Despite the challenges of the COVID-19 pandemic, 2020 was a landmark year for investment in biotech and pharma (Nat. Rev. Drug Disc. 20, 93–94; 2021). Once again, oncology played a large part in dealmaking (Biopharma Dealmakers B23–25, December 2020) with $133 billion total disclosed deal value. Drug licensing activity accounted for $59 billion of that, and, while there was a general downturn in large mergers and acquisitions (M&A) throughout 2020, oncology M&A totaled $45 billion in disclosed deal value.

**Licensing trends**

Immuno-oncology (IO) continues to feature strongly in oncology dealmaking, being involved in 49% of drug licensing transactions and representing 66% of the total disclosed deal value. Of the 21 oncology drug licensing deals larger than $1 billion in value, 15 were for IO-related assets, and 9 of those were for multi-targeted approaches such as bispecific antibodies and antibody–drug conjugates (ADCs) (Table 1). AstraZeneca topped the drug licensing list again this year with its partnership with Daiichi Sankyo, paying $1 billion upfront with a total potential value of $6 billion to license the anti-TROP2 ADC datopotamab deruxtecan, following the pair’s successful development and commercialization of the anti-HER2 ADC trastuzumab deruxtecan in 2019.

Similarly, Merck & Co. licensed Seattle Genetics’ phase 2 anti-LIV1 ADC ladiratuzumab vedotin for $600 million upfront and with a total potential value of $3.2 billion. Also noteworthy are AbbVie’s agreement to license Gemma’s phase 2 bispecific antibodies for $750 million upfront with a total projected value of $3.9 billion, the third largest drug licensing deal of 2020, and Genentech’s agreement to license Bicycle Therapeutics’ drug discovery platform for $1.7 billion total projected value and $30 million upfront. This is the largest ever deal for Bicycle’s novel protein-binding technology, which pairs a bicyclic binding protein to a toxin to create a bicyclic–drug conjugate.

Interestingly, of the six non-IO top drug licensing deals, three were for precision medicine drugs with potential values of greater than $1.5 billion, with the largest of these being GlaxoSmithKline’s deal to license IDEAYA Biosciences’ synthetic lethality drugs, which has a total projected deal value of $3 billion and includes $100 million paid upfront (Table 1). This represents one of the largest ever payouts for a technology that promises to drug the undruggable.

Multi-target drugs achieved the highest drug licensing deal values in 2020, accounting for 37% of the total licensing deal value despite only accounting for 12% of transactions (Fig. 1). Unlike in 2019, where there were multiple deals around fusion protein technologies, the majority of the multi-target drugs licensing deals of 2020 were for ADCs and bispecific antibodies, and they accounted for 80% of the multi-target deal value. The past few years have seen growing interest and investment in these drugs. This year’s dealmaking reflects the clinical success of these modalities, as there are now 10 ADCs that have received regulatory approval globally, and, while only 3 bispecific antibodies are registered, 11 are in phase 3 clinical trials.

In terms of development stage, drug licensing deal volume has been largest at the discovery stage in recent years, and that continued to be true in 2020 (Fig. 2). What was surprising in 2020 was the volume of activity around drugs in phase 1 of clinical development, with nearly twice as many phase 1 drug licensing deals signed in 2020 compared with 2019 (Biopharma Dealmakers B2–4, March 2020). Drugs in phase 1 achieved the highest average deal values ($842 million) and average upfront payments ($263 million) in 2020, where disclosed; however, the averages are inflated by the AstraZeneca/Daiichi Sankyo pact, which was the largest drug licensing deal in 2020, as discussed earlier. Drugs in phase 1 do not normally achieve such high price tags, but this deal follows a very successful collaboration between...
the two companies on trastuzumab deruxtecan, an ADC that was then in phase 2 and went on to demonstrate clinical success, gain regulatory approval, and is predicted to be a blockbuster by 2024, according to Clarivate. Removing the AstraZeneca/Daiichi Sankyo deal from the 2020 averages, phase 1 drugs achieved the lowest average upfront payments ($17 million) and total potential deal value ($198 million) in 2020, with the highest upfront payments achieved in the later stages of drug development and the highest total deal potential coming in the early discovery and preclinical stages, though those deals will be subject to numerous milestones (Fig. 2).

Indeed, of the top $1 billion-plus licensing transactions in 2020, eight were for drug discovery platforms (Table 1), representing high value in developing novel technologies from an early stage. Discovery stage transactions account for 30% of licensing transactions and represent a variety of drug technologies, including cell therapy (29%), small molecules (28%), multi-target drugs (18%) and antibodies (9%), perhaps indicating an industry-wide interest in diversifying the early-stage pipeline (data not shown). The highest value discovery stage transaction was Janssen’s deal with Fate Therapeutics for access to its induced pluripotent stem cell therapy platform, paying $50 million upfront with a total potential of $3.1 billion. There were also large payouts for bispecific T cell engagers, precision medicines and protein degradation modulators (Table 1).

### M&A trends
While M&A activity in biopharma was comparatively slow in 2020, there were seven $1 billion-plus M&A deals in oncology (Table 2). Interestingly, four of the acquisitions...
were for IO-related drug assets and the other three were for genetics-based diagnostics platforms.

Similarly to the high-value licensing activity in 2020, there were high-value M&A deals around multi-targeted therapies. The highest-value M&A deal in 2020 was Gilead’s acquisition of Immunomedics following the US Food and Drug Administration approval of its anti-TROP2 ADC sacituzumab govitecan for metastatic breast cancer. Merck & Co. acquired VelosBio for $2.75 billion, gaining its anti-ROR1 ADC, VLS-101, which is in phase 2 of clinical development. Boehringer Ingelheim agreed to acquire NBE-Therapeutics for $1.3 billion based on its next-generation iADC platform that generates highly specific, immune-stimulatory ADCs. The company’s lead candidate, NBE-002, has since entered into phase 2 clinical trials for various solid tumors in multiple sites across the USA. In a non-ADC-related purchase, Gilead also acquired Forty Seven for $4.9 billion, gaining its anti-CD47 antibody magrolimab, a first-in-class IO target that looks promising in treatment for newly diagnosed myelodysplastic syndrome.

Diagnostics were also prominent among M&A deals, with three of the $1 billion-plus M&A deals executed by diagnostics companies (Table 2). The diagnostics giant and worldwide leader in next-generation sequencing, Illumina, sought to reacquire its spinout GRAIL for $8 billion, gaining back its blood-based diagnostics expertise focused on early detection. Exact Sciences acquired Thrive Earlier Detection for $2.15 billion, also focused on early detection and screening of multiple cancer types. Finally, Invitae acquired ArcherDX for $1.4 billion, gaining its portfolio of precision medicine and liquid biopsy products.

**Conclusion**

In summary, 2020 was another big year for oncology dealmaking. IO continued to drive high-value drug licensing deals, and there was a return to high-value IO M&A deals compared with 2019. Multi-targeted therapies again featured prominently in drug licensing activity but also appeared in high-value M&A deals in 2020, with ADCs featuring in both the highest-value drug licensing transaction (AstraZeneca/Daiichi Sankyo) and M&A deal (Gilead/Immunomedics) following continued clinical success of these drugs in solid tumor indications. While M&A activity was slow across biopharma in the beginning of 2020, oncology M&A deal activity remained high, with 48 agreements and a total disclosed deal value of $45 billion. As the pharmaceutical industry gears up to deliver coronavirus vaccines across 2021, it will be interesting to watch investment in oncology trends across this year.

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