartis's CEO [stating that](#) any M&A activity the company is looking to conduct would potentially be in the sub-\$2bn range. 2023 has already begun with some acquisition activity as Moderna announced its [first-ever acquisition](#), targeting the Japanese DNA manufacturer OriCiro Genomics for \$85m.

In 2021, the industry was, arguably, saturated with too many candidates and too many biotechs, so a market downsizing may not only make companies leaner but will also provide greater focus on the development of key assets. Ultimately, it will be the biotechs with the most robust underlying technology that will make it to the other side.

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