Oncology dealmaking in 2020

After a slow start due to the COVID-19 pandemic, oncology dealmaking thrived in 2020 as immuno-oncology fueled a number of high-value drug licensing deals and a string of billion-dollar M&As were announced.

Sarah Hardison

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 Genmab'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

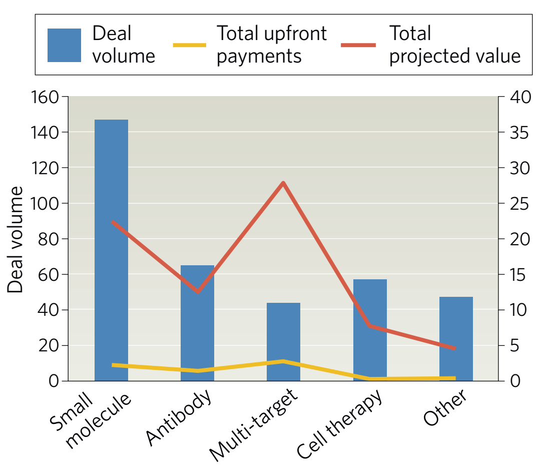

Fig. 1 | Licensed oncology drug technologies. Drugs were categorized using the 'Technologies' field of oncology deals extracted from Cortellis. Multi-target drugs capture the highest accumulated deal value and upfront payments, where disclosed. Small molecule deals account for 41% of drug licensing transactions by volume. Data are from Cortellis Deals Intelligence from Clarivate.

Table 1 | $1 billion-plus oncology drug licensing deals in 2020

Buyer	Seller	Total projected value ($ million)	Upfront payment ($ million)	Mechanism	Drug(s)	Status (deal start)	IO
AstraZeneca	Daiichi Sankyo	6,000	1,000	Antibody–drug conjugate	Datopotamab deruxtecan	Phase 1	✓
Pfizer	Myovant	4,250	650	Hormone receptor antagonist	Relugolix; relugolix + estradiol + norethindrone combination	Launched	
AbbVie	Genmab	3,900	750	Bispecific T cell engager	GEN-1044; GEN-3009; epcoritamab	Phase 2	✓
Merck & Co.	Seagen	3,200	600	Antibody–drug conjugate	Ladiratuzumab vedotin	Phase 2	✓
Janssen	Fate Therapeutics	3,100	50	CAR T cells	Drug discovery platform	Discovery	✓
GlaxoSmithKline	IDEAYA	3,030	100	Precision medicine; synthetic lethality	IDE397; Pol-theta inhibitors; werner inhibitors	Preclinical	
AbbVie	I-Mab	2,940	180	Anti-CD47 antibody	Lemzoparlimab	Launched	✓
Astellas	CytomX	2,580	80	Bispecific T cell engager	Drug discovery platform	Discovery	✓
Merck & Co.	Taiho	2,550	50	Precision medicine; KRAS inhibitor	Drug discovery platform	Preclinical	
Innovent	Roche	2,100	Unspecified	Bispecific T cell engager; CAR T cell	Drug discovery platform	Discovery	✓
Roivant	Affimed	2,091	40	Bispecific natural killer cell engager	AFM-32 and others	Preclinical	✓
Gilead	Arcus	2,000	175	Anti-ITIM antibody; anti-PD1 antibody	Domvanalimab; zimberelimab	Pre-registration	✓
Incyte	MorphoSys	1,955	750	Anti-CD19 antibody	Tafasitamab	Pre-registration	✓
Genentech	Bicycle	1,720	30	Peptide–drug conjugate	Drug discovery platform	Discovery	✓
Roche	Blueprint	1,702	675	Precision medicine; RET inhibitor	Pralsetinib	Pre-registration	
Astellas	Adaptimmune	1,457.5	50	CAR T cells	Drug discovery platform	Discovery	✓
EQRx	CStone	1,300	150	Anti-PD1 antibody; anti-PDL1 antibody	CS1003; sugemalimab	Phase 3	✓
AstraZeneca	Accent	1,155	55	RNA-modifying protein inhibitors	Drug discovery platform	Discovery	
Abpro Bio	Abpro	1,100	Unspecified	Bispecific T cell engager	ABP-100; ABP-201	Preclinical	✓
AbbVie	Frontier	1,055	55	Protein degradation targets	Drug discovery platform	Discovery	
Merck & Co.	Janux	1,001	Unspecified	Bispecific T cell engager	Unspecified drug candidates	Preclinical	✓

Drug licensing deals in 2020 with total projected deal value greater than or equal to $1 billion. 'Status' indicates the furthest development stage of any asset included in the deal at deal start date. 'IO' indicates whether any asset in the deal involves immuno-oncology. Data are from Cortellis Deals Intelligence from Clarivate.

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-derived 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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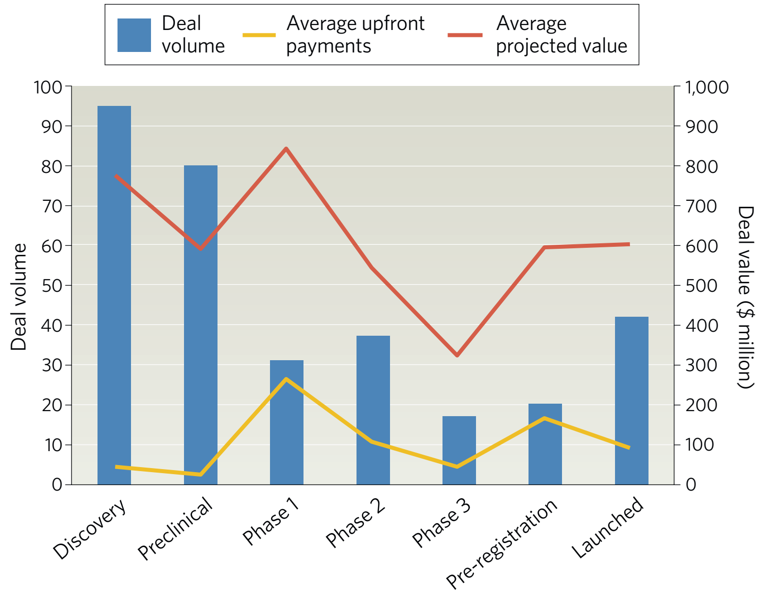

Fig. 2 | Oncology drug licensing values in 2020 by development phase. Development phase refers to the furthest status of any asset included in the deal at deal start. The greatest volume of transactions occurs at discovery stage, and the majority of these are for drug discovery platforms. The highest average deal values were achieved by assets in phase 1, where disclosed. Data are from Cortellis Deals Intelligence from Clarivate.

Table 2 | $1 billion-plus oncology M&A deals in 2020

Seller	Buyer	Total projected ($ million)	Technology	IO
Immunomedics	Gilead	21,000	Antibody–drug conjugate (sacituzumab govitecan)	✓
Grail	Illumina	8,000	Diagnostics (genomics)	
Forty Seven	Gilead	4,900	Anti-CD47 antibody (magrolimab)	✓
VelosBio	Merck & Co.	2,750	Antibody–drug conjugate (VLS-101)	✓
Thrive Earlier Detection	Exact Sciences	2,150	Diagnostics (genomics)	
ArcherDX	Invitae	1,400	Diagnostics (genomics)	
NBE-Therapeutics	Boehringer Ingelheim	1,379	Antibody–drug conjugate (NBE-002)	✓

M&A deals in 2020 with total projected deal value greater than or equal to $1 billion. 'IO' indicates whether any asset in the deal involves immuno-oncology. Disclosed deal values. Data are from Cortellis Deals Intelligence from Clarivate.