Thursday, September 2, 2021

Company Report

China Merchants Securities (HK) Co., Ltd.
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I-Mab (IMAB US)

Its' the differential that makes the difference

- **I-Mab is a China-based biotech w/ a MoA-differentiated R&D portfolios of 11 clinical-stage assets, with potential to be BIC or FIC**
- **Co.'s USD2bn upfront-biobucks R&D deal with AbbVie validates its R&D strength, providing unique opportunity to add alpha**
- **We initiated coverage on I-Mab with a BUY rating and FY22E SOTP-based TP of USD106, implying 48% upside potential**

A unique growth model to maximize pipeline value

The notable deal with AbbVie has validated I-Mab's value creation strategy and R&D strength. As one of the few biotech with proven out-licensing track record with top MNC pharmaceutical, we think some other I-Mab's MoA-differentiated pipelines (i.e. ulildlimab, plonmarlimab) are also uniquely positioned to achieve similar catalyst for value creation, supported by their scientific and commercial attraction. Per Evaluate Pharma, the global average takeout premium for a research-stage biotech ranged 45%-143% over 2016-2021YTD. In addition, We think I-Mab has greater financing flexibility in pre-commercial stage amongst its biotech peers. We anticipated the potential cash flow from milestone income will reach USD80mn-150mn (~RMB520mn-975mn) in 2021E-2023E. Lastly, we think this model places less reliance on external equity financing, which also reduces dilution risk for I-Mab's existing shareholders.

Core pipeline assets see "blockbuster potential"

The three core assets in the pipeline are from in-house developed compounds with potential to be best-in-class (BIC) or first-in-class (FIC): 1) Lemzoparlimab (TJC4, αCD47) differentiates on safety profile with potential to be promising I/O therapy for blood and solid tumors. The upcoming early safety and efficacy readout in 4Q21E should serve as a meaningful catalyst; 2) Ulildlimab (TJD5, αCD73) has potential to be a BIC αCD73 agent which has synergistic therapeutic effect with mainstream I/O drugs in the tumor microenvironment; 3) Plonmarlimab (TJM2, αGM-CSF), in addition to inflammation disease, its outlook brightened by recent interim analysis of the ongoing U.S. ph2/3 study for severe COVID-19.

We initiate with BUY, SOTP-based TP of USD106

We set the SOTP-based TP at USD106 (Please see details in Valuation Part). Our main valuation method is risk-adjusted NPV, and applied a 20% premium to equity value to reflect the great potential in BD territory. We estimate Co. to generate revenue of RMB520mn/650mn/1,075mn in in 2021E-23E, but remain a loss position due to large R&D spending.

RMB mn	2019	2020	2021E	2022E	2023E
Revenue	30	1,543	520	650	1,075
yoy growth	-44%	5042%	-66%	25%	65%
Adjusted net profit	(1,085)	964	(577)	(690)	(570)
yoy growth	n.a.	n.a.	n.a.	n.a.	n.a.

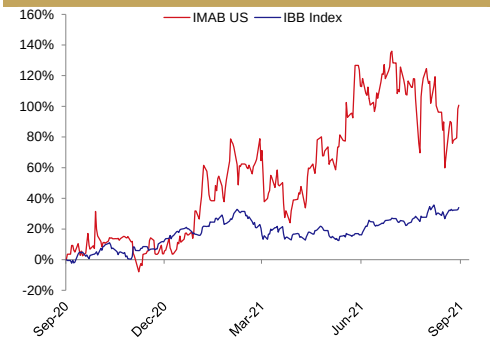
Sources: Company data, CMS (HK) estimates

Initiation

BUY

Price (September 1, 2021)	USD71.8
12-month Target Price (Potential up/downside)	USD106 (+48%)

Price Performance



Source: Bloomberg

%	1m	6m	12m
IMAB US	(6.6)	17.3	100.8
IBB	1.1	15.4	34.0

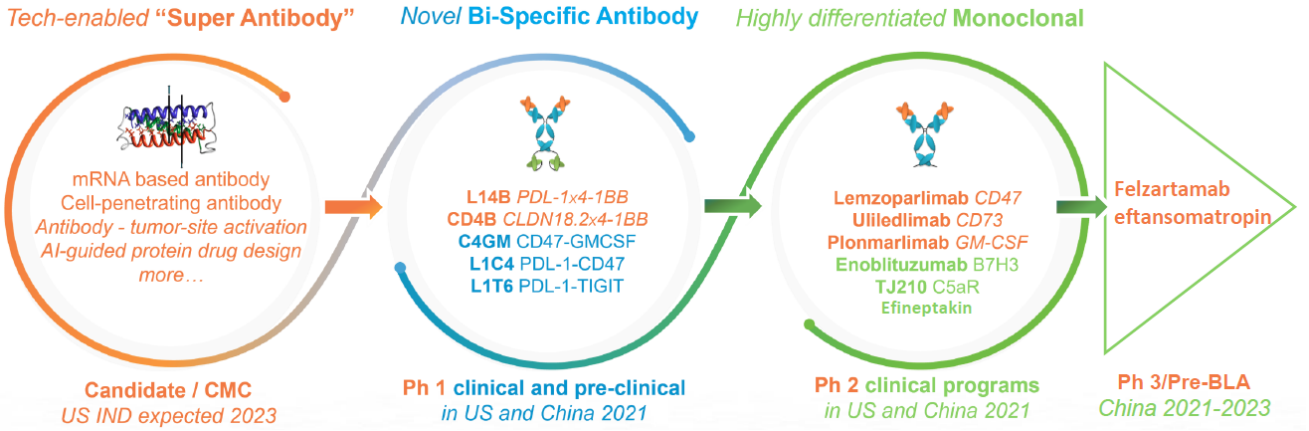
Sources: Bloomberg

Pharmaceutical & Healthcare	
NASDAQ (September 1, 2021)	15,310
IBB (September 1, 2021)	174.06
Key Data	
52-week range (USD)	32.6-85.4
Market cap (USD mn)	5,527
Avg. daily traded value (USD mn)	43.3
BVPADS (USD)	8.4
Shareholding Structure	
Managements	27.2%
Hillhouse	11.2%
Tasly	8.1%
GIC	7.3%
Genexine	5.9%
Hony	5.1%
Free float	35.2%

Sources: Company data, Bloomberg

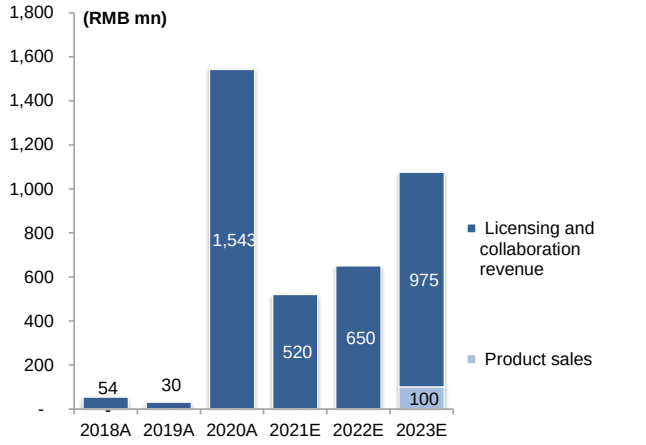
Focus charts

Figure 1: I-Mab's innovation and pipeline development in three waves



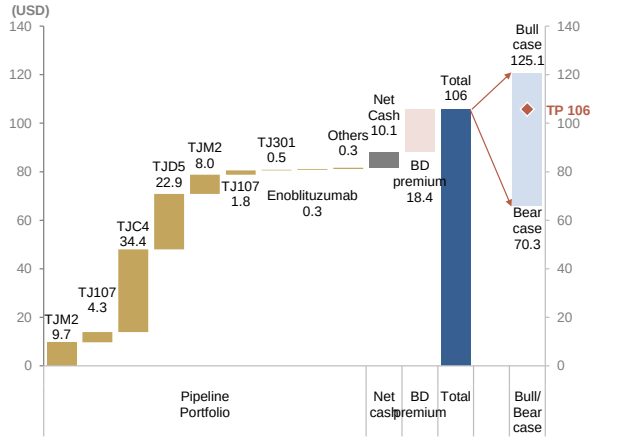
Sources: Bloomberg

Figure 2: Revenue forecast and breakdown



Sources: Company data, CMS (HK) estimates

Figure 3: rNAV per share breakdown



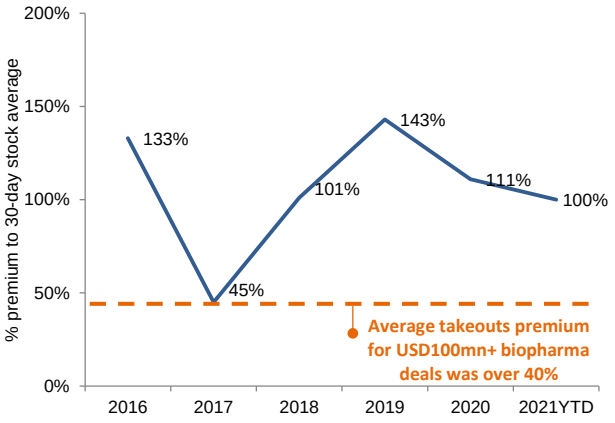
Sources: Company data, CMS (HK) estimates

Figure 4: Catalyst calendar

Products/ Pipelines	Target	Indication	21-22E Milestone / Event	Timeline	Achieved
Lemzoparlimab (TJC4)	CD47	NHL (+rituximab)	Preliminary data readout at ASH21	4Q21E	
		NHL (+rituximab)	Topline data readout	YE21E/22E	
		Solid tumor (+pembro)	Preliminary data readout	YE21E/22E	
Uliledlimab (TJD5)	CD73	Advanced cancer	Ph1 data readout at ASCO	Jun, 2021	✓
Felzartamab (TJ202)	CD38	3L MM	Topline data readout	2H21E	
		3L MM	NDA filing	2H21E	
		2L MM	NDA filing	FY23E	
Eftansomatropin (TJ101)	rhGH	PGHD	NDA filing	FY23E	
Efineptakin alfa (TJ107)	IL-7	Lymphopenia; I/O booster	Ph1b data readout at CSCO21	YE21E	
TJ301	IL-6	Ulcerative colitis	Ph2 data readout	Apr, 2021	✓
TJM2	GM-CSF	COVID-19 (CRS)	US interim data readout	Aug, 2021	✓

Sources: Company data, CMS (HK) estimates

Figure 5: The mean percentage premium to 30-day average of USD100mn+ biopharma buyouts



Source: Evaluate Pharma

Contents

Investment summary

I-Mab (hereafter referred to as Company), founded in 2014, is a China-based biotech company focusing on immuno-oncology and immune-inflammation with significant unmet medical needs in the global market. Co. has a proven growth strategy: 1) Global strategy propelled by its capable in-house R&D platform to maximize value creation opportunities (i.e. USD2bn upfront-biobucks R&D deal for lemzoparlimab with AbbVie in 2020); and 2) China strategy to source de-risked asset from global partner for China market. I-Mab's novel portfolio currently includes 11 clinical-stage pipeline assets.

According to Evaluate Pharma, the global average takeout premium for a research-stage biotech is tracking at 100% YTD 2021, while the average takeout premium during 2016-2020 was over 45%. Chinese biotech companies, long in-licensors of innovative biopharma assets for the region, have started to reverse the flow by out-licensing internally generated candidates to global players. We noted increased out-licensing deal count among Chinese biotech companies since 2020.

Against the backdrop of this evolving China biotech market, we think I-Mab presents attractive opportunity to add alpha through China biotech investment. Despite I-Mab's lemzoparlimab still in the early clinical stage, its deal size ranked among the top three largest China out-licensing deals in the history in terms of both upfront payment and biobucks (See Figure 7). We reckon the deal size clearly is a key facet to understand the commercial potential of the associated molecule and scientific strength of the company. As a biotech with proven out-licensing track record with top MNC pharmaceutical, we think some of I-Mab's MoA-differentiated pipeline with blockbuster potential (i.e. ulilediimab and plonmarlimab) are well positioned to benefit from the positive trends.

Biotech companies usually rely heavily on external equity financing to fund their R&D activities. Financing challenges might delay development progression. We think I-Mab has greater financing flexibility to pursue growth opportunities amongst its biotech peers, despite its first wave of product launch starting from 2023E. This is because I-Mab has potential to receive a sustainable and meaningful cash flow regulatory milestone payment from the R&D deal with AbbVie. We anticipated the potential cash flow from milestone income will reach USD80mn-150mn (~RMB520mn-975mn) in 2021E-2023E, adding strong support for I-Mab's growth strategy. In addition, we think less reliance on external equity financing also reduces dilution risk for I-Mab's existing shareholders.

I-Mab's portfolio currently includes 11 clinical-stage assets. The three core assets in the pipeline are from in-house developed compounds with potential to be best-in-class (BIC) or first-in-class (FIC): 1) **Lemzoparlimab** (TJC4, αCD47 mAb) differentiate on safety profile for I/O therapy. Nearly all types of tumors overexpress CD47, representing great clinical and commercial potential not only in hematological malignancies but in solid tumors. This has been evidenced by some preliminary data from other CD47 candidates (i.e. magrolimab, and ALX148). The ph1 U.S. study is underway exploring lemzoparlimab in combination with pembrolizumab for NSCLC and ovarian cancer. As one of the global leading αCD47 candidates, we reckon the upcoming early safety and efficacy readout in 4Q21E should serve as a meaningful catalyst, and we see 20-25% upside in the value of lemzoparlimab if efficacy plays out in human trials. 2) **Ulilediimab** (TJD5, αCD73 mAb) has potential to be a BIC αCD73 agent with no "hook effect" through intra-dimerization mechanism v.s. other competitive αCD73 candidates. CD73 is a cell surface enzyme which is overexpressed in the tumor microenvironment (TME) and promotes tumor growth by limiting anti-tumor. The scientific attraction of the CD73 and synergistic therapeutic effect with other I/O drugs should drive CD73 class entering global BD/M&A territory. We believe I-Mab's ulilediimab, as a leading αCD73 mAb, is well positioned to achieve value creation along this path. 3) **Plonmarlimab** (TJM2, αGM-CSF mAb) is an investigational neutralizing antibody against human granulocyte-macrophage colony-stimulating factor (GM-CSF). GM-CSF is a central driver cytokine in orchestrating an innate immune response during inflammation. The recent interim analysis of the ongoing U.S. ph2/3 study for severe COVID-19 showed plonmarlimab treatment resulted in lower mortality rate and reduced time to recovery and hospitalization duration as compared to placebo. Given limitations of current COVID-19 treatment and uncertainties of COVID-19 variants, we reckon plonmarlimab as a non-variant dependent treatment should has greater potential in treating severe COVID-19 (U.S. market at least at ~USD1.3bn/yr given a endemic COVID-19 may be a more realistic endpoint than herd immunity., per our calculation), comparing to viral targeted neutralizing antibody.

I-Mab also built a China-focused pipeline to source the promising overseas product to China market. **Felzartamab** (TJ202) is a fully human αCD38 antibody in-licensed from MorphoSys in 2017. TJ202 is positioned as a potential differentiated αCD38 therapy for multiple myeloma (MM), given its short infusion time and low infusion reaction rate (IRR). Two registrational trials are underway exploring in 3L monotherapy trial and a 2L combination therapy trial in MM in Greater China. In addition, TJ202 is in early clinical trials for 1L MM patients and SLE. **Eftansomatropin alfa** (TJ101) is a long-acting recombinant human growth hormone (rhGH) for treatment of growth hormone deficiency (GHD), in-licensed from Genexine in 2015. TJ101 is considered as a more convenient (weekly/bi-weekly vs daily injection) and better safety profile (natural protein-based long-acting protein vs. PEG/chemical linkers), compared to currently marketed rhGH products. We anticipate the market will gradually shift to a higher long-acting adoption from now onwards, thanks to stricter regulation and uptake of penetration rate. We believe TJ101 is well position to capture the growth opportunities in PGHD in China.

Meanwhile, Co. continued its focuses on adding the next wave of innovation into its portfolio, maximizing its long-term value creation. At present, the second wave consists of a series of early-stage development projects focusing on differentiated MoA candidates (i.e. IL-7i, IL-6i, B7-H3, and αC5aR, etc.) or novel drug modalities (i.e. CD47xGM-CSF BsAb, Claudin18.2x4-1BB BsAb).

We estimate that I-Mab should generate the revenue of RMB520mn/650mn/1,075mn in 2021E/22E/23E, thanks to the sustained regulatory milestone income from TJC4's (lemzoparlimab) out-licensing deal with AbbVie and the marketing of TJ101 (eftansomatropin alfa) and TJM2 (plonmarlimab) in 2023E. I-Mab reported adj. net profit of RMB964mn in 2020 owing to hefty licensing revenue from the AbbVie deal. We don't expect Co. to remain in profit over 2021E-2023E. This is because we project that uptrend of R&D expense from RMB1.3bn to RMB2.1bn over 2021E-23E, reflecting more R&D pipeline advancing into late-phase clinical studies.

We set the SOTP-based TP at USD106. Our main valuation method is risk-adjusted NPV, primarily consisting of lemzoparlimab (αCD47, valued at RMB12.9bn), uliledlimab (αCD73, RMB8.7bn), plonmarlimab (αGM-CSF, RMB3.0bn), eftansomatropin alfa (Long-acting rhGH, RMB3.7bn), felzartamab (αCD38, RMB1.6bn) and a 20% BD premium to reflect potential value creation through BD success thanks to its MoA-differentiated pipeline and proven track record. The valuation range is determined by the varying PoS and patient share in each indication.

Major catalysts to watch in 2H21E/22E: 1) **Felzartamab:** 3L MM BLA submission in 4Q21E; 2) **Lemzoparlimab:** the U.S and China nHL combo topline data read out in 4Q21E/1Q22E; U.S solid tumor combo w/ pembro preliminary data read out in 4Q21E/1Q22E; 3) **Efineptakin alfa:** China ph1 clinical trial data readout in 3Q21E; 4) potential opportunities in BD territory

Key risks: Clinical failure of core clinical assets; Worse than expected commercial launches; and Pricing uncertainty in the future China NRDL negotiation; Geopolitical uncertainty

Figure 6: Summary of I-Mab pipeline portfolio

Product	MoA	Indications (Lead)	Partner	Rights	Preclinical	Phase 1	Phase 2	Phase 3/ registrational	Expected BLA 2021-2024
Lemzoparlimab (TJC4)	αCD47 mAb	AML/MDS/nHL/ STs	AbbVie	China (100%) WW (~10-15% royalties)					2023/2024
Uliledlimab (TJD5)	αCD73 mAb	STs (PD-1/L1 combo)	n.a.	WW (100%)					
Plonmarlimab (TJM2)	αGM-CSF mAb	CRS (CGT/Severe COVID-19) / RA	n.a.	WW (100%)					
Felzartamab (TJ202)	αCD38 mAb	2L/3L MM	MorphoSys	CN (100%)					3L 2021 2L 2023
Eftansomatropin (TJ101)	Long-acting rhGH (Hy-Fc)	PGHD	Genexine	CN (100%)					2023
Efineptakin alfa (TJ107)	Long-acting rh IL-7 hyFc	Lymphopenia/ CPI booster	Genexine	CN (100%)					
Olamkicept (TJ301)	IL-6 protein inhibitor	UC	Ferring	CN & S.KR (100%)					
Enoblituzumab (TJ)	αB7-H3 mAb	STs	MacroGenics	CN (100%)					
TJ210	αC5aR mAb	STs	MorphoSys	WW & CN shared					
TJ-CD4B	Claudin18.2 x 4-1BB bispec	GC/PC	ABL Bio	WW & CN shared					
TJ-L14B	PD-L1 x 4-1BB bispec	STs	ABL Bio	WW & CN shared					
TJ-X7	αCXCL13 mAb	Autoimmune diseases	n.a.	WW (100%)					
Other BsAbs	TJ-C4GM; TJ-L1C4; TJ-L1T6; TJ-L1I7	Oncology	n.a.	WW(100%)					

Source: Company data; Note: AML: acute myeloid lymphoma, MDS: myelodysplastic syndromes, nHL: non-Hodgkin lymphoma, STs: solid tumors, CRS: cytokine release syndrome; CGT: cell & gene therapy, MM: multiple myeloma, PGHD: pediatric growth hormone deficiency, CPI: checkpoint inhibitor, UC: ulcerative colitis, GC: gastric cancer, PC: pancreatic cancer, S.KR: South Korea

Out-licensing deal separating biotech names

When it comes to investing in pharmaceutical companies, looking at pipelines, and research and development prospects is important. But licensing is also key when looking at these stocks: licensing deals expedites drug development along with mitigating risk. Chinese biotech companies, long in-licensors of innovative biopharma assets for the region, have started to reverse the flow by out-licensing domestically generated candidates to global players. Hence, we expect investor interests to increasingly shift toward these biotech companies with great potential in out-licensing territory. We believe I-Mab's MoA-differentiated pipelines are well-positioned to benefit the rising wave of out-licensing opportunities.

Licensing deal, explained; financial value is an important facet

Licensing deals often involve some combination of an upfront payment that is made immediately, development or regulatory (DR) milestone payments that are paid once defined goals in the development of assets are achieved, and royalty payments once a product resulting from a deal is marketed.

Let's take I-Mab/AbbVie collaboration as an example. In Sep 2020, I-Mab licensed out its early clinical-stage oncology asset lemzoparlimab (a.k.a. TJC4, an innovative anti-CD47 mAb) to AbbVie, a top MNC pharma. Under the pact, AbbVie received an exclusive global license, excluding greater China, to develop and commercialize lemzoparlimab. Both companies will collaborate to design and conduct further global clinical trials to evaluate lemzoparlimab in multiple cancers.

In this agreement, AbbVie is the in-licenser (licensee), meaning it is licensing a product from I-Mab; I-Mab, which is licensing its product to AbbVie, is the out-licenser (licensor). These deals are popular as they allow one company (in this case, AbbVie) to take on some of the financial, regulatory or technological burdens associated with developing the product of another company (in this case, I-Mab). Both end up benefiting.

I-Mab benefits from 1) USD180mn upfront payment plus USD20mn milestone on ph1 clinical results, 2) up to USD1.74bn regulatory and commercial milestone payments (o/w USD840mn are success-based clinical development and regulatory approval milestones), 3) in addition to tiered royalties from low-to-mid teen percentages on global net sales outside of Greater China.

Chinese biotech companies, long in-licensors of innovative biopharma assets for the region, have started to reverse the flow by out-licensing domestically generated candidates to global players. We noted increased out-licensing deal count among Chinese biotech companies since 2020. Despite the financial value is only one of many parts of a licensing deal, we reckon it's clearly a key facet to get easy understanding of the commercial potential of the molecule and scientific strength of the company.

We advise investors to focus on TWO numbers in the licensing deal terms – 1) the value of any upfront payments and 2) the 'biobucks' number, which is the potential total value of all upfront and milestone payments under the licensing deal. This is because biobucks for an early-stage asset are usually associated with lower probability of success (PoS) and deeper discount rate if those milestones will likely occur over the next 10 to 15 years. Below table summarizes selected sizeable China out-licensing deals (total biobucks ≥USD500mn) during 2020-YTD21E. Despite that lemzoparlimab was in the early clinical stage, we noted AbbVie/I-Mab deal ranked among the top three largest in both upfront payment and biobucks. We believe the deal validates the quality of I-Mab's discovery and development franchise.

Figure 7: Major China biotech and pharma out-licensing deals (over 500mn biobucks) summary in 2020-2021YTD

Licensor	Licensee	Drug	MoA	Indications	Status	Licensed Region	Upfront (USDmn)	Milestone (USDmn)	Royalties (%)	Biobuks (USDmn)	Other deal terms	Time
RemeGen	Seagen	Disitamab vedotin	HER-2 ADC	HER2+ solid tumors	Marketed (CN)	Global (ex. Asia) + JP/SG	200	2,400	High-single-digit to mid-teens	2,600	n.a.	Aug 2021
BeiGene	Novartis	Tislelizumab	PD-1 mAb	Hemato./solid tumors	Marketed (CN)	North America, EU, etc	650	1,300	High-teens to high-twenties	1,950	n.a.	Jan 2021
I-Mab	AbbVie	Lemzoparlimab	CD-47 mAb	Hemato./solid tumors	**Ph1**	Global (ex. China)	**180 (upfront) +20 (milestone)**	1,760	Low-mid-teens	**1,960**	n.a.	Sep 2020
HiFiBiO	FibroGen	Galectin-9	Galectin-9	AML and solid tumors	Pre-IND	Global	25	1,100	N.D.	1,125	an exclusive option for CXCR5 and CCR8	Jun 2021
Innovent	Eli-Lilly	Sintilimab	PD-1 mAb	Hemato./solid tumors	Marketed (CN)	Global (ex. China)	200	825	Double digit	1,025	n.a.	Aug 2020
Cstone	EQRx	CS1001	PD-L1 mAb	Hemato./solid tumors	NDA filed (CN)	Global (ex. China)	150	1,150	N.D.	1,300	n.a.	Oct 2020
		CS1003	PD-1 mAb	HCC	Ph3							

Licensor	Licensee	Drug	MoA	Indications	Status	Licensed Region	Upfront (USDmn)	Milestone (USDmn)	Royalties (%)	Biobuks (USDmn)	Other deal terms	Time
InnoCare	Biogen	Orelabrutinib	BTK TKI	Hemato. tumors	Marketed (CN)	Global (ex. China)	125	813	10-20%	938	n.a.	Jul 2021
Allist Pharma	Arrivent Bio	Furmonertinib	EGFR TKI	EGFR T790M+ NSCLC	Marketed (CN)	Global (ex. China)	40	765	Double digit	805	Upfront payment also includes ArriVent's share	Jun 2021
Kintor	Fosun Pharma	Proxalutamide	AR antagonist	COVID-19	Ph3	India & Africa	N.D.	N.D.	≥50% of NOP	650	N.D.	Jul 2021
CPSC (Nova Rock)	Flame Bio	NBL-015	Claudin 18.2 mAb	GC/PC	IND	Global (ex. China)	8	633	N.D.	640	o/w R&D milestones (up to USD172.5mn); commercial milestones (up to USD460mn)	Aug 2021
Junshi	Coherus	Torlipalimab	PD-1 mAb	Hemato./solid tumors	Marketed (CN)	US, Canada	150	380	20%	530	Milestones will be aggregated & paid at one time; Coherus will make additional co-development payment	Feb 2021
Sino Biopharm	Graviton	TDI-01	ROCK2	Pulmonary/liver fibrosis	Ph1	US	N.D.	N.D.	N.D.	518	N.D.	Feb 2021

Source: Company data, Notes: N.D.=not disclosed, JP: Japan, SG: Singapore

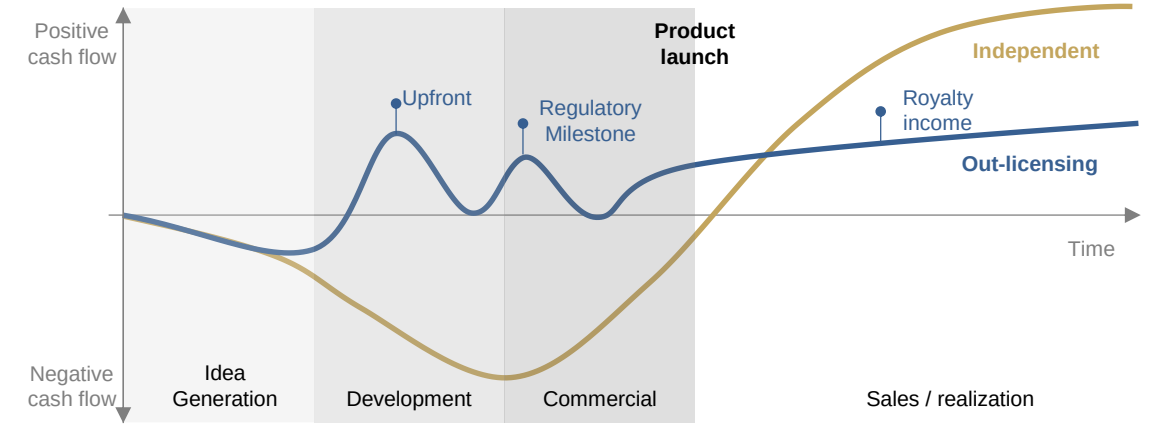
The logics of out-licensing, an alternative way for sustainable growth

1) Cash flow generation prior to commercialization, with minimum dilution risk for current shareholders

A growing biotech company has to raise capital several times until it finally generates revenue. Fund-raising is a time-consuming activity that sometimes diverts the attention from the operational business and causes delays. In addition, the market environment might not be favorable for the financing of such risky endeavors and existing investors might get excessively diluted. If the project fails at one point along the development path, most of the invested money will be lost; hence the investors take a big risk with the company's strategy to commercialize a drug on its own.

A chart demonstrating below is the cash flow comparison graph. The cash flow comparison shows the "independent model" goes well deeper into the negative cash flow when the biotech advances the development and manufacturing independently, but it likely yield a much higher return on investment. In comparison, the out-"licensing model" is more of the safer bet, in which no further cash is required to take the project forward and part of the value can be incurred prior to commercialization with upfront and milestone payments.

Figure 8: Illustration of cash flow comparison of out-licensing model and independent model



Source: CMS(HK)

Since biotech are the ones that have to bear nearly all development risks, why take only licensing royalties and not distribute the product themselves? The transformation from a R&D oriented structure to a full-fledged commercial pharma company is not guaranteed to succeed. Alternatively, the out-licensing of a blockbuster-potential candidate to pharma company for an average of 15-20% flat royalty rate on the net sales, meaning the biotech would reward a sustainable cash flow from its licensee's net sales without significant costs increase (since all production and sales costs are nearly always supported by its marketing partner). The cash flow generation of upfront and milestone payment from an out-licensing deal also provides an alternative fund-raising avenue to grow the company, without additional dilution risk for current shareholders.

I-Mab's USD2bn upfront-biobucks R&D deal with AbbVie ranked among the top three largest China out-licensing deals in the history. Despite I-Mab's first wave of product launch likely starting from 2023E, we anticipated the sizable R&D deal with AbbVie will provide I-Mab a sustainable and meaningful cash flow down the road. We modeled the potential cash flow from milestone income will reach USD80mn-150mn (~RMB520mn-975mn) in 2021E-2023E. We think this will provide greater financing flexibility for I-Mab to pursue growth opportunities, and help the Co. to stand out amongst its biotech peers.

2) Proof-of-concept effect to defend pipeline valuation

Another advantage of out-licensing deal is the proof-of-concept effect. New mechanisms of actions (MoAs) are always difficult to evaluate, resulting in such pipeline usually being valued rather conservatively. If a well-reputed industry player licenses such an asset, this contract is perceived as an expert affirmation to the bright future of this new MoA. Moreover, the out-licensing scenario should probably lead to more optimistic assumptions in terms of shorter development duration and higher peak sales, as pharma company has the experiences and resources to maximize the value. Thus, such a deal it is easier to defend a higher valuation.

Despite I-Mab's anti-CD47 candidates still in the early clinical stage, the out-licensing deal size validates its clinical data sets and commercial value for investors. Thus, the ~USD2bn biobucks deal greatly supports the valuation level at current clinical stage and retains a huge upside potential through the advancement of pipeline. In addition, we believe the deal also validates I-Mab's discovery and development platform amongst its China biotech peers. Thus, we believe I-Mab is well-positioned to deliver more out-licensing deals given its MoA-differentiated pipeline and capable R&D franchise.

3) Getting access to know-how and expertise of the partner

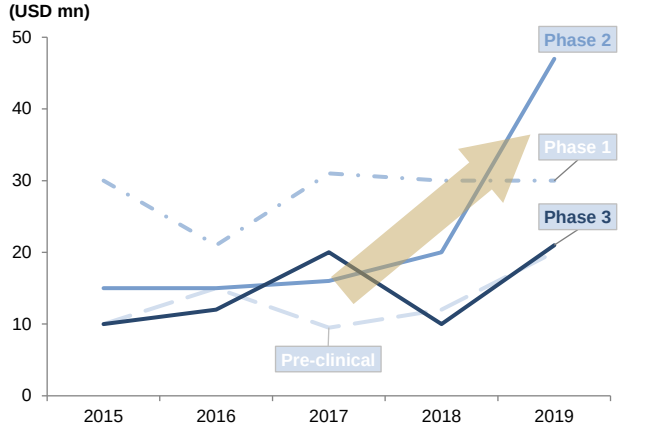
Biotech companies often are not used to running large-scale trials and dealing with regulatory authorities. Teaming up with an experienced industry player not only fills that gap for the project in question but also allows the biotech company to gain industrial experience. Most companies already try to reduce this lack of experience by putting ex-pharma employees into key positions of the biotech company's management, but these managers cannot always compete with a whole department focused on clinical trial design, regulation or marketing.

AbbVie ranked the global fifth largest pharmaceutical MNC in terms of FY20 revenue. Against the backdrop of fiercer competition and stricter regulations in China healthcare market, China pharma and biotech players are developing global strategies to maximize their pipeline value. However, the main stumbling blocks lack familiarity with regulations and sufficient experience accessing ex-China market. We believe I-Mab is uniquely positioned to access these know-hows from AbbVie through the advancement of the pipeline.

4) Growing deal premium to favor licensor

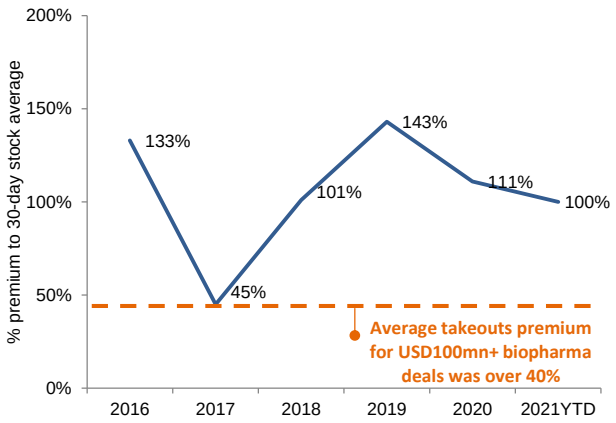
It is no surprise that pharma companies are willing to pay the top price to in-license or buyout not only mostly de-risked assets (i.e. post-POC or late-stage candidates) but also an increasing number of early-stage promising compounds. As per Evaluate Pharma, up-front payments and buyout premium for late-stage assets continue to rise as many large drug developers are in need of pipeline infusions in a conducive funding environment.

Figure 9: Median in-licensing deal upfront climbing over 2015-2019



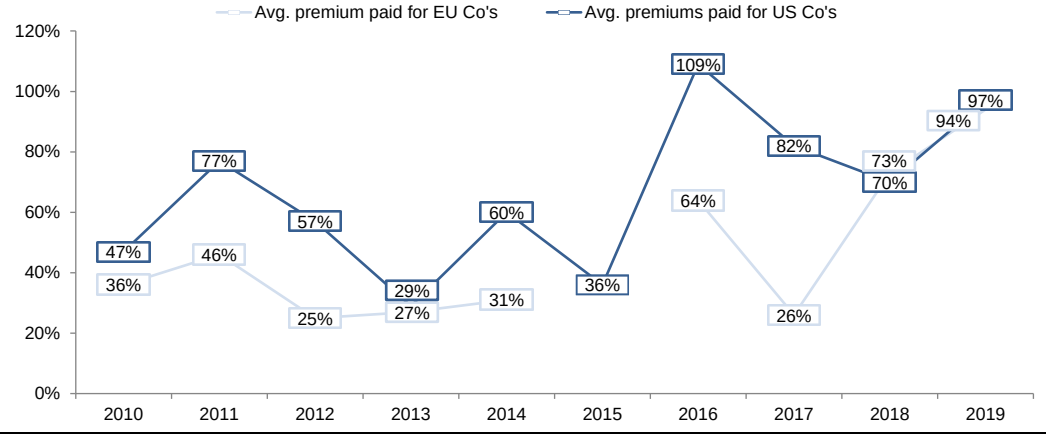
Source: Evaluate Pharma

Figure 10: The mean percentage premium to 30-day average of USD100mn+ biopharma buyouts



Source: Evaluate Pharma

Figure 11: Premiums paid for US/EU public biopharma companies (deal size over USD100mn), 2010-2019



Source: Evaluate Pharma

Basically, that is the choice that big pharma have today: Either buy and integrate with successful biotech (with high premiums justified in part by the predictable profit margin) or face the threat of additional competition from better drugs, while losing patent protection on their own products. Notably, the number of assets with blockbuster potential is not unlimited, and bidding wars can lead to very high acquisition premiums. From this perspective, it does look like a no-brainer. Indeed, as evidence of this, virtually all small biotech, which have come close to market a blockbuster drug, have been acquired by larger companies at pricey before they would eventually reach licensing deals for their products. Given the increases in deal prices and out-licensor economics, it would seem logical that out-licensers have enjoyed a bonanza in deal revenues.

I-Mab, in our view, has established a MoA-differentiated and competitive pipeline via its in-house R&D platform. The platform has been validated by AbbVie deal, which proves its scientific strength and quality of data package. We anticipate I-Mab's other internally-develop pipelines are also well positioned to achieve attractive economics through potential licensing deals

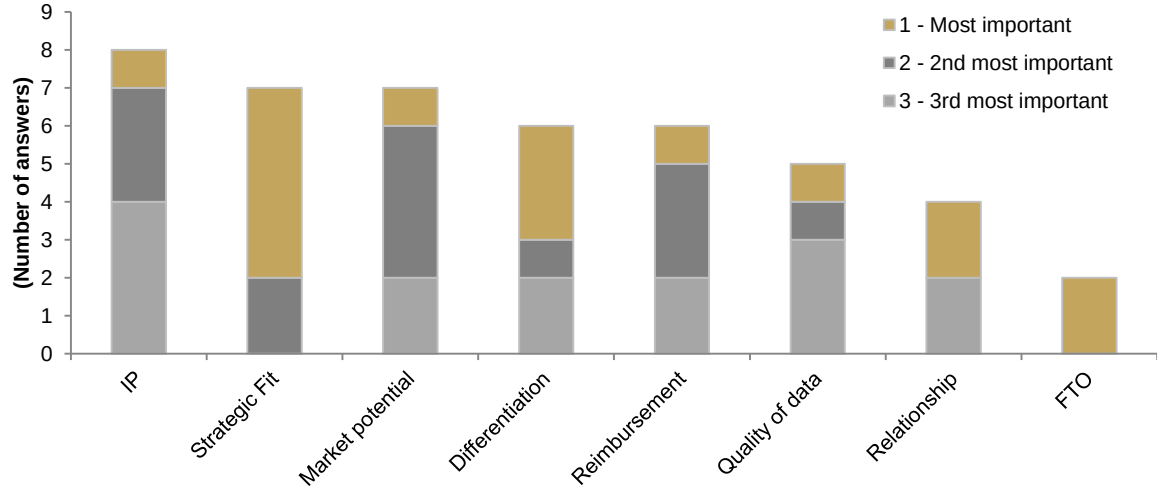
Greater differentiation is one of the key assessments for licensing deals

According to Jimmie Hofman, et al. (2016), the chart below summarized several categories of success factors that drive the likelihood of a licensing deal based on the result of both the literature review and the interviews. We noted the responders favored strategic fit as the single most significant factor, followed by differentiation. Interestingly, BIC and FIC are not the top mentioned success factors of assessment for licensing deals. Instead, industry professionals highlighted the data package needs to fully represent the stage of the asset and support its further clinical development without having to build up data that already should have been gathered since this will negatively affect timelines, labeling possibilities and increase risk.

We extract the definition for the two most significant factors below:

- **Strategic Fit:** Specific components of strategic fit that were mentioned by the interviewees were e.g. established sales force within the indication, complementing to existing product portfolio and aligned with overall strategy. Essential factors mentioned were focusing on the characteristics of the partner and aspects of scientific and business synergy.
- **Differentiation from Competition:** A success factor that was mentioned by all of the biotech experts and is highly linked to both scientific and commercial attractiveness is differentiation. If you have an asset that is not differentiated from competition, then the scientific attractiveness is likely lower and the commercial case not as good. In a sense the concept of differentiation overlaps with competition.

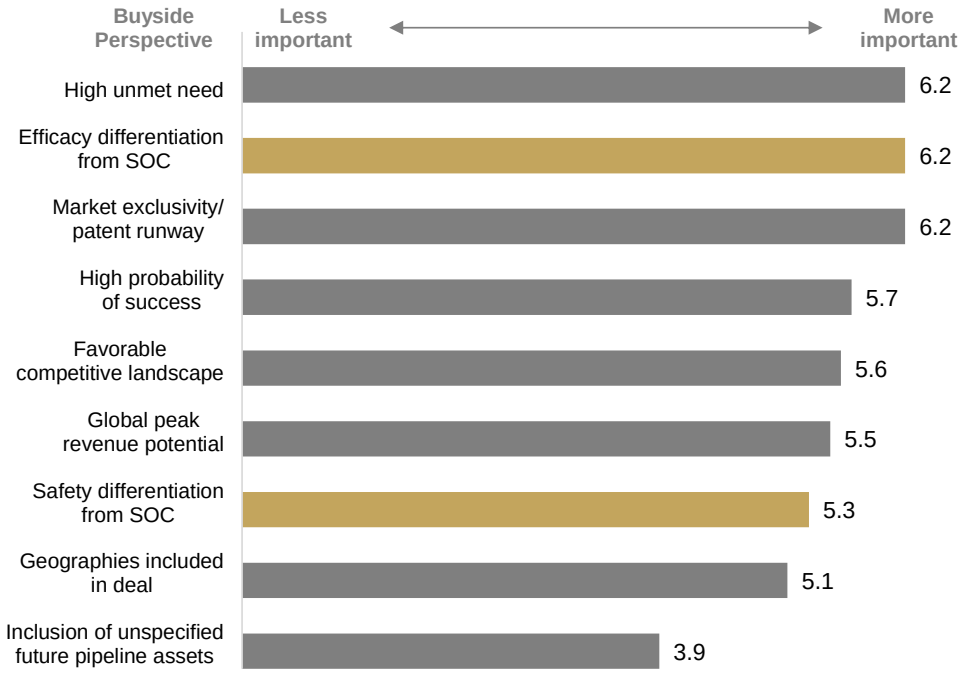
Figure 12: Most important success factors in licensing deals



Source: Jimmie Hofman, et al, FTO = freedom-to-operate, in relation to patents and IP, which is the ability of a company to develop, make, and market products without legal liabilities to third parties.

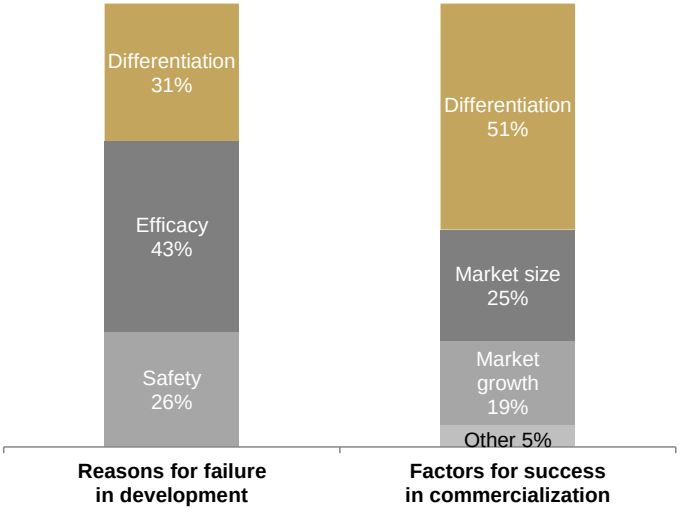
We founded similar conclusions in other industry researches. According to a recent survey conducted by L.E.K. Consulting in 2020. The results show the factors of greatest importance to buyers during asset evaluation and deal negotiation — differentiation, high unmet need and exclusive rights outweigh other considerations. According to Anaxomics, lack of differentiation accounted for 30% of the reasons for clinical failure and 50% of factors for commercial success. These findings all accentuated the importance of greater differentiation which highly link to deal assessment and commercial success. We believe this is increasingly true in a world where approval is the minimum bar, but differentiation is the key to unlock value.

Figure 13: Level of importance of pharma deal assessment (Average score on scale of 1-7)



Sources: L.E.K., HIC BD simulator survey 2020

Figure 14: Differentiation matters in both clinical development and commercialization



Source: Anaxomics

Chinese biotech companies, long in-licensors of innovative biopharma assets for the region, have started to reverse the flow by out-licensing domestically generated candidates to global players. As a proven innovator in China biotech, I-Mab in our view clearly belongs in the first tier of biotech where we could see the greatest return from the potential out-licensing opportunities. This is supported by AbbVie's deal which has validated the quality of I-Mab's discovery and development engine. Also, I-Mab continued to expand its differentiated R&D pipeline with quality and speed, such as novel BsAb and super antibody.

We see some promise for the ulilediimab (αCD73 mAb) and plonmarlimab (αGM-CSF mAb) for their scientific and commercial attractiveness along with their differentiation from competition. We look for additional detail on these candidates, as well as the preliminary data from I-Mab's other pipeline, from 2022E onwards.

Pipeline overview

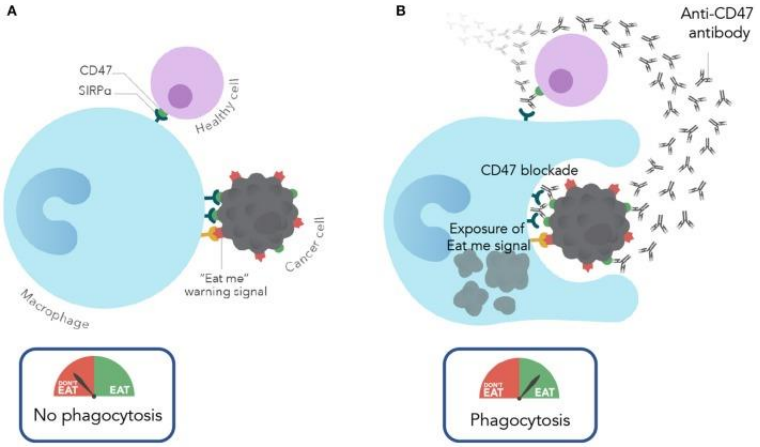
I-Mab's portfolio currently includes 11 novel clinical-stage pipeline assets. The core assets are internally developed molecule, namely lemzoparlimab, uliledlimab and plonmarlimab. Co. also expanded its pipeline via in-licensing deals to source drugs with high unmet medical need. Moreover, I-Mab continued to broaden its pipelines onto the next wave of innovation that will sustain the building momentum. We surmised each below, including proposed indications, current development status, and the clinical data to data.

Lemzoparlimab (TJC4, αCD47 mAb) – New 'don't eat me' signal on track provide basis for cancer therapies

Lemzoparlimab or TJC4 is a fully human CD47 mAb developed internally by I-Mab for cancer immunotherapy. CD47 has long been of interest because of mounting evidence that tumors use the protein to evade immune attacks. CD47 functions as an innate and adaptive immune checkpoint, delivering the 'don't eat me' signals to signal-regulatory protein alpha (SIRPα) on macrophage then inhibiting phagocytosis. Problem is, blocking CD47 can cause dangerous hematological side effects.

Lemzoparlimab's clinical advantages include: 1) well tolerability and no severe anemia, 2) favorable PK profile, and 3) no priming dose required. Co. will evaluate the therapeutic role of lemzoparlimab in 1) hematologic malignancies; 2) solid tumors, in combination with other treatment agents; and 3) combination with felzartamab for front line MM patients. Company granted AbbVie the global rights (excluding Mainland China, Hong Kong, and Macau) in Sep 2020 and prioritize to launch lemzoparlimab as the first CD47 antibody product in China.

Figure 15: αCD47 pathway MoA overview



Source: Nature

AbbVie collaboration recap

In Sept. 2020, I-Mab out-licensed worldwide rights of lemzoparlimab to AbbVie (ABBV). Under the pact, ABBV will pay I-Mab USD180mn in an upfront payment to exclusively license lemzoparlimab, along with USD20mn in a milestone payment based on the Ph1 results, for a total of USD200mn. In addition, I-Mab will be eligible to receive up to USD1.74bn in success-based milestone payments for lemzoparlimab, of which USD840mn are based on clinical development and regulatory approval milestones, with the remainder based on commercial milestones.

Nearly all types of tumors overexpress CD47, representing great clinical and commercial potential

Recent developments in the field of immuno-oncology have demonstrated that interfering in the PD-L1-based immune suppression system allows the adaptive immune system to attack cancer cells, resulting in significant reduction in tumor burden and increasing overall survival in some cancers. These therapies are generally referred to as checkpoint inhibitors and include both therapies that target PD-1 or PD-L1 such as nivolumab, pembrolizumab, atezolizumab, durvalumab and avelumab as well as therapies such as ipilimumab that target another checkpoint known as CTLA-4. Despite the success of T-cell checkpoint inhibitors, these therapies have been shown to be effective only in a subset of tumors, highlighting the need for additional therapies.

Figure 16: Macrophage-focused I/O therapy vs. T-cell checkpoint inhibitors I/O therapy

	Macrophages	T-cells
Immune system targeted	Innate immune cells	Adaptive immune system
Percentage of tumor infiltrating immune cells	20-40%	10-20%
Cell-surface checkpoints and their receptors	CD47/SIRPα	PD-1/L1, CTLA-4
Applicability to tumor targets	Not target limited	Target limited
Dependency	Works independently and can recruit adaptive immune cells	Requires antigen presentation by innate immune cells

Sources: Forty Seven, Gentles and Alizadeh, Nature Medicine

Nearly all types of tumors overexpress CD47 as a way to avoid the innate immune system. Sending this “don’t eat me” signal prevents the initial attack by macrophages and other phagocytic cells. Because these cancer cells are not digested, the macrophages cannot present components of the cancer cells to the adaptive immune system thereby preventing the activation of T-cells that could specifically target them. Expression of CD47 by cancer cells can thus render these cells invisible to innate immune recognition. Interfering with CD47 binding to SIRPa has the potential to activate an immune response to cancer cells that is upstream of current checkpoint inhibitors that target PD-1/PD-L1 or CTLA-4. As shown in the following figure the overexpression of CD47 in many types of cancer has been demonstrated by a variety of scientific techniques.

Figure 17: CD47 overexpression across a wide variety of cancer

	RNA	Protein immuno-histochemistry	Protein western blot	Protein flow cytometry
Pancreatic cancer	✓	✓		
Lung cancer	✓		✓	✓
Ovarian cancer	✓	✓	✓	
Laryngeal cancer	✓	✓	✓	
Gastric cancer				✓
Kidney cancer				✓
Colon cancer				✓
AML				✓
nHL				✓
ALL				✓

Source: Forty Seven; Notes: AML=acute myeloid leukemia, nHL= non-hodgkin's lymphoma; ALL= acute lymphocytic leukemia

According to our literature research, CD47 is ubiquitously expressed in human cells where it acts as a 'marker of self'. CD47 inhibits phagocytosis through its binding to SIRP-α, a receptor found on the surface of phagocytic cells, including macrophages and dendritic cells (Zhao et al, 2011; Feng et al, 2015). The binding of CD47 to SIRP-α causes the phosphorylation of the immunoreceptor tyrosine-based inhibitory motif on SIRP-α, the recruitment of Src homology region 2 domain-containing phosphatase (SHP)-1 and SHP-2 to the membrane, which inhibits myosin-IIA accumulation at the phagocytic synapse, ultimately resulting in the inhibition of phagocytosis (Fujioka et al, 1996).

Conversely, CD47-deficient circulating cells are rapidly cleared by splenic macrophages (Brown and Frazier, 2001). It is possible that in patients with NSCLC, CD47 overexpression may cause an increase in the number of circulating neutrophils by reducing their clearance from the system (Barrera et al, 2017). It has been reported that cancer cells and circulating tumor cells may express CD47 as a mechanism to avoid immune system attack (Chao et al, 2012; Eruslanov et al, 2014; McCracken et al, 2015). Indeed, CD47 overexpression has been found in haematologic malignancies (Jaiswal et al, 2009; Majeti et al, 2009), gastric cancer (Yoshida et al, 2015) and NSCLC (Zhao et al, 2016), where its expression correlates with a bad prognosis. Promising clinical results have been obtained using αCD47 class for the treatment of various hematological malignancies, including acute myelogenous leukemia (AML) and Non-Hodgkin's lymphoma (nHL).

Beyond hematological malignancies, αCD47 inhibitor has also notably shown promising initial clinical responses in patients with advanced solid tumors. In Jul 2021, ALX Oncology (ALXO) announces new data from ASPEN-01 of ALX148 (a CD47 blocking therapeutic) in patients with ≥2L gastric or gastroesophageal junction cancer (GC). The ph1b Study (n=18) showed robust 72% ORR, 9.1mo mPFS and 76% mOS at 12mo in a quadruplet combination regimen, which was numerically better than benchmark regimen (cyrama+paclitaxel, 28%ORR, 4.4mo mPFS and 9.6mo mOS). In Dec 2020, ALXO also published positive data of ALX148 in patients with 1L and ≥2L head and neck squamous cell carcinoma (HNSCC). The results showed 75% ORR and mPFS/mOS not reached in 1L HNSCC cohort, along with 40% ORR, 4.6mo mPFS and 22.1mo mOS in ≥2L cohort. Based on the positive data, ALX-148 received two FDA fast track designations (FTD) for the above two solid tumor indications in Feb 2020.

Figure 18: ALX-148 (SIRPα fusion w/ inactive Fc) study data in solid tumors

Population	**≥2L HER2+ GC**			**1L HNSCC**		**≥2L HNSCC (CPI naive)**	
Combination	Evorpa+trastu +ramu+pac	Evorpa+trastu	Benchmark (Ramu+pac)	Evorpa+Pem + 5FU & pac	Benchmark (Pem+5FU+pac)	Evorpa+Pem	Benchmark (Pem mono)
Evaluable patient	18	19	n.a.	4	n.a.	10	n.a.
ORR (%)	72	21	28	75	36	40	15
mPFS (month)	9.1	2.2	4.4	NR	4.9	4.6	2.1
mOS (month)	NR	8.1	9.6	NR	13.0	22.1	8.4
Source	ALXO	ALXO	Lancet 2014	ALXO	Lancet 2019	ALXO	Lancet 2018

Sources: ALX Oncology, CMS(HK); Note: evorpa: evorpacept (ALX148), trastu: trastuzumab, ramu: ramucirumab, pac: paclitaxel, 5FU: fluorouracil, pem: pembrolizumab, GC: gastric cancer, HNSCC: head and neck squamous cell carcinomas, CPI: checkpoint inhibitor, NR: not reached

In addition, Gilead/FortySeven's magrolimab (a αCD47 mAb) updated initial efficacy signal in ovarian cancer and colorectal cancer (CRC) patients using various combination strategy. In a ph1b/II study for previously treated CRC patient, magrolimab in combination with cetuximab (a αEGFR mAb) reached 6.7% ORR, 3.6mo mPFS and 10.1mo mOS for KRASwt cohort, and reached 0% ORR (o/w 45% SD), 1.9mPFS and 10.4mo mOS for KRASm cohort. Moreover, in another ph1b study for ovarian cancer patients (n=34), the study of magrolimab with the avelumab (a αPD-L1) observed 1PR in a ST pt and a 56% SD rate in OC pts. Both studies showed the combination regimen was well tolerated. In Apr 2021, Gilead further initiated two ph2 studies of magrolimab + pembrolizumab in HNSCC and advanced solid tumors (including pts with NSCLC, SCLC, and UC).

As one of the global leading αCD47 drugs, we believe TJC4 also has strong potential as a therapeutic target for the treatment of a variety of cancers, including AML, nHL, CRC, GC, lung cancer, HNSCC, and ovarian cancer.

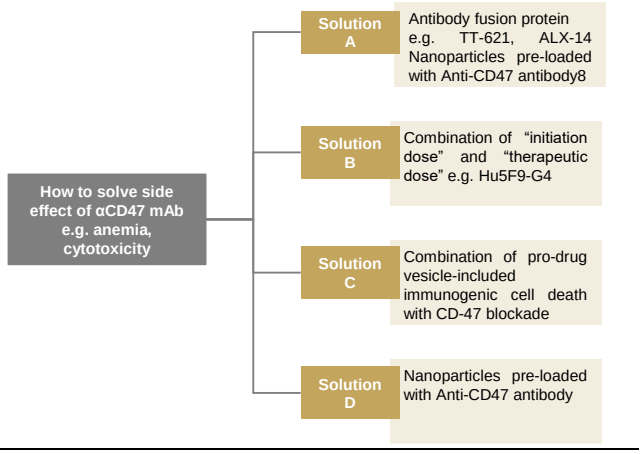
Safety advantage is the key differentiator

The treatment-related hemolytic anemia is the major toxicity concern for potential CD47 targeting agents. CD47 was identified as a major homeostatic regulator of RBC turnover and a marker of self and protective mechanism against red blood cells (RBC) clearance. Thus, CD47 blockade has the potential to accelerate RBC clearance by unmasking of pro-phagocytic signals, leading to anemia when administered to patients. To address that, various strategies have been developed to optimizing the therapeutic window of CD47 targeting agents to mitigate on-target toxicities:

- **Priming/Maintenance dose strategy:** Magrolimab (Gilead/Forty Seven) has successfully used a priming and maintenance dose strategy to mitigate anemia.
- **Reduce molecule affinity to RBCs:** Recombinant fusion protein, which associated minimal anemia risk as it does not induce hemagglutination and has minimal binding to human erythrocytes, e.g. TTI-621, ALX148
- **Antibodies targeting macrophage ligand SIRPα**: antibodies that target the macrophage ligand SIRPα may also lead to minimal anemia as SIRPα expression is generally restricted to immune effector cells with absent expression on RBCs.

Almost all clinical trials with CD47 antibodies have shown significant hematologic adverse effects, likely due to inherent RBC-binding properties of generic CD47 antibodies. Thus, mitigating the on-target anemia observed with CD47 blockade is critical to successful clinical development of CD47 targeting agents.

Figure 19: Solutions to address αCD47 side effects



Source: Front. Immunol., 2020

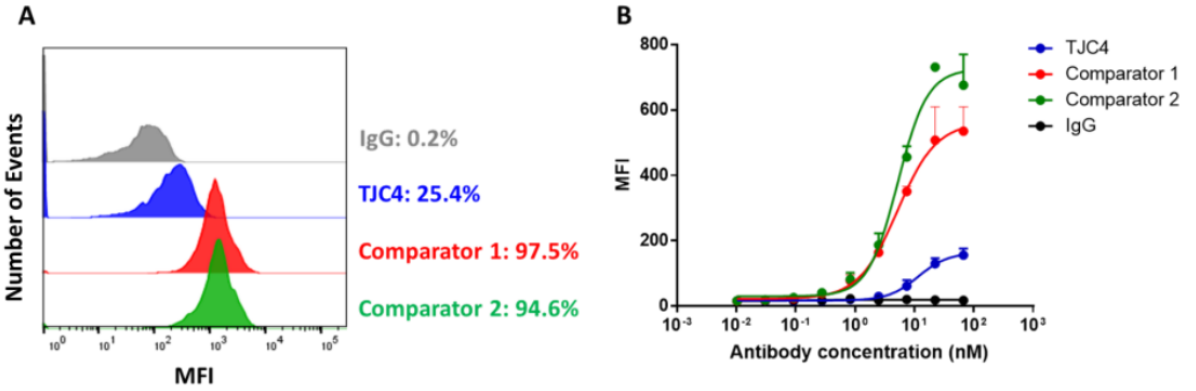
Figure 20: Lemzoparlimab has minimal RBC binding

	Company 1	Company 2	Company 3	I-Mab
Affinity	$8x10^{-9}$	$4x10^{-9}$	$8x10^{-10}$	$5x10^{-10}$
RBC binding	++	++	++	Minimal
RBC clumping	++	-	-	-
Anti-tumor activity	++	++	++	++
Phase 1	Anemia	Anemia NHL *on-going* AML *stopped*	Anemia *Suspended*	1st patient cohort dosed in U.S. Clinical trials planned China
Phase 2	On-going (combo)			

Sources: ASH, PLOS One, WIPO, Company data

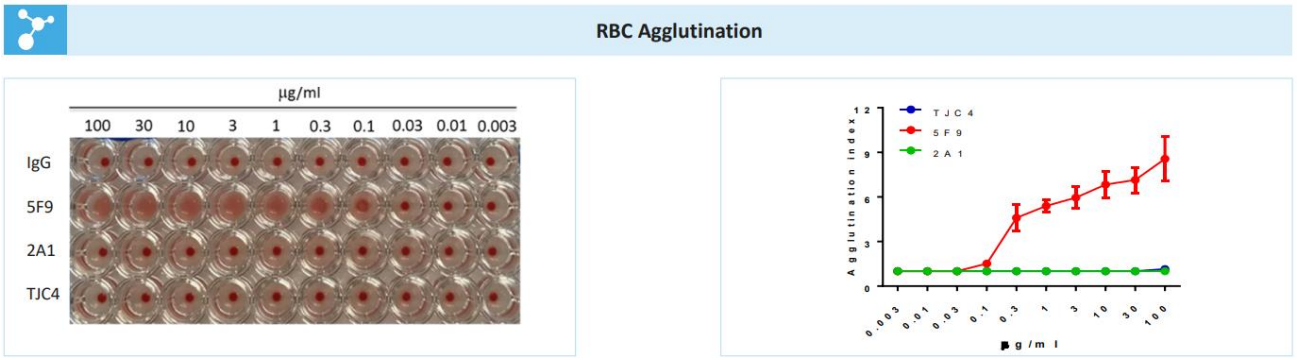
Lemzoparlimab has similar sub-nanomolar binding affinity as other CD47 antibodies and exhibits comparable anti-tumor activity. The key advantage of lemzoparlimab is its minimal binding to RBCs, thus potentially avoiding or minimizing inherent hematologic adverse effects typically seen in other CD47 antibodies in clinical trials. According to the pre-clinical data, lemzoparlimab showed consistently good safety profile: 1) no priming doses needed given minimal binding to RBCs thanks to its unique glyco-epitope (Figure 21), 2) no RBC agglutination induction (Figure 22), and 3) non-dose dependent anemia in cyno monkeys, including a pivotal 4-week GLP toxicity study (Figure 23). Taken together, I-Mab believes lemzoparlimab has a potentially better clinical safety profile and may be used in a broader patient population to explore its anti-tumor potential compared to other clinical-stage competitor molecules.

Figure 21: Lemzoparlimab has shown lower level of RBC binding compared to peers



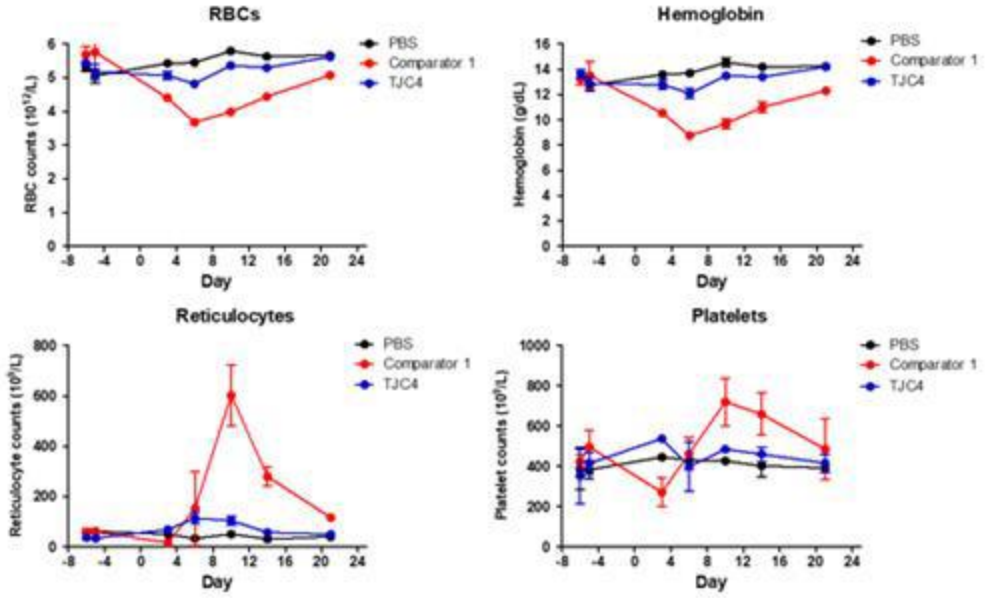
Source: Company data

Figure 22: Lemzoparlimab did not induce RBC agglutination across a wide range of antibody concentrations



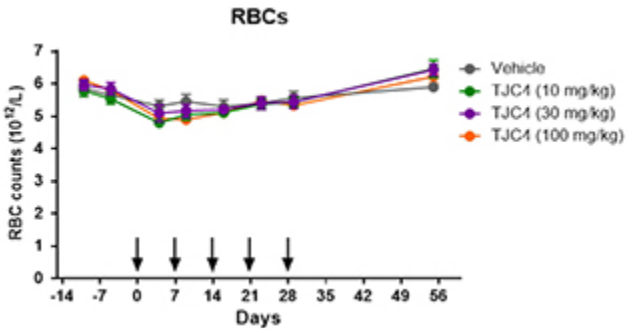
Source: Company data; Note: Left: representative graph of hemagglutination (haze appearance) or lack thereof (precipitate) by different concentrations of control IgG, lemzoparlimab (TJC4), and comparator antibodies. Right: quantification through an index determined by the area of RBC occupation in the presence of the test antibodies, normalized to that of IgG control

Figure 23: Lemzoparlimab did not induce RBC agglutination across a wide range of antibody concentrations



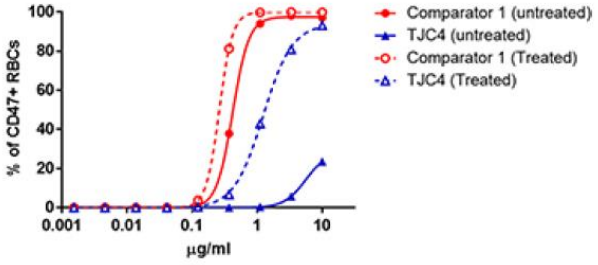
Source: Company data; Note: Hematological parameters in non-human primates treated with a single dose of CD47 antibodies. On Day 0, naive cynomolgus monkeys were IV injected with PBS control (n=2), lemzoparlimab (TJC4) (n=2, 10 mg/kg) or a comparator antibody (n=2, 10 mg/kg). Blood cells were counted, twice before drug injection (baseline) and at 3, 6, 10, 14 and 21 days post-injection.

Figure 24: Four-week GLP toxicology study in monkeys



Source: Company data; Note: RBC counts in male cynomolgus monkeys treated with five consecutive weekly dose of lemzoparlimab (TJC4) at 0-100 mg/kg in a 4-week GLP toxicology study.

Figure 25: PNGase treatment of RBCs significantly increased the binding of lemzoparlimab as compared to a control antibody



Source: Company data; Note: In a representative experiment, human RBCs were treated with PNGase for 1 hr followed by the addition of lemzoparlimab (TJC4) or a comparator CD47 antibody that binds strongly to RBC at the indicated concentrations. The binding of CD47 antibodies to the treated (de-glycosylated) or untreated RBCs was analyzed by flow cytometry.

Clinical Studies

The ph1 study (NCT03934814) for the monotherapy dose escalation has been completed and the initial data were presented at Society for Immunotherapy of Cancer (SITC) in Nov 2020 (poster #385). The initial safety results (n=20/88) of its US Ph1 trial showed lemzoparlimab was well tolerated up to 30mg/kg on a weekly infusion schedule without priming dosing. No G3 anemia or G3 treatment-related adverse events (TRAEs) were observed, except that one Grade 3 lipase increase was reported but no treatment was needed.

Figure 26: Treatment-related adverse events (TRAE) by cohort

Adverse Event	1 mg/kg (N=4)		3 mg/kg (N=4)		10 mg/kg (N=4)		20 mg/kg (N=5)		30 mg/kg (N=3)		Total (N=20)
	GR ANY	GR 3	GR ANY	GR 3	GR ANY	GR 3	GR ANY	GR 3	GR ANY	GR 3	GR ANY
Anemia	0	0	2	0	2	0	1	0	1	0	6 (30%)
Neutropenia	0	0	0	0	0	0	0	0	1	0	1 (5%)
Lymphocyte count decreased	0	0	0	0	1	0	0	0	0	0	1 (5%)
Platelet count decreased	0	0	0	0	1	0	0	0	0	0	1 (5%)
Blood bilirubin increased	0	0	0	0	1	0	0	0	0	0	1 (5%)
Blood LDH decreased	0	0	0	0	0	0	0	0	1	0	1 (5%)
Lipase increased	0	0	0	0	0	0	0	0	1	1	1 (5%)
Fatigue	0	0	2	0	2	0	1	0	2	0	7 (35%)
Chills	0	0	1	0	0	0	0	0	0	0	1 (5%)
Infusion related reaction	0	0	0	0	2	0	2	0	1	0	5 (25%)
Constipation	0	0	0	0	0	0	1	0	0	0	1 (5%)
Diarrhea	1	0	1	0	1	0	0	0	0	0	3 (15%)
Nausea	0	0	0	0	0	0	1	0	0	0	1 (5%)
Dyspnea	0	0	0	0	0	0	0	0	1	0	1 (5%)
Hypotension	0	0	0	0	0	0	0	0	1	0	1 (5%)

Source: Company data; Note: Grade (GR); all toxicities were graded using CTCAE V5.0

In addition, the ph1 data observed preliminary efficacy signal of lemzoparlimab. One confirmed partial response (PR) was observed in the 30 mg/kg monotherapy cohort (1/3) with 11 cycles completed. The patient who had metastatic melanoma had failed prior systemic treatment of nivolumab and ipilimumab. In addition, three patients achieved stable disease (SD) with duration longer than 16 weeks at dose cohorts cross 1 mg/kg, 10 mg/kg and 30 mg/kg. Two patients with HNSCC and renal cell carcinoma (RCC), respectively, failed nivolumab and the other with ovarian cancer received no prior PD-(L)1 inhibitor treatment. Those preliminary data of lemzoparlimab demonstrated the promising initial clinical responses in patients with hematologic malignancies or advanced solid tumors.

Based on the positive ph1 data, I-Mab plans evaluate lemzoparlimab in 1) hematologic malignancies; 2) solid tumors, in combination with other treatment agents; and 3) its application to advance the current treatment options of felzartamab as the second-line and the third-line potentially to a first-line treatment.

- **Hematologic malignancies:** MDS and nHL are being evaluated as the lead indication given CD47 class has demonstrated promising clinical results for the treatment of hematological malignancies. Further, lemzoparlimab is evaluated among a series combo study for the various hematological malignancies 1) w/ AZA for a ph2 pivotal study in patients with AML and MDS; 2) w/ rituximab in patients with DLBCL and FL; and 3) w/ AZA and venetoclax for a global ph3 study in pts AML.
- **Solid tumors:** The ongoing study in the U.S. is combining lemzoparlimab with pembrolizumab to evaluate the safety and efficacy in patients with NSCLC and ovarian cancer. I-Mab expects to present a preliminary data readout in 4Q21.
- **Combination with felzartamab for 2L/3L multiple myeloma (MM):** Pre-clinical data supported the synergy potential of lemzoparlimab combination with CD38 antibody for MM. I-Mab plans to initiate a clinical study in the 2H21E in China.

Competitive Landscape

Immunotherapy targeting CD47/SIRPα pathway has become one investment hotspot after the emergence of promising clinical data and completion of multiple sizeable BD or buyouts during 2020-YTD21. At present, I-Mab's lemzoparlimab remained ranked in the top-tier among peers in the CD47 league.

Figure 27: Global αCD47 pathway pipeline summary

Projects	Company	MoA	Stage*	Indications
Magrolimab	Forty Seven/Gilead	αCD47 mAb	Ph3	MDS, AML, NHL, STs
Lemzoparlimab	I-Mab/AbbVie	αCD47 mAb	Ph2	Hemato./solid tumors (STs)
ALX148	ALX Oncology	SIRPα fusion w/ inactive Fc	Ph2	HNSCC, GC/GEJ, NHL
AO-176	Arch Oncology	αCD47 mAb	Ph1/2	Solid tumor (ST), r/r AML
DSP107	KAHR Medical	αSIRPα-4-1BBL bi-functional fusion	Ph1/2	NSCLC, AML, MDS
OSE-172	OSE/Boehringer	αSIRPα mAb	Ph1/2	ST
Letaplimab	Innovent	αCD47 mAb	Ph1/2	MDS, r/r AML
IBI-322		αCD47xPD-L1 BsAb	Ph1	MDS
IMM01	ImmuneOnco	αCD47 mAb	Ph1/2	Hematological tumor
IMM0306		αCD47xCD20 BsAb	Ph1/2	Hematological tumor
IMM2902		αCD47xHER-2 BsAb	Ph1	ST
AK117	Akseo Bio	αCD47 mAb	Ph1/2	Hemato./solid tumor
TTI-621	Trillium/Pfizer	Wt. SIRPα-IgG1 Fc fusion	Ph1/2	Hemato./solid tumor
TTI-622		Wt. SIRPα-IgG4 Fc fusion	Ph1/2	Hemato. tumor
TG-1801	TG Therapeutics	αCD47xCD19 BsAb	Ph1	NHL
CC-95251	Celgene/BMS	αSIRPα mAb	Ph1	ST, lymphoma
FSI-189	Forty Seven/Gilead	αSIRPα mAb	Ph1	NHL
IMC002	ImmuneOncia	αCD47 mAb	Ph1	ST, lymphoma
SL-172154	Shattuck Labs	SIRPαxCD40L bi-functional	Ph1	OC/HNSCC/hemato.
ZL-1201	Zai-Lab	αCD47 mAb	Ph1	Hematological tumor

Sources: Evaluate Pharma, Company data, CMS (HK), Notes: Stage reflects Co.'s most advanced studies,*

Figure 28: Global αCD47 pathway candidates trials data comparison (hematological malignancies)

Company	Forty Seven/Gilead			I-Mab/AbbVie	ALX Oncology	Trillium/Pfizer		TGTX	Innovent	Akesobio	KAHR Medical
Drug name	**Magrolimab**			**Lemzoparlimab**	**ALX148**	**TTI-622**	**TTI-621**	**TG-1801**	**IBI188**	**AK117**	**DSP107**
MoA	αCD47 mAb	αCD47 mAb	αCD47 mAb	αCD47 mAb	SIRPα fusion w/ inactive Fc	Wt. SIRPα-IgG4 Fc fusion	Wt. SIRPα-IgG1 Fc fusion	αCD47xCD19 bi-spec Ab	αCD47 mAb	αCD47 mAb	αSIRPα-4-1BBL bi-functional
Indication	MDS	1L MDS	1L AML	ST & Lymphoma	≥2L nHL	Lymphoma	ST/Lymphoma	Lymphoma	AML	ST & Lymphoma	AML, MDS
Study Phase	Phase 3	Phase 1b	Phase 1b	Phase 1	Phase 1b	Phase 1	Phase 1	Phase 1	Phase 1	Phase 1	Phase 1/2
Allocation	Randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized
Study Arms	Magro+azaci (vs PbO+azaci) (n=180/520)	Magro+azaci (n=33/39)	Magro+azaci (n=25/29)	Lemzo (n=20/88)	ALX148+rituxi (n=10/33)	TTI-622 (n=27)	TTI-621 (n=91/242)	TG1801+ublitu (n=16)	IBI188 (n=20)	AK117 (n=159)	DSP107+azaciti (n=36)
Dose Escalation	30mg/kg	45mg/kg	45mg/kg	30mg/kg	15mg/kg*	18mg/kg Ongoing	2mg/kg Ongoing	Ongoing	30mg/kg	20mg/kg Ongoing	50mg/kg
Priming Dose	1mg/kg	1mg/kg	1mg/kg	No priming dose	No priming dose	n.a.	n.a.	n.a.	1-3mg/kg	No priming dose	n.a.
Efficacy data											
ORR (%)	n.a.	91	64	n.a.	70	33	20	n.a.	n.a.	n.a.	n.a.
mDOR (month)	n.a.	NR	NR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Safety profile											
AEs (%)	n.a. n.a.	AEs Treat disc. (1.5)	AEs Treat disc. (1.5)	≥G3 n.a.	≥G3 Neutropenia (6.1)	≥G3 Thrombocyt (5) Neutropenia (9)	AEs No New Sig. Obers.	n.a. n.a.	≥G3 n.a.	≥G3 n.a.	≥G3 n.a.
≥G3 Anemia (%)	n.a.	38 (G1-3, no G4-5)	38 (G1-3, no G4-5)	No observed	3	2	n.a.	n.a.	5	No observed	n.a.
DLT	n.a.	n.a.	n.a.	No DLT	No DLT	One G4 DLT	One G3 DLT	n.a.	No DLT	No DLT	No DLT
Hemoglobin Level. (%)	n.a.	Mild drop on the 1st dose	Mild drop on the 1st dose	-10 (non-dose depedent)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<10
Administrative Info											
NCT Number	NCT04313881	NCT03248479	NCT03248479	NCT03934814	NCT03013218	NCT03530683	NCT02663518	NCT03804996	NCT03763149	NCT04349969	NCT04937166
Study ID	ENHANCE	5F9005 (MDS)	5F9005 (AML)	TJ011133EDI101	ASPEN-01	TTI-622-01	TTI-621-01	TG-1801-101	CIBI188A102	AK117-101	DSP10-002
Data Source	ASCO21	ASCO20	ASCO20	SITC20	ESMO-WCGC20	Company	Company	EHA19	SITC20	SITC20	Company

Sources: ASCO, SITC, ESMO, AACR, Company data, Evaluate Pharma, CMS (HK); Notes: MDS: myelodysplastic syndrome, AML: acute myeloid leukemia, ST: solid tumor, nHL: non-Hodgkin lymphoma, ALX148 dose escalation (mono up to 30mg/kg, combo up to 15mg/kg)*

Figure 29: Global αCD47 pathway candidates trials data comparison (solid tumors)

Company	Forty Seven/Gilead		I-Mab/AbbVie	ALX Oncology				Trillium		KAHR Medical
Drug name	Magrolimab		Lemzoparlimab	ALX148				TTI-621	TTI-622	DSP107
MoA	αCD47 mAb	αCD47 mAb	αCD47 mAb	SIRPα fusion w/ inactive Fc	SIRPα fusion w/ inactive Fc	SIRPα fusion w/ inactive Fc	SIRPα fusion w/ inactive Fc	Wt. SIRPα-IgG1 Fc fusion	Wt. SIRPα-IgG4 Fc fusion	αSIRPα-4-1BBL bi-functional
Indication	ST & CRC	ST & OC	ST & Lymphoma	≥2L HER2+ GC	≥2L HER2+ GC	≥2L HNSCC	1L HNSCC	1/2L LSM	≥2L OC	ST & NSCLC
Study Phase	Phase 2	Phase 1	Phase 1	Phase 1b	Phase 1b	Phase 2	Phase 2	Phase 1/2	Phase 1b/2	Phase 1/2
Allocation	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized
Study Arms (n=evaluable/total pts)	Magro+cetuxii (n=40/78)	Magro+avelu (n=34)	Lemzo (n=20/88)	ALX148+trastu +ramu+chemo (n=18)	ALX148+trastu (n=19)	ALX148+pembro (n=19/52)	ALX148+pembro+ chemo (5FU&plat) (n=4/5)	TTI-621+chemo (n=80)	TTI-622+chemo n.a.	DSP107/ DSO107+ atezo (n=100)
Baseline	KRASm No brain meta.	CPI naïve/ No CNS meta.	No CNS metastases	No CNS metastases	No CNS metastases	CPI naïve/ No CNS meta.	PD-1 naïve/ No CNS meta.	Anthracycline-naïve/No CNS meta	n.a.	Unresectable
Priming Dose	1mg/kg	1mg/kg	No priming dose	No priming dose	No priming dose	No priming dose	No priming dose	n.a.	n.a.	n.a.
Efficacy data										
ORR (%)	n.a.	n.a.	n.a.	72	21	40	75	n.a.	n.a.	n.a.
mDoR (month)	n.a.	n.a.	n.a.	NR	8.7	n.a.	n.a.	n.a.	n.a.	n.a.
mPFS (month)	1.9	n.a.	n.a.	9.1	2.2	4.6	NR	n.a.	n.a.	n.a.
mOS (month)	10.4	n.a.	n.a.	NR	8.1	22.1	NR	n.a.	n.a.	n.a.
Safety profile										
AEs (%)	Disc. due to AEs 3	≥G4 0	≥G3 Lipase incr (5.0)	≥G3 n.a.	≥G3 Plat. decr (6.7) Neutropenia (6.7)	≥G3 Plat. decr (3.8) ALT incr (1.9) Neutropenia (1.9)	≥G3 n.a.	AEs n.a.	AEs n.a.	≥G3 n.a.
≥G3 Anemia (%)	n.a.	n.a.	Not observed	Not observed	Not observed	1.9	Not observed	n.a.	n.a.	n.a.
Hemoglobin Level. (%)	n.a.	n.a.	-10 (non-dose depedent)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<10
Administrative Info										
NCT Number	NCT02953782	NCT03558139	NCT03934814	NCT03013218	NCT03013218	NCT04675294	NCT04675333	NCT04996004	n.a.	NCT04440735
Study ID	5F9004	5F9006	TJ011133EDI101	ASPEN-01	ASPEN-01	ASPEN-03	ASPEN-04	TTI-621-03	n.a.	DSP10-001
Data Source	ASCO20	ASCO20	SITC20	ESMO-WCGC21	ESMO-WCGC21	Company	Company	Company	Company	Company

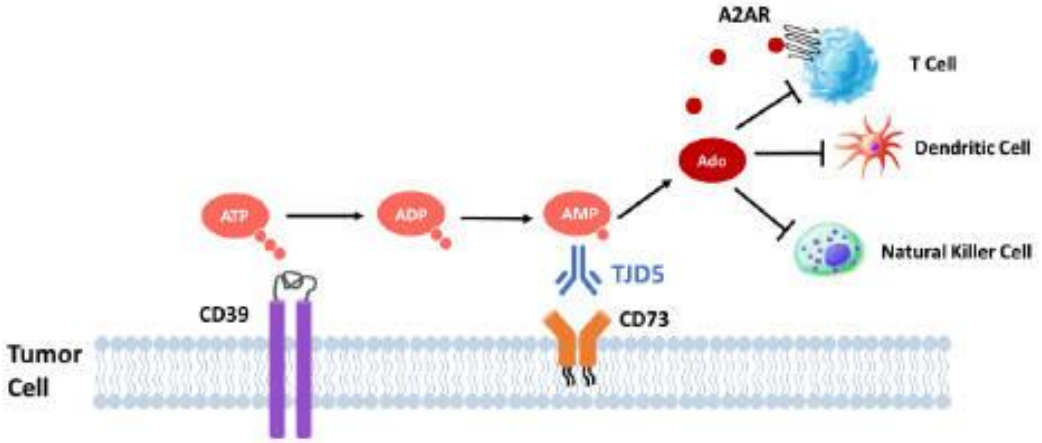
Sources: ASCO, ESMO, Company data, CMS (HK), Notes: CRC: colorectal cancer, OC: ovarian cancer, GC: gastric cancer, HNSCC: head and neck squamous cell carcinomas, LSM: Leiomyosarcoma*

Uliledlimab (TJD5, αCD73 mAb) - A promising biomarker within the tumor microenvironment

Uliledlimab or TJD5 is an in-house developed, humanized αCD73 mAb for treatment of solid tumors. CD73 is a homodimeric enzyme expressed in tumors and plays a critical role in suppressing immune cells in tumor micro-environment (TME). Despite recent breakthroughs with PD-1/-L1 therapies, unsatisfied clinical response rates (below 60% in overall cancer patients) remained key concerns. This non-responsiveness is partly due to T-cells within an inhibitory tumor environment are suppressed and fail to respond to stimulation-induced by PD-1/L1 mAb.

According to our literature research, CD39/CD73/A_{2A}R axis played a pivotal role in maintaining immune homeostasis by modulating the balance between extracellular adenosine triphosphate (ATP) and extracellular adenosine. Significant work has thus been done in targeting various aspects of tumor-associated adenosine signaling as a means of enhancing the immune response to malignancy, including agents targeting CD39, or CD73, or the A2aR receptor.

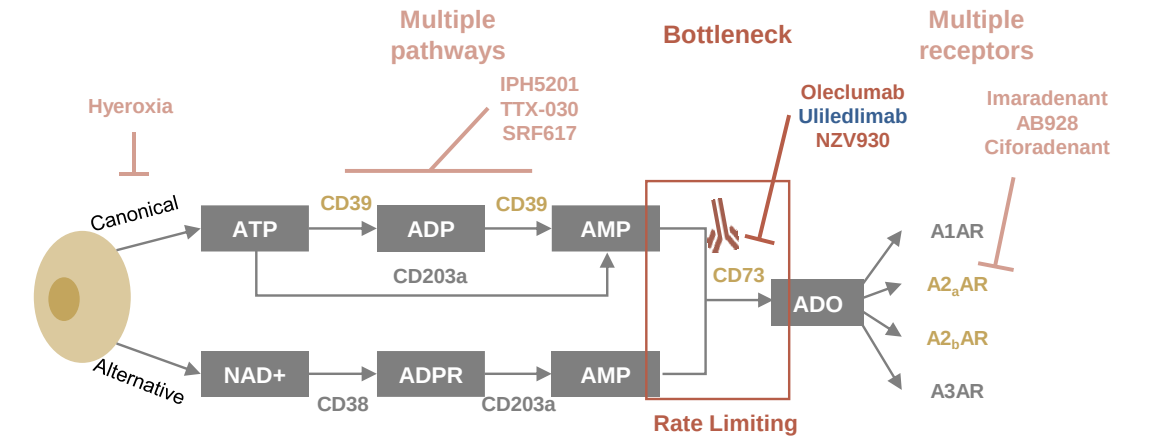
Figure 30: Illustration of CD73-catalyzed Ado generation and immunosuppression in the TME



Source: Company data

CD73, as a **rate-limiting** enzyme for adenosine production, plays a critical role to maintain tissue homeostasis by converting/switching ATP-triggered immune activation to adenosine-mediated immunosuppression, although the relative contribution of non-canonical adenosinergic pathways led by alkalike phosphatases and/or NAD+ ectohydrolase CD38 may need consideration. The extracellular ATP level is elevated in stressful situations such as inflammation, malignancy, and ischemia. While ATP mediates inflammatory responses through their P2 purinergic receptors, that is, P2XRs and P2YRs, it is rapidly hydrolyzed by the enzymatic cascade via CD39 (NTPDases) and CD73 (ecto-5'-nucleotidase) to generate adenosine that acts as an anti-inflammatory mediator to downregulate the immune cell function through its four receptors (A1, A2A, A2B, and A3). As such, CD73, by degrading extracellular AMP to adenosine, is a key player for the establishment of an immunosuppressive tumor microenvironment (TME). Notably, pre-clinical studies have indicated that the inhibition of CD73 renders T-cells more responsive to PD-1/PD-L1 therapies by altering the tumor micro-environment, resulting in a superior anti-tumor effect.

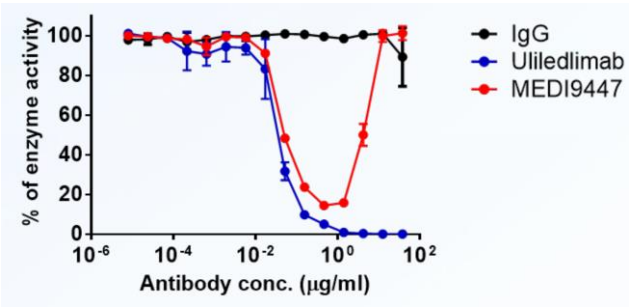
Figure 31: CD73 as a rate-limiting enzyme for adenosine production vs. CD39 and $A2_aAR$



Source: Company data

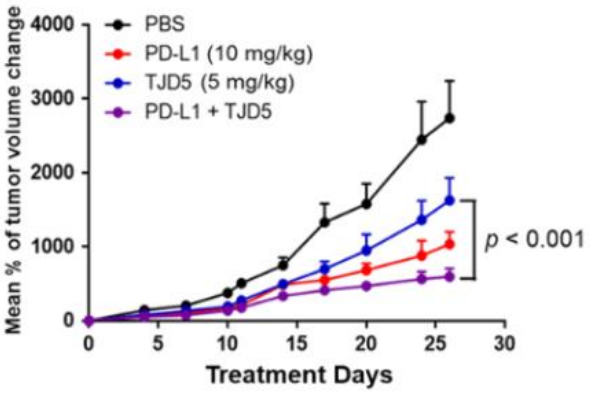
I-Mab boasts its differentiated CD73 mAb ulilediimab has the following key advantages: 1) no "hook effect" through intra-dimerization mechanism (Figure 32); and 2) a substrate non-competitive pathway. Co. believed these pharmacological properties may translate into efficient target inhibition in tumors and superior anti-tumor activity, especially in an adenosine-rich TME. In addition, preclinical data of ulilediimab in combination with PD-L1 mAb showed synergistic anti-tumor activities both in vitro and in vivo (Figure 33).

Figure 32: TJD5 showed no "hook effect"



Source: Company data

Figure 33: TJD5 showed synergistic anti-tumor activities with PD-L1 inhibitor

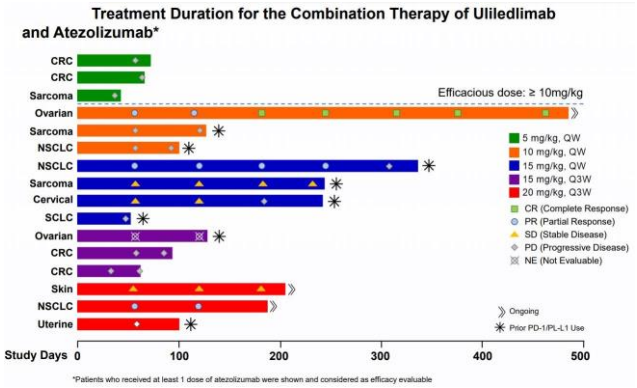


Source: Company data

Clinical Studies

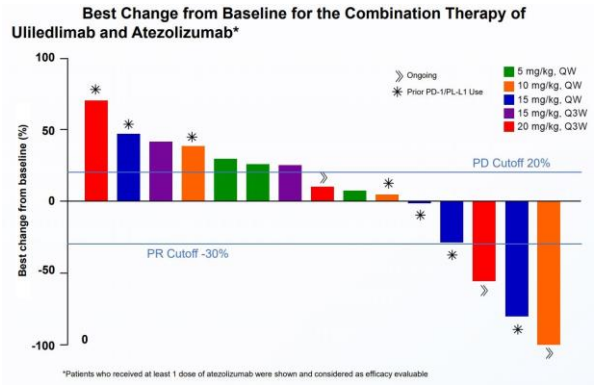
Global development of ulilediimab in the U.S. and China is focused on combination studies with Roche's atezolizumab (αPD-L1 mAbs) in patients with solid tumors. The ph1 study was completed with positive results. In ASCO2021, topline results showed ulilediimab is safe and well-tolerated. Among the 13 efficacy-evaluable patients dosed at ≥10 mg/kg, three patients had complete or partial responses (23% ORR) and three had stable disease (46% DCR). The clinical activity was observed in both PD-(L)1 treatment naïve and refractory cancer patients, including one partial response patient who previously failed nivolumab. Tumor types of patients who had complete or partial responses or stable disease included ovarian clear cell carcinoma, NSCLC and a few other cancers.

Figure 34: Treatment duration for the ulilediimab and atezolizumab combo therapy*



Source: Company; Note: Patients who received at least 1 dose of atezolizumab were shown and considered as efficacy evaluable*

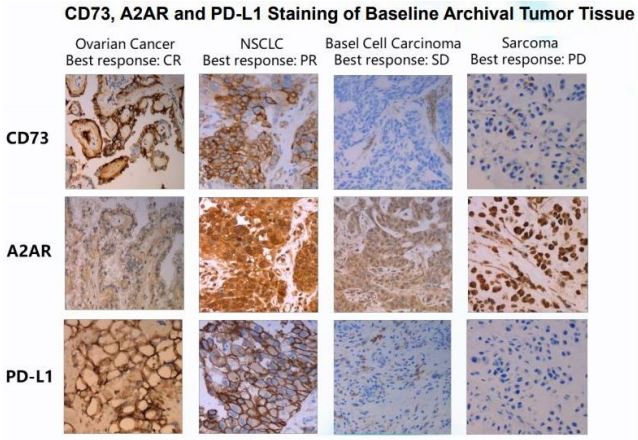
Figure 35: Tumor size reduction compares to baseline for the ulilediimab and atezolizumab combo



Source: Company; Note: Patients who received at least 1 dose of atezolizumab were shown and considered as efficacy evaluable*

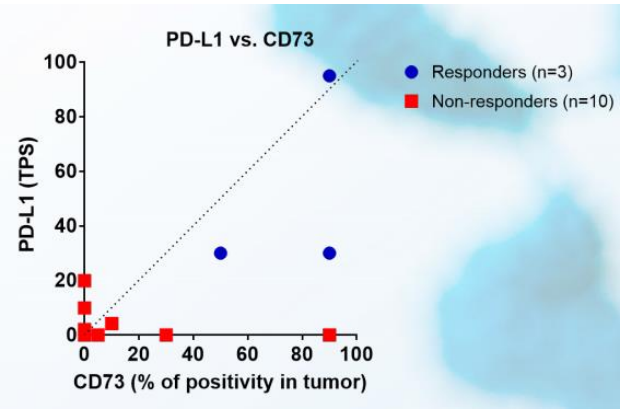
The three responders were identified as the only patients who exhibited higher co-expression of tumor CD73 and PD-L1 as compared to non-responders, indicating a correlation between higher CD73 expression and clinical activity of ulilediimab and a potential role of CD73 as a predictive biomarker to warrant further investigation.

Figure 36: Preliminary efficacy of ulilediimab in combination with atezolizumab



Source: Company data

Figure 37: Preliminary efficacy of ulilediimab in combination with atezolizumab



Source: Company data; Note: A higher co-expression of CD73 and PD-L1 only found in the three clinical responders (CR and PR) Co-expression for responders CD74 (78%) and PD-L1 (mTPS = 52%) vs. non-responders CD73 (22%) and PD-L1 (mTPS = 4%)

In China, ulilediimab is being explored in combination with Junshi's Toripalimab (αPD-1 mAbs) in patients with advanced or metastatic solid tumor. Based on the efficacy signal in the prior ph1 results, I-Mab will select NSCLC in subpopulations and OC as a potential lead indication in China.

Competitive Landscape

Currently, Oleclumab (MEDI-9447) from Medimmune/AZ and BMS-986179 from Bristol-Myers Squibb (BMS) are the two most advanced CD73 antibodies for cancer therapy, which are in ph2 clinical trials. Ulileldlimab's clinical progress now ranks the third-most advanced globally among CD73 biologics. The scientific attraction of the CD73 and synergistic therapeutic effect with other I/O drugs should drive CD73 class entering into BD/M&A territory. We believe I-Mab's ulileldlimab is well-positioned to achieve value creation along this path.

We also provide targeted agents along CD39/CD73/A_{2A}R pathway for reference, including αCD39 inhibitor (i.e. Corvus's CPI-006) binds to the CD39 protein of tumor cells and A_{2A}R antagonist (mainly small molecules) which prevents ADO binding immune cells' A2A receptors.

Figure 38: Global CD73/CD73/A_{2A}R cascade candidate pipelines

Target	Projects	Company	MoA	Stage	Lead indications	Other indication
αCD73	**Oleclumab**	AstraZeneca (AZ)	αCD73 mAb	Ph2	CRC/PDAC/EGFR-m NSCLC	NSCLC*/TNBC/OC/ UC
	BMS-986179	BMS	αCD73 mAb	Ph1/2	STs	
	Ulileldlimab	I-Mab	αCD73 mAb	Ph1/2	STs	
	Mupadolimab	Corvus	αCD73 mAb	Ph1/2	HNSCC	Viral-associated cancers
	NZV930	Novartis/Surface	αCD73 mAb	Ph1	STs	
	AK119	Akeso Bio	αCD73 mAb	Ph1	STs	
	Quemliclustat	Arcus Bio	CD73 inhibitor (small molecule)	Ph2	Pancreatic cancer	
αCD39	**IPH5201**	AZ/Innate Pharma	αCD39 mAb	Ph1/2	STs	
	TTX-030	AbbVie/Tizona	αCD39 mAb	Ph1	STs	Lymphoma
	SRF617	Surface	αCD39 mAb	Ph1	STs	
$\alpha A_{2A}R$	**Imaradenant**	AstraZeneca (AZ)	$\alpha A_{2A}R$ antagonist	Ph1/2	Pancreatic cancer	NSCLC*/STs
	Etrumadenant	Arcus Bio	$\alpha A_{2A}R/\alpha A_{2B}R$ antagonist	Ph1/2	PC/CRC	NSCLC
	Ciforadenant	Roche/Corvus	$\alpha A_{2A}R$ antagonist	Ph1/2	RCC	
	PBF-509	Novartis	$\alpha A_{2A}R$ antagonist	Ph1/2	NSCLC	
	CS3005	CStone	$\alpha A_{2A}R$ antagonist	Ph1	STs	

Sources: Clinicaltrials.gov, Evaluate Pharma, Company data; Notes: CRC: colorectal cancer; PDAC: pancreatic ductal adenocarcinoma; EGFR-m NSCLC: EGFR mutation non small cell lung cancer; TNBC: triple negative breast cancer; STs: solid tumors; BC: breast cancer; OC: ovarian cancer; UC: urothelial carcinoma

We summarized several candidates targeting CD73/CD73/$A_{2A}R$ cascade that have been developed for solid tumor treatment, including biologics and small molecules.

Figure 39: Global CD73/CD73/A2AR cascade candidates trials data comparison

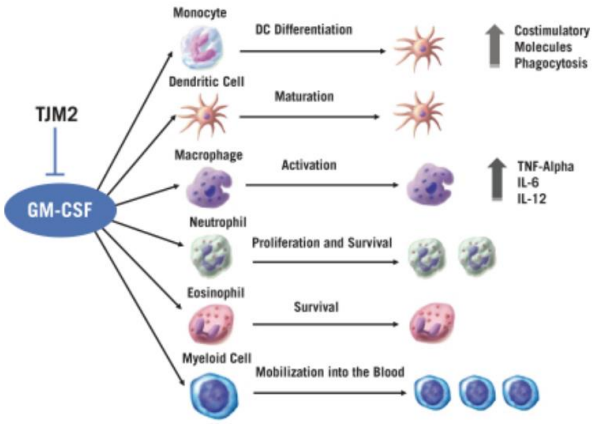
Company	AstraZeneca		I-Mab/AbbVie		Novartis/Surface	Corvus	AstraZeneca	Abbvie/Tizona	Arcus Bio	Roche/Corvus
Drug name	**Oleclumab**		**Ulileclimab (TJD5)**		**NZV930**	**CPI-006**	**IPH5201**	**TTX-030**	**AB928**	**Ciforadenant**
MoA	αCD73	αCD73	αCD73	αCD73	αCD73	αCD73	αCD39	αCD39	$αA_{2A}R/A_{2A}R$	$αA_{2A}R$
Indication	CRC/PDAC/ EGFR-m NSCLC	1L/2L PDAC	STs	STs	STs	STs	STs	STs	mCRPC	mCRPC
Study Phase	Phase 1	Phase 1b/2	Phase 1	Phase 1/2	Phase 1/1b	Phase 1	Ph1	Ph1	Phase 1b/2	Phase 1b/2
Allocation	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized	Non-randomized
Intervention Model	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single
Study Arms (n=evaluable pts/total pts)	Ole/Ole+durva (n=192)	Ole/Ole+chemo (n=339)	Ulile/Ulile+atezo (n=13/20)	Ulile/Ulile+Toripali (n=221)	NZV930+/- PD-1+/-A2AR (n=334)	CPI-006+/- Pembro+/-Cifo (n=378)	IPH5201+/- Ole+/-durva (n=204)	IPH5201+/- chemo+/-PD-1 (n=152)	AB928+/- chemo+/-PD-1 (n=11/17)	Cifora+/-Atezo (n=14/33)
Dose Escalation	40mg/kg Q2W	n.a.	15mg/kg QW or 20mg/kg Q3W	20mg/kg QW	n.a.	24mg/kg Q3W	n.a.	n.a.	150mg QD	100mg QD 200mgQD
Efficacy data										
ORR (%)	n.a.	n.a.	23	n.a.	n.a.	n.a.	n.a.	n.a.	27	38
mDOR (month)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hook effect	Yes	Yes	No	No	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Safety profile										
AEs (%)	G3/4 7.1 (mono)/ 20.8 (combo)	n.a. n.a.	G1/2: 65	n.a. n.a.	n.a. n.a.	G3/4 16.7 (mono)/ 12.5 (combo)	n.a. n.a.	n.a. n.a.	≥G3 76	G3/4 ~10
DLT	No DLT	n.a.	No DLT	No DLT	n.a.	n.a.	n.a.	n.a.	n.a.	
Administrative Info										
NCT Number	NCT02503774	NCT03611556	NCT03835949	NCT04322006	NCT03549000	NCT03454451	NCT04261075	NCT04306900	NCT04381832	NCT02655822
Study ID	D6070C00001	D6070C00005	4309ST101	STM102	CNZV930X2101	CPI-006-001	D6770C00001	TTX-030-002	ARC-6	CPI-444-001
Data Source	ASCO21	ASCO21	ASCO21	Company	Company	SITC21	Company	Company	ASCO21	ASCO20

Sources: Company data, ASCO, SITC: PDAC: mCRPC: metastatic castrate-resistant prostate cancer

Plonmarlimab (TJM2, αGM-CSF mAb) – Beyond inflammation, now unlocking value for severe COVID-19

Plonmarlimab (TJM2) is an internally-developed neutralizing antibody against human granulocyte-macrophage colony-stimulating factor (GM-CSF). GM-CSF is a central driver cytokine in orchestrating an innate immune response during inflammation. It is responsible for myeloid cell proliferation and functions, such as chemotaxis, adhesion, phagocytosis, and microbial killing. Importantly, GM-CSF can polarize macrophages into a pro-inflammatory M1 phenotype and is known to induce an inflammatory cascade involving other pro-inflammatory cytokines such as TNF, IL-1, IL-6, IL-12, and IL-23. It is evident that GM-CSF plays a crucial role in the pathogenesis and disease progression of multiple autoimmune conditions such as rheumatoid arthritis (RA). Further, GM-CSF might be a treatment solution for cytokine release syndrome (CRS) during CAR-T treatment or COVID-19 infection, as recent evidence has highlighted their critical role in modulating innate immune effector functions.

Figure 40: Role of GM-CSF in orchestrating coordinated immune response



Source: Company

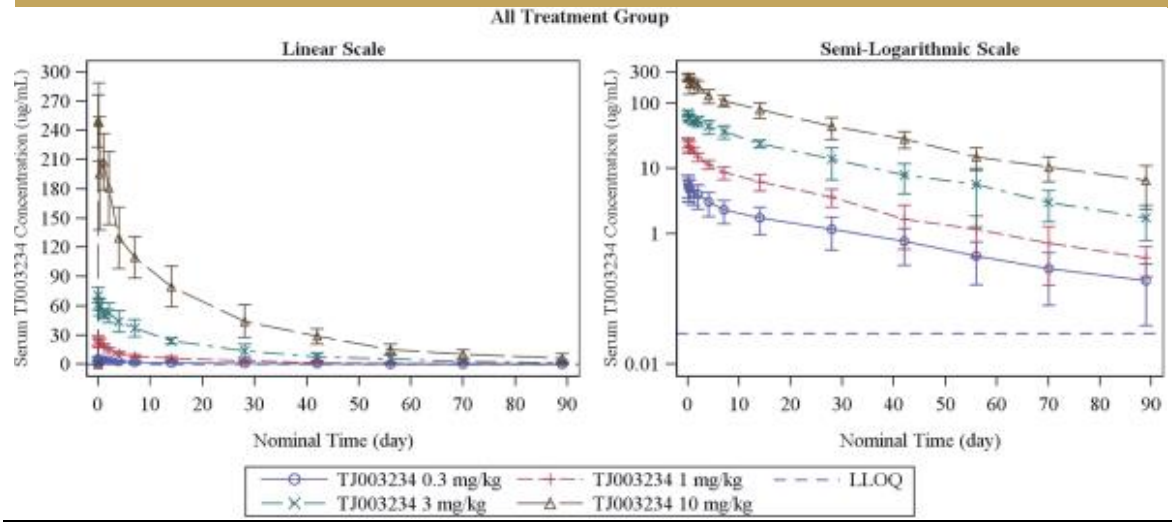
I-Mab expects its plonmarlimab should have the below clinical advantages comparing to front-runner GM-CSF mAb and other RA biologics:

- **Fast onset of therapeutic effect:** Because GM-CSF acts at a relatively early stage in the inflammatory cascade, GM-CSF blockade is expected to take effect after just a few initial doses and provide quick symptomatic relief to patients. This fast onset of clinical responses in RA has been shown in Ph2 clinical trials on otilimab and mavrilimumab. Given the similar MoA, Co. anticipates plonmarlimab has comparable fast onset potential.
- **Favorable PK/PD profiles:** plonmarlimab has exhibited favorable PK/PD profiles given its high affinity, good PK, clean immunogenicity, and concentrated formulation. Therefore, Co. expects the plonmarlimab's clinically active dose to be low, a favorable characteristic (potentially better safety outcome and better patient compliance) for treatment of autoimmune diseases due to longer DoT.
- **Symptomatic pain relief:** given the GM-CSF receptor is also expressed on sensory neurons. Based on peer's mavrilimumab, αGM-CSF mAb is expected to provide symptomatic pain relief which can improve the quality of life of autoimmune disease patients.

Clinical Studies

The ph1 study (NCT03794180) in the U.S. for safety and PK/PD assessment has been completed. The initial safety results (n=24) showed plonmarlimab was well tolerated up to 10mg/kg dose level with no MTD reached. There were no interruptions in dosing or early withdrawals. The majority of AEs were mild to moderate in nature. The most common AEs were headache (25%) and protein urine (25%). No serious adverse events were reported during the study. Pharmacokinetics (PK) result showed that over the dose range of 0.3 mg/kg to 10 mg/kg, both Cmax and exposure increased in an approximately dose-proportional manner, with Cmax increased from 5.75 mg/mL to 260 mg/mL and AUC0-last increased from 90.5 day*mg/mL to 3780 day*mg/mL (see Figure below). Pharmacodynamics (PD) results showed four hours after dosing, the induction of STAT5 phosphorylation by ex vivo GM-CSF in circulating monocytes was inhibited by at least 70% compared to the placebo following a single dose of plonmarlimab for all dose groups. Plonmarlimab inhibited GM-CSF-stimulated STAT5 phosphorylation levels by more than 90% in subjects in the 3 mg/kg and 10 mg/kg cohorts at 4 h to up to 2 weeks after dosing, suggesting the saturation of STAT5 inhibition by the treatment at doses of 3 mg/kg and above.

Figure 41: Mean±SD concentration-time plots of serum plonmarlimab levels



Source: Company data

Plonmarlimab unlocking its value in patients with severe COVID-19

During COVID-19 pandemic, researchers are investigating several cytokine inhibitors to treat COVID-19, o/w the most advanced αGM-CSF mAb is lenzilumab. In May 2021, lenzilumab published the ph3 LIVE-AIR results (n=520) in hospitalized patients with severe COVID-19. The result showed lenzilumab improved the likelihood of survival without ventilation (SWOV) by 54% in the mITT population (HR: 1.54; 95%CI: 1.02-2.31, p=0.041) and by 90% in the ITT population (HR: 1.90; 1.02-3.52, nominal p=0.043) compared to placebo. SWOV also relatively improved by 92% in subjects who received both corticosteroids and remdesivir (1.92; 1.20-3.07, nominal p=0.0067); by 2.96-fold in subjects with CRP<150 mg/L and age <85 years (2.96; 1.63 – 5.37, nominal p=0.0003); and by 88% in subjects hospitalized ⩽2 days prior to randomization (1.88; 1.13-3.12, nominal p=0.015). Survival was improved by 2.17-fold in subjects with CRP<150 mg/L and age <85 years (2.17; 1.04-4.54, nominal p=0.040).

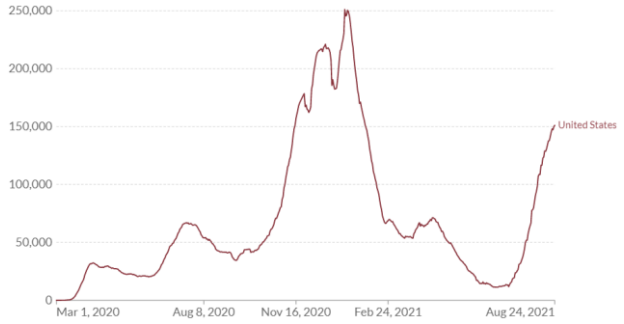
I-Mab's plonmarlimab is also being explored in COVID-19 related CRS studies in patients with severe COVID-19. Co. recently announced positive Interim analysis from ph2/3 study of plonmarlimab to treat patients with severe COVID-19. The current interim analysis showed positive preliminary results in patients who were mechanical ventilation free (MVF) at baseline (n=91). Plonmarlimab treatment resulted in a higher MVF rate (83.6% vs 76.7%) by day 30, lower mortality rate (4.9% vs 13.3%) by day 30, higher recovery rates (68.9% vs 56.7% at day 14 and 80.3% vs 70.0% at day 30), as well as reduced time to recovery and hospitalization duration, as compared to placebo. The magnitudes of the clinical improvements are comparable to those observed with lenzilumab in a similar patient population. Biomarker results were consistent with the observed clinical outcome and indicated patients treated with plonmarlimab had a reduction in plasma levels of pro-inflammatory cytokines and chemokines critically involved in CRS, including TARC, IP10, GCSF, IL10, IL6, MCP1, IL1RA, TNF-alpha but not interferon-

gamma. A transient increase in Neutrophil to Lymphocyte Ratio (NLR) that is commonly associated with disease exacerbation was only observed in placebo. Plonmarlimab was well tolerated in all patients with no significant safety concerns. Based on the positive results from the interim data analysis of ph2/3 trial, I-Mab intends to continue advancing the study for in U.S. patients with severe COVID-19.

Coronavirus Treatments Tracker: To date, there is still no cure yet for COVID-19. Remdesivir is the only FDA approved drug for patients who require hospitalization for COVID-19 virus. Yet many experts remain skeptical of remdesivir's benefits. They point out, for example, that there's no statistically significant evidence that remdesivir actually prevents deaths from COVID-19. On Nov. 19, the WHO recommended against using remdesivir. Based on a global randomized trial, they concluded in February that remdesivir had little to no effect on hospitalized patients with COVID-19. On April 12 2020, Gilead announced it would halt its ph3 trial of remdesivir in high-risk, non-hospitalized COVID-19 patients. That's because Gilead doesn't see a need in developing the multi-day treatment, it said.

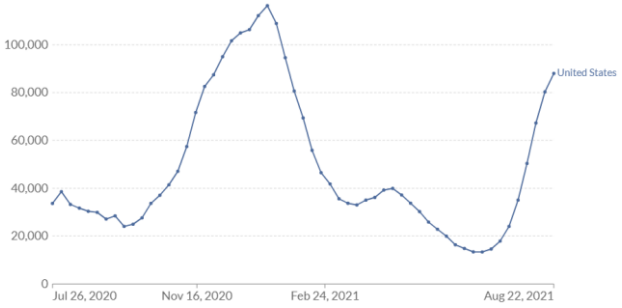
COVID-19 monoclonal antibodies are not currently authorized for use in patients who are hospitalized with severe COVID-19 symptoms. Three monoclonal antibody products currently have EUA from the FDA for the treatment of mild-to-moderate COVID-19 in non-hospitalized patients at high risk of progressing to severe disease and/or hospitalization. These products are: 1) Bamlanivimab plus etesevimab from Eli Lilly; 2) Casirivimab plus imdevimab from Regneron, and 3) Sotrovimab from GSK/Vir. However, the distribution of bamlanivimab plus etesevimab was paused during Jun-Aug 2021, because the Gamma (P.1) and Beta (B.1.351) variants emerged in early 2021 proved resistant.

Figure 42: Daily new confirmed COVID-19 cases rises due to delta variant (by 7-day rolling average)



Sources: U.S. government sources

Figure 43: Weekly new hospital admissions for COVID-19 rises due to delta variant



Source: Johns Hopkins University CSSE COVID-19 Data

According to U.S. government sources and Johns Hopkins University, the daily new confirmed COVID-19 cases ranges from 11k to 250k in 2021 YTD. We calculated the hospitalization rate during the period was 7%-16%, which surprisingly the hospitalization rate was negatively correlated with the daily new confirmed cases. This indicates a at least a total of hospitalization burden of ~642k per year in the U.S. assuming pandemic is managed without new variant threats.

Given COVID-19 variants creates uncertainties in global fight against pandemic, prospects for reaching the end of the pandemic look much cloudier now. McKinsey anticipate endemic COVID-19 may be a more realistic endpoint than herd immunity. Based on this scenario, we assume COVID-19 will cause similar burden of influenza disease, which resulted in an average 445k hospitalization per year during 2010-2020 (ranges from 140k to 810k per year vs. 2.6mn new admissions of COVID-19 pts in last 12mo).

Thus, we reckon the total hospitalization burden in the U.S. to reach 445k-642k per year for patients with severe COVID-19. We assume the potential treatment cost of plonmarlimab is USD3,000, largely in line with a five-day course of remdesivir, which costs as much as USD3,120. As such, the potential market for severe COVID-19 patients could be at least at USD1.3bn post COVID-19 pandemic.

The interim analysis is shown in the below table along with peers' published data.

Figure 44: Clinical data comparison amongst αGM-CSF mAbs for severe COVID-19

Company	I-Mab	Humanigen	Kiniksa	GSK
Generic name	**Plonmarlimab**	**Lenzilumab**	**Mavrilimumab**	**Otilimab**
MoA	αGM-CSF	αGM-CSF	αGM-CSF	αGM-CSF
Study Phase	Ph2/3	Ph3 (US EUA filed)	Ph2/3 (Ph2 data below)	Ph2a
Indication	Severe COVID-19	Severe COVID-19	Severe COVID-19	Severe COVID-19
Median age	n.a.	62	56.7	70
Selected Dose	6mg/kg QD	600mg QQ	6mg/kg QD	90mg QD
Study Arms (evaluable pts/total pts)	Plonmarli (vs PbO)	Lenzi (vs PbO)	Mavrili (vs PbO)	Otili (vs PbO)
	(n=91/384)	(n=479/520)	(n=40)	(n=180/806)
Efficacy data				
Primary Outcome				
SWOV (%)	83.6 (vs 76.7) (in 30 days)	84.4 (vs 77.9) (in 28 days)	95 (vs 79) (in 28 days)	65.1 (vs 45.9) (in 28 days)
Secondary Outcome				
Mortality rate (%) (follow-up days)	4.9 (vs 13.3) (in 30 days)	10 (vs 14) (in 28 days)	5 (vs 16) (in 28 days)	26 (vs 40.4) (in 60 days)
Safety profile				
AEs (%)	n.a.	≥G3	SAE	SAE (respiratory)
		26.7 (vs 32.7)	24 (vs 21)	4 (vs 5)
Administrative Info				
NCT Number	NCT04341116	NCT04351152	NCT04447469	NCT04376684
Study ID	TJ003234COV201	LIVE-AIR	KPL-301-C203	OSCAR (>70yr old grp)
Data Source	Company	Company	Lancet	Company

Sources: FDA, NEJM, Company data, CMS (HK); Note: CRS: cytokine release syndrome, SWOV: Survival without Ventilation; PbO=Placebo*

Figure 45: COVID-19 neutralizing antibodies with FDA-granted EUA

Drugs	Company	MoA	Indications	Date of EUA
Tocilizumab	Genentech	αIL-6 mAb (vector binding)	Hospitalized COVID-19	June 2021
Sotrovimab	GSK/Vir	rh IgG1 mAb (viral binding)	Mild/moderate COVID-19	May 2021
Etesevimab & bamlanivimab	Junshi/Eli Lilly	rh IgG1 mAb (viral binding)	Mild/moderate COVID-19	Feb 2021 (paused during Jun-Aug 2021)
Casirivimab & imdevimab	Regeneron	rh IgG1 mAb (viral binding)	Mild/moderate COVID-19	Nov 2020
Bamlanivimab	Eli Lilly	rh IgG1 mAb (viral binding)	Mild/moderate COVID-19	Nov 2020 (evoked in Apr 2021)

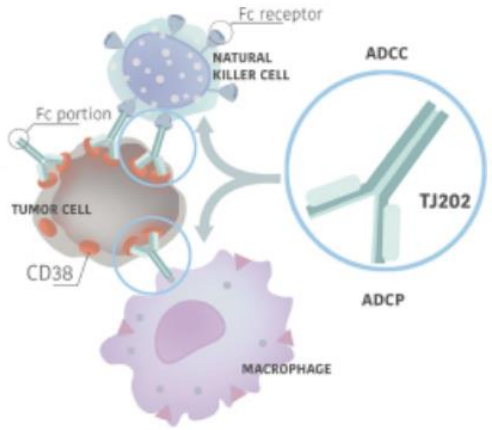
Sources: FDA, Clinicaltrials.gov, Evaluate Pharma,

We think plonmarlimab is less susceptible to evasions caused by virus mutation, as it binds to GM-CSF (host target) instead to the receptor-binding domain of the spike protein of SARS-CoV-2 (viral target). We think this will prolong the potential life cycle of this candidate. Given the above positive data of plonmarlimab, we think plonmarlimab as a host targeted neutralizing antibody, should have a better potential in treating hospitalized COVID-19 patients compares to viral targeted neutralizing antibody.

Felzartamab (TJ202, αCD38 antibody)

Felzartabmab is a fully human αCD38 antibody which I-Mab in-licensed its Greater China rights from MorphoSys in 2017. Felzartamab binds to CD38 overexpressed on the surface of target cells and kills them by inducing antibody-dependent cellular cytotoxicity (ADCC) and antibody-dependent cellular phagocytosis (ADCP). The target cells are the malignant plasma cells in MM and a group of dysregulated CD38high B cells and plasma cells that produce pathogenic antibodies in autoimmune conditions such as SLE. Felzartamab is being explored in indication of multiple myeloma (MM) and autoimmune diseases.

Figure 46: Felzartamab kills CD38-bearing tumor cells by inducing ADCC and ADCP

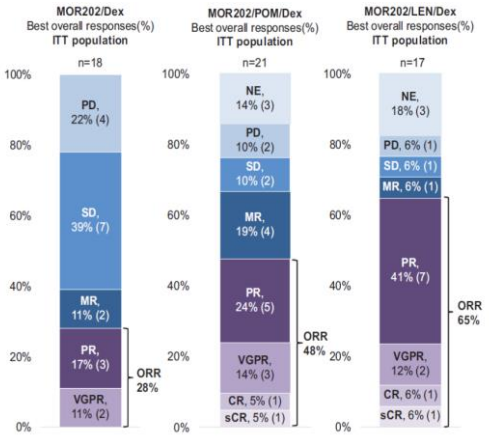


Source: Company data

Clinical Studies

Based on the ph1/2a study (n=91) conducted by MorphoSys, felzartamab was well tolerated in patients with relapsed or refractory (r/r) MM in Austria and Germany. The ph1/2 also demonstrated preliminary efficacy signal in three combo cohorts, TJ202+DEX (28% ORR, 8.4mo mPFS), TJ202+POM+DEX (48% ORR, 17.5mo mPFS) and TJ202+LEN+DEX (65% ORR, not reached mPFS). In addition, felzartamab was administered as a two-hour IV infusion at first dose and infusion time could be reduced to as short as 30 minutes at subsequent doses without obvious safety concerns.

Figure 47: ORR data of felzartabmab's Ph1/2a study



Source: Company data

The ph1/2a trial results revealed felzartamab has the following potential advantages over other αCD38 antibodies: 1) Shorter infusion time: TJ202 only requires an infusion time of 0.5-2 hours, compared to ~3-7 hrs of current SOCs; 2) Low infusion reaction rate (IRR): as low as 7% for felzartamab, compared to 38%-48% for the currently marketed CD38 antibody (dratumumab and isatuximab).

Figure 48: Felzartamab's advantage over competitive CD38 agents

		Felzartamab	Daratumumab	Isatuximab
Patient (n)		56	1,166	154
Onset duration	Median time to onset IRR (hr)	n.a.	1.4	n.a.
	Infusion time (hr)	0.5-2	3-7	~3
Safety	Any grade AEs (%)	7	42	99
	Grade 3/4 AEs (%)	0	6	62
	Complement dependent cytotoxicity (CDC)	-	+++	+
	Infusion related reaction (%)	7	42 (16mg/kg)	38 (10mg/kg)

Sources: Company Data, ASH, ASCO, clinicaltrial.gov

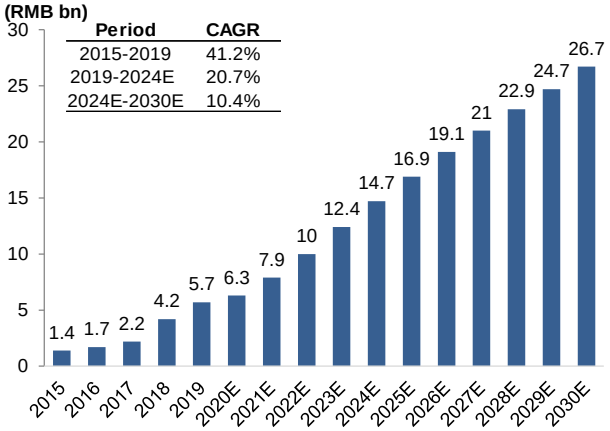
Felzartamab is currently on track for two on-going registrational clinical trials in China. One is a single-arm registrational trial (n=113) with felzartamab and DEX for 3L MM patients using ORR as the primary endpoint (NCT03860038). Co. has completed the pts enrollment and expected to file NDA to CDE in 2021. The other is a parallel registrational trial (n=291) combining felzartamab with LEN and DEX for 2L MM patients (NCT03952091). The patient enrollment is on-track (n=155/291 as of Feb 2021). In addition, I-Mab will initiate a combination clinical trial of felzartamab with lemzoparlimab in 2H21E for 1L MM patients. Additionally, I-Mab expects to receive IND approval and start a Phase 1b clinical trial in patients with SLE in the 2H21E.

Competitive Landscape

Currently development of CD38 drug class is focused on multiple myeloma (MM) patients or systemic lupus erythematosus (SLE) patients

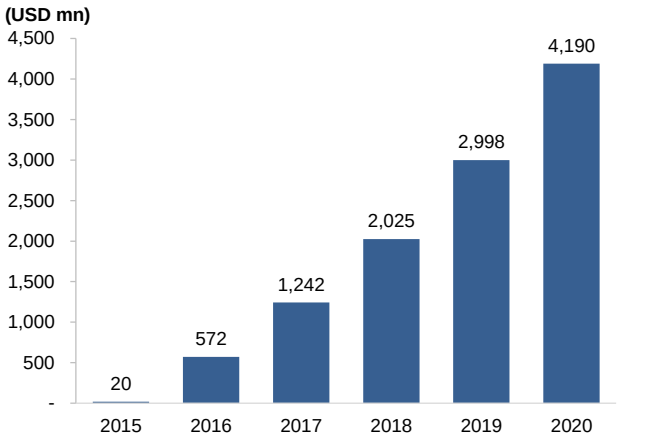
Multiple myeloma is a cancer of the white blood cell, which accumulates in bone marrow and interrupts normal cell function and processes. It is the second most common hematologic tumor, accounting for ~1% of all tumors and 13% of hematologic tumors. MM is often diagnosed in later stages and nearly 20% of patients may experience disease reoccurrence or relapse after initial treatment. As per WHO, It is estimated that there were 21,116 new cases and 16,182 deaths due to MM in China during 2020, with a higher prevalence in males and older adults ages 55 and 74 years old. Uncontrolled MM leads to complications including pathologic fractures and anemia.

Figure 49: China Market for MM Therapeutics (2015-2030E)



Source: Frost & Sullivan Analysis

Figure 50: Darzalex recorded fast sales ramp up over 2015-2020



Source: JNJ

Darzalex (daratumumab) is the global FIC CD38 mAb approved by FDA in Nov 2015. Over the years, Darzalex has advanced its initial label for 4L MM (mono therapy) to ASCT eligible 1L MM patients (Darzalex + VTd). JNJ reported USD4.2bn WW sales of Darzalex in FY20, representing a 65% CAGR over 2016-2020. Evaluate Pharma forecasted Darzalex FY26E sales to reach USD8bn.

Current MM treatment guideline in China recommend VCD triplets (Velcade (bortezomib), cyclophosphamide and dexamethasone) as well as VRD triplets (Velcade, Revlimid (lenalidomide) and dexamethasone) as 1L regimen. We expect the future GPO of bortezomib and lenalidomide should improve the affordability of this triplet combination regimen, driving penetration uptake in CD38 drug class.

Darzalex has received a conditional approval from the NMPA in July 2019. Darzalex has not been covered by NRDL yet and its current annual treatment cost is at around RMB40,000/mo. Competitive late-stage CD38 mAb candidates in China include Sanofi's sarcisa, and I-Mab's felzartamab. We summarize data and ongoing clinical development for CD38 drug class below

Figure 51: China CD38-targeted antibodies

Projects	Company	MoA	China status	Indication
Daratumumab (IV)	JNJ	αCD38 mAb	Marketed	3L MM
Isatuximab (IV)	Sanofi	αCD38 mAb	Ph 3	1L MM
Felzartamab (IV)	I-Mab/MorphoSys	αCD38 mAb	Ph 3	3L MM/2L MM/1L MM

Sources: Clinicaltrials.gov, Company, CMS(HK); Notes: MM: multiple myeloma

Figure 52: αCD38 mAb clinical data comparisons

Company	**I-MAB/MOR**			**JNJ**					**Sanofi**
Drug name	**Felzartamab**			**Daratumumab**					**Isatuximab**
MoA	αCD38 mAb			αCD38 mAb					αCD38 mAb
Indication	≥3L MM	≥2L MM	≥3L MM	≥3L MM	≥2L MM	≥2L MM	1L MM	1L MM	≥3L MM
Study Phase	Phase 1/2	Phase 1/2	Phase 1/2	Phase 1	Phase 3	Phase 3	Phase 3	Phase 3	Phase 3
Allocation	Non-random.	Non-random.	Non-random.	Non-random.	Randomized	Randomized	Randomized	Randomized	Randomized
Study Arms (n=treatment/comparator group)	Felza+DEX	Felza+ LEN/DEX	Felza+ POM/DEX	Daratu +POM/DEX	Daratu +LEN/DEX (vs LEN/DEX)	Daratu +V/DEX (vs BOR/DEX)	Daratu +LEN/DEX (vs LEN/DEX)	Daratu +V/M/P (vs V/M/P)	Isatu +POM/D (vs POM/D)
	18	17	21	103	281/276	251/247	368/369	350/356	154/153
Median prior treatment lines	3	2	3	4	≥1	≥1	0	0	≥3
Media age	57	65	66	64	n.a.	64	73	71	~75
Infusion time (hour)	0.5-2	0.5-2	0.5-2	3–7	3–7	3–7	3–7	3–7	~3
Efficacy data									
ORR (%)	28	65	48	60	93 (vs 76)	85 (vs 63)	93 (vs 82)	91	56 (vs 25)
DCR (%)	78	76	76	87	n.a.	n.a.	n.a.	n.a.	90 (vs 77)
mDoR (month)	16.7	n.a.	16.6	NR	34.3 (vs 16.0)	13.4 (vs 5.2)	n.a.	NR (vs 21.3)	n.a.
mPFS (month)	8.4	NR	17.5	8.8	44.5 (vs 17.5)	16.7 (vs 7.1)	NR	NR	11.5 (vs 6.5)
mOS (month)	NR	NR	NR	17.5	NR	NR (ongoing)	NR	NR	NR (vs 11.6)
Safety profile									
≥G3 AEs (%)		Neutropenia (52) Lymphopenia (48) Leukopenia (39)		Neutrop (78) Anemia (28) Leukope (24)	Neu (56 vs 42) Ane (18 vs 21) Thr (15 vs 16)	Thr (46 vs 33) Ane (16 vs 16) Neu (14 vs 5)	Neu (50 vs 35) Ane (12 vs 20) Leu (11 vs 5)	Neu (40 vs 39) Thr (34 vs 38) Leu (16 vs 20)	(87 vs 71)
≥G3 IRR (%)	**0**	**0**	**0**	12	n.a.	n.a.	n.a.	n.a.	2 (vs 0)
Administrative Info									
NCT Number	NCT01421186			NCT01998971	NCT02076009	NCT02136134	NCT02252172	NCT02195479	NCT02990338
Study ID	MOR202C101			EQUULEUS	POLLUX	CASTOR	MAIA	ALCYONE	ICARIA
Data Source	Company data, ASH18, Lancet Haematol 2020			ASCO20	Nature	Journal CLML	ASCO21	Lancet	Lancet

Sources: Company data, ASH; Note: DEX: dexamethasone, LEX: lenalidomide, POM: pomalidomide

SLE, as an autoimmune disease, is caused by mistakenly attacks on healthy tissues and organs by immune systems and could lead to organ damage and eventually to death. SLE typically becomes symptomatic in patients between age 15 and 45, and their life expectancy is reduced by 12.4 years on average. Studies show that young women are more susceptible to SLE (Weckerle, Clinical Reviews in Allergy & Immunology). The prevalence of SLE in China reached 1.0mn in 2018, and is expected to increase to 1.1mn in 2030 at a CAGR of 0.6% from 2018 as per F&S.

Competitive approved novel biologics therapeutics or candidates in China include belimumab by GSK (approved in 2019) and telitacicept by RemGen (approved in 2021), both belong to the TNFα family. However, research (*Liao. et, al. International Journal of Rheumatic Diseases 2017*) founded long-term use of TNFα drugs may result in bacterial infections due to immunosuppression. We believe the felzartamab has the potential to become a safer solution for treating SLE over competitors, as it directly inhibits and selectively depletes the pathogenic B cells and plasma cells.

Figure 53: China biologic products for SLE treatment

Projects	Company	MoA	Indications	China status
Belimumab	GSK	αBLyS mAb	SLE/LN	Marketed (2019)
Telitacicept	RemeGen	αBLyS/APRIL fusion	SLE	Marketed (2021)
Lanalumab	Novartis	BAFF-R Inhibitor	SLE	Ph2
TJ202	I-Mab/MorphySys	αCD38 mAb	SLE	Ph1b

Sources: Clinicaltrials.gov, Company data, CMS(HK); Notes: SLE: systemic lupus erythematosus; LN: lupus nephritis; BlyS: B-cell lymphocyte stimulator; APRIL: a proliferation-inducing ligand;

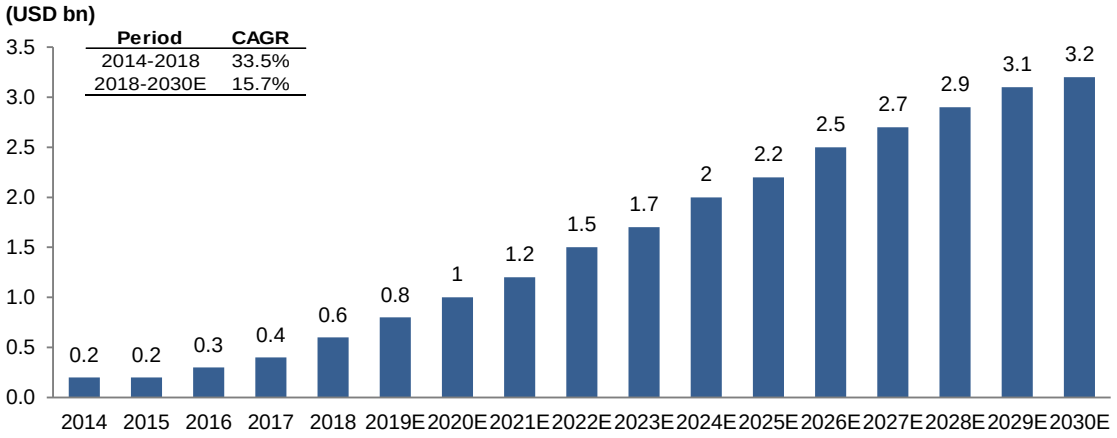
Eftansomatropin alfa (TJ101, long-acting growth hormone)

Eftansomatropin (TJ101) is a long-acting recombinant human growth hormone (rhGH) for treatment of growth hormone deficiency (GHD). Co. obtained TJ101's greater China rights from Genexine in 2015. TJ101 is considered as a more convenient (weekly/bi-weekly vs daily injection) and has better safety profile (natural protein-based long-acting protein vs. PEG/chemical linkers) compares to currently marketed rhGH peers. Co. expected an NDA submission in China in 2023E.

GHD is a pituitary disorder that occurs when the production of growth hormone, normally secreted by the pituitary gland, is disrupted. Since growth hormone plays a critical role in stimulating body growth and development and is involved in the production of muscle protein and the breakdown of fats, a decrease in growth hormone affects numerous physiological processes, including short stature in children and other physical ailments in both children (pediatric growth hormone deficiency, PGHD) and adults (adult growth hormone deficiency, AGHD). Deficiency in growth hormone can be induced by different pathological statuses, including ordinary deficiency of growth hormone, idiopathic short stature (ISS), Turner Syndrome, etc. The widely adopted treatment for PGHD is patient-specific growth hormone replacement therapy, which is given in a calculated weight-based dosing regimen.

According to F&S, PGHD affected c.3.4mn patients in 2018 in China. However, only 5.7% of all PGHD patients projected in China received primarily daily injections (primarily daily injection/short-acting) of growth hormone replacement therapy in 2020, reflecting the PGHD patients' clinical needs are largely untapped. The PGHD market in China is forecasted to grow to RMB19.6bn by 2033E, representing an 11.5% CAGR during 2018-2033.

Figure 54: China PGHD therapeutics market size (2014-2030E)



Source: Company data

The market recently raised concerns about potential policy headwind to the rhGH market in China. We understand the rationale behind a more stringent regulatory trend is to address rhGH drug abuse in healthy pediatric population in China. We thus expect a minimal impact on the uptake penetration rate in PGHD addressable market in China, from 1% in 2019 to 8% in 2027E, in our estimates.

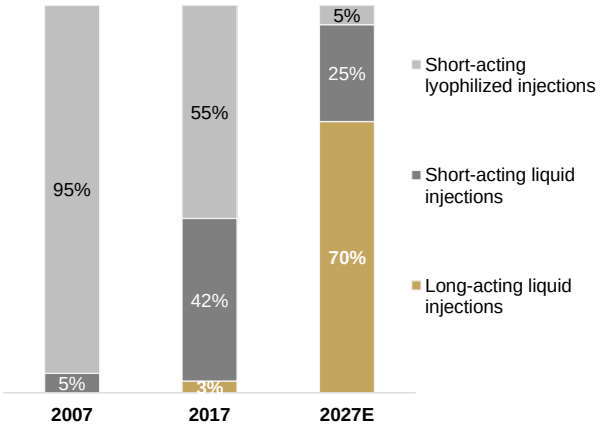
Figure 55: PGHD market size estimates in 2029E

Market size (k)	2019	2029E
Total pediatric (4-15 year old, k)	**195,290**	**134,910**
Short stature Prevalence (%)	3	3%
PGHD related Indication (%)	53	53%
PGHD addressable market (k)	**3,105**	**2,145**
Penetration (%)	1	9%
PGHD treated pts (k)	**32**	**192**
Total PGHD mkt (RMB mn)	**1,267**	**6,354**

Source: CMS (HK) estimates

Currently, short-acting rhGH is commonly used for the long-term treatment of PGHD and AGHD. As per MENET, short-acting rhGH represented 95% market during 2007-2017. However, the inconvenience of short-acting rhGH often resulted in poor patient compliance, creating great needs for better dosing options. We anticipate the market will gradually shift to a higher long-acting adoption during 2017-2027E thanks to improving affordability and acceptance. In our scenario model the long-acting class will reach c.70% market share in2027E.

Figure 56: The rhGH market will gradually shift to a greater long-acting adoption in 2017-2027E



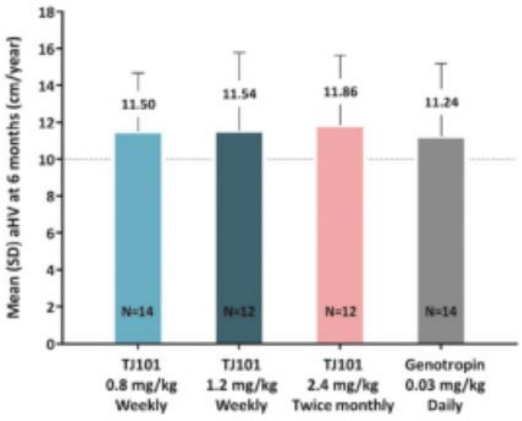
Source: CMS (HK) estimates

Clinical Studies

Eftansomatropin alfa is currently in global ph3 registrational study (TALLER) for PGHD, aiming to demonstrate non-inferiority of 1.2 mg/kg/week of eftansomatropin alfa over Norditropin. The study in China completed first patient enrollment in Feb 2021. The top-line clinical data are expected to become available in 2Q23E to support NDA submission.

At the 2018 Endocrine Society annual meeting, eftansomatropin alfa presented its ph2 interim results, showing comparable safety profile to marketed products. The study informed no study drug-related serious adverse events (SAEs) or death occurred. Most Injection site reactions (ISRs) were transient and no patients discontinued treatment due ISRs. PK data demonstrated a longer half-life of TJ101 77.75–141.95 hours after a single dose and 43.92–55.66 hours (vs 5.27 hours of Genotropin) after three months of multiple-dose injections. In the same ph2 study, subcutaneous administration of TJ101 over the dose range of 0.8mg/kg QW, 1.2 mg/kg QW, 2.4mg/kg Q2W had an increase in aHV of 11.50cm, 11.54cm, and 11.86 cm/year over the six-month study period respectively. Patient in the genotropin cohort had an increase in aHV of 11.24 cm/year over the same study period.

Figure 57: The aHV at 6mo showed comparable growth rates between TJ101 and peers



Source: Genexine; Note: CH2 & CH3: Constant regions 2 & 3 of antibody heavy chains, respectively; hGH: human growth hormone

Competitive Landscape

Jintrolong (金賽增) is the only CDE-approved long-acting pegylated rhGH in China. However, concerns remain on its safety profile, such as potential renal toxicity, cellular vacuolation and formation of anti-polyethylene glycol antibodies. In addition to TJ101, other competitive late-stage players in China include GeneScience, Anhui Anke, Xiamen Amoytop, Generon and Visen.

We believe a stricter environment will benefit rhGH names with higher safety profile. TJ101 is the only Fc-based long-acting rhGH in China with no safety concerns typically associated with pegylated drugs, such as potential renal toxicity, pre-existing or treatment-induced anti-PEG antibodies, and cellular vacuolation in macrophages, renal tubule cells and the choroid plexus epithelial cells. We summarize data and ongoing clinical development for long-acting rhGH below.

Figure 58: Marketed and late-clinical stage long-acting growth hormone products in China

Projects	Company	MoA	Dosing frequency	Status in China
Jintrolong	GeneScience	PEGylated GH	QW	Marketed
Lonapegsomatropin (ACP-001)	Visen/Ascendis	TransCon hGH	QW	Ph3
Eftansomatropin (TJ101)	I-Mab/Genexine	Hy-FC (Fc FP)	**Q2W**	Ph3
PEG-rhGH	Anke Bio	PEGylated GH	QW	Ph2/3
Y-shaped PEG somatropin	Amoytop Bio	PEGylated hGH	N.A.	Ph2/3
Somapacitan	Nova Nordisk	IGF-1	QW	Ph2

Sources: Clinicaltrials.gov, Company data, CMS(HK); Notes: GHD: growth hormone deficiency

Figure 59: Safety data comparison

PGHD	Eftansomatropin	Lonapegsomatropin	Somatrogan
Stage	Ph2	Ph2	Ph3 (now in U.S. BLA)
Patient (n)	56	105	109
Dosing	0.8, 1.2mg/kg/QW and 2.4mg/kg/Q2W	0.14, 0.21, 0.30 mg/kg/QW	0.66 mg/kg/QW
AEs (%)	69.2-84.6	77.1	87.2
Serious AEs (%)	2.0	1.0	2.8
TRAEs (%)	14.3/23.1/15.4	11.4	n.a.
Serious TRAEs (%)	0.0	1.9	n.a.

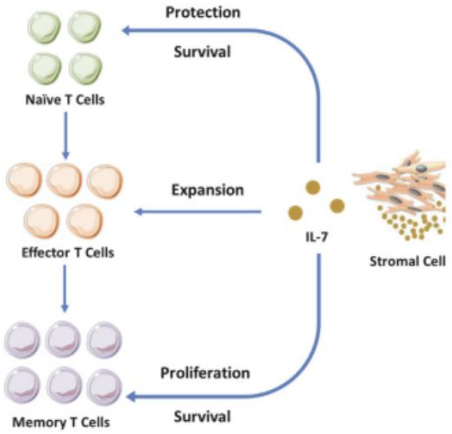
Sources: Company data, clinicaltrial.gov

Efineptakin alfa (TJ107, long-acting interleukin 7)

Efineptakin alfa is the world's first and only long-acting recombinant human interleukin-7 ("rhIL-7"), which is being developed as a T lymphocyte-booster for cancer-related immunotherapy. In 2017, I-Mab in-licensed efineptakin alfa from Genexine to develop and commercialize in Greater China.

IL-7 is a non-hematopoietic cell-derived cytokine and plays a pivotal role in the adaptive immune system. It maintains survival and proliferation of naive and memory T-cells. In the event of lymphopenia, IL-7 can restore T-cells to normal levels by stimulating T-cells proliferation and restoring patient's immune capacity. TJ107 as a differentiated IL-7 may also enhance anti-tumor activity by increasing the T-cells amount. Therefore it has potential to offer synergistic anti-tumor effects with I/O therapeutics, cancer vaccine or even CAR-T therapies.

Figure 60: Role of IL-7 in T-cell maintenance and proliferation

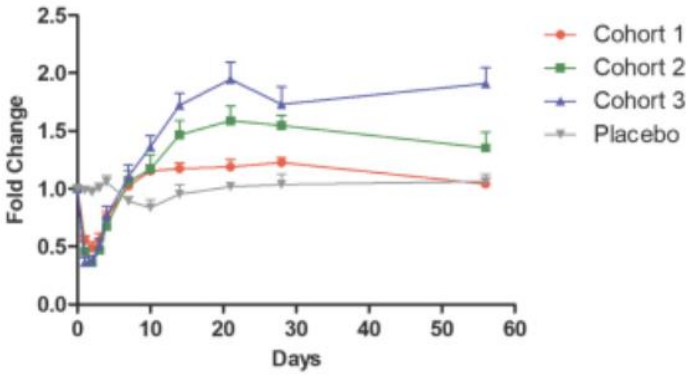


Source: Company data

Clinical Studies

In treatment-related lymphopenia, the South Korea ph1 trial has completed (n=32, NCT02860715). The results showed good tolerability and increased absolute lymphocyte count (ALC) to maximum level over 21 day period, demonstrating a long-lasting effect of increasing lymphocyte. A greater increase of ALC was observed in higher dose SC cohort (Cohort 2) vs lower dose SC cohort (Cohort 1), indicates a dose–response relationship. In addition, a higher increase in ALC was observed in IM cohort (Cohort 3) vs SC cohort (Cohort 2). This was consistent with the PD results from an animal study, where IM injection is more effective than SC injection in increasing lymphocytes.

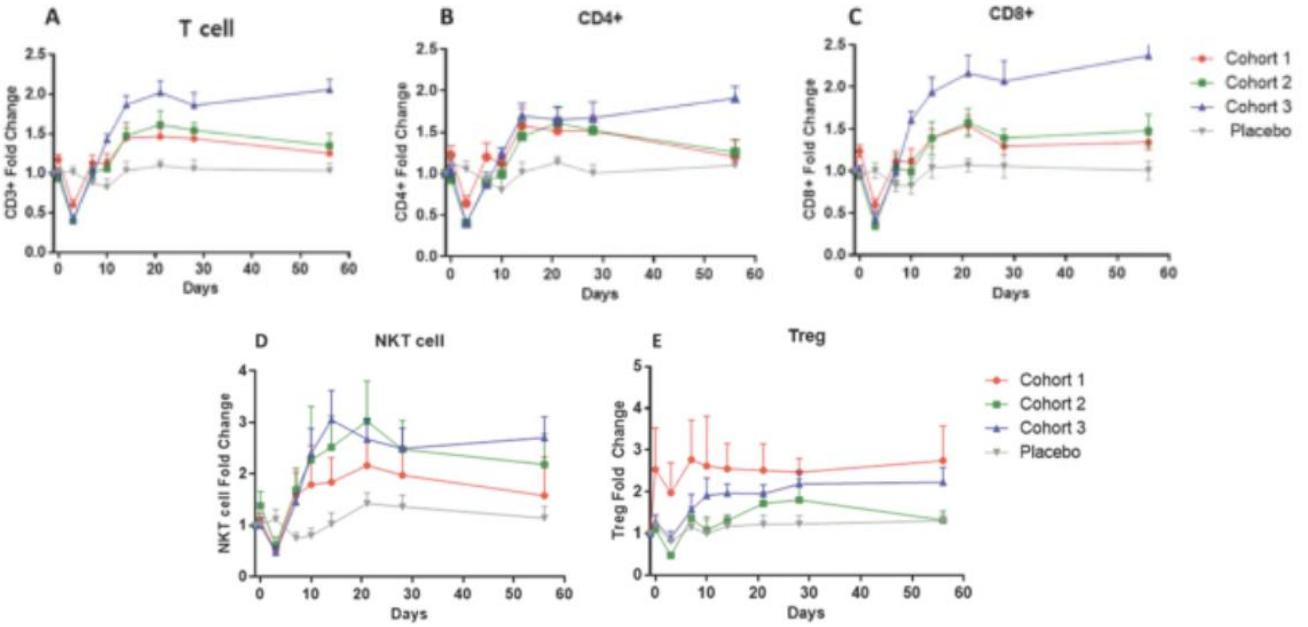
Figure 61: Median fold changes of ALC following a single dose of efineptakin in humans



Source: Genexine

In addition to ALC marker, this Phase 1 study also showed that TJ107 significantly increased the number of CD4 and CD8 T-cells, natural killer T-cells, naive T-cells, central memory, effector memory as well as terminally differentiated effector memory T-cells and did not affect the number of B cells, natural killer cells, monocytes or Tregs.

Figure 62: Median fold changes of number of immune cells following a single dose of TJ107 in human subjects



Source: Genexine

At SITC2020, Genexine presented a ph1/2 interim results (KEYNOTE-899, n=60) of efineptakin alfa in combination with pembrolizumab in patients with r/r/ triple-negative breast cancer (TNBC). The results demonstrated the combination treatment of efineptakin alfa and pembrolizumab, with or without CPA, was safe and well-tolerated. The concurrent treatment cohort induced higher ORR (7/36, 19.4%) than sequential treatment cohort with CPA (2/24, 8.3%). In particular, the cohort (n=18) receiving 1,200μg/kg efineptakin alfa with pembrolizumab without CPA showed the highest 27.8% ORR (5 PRs) with 44.4% DCR (5 PRs and 3 SDs). Of note, pembrolizumab monotherapy failed a ph2 study in 2L mTNBC (KEYNOTE-086), with only 5.3% ORR and no OS improvement over standard chemotherapy. The KEYNOTEA60 study (or NIT-110 study NCT04332653), presented at ASCO2021, also showed that the pembrolziumab+TJ107 combo has good safety and tolerability.

In China, a ph2 study is underway exploring TJ107 in GBM patients with lymphopenia, and another ph2 combination clinical trial will be initiated in 2H21E.

Competitive Landscape

Efineptakin is the only long-acting rhIL-7 candidate in China. I-Mab boasts efineptakin alfa is of selective immune functions, improved stability, and extended half-life, which should potentially translate into a better clinical benefit comparing to short-acting rhIL-7 and other T-cell growth factor (e.g., interleukin-2). Another clinical-stage rhIL-7 drug is CYT107 from Revimmune but it has not initiated clinical study in China yet.

Figure 63: Global IL-7 candidates clinical development status

Projects	Company	MoA	Indication	China Status	Global Status
Efineptakin	I-Mab/Genexine	Long-acting rh IL-7 hyFc	Lymphocytopenia/ malignancies	Ph2	Ph2
CYT-107	RevImmune	rh IL-7 (glycosylated protein)	Sepsis/ anti-bacterial/ oncology/HSCT	N.A.	Ph2

Sources: Company data, CMS(HK); Note: HSCT: hematopoietic stem cell transplantation

Olamkicept (TJ301, IL-6 inhibitor)

TJ301 is a selective interleukin-6 (IL-6) inhibitor for treatment of ulcerative colitis (UC) and Crohn's disease (CD). IL-6 plays a pivotal role in affecting immune cells which are involved in the pathogenesis of autoimmune diseases. I-Mab in-licensed the Greater China and South Korea rights of Olamkicept from Ferring in 2016.

Based on pre-clinical data, TJ301 is expected to treat IL-6 mediated inflammation without affecting the normal function of IL-6 (i.e. immune responses against infections). This is a potentially major differentiation compares to other UC/CD treatments. For example, JAK1/3 kinase inhibitors and TNF-α inhibitors may cause serious infections and or malignancies due to excessive immunosuppression.

As per epidemiology data from the Inflammatory Intestinal Diseases journal, UC and CD incidence are estimated at 0.4-2.1 and 0.1-1.1 per 100K population in China and 3.6 and 1.7 per 100K population in South Korea.

In China and South Korea, I-Mab has completed a Ph2 proof-of-concept study in 91 patients with active UC. The result has met both its primary and key secondary endpoints, which detailed data analysis was presented at Digestive Disease Week (DDW) 2021 and at European Crohn's and Colitis Organization (ECCO) meeting 2021. The data demonstrated significantly higher clinical response rates after 12 weeks of treatment in patients receiving 600mg olamkicept compared to those on placebo ($p=0.032$). Significantly more patients in the 600 mg olamkicept group achieved clinical remission and mucosal healing than in placebo ($p<0.001$), which are two key secondary endpoints of the study. Olamkicept was well tolerated and showed an excellent safety profile. The safety data was consistent with prior safety results of two Ph1 studies conducted by Ferring.

Enoblituzumab (TJ271, B7-H3 antibody)

Enoblituzumab is an investigational, humanized, Fc-optimized monoclonal antibody directed at B7-H3, a member of the B7 family of immune regulators. B7-H3 is a promising immuno-oncology target as it is widely expressed across multiple tumor types, minimally expressed on normal tissues and is believed to play a key role in regulating immune response against cancers. Increasing pre-clinical and clinical evidence suggests that B7-H3 antibody and PD-1 antibody may work in concert to elicit an optimal T-cell activation for the treatment of a variety of cancers. The expression of B7-H3 has been shown to be associated with adverse clinical features and negative outcomes in various solid tumors. Together, these observations suggest that enoblituzumab has a wide potential range of cancer applications as either a monotherapy or in combination with PD-1 therapies or small molecule drugs. I-Mab in-licensed the Great China and South Korea rights of enoblituzumab from MacroGenics in 2019.

The interim result of ph1 study of enoblituzumab in combination with pembrolizumab was presented at ASCO2018. A total of 133 patients with B7-H3-expressing melanoma, SCCHN, NSCLC, and urothelial cancer have been treated in the study. The preliminary results showed acceptable tolerability with preliminary efficacy signals in SCCHN and NSCLC.

Enoblituzumab has also been evaluated in a neoadjuvant Ph2 study as a single agent in patients with intermediate and high-risk localized prostate cancer. The clinical studies so far have shown that enoblituzumab is well-tolerated, with increased CD8 T-cell infiltration in tumors with more focused T-cell repertoires. Enoblituzumab combination has been explored with either retifanlimab (an investigational PD-1 antibody) in front-line patients with SCCHN who are PD-L1 positive or with tebotelimab (an investigational PD-1 x LAG-3 bispecific DART® molecule) in SCCHN patients who are PD-L1 negative.

I-Mab plans to initiate a ph2 study of enoblituzumab with PD-1 in patients with selected cancer types in China. This is a basket study involving NSCLC and two other selected tumor types based on the previous clinical trials conducted by MacroGenics.

Next Wave of Innovation

I-Mab's existing innovative pipelines are on track to be validated. Meanwhile, Co. continued to focus on adding the next wave of innovation to enrich its portfolio, maximizing long term value creation. At present, the second wave consists of following early-stage development projects.

TJ210 (αC5aR mAb) is a fully human, highly affinitive antibody for the treatment of oncology and potentially autoimmune diseases. C5a was found to play an important role in facilitating aberrant complement activation and tumor progression (Meng, J, STIC 2020) by attracting immune-suppressive myeloid-derived suppressive cells (MDSCs), neutrophils and M2 macrophages into the tumor site. The immunosuppressive tumor microenvironment (TME) was found to be highly correlated with poor prognosis and resistance to PD-1/L1 therapies. The inhibition of C5a/C5aR (CD88) pathwauy has been identified as a highly potentiated method to control MDSCs and to restore the immune homeostasis (restoring the tumor killing function of T-cells and NK cells). In addition, αC5aR mAb has been shown to have significant therapeutic activity when combined with PD-1 inhibitors in PD-1-resistant tumor models.

TJ210 inhibits the activation and migration of C5aR1-expressing myeloid cells. Compared to the only competing aC5aR mAb candidate from Innate Pharma, TJ210 shows an anti-tumor effect with higher potency, under the environment with high C5a concentrations. Data showed TJ219 can bind to C5a receptors in both humans and monkeys cells, which makings pre-clinical safety assessment possible.

In September 2020, Company received IND approval from the FDA for a Phase 1 US study. The trial is designed to evaluate the safety, tolerability, pharmacokinetics and pharmacodynamics of TJ210 monotherapy. The first patient was dosed in Jan 2021. In Feb 2021, the NMPA has approved the Phase 1 China clinical study with a similar design.

TJX7 is a humanized neutralizing antibody targeting the CXCL13 chemokine for treatment of autoimmune diseases. CXCL13 (via its CXCR5 receptor) plays an important role in forming germinal centers (GCs). Aberrant formation of GCs due to unregulated high serum of level CXCL13, can cause chronic inflammation as well as tissue destruction and lead to auto immune diseases such as Sjögren's syndrome, RA, multiple sclerosis, and systemic lupus erythematosus (SLE).

TJX7 has been shown sub-nanomolar affinity when binding to CXCL13, which can blocking the interaction between CXCL13 and its receptor CXCR5 and the downstream signaling. Based on pre-clinical study, TJX7 are able to inhibit the migration of primary human tonsil B cells completely. TJX7's inhibitory effects on GCs formation and antibody production were further confirmed based on PD studies conducted in mice and cynomolgus monkeys.

The MoA of TJX7 is unique and may provide a differentiated therapeutic perspective when address autoimmune diseases. As per Company's most recent update, Company has completed a pre-IND meeting with FDA during 1H21.

TJ-C4GM (CD47xGM-CSF) is considered as a "fortified" or enhanced version of the CD47 antibody, specifically for the treatment of solid tumors through the CD47-mediated phagocytosis mechanism. Majority of tumor-associated macrophages function as anti-inflammatory and tumor-promoting M2 phenotype rather than a pro-inflammatory M1 phenotype. The former are less efficient in phagocytosis in response to CD47 blockade and may result in limited efficacy in treating solid tumors. The GM-CSF is a potent cytokine which can convert tumor-resident M2 macrophages into tumor-engulfing M1 macrophages, therefore enhancing the phagocytosis of solid tumors.

TJ-CLDN4B (Claudin18.2x4-1BB) is for treatment of gastric cancer. Claudin 18.2 is a tumor antigen that is preferentially expressed in gastric and pancreatic cancers. As a tight junction molecule normally expressed only on epithelial cells of the gastric mucosa, Claudin 18.2 is inaccessible by normal antibodies. TJ-CLDN4B linked Claudin18.2 with 4-1BB, a co-stimulatory molecule on T-cells, which 1) make this bi-specific antibody capable of binding to tumor cells even with low Cladudin 18.2 expression and 2) activates T-cell only upon tumor cell engagement.

Milestone and Catalyst Calendar

Figure 64: I-Mab: Milestone and Catalyst Calendar

Timeline	Product	Indication	Milestone / Event	Comment
2020				
Jan			US equity offering	To offer ~7.4mn shr at USD14/shr (ADS) on NASDAQ (10 ADSs represent 23 ordinary shrs)
Feb			CD47|SIRPα Summit	Co. to participate CD47|SIRPα summit in Boston
Mar	TJM2 (GM-CSF)	Cytokine storm (CRS)	FDA IND accepted/S. Korea study	IND accepted for treating cytokine storm during severe COVID-19 cases. Co. to initiate study in S. Korea
Mar	Uliledlimab or TJD5 (CD73)	Solid tumors (STs)	Out-licensed ASEAN & MENA rights	Co. out-licensed uliledlimab and another candidate to Kalbe (total potential value of agreement up to USD340mn)
May	TJM2 (GM-CSF)	CRS	Interim data release of Part 1 study	Data reviewed by DMC and was recommended to proceed to Part 2 study
Jun	TJ-CD4B (Claudin 18.2 x 4-1BB)	STs	Pre-clinical data at AACR20	I-Mab and ABL Bio to jointly publish pre-clinical data of this BsAb candidate
Sep	Lemzoparlimab or TJC4 (CD47)		Out-licensing to AbbVie	Co. out-licensed ex. Greater China right to AbbVie (USD180mn upfront + up to USD1.76bn milestones)
Sep			US equity offering	To offer 12.7mn shr at USD33/shr (ADS) thru PIPE, plus warrant (USD104.5mn underlying) to Hillhouse led investors
Sep	Lemzoparlimab or TJC4 (CD47)	r/r Lymphoma	China IND approval	This is the 2nd INDs approved by the NMPA
Sep	Eftansomatropin or TJ101 (rhGH)	PGHD	China Ph3 trial approval	NMPA's CDE approved long acting-rhGH's Ph3 trial for pediatric hormone deficiency
Nov	Lemzoparlimab or TJC4 (CD47)	r/r Malignancies	Data readout at SITC20	Co. presented lemzoparlimab's Ph1 data at STIC20 (No DLT, no ≥G3 anemia)
Nov	TJ210 (C5aR)	Malignancies	Pre-clinical data at SITC20	Co. presented TJ210's pre-clinical data at STIC20 (good safety profile)
Dec			US ETF inclusion	Co.'s ADS was included in the NASDAQ Biotech Index (NBI US)
2021				
Mar			Next Gen tech collaboration	Collaboration agreement allowed Co. to access to Complix's CPAB platform and Affinity's masked antibody platform
Mar	TJ-CD4B (Claudin 18.2 x 4-1BB)	STs	US IND approval	Co. received IND approval to initiate Ph1 study in adv./metastatic sold tumor pts
Apr	Uliledlimab or TJD5 (CD73)	STs	Pre-clinical data at AACR21	Co. presented uliledlimab differentiated MOA and pre-clinical data at AACR21
Apr	TJ301 (IL-6)	Ulcerative colitis (UC)	Ph2 data readout, MET primary EP	Co. announced positive topline Ph2 results (CCR at 12wk: 58.6% vs. PbO's 34.5%), detailed data published at ECCO21
May			MSCI China Index inclusion	Co.'s ADS was included in MSCI China Index effective after May 27, 2021

Timeline	Product	Indication	Milestone / Event	Comment
Jun	Uliledlimab or TJD5 (CD73)	Solid tumors	Ph1 data readout at ASCO	Co. presented uliledlimab Ph1 data (No DLT, good safety profile)
Jul			Shanghai STAR listing	Co. announced preliminary proposal for potential dual listing in Shanghai STAR board
Aug	TJM2 (GM-CSF)	CRS	Ph2/3 interim data readout	Positive interim analysis for treating patients with severe COVID-19 (SWOV at 30d: 83.6% vs PbO's 76.7%)
3Q21E	Felzartamab	1L MM	China IND approval	To conduct exploratory combo study with an I-Mab asset
4Q21E	**Felzartamab**	**3L MM**	**China NDA submission**	**China NDA submission expected**
4Q21E	Lemzoparlimab + rituximab	nHL	Preliminary data at ASH21	Preliminary data submitted for ASH21, potentially leading to a pivotal trial in 22E
4Q21E	**Lemzoparlimab + pembrolizumab**	**STs**	**Preliminary data readout**	**Preliminary data (US study) readout by YE21E/1Q22E**
4Q21E	Lemzoparlimab + PD-1	STs	China IND approval	Ph2 IND (China study) approval expected by YE21E
4Q21E	Lemzoparlimab	MDS/AML	Enrolment completion	Enrolment completion by YE21E; potentially leading to a pivotal trial in 22E
4Q21E	Uliledlimab + atezolizumab	STs	Ph2 basket trial	Ph2 basket trial starts in 4Q21E in the US
4Q21E	Enoblituzumab (B7-H3) + PD-1	Malignacies	Ph2 basket trial	Ph2 basket combo trial starts in 4Q21E in China
2022				
1Q22E	Eftansomatropin or TJ101 (rhGH)	PGHD	Enrolment completion	Complete patient enrollment for the Ph 3 clinical trial
2Q22E			Manufacturing	Hangzhou pilot plant ready (5,000L total capacity)
2023				
23E	Felzartamab	2L MM	China NDA	China NDA submission
23E	Eftansomatropin or TJ101 (rhGH)	PGHD	China NDA	China NDA submission
23E			Manufacturing	Commercial scale production (32,000L total capacity)
23E	Super antibodies	Malignacies	US IND	US IND submissions

Source: Company data

Manufacturing and commercialization

I-Mab currently outsources clinical-scale manufacturing to global leading CDMOs such as Wuxi Biologics. The company plans to establish its own manufacturing capability in Hangzhou to manufacture both in-house developed and in-licensed products/candidates. The Hangzhou plant will have a pilot capacity of 2 x 2,000L in operation by 2022E and commercial capacity of up to 8 x 2,000L in operation by 2023. For lemzoparlimab (αCD47 antibody), I-Mab will primarily be responsible for manufacturing in Great China.

I-Mab expects to launch a series of products from FY23E/24E onwards, with initial focus in hematological oncology and to expand into solid tumor filed in mid-term. In China, I-Mab will start to build up its commercial team during 2H21E/22E to prepare for the commercial launch of felzartamab. In the US, Company will continue to expand its research and development capabilities and footprint to advance its global strategy.

Visionary and experienced senior management team

Person	Position	Biography
Dr. Jingwu Zang, M.D.,Ph.D..	Founder, Honorary Chairman and Director	Aged 64, founded the company in 2014 and served as the CEO until 2019. Prior to founding the Company, Dr. Zang held senior management role at Simcere Pharma, Bioscikin, and GSK China. Dr. Zang was a professor at Baylor College. He is the founding director of the Institute of Health Sciences at Chinese Academy of Sciences and founding director of Institute Pasteur Shanghai. Dr. Zang conducted his post-doc work at Harvard Medical School and obtained his U.S. medical license at Baylor College. Dr. Zang received his Ph.D. in neuroimmunology from the University of Brussels and his M.D. from Shanghai Second Medical University (now part of Shanghai Jiaotong University).
Dr. Joan Shen, M.D.,Ph.D..	CEO and Director	Age 58, has served as the CEO and director of the Company since 2019. Prior to joining the Company in 2017, Dr. Shen served in senior R&D roles at Janssen Pharma, Hengrui, Pfizer China. Dr. Shen also worked at R&D divisions of Pfizer, Wyeth Research and Eli Lilly. Dr. Shen was an adjunctive assistant professor at Indiana University (IU) School of Medicine. She completed three fellowships at IU School of Medicine, including endocrinology, psychopharmacology and clinical pharmacology. Dr. Shen obtained her U.S. medical license as well as her Ph.D. in anatomy/neuroscience from IU School of Medicine, and her M.D. from Southeast University Medical College.
Dr. Zheru Zhang, Ph.D..	President and Director	Aged 57, has served as director and president since 2017. Prior to joining the Company, Dr. Zhang served at senior management positions of Tasgen Bio-tech (Tianjin), Shanghai JMT-Bio, and Celltrion. He also worked at JNJ and BMS between 2000 and 2008. Dr. Zhang received his Ph.D. in chemistry from the University of Alberta in Canada and his master's degree in chemistry from Suzhou University.
Jielun Zhu, MBA, CFA	CFO and Director	Aged 44, has served as the CFO since 2018 and director since 2019. Prior to joining the company, he was the head of healthcare investment banking at Jefferies Hong Kong. Prior to joining Jefferies, he also worked at Deutsche Bank and UBS in Hong Kong. Mr. Zhu received his MBA from the Harvard Business School with distinction and BAs with honors in mathematics-economics from Wesleyan University.
Ivan Yifei Zhu	Chief Commercial Officer	Aged 51, served as the chief commercial officer since 2020. Mr. Zhu has more than 20 years of successful commercialization experience at global and domestic pharma/biotech companies, such as Qilu Pharma, BeiGene, and Xi'an Janssen. At Xi'an Janssen, he built and managed oncology, immunotherapy, dermatology, infectious diseases and the CNS business units. Mr. Zhu received his bachelor's degree in medicine from Zhejiang University.

Sources: Company data, CMS (HK)

Proven BD track records

Figure 65: Company's collaboration and BD activities

	Product/technology/role	Partners	Commercial rights	Announcement date
Collaborations	Lemzoparlimab (αCD47 mAb)	AbbVie	AbbVie: global (ex - Greater China)	Sep 2020
	WuxiBody Platform/ CMO/Investor	Wuxi Biologics	Worldwide	Sep 2018 Apr & Jul 2019
	Strategic commercial partner (αCD73 mAb)	Kalbe	ASEAN & MENA	Mar 2020
	Discovery & innovation collaboration	Affinity/Complix Immorna/neoX	Worldwide	Mar & Jul 2021
In-license	Olamkicept (IL-6 inhibitor)	Ferring	Greater China, South Korea	Nov 2016
	Felzartamab (αCD38 mAb)	MorphoSys	Greater China, South Korea	Nov 2017
	TJ210 (αC5aR mAb)	MorphoSys	China	Nov 2018
	Eftansomatropin (long-acting hGF)	Genexine	Greater China	Oct 2015
	Efineptakin alfa (long-acting IL-7)	Genexine	Greater China	Dec 2017
	Enoblituzumab (αB7-H3 mAb)	MacroGenics	Greater China	Jul 2019
Co-development	Atezolizumab + αCD73 mAb combo	Roche	Global (ex - China)	Mar 2019
	Pembrolizumab + αCD47 mAb combo	Merck	Worldwide	Sep 2019
	Toripalimab + αCD73 mAb Combo	Junshi Bio	China	Sep 2019
Out-license	αPD-L1 mAb	Lepu Medical	Worldwide	Apr 2017
	TJ-CD4B (Claudin 18.2 x 4-1BB)	ABL Bio	Ex - Greater China	Jul 2018
	TJ-L14B (PD-L1 x 4-1BB)	ABL Bio	Ex - Greater China	Jul 2018
	TJ103 (long acting GLP-1)	CSPC	Greater China	Dec 2018

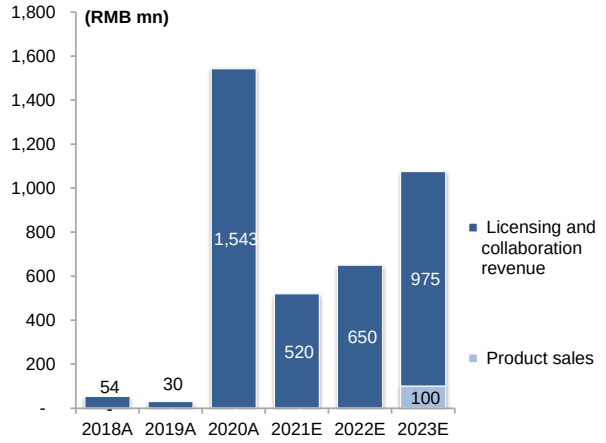
Source: Company data; Note: ASEAN: Southeast Asian Nations, MENA: Middle East and North Africa

Financial overview

We estimate that I-Mab should generate the revenue of RMB520mn/650mn/1,075mn in 2021E/22E/23E, thanks to the continued regulatory milestone income from TJC4 (lemzoparlimab) out-licensing deal with AbbVie since 2020 and the marketing of TJ101 (eftansomatropin alfa) and TJM2 (plonmarlimab) in 2023E.

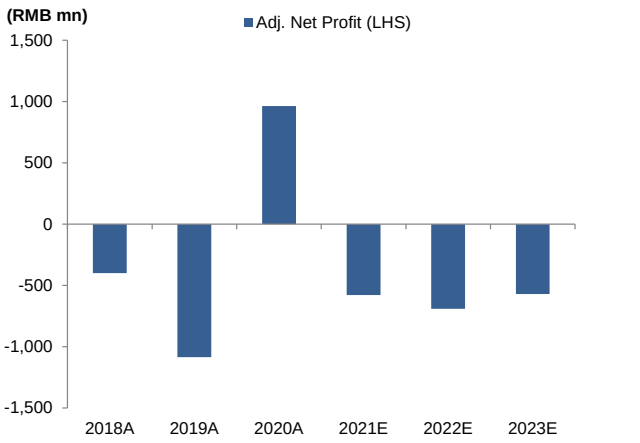
I-Mab reported an adj. net profit of RMB964mn in 2020 owing to hefty licensing revenue from AbbVie deal. We don't expect Co. to remain in profit over 2021E-2023E. This is because we project that uptrend of R&D expense from RMB1.3bn to RMB2.1bn over 2021E-23E, reflecting more R&D pipeline advancing into late-phase clinical studies.

Figure 66: Revenue breakdown



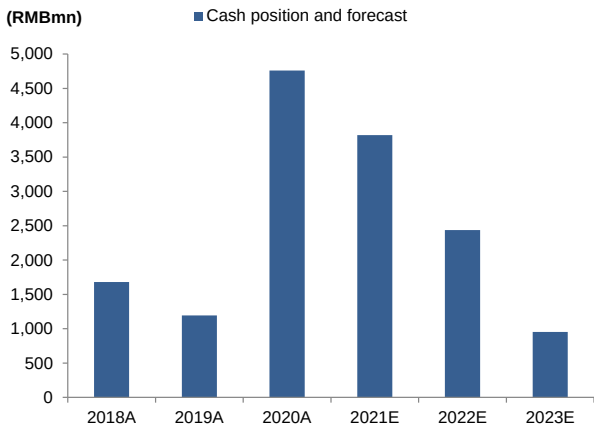
Sources: Company data, CMS (HK) estimates

Figure 67: Adj. net profit trend



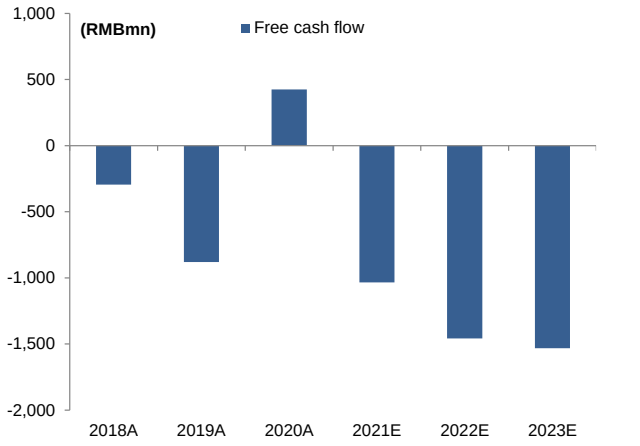
Sources: Company data, CMS (HK) estimates

Figure 68: Cash position and forecast



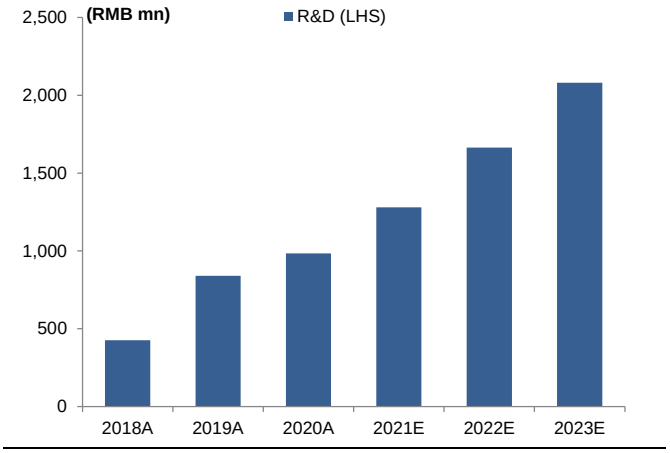
Sources: Company data, CMS (HK) estimates

Figure 69: Free cash flow forecast



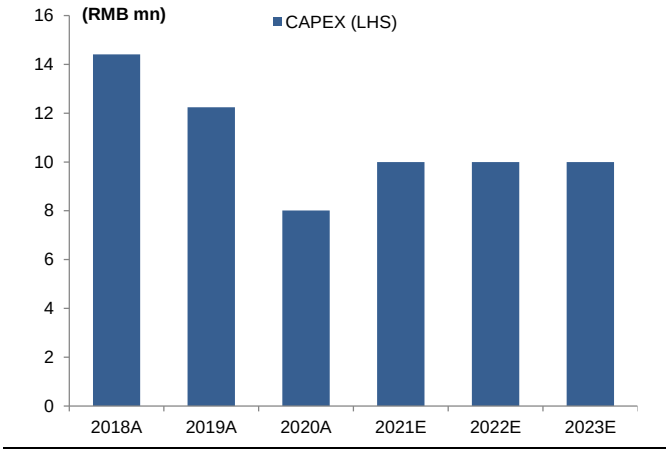
Sources: Company data, CMS (HK) estimates

Figure 70: R&D expenses trend



Sources: Company data, CMS (HK) estimates

Figure 71: CAPEX forecast



Sources: Company data, CMS (HK) estimates

Valuation Summary

We arrived at our SOTP-based TP using a risk adjusted NPV (rNPV) approach, with sensitivities on the peak sales and the probability of success (PoS) of various molecules. We detail below our assumption and valuation results.

Figure 72: rNPV-based SOTP valuation and main assumptions

(RMB mn)	Target	R&D Status*	Partner	Major Indication	Launch date**	Adj. Peak sales	PoS***	Rights	rNPV
Pipeline valuation (rNPV)									**30,971**
Lemzoparlimab (TJC4)	CD47	Reg (CH), Reg (U.S.)	AbbVie/(MorphoSys)	AML/MDS/nHL/Solid tumors	2025	6,432	60%(CH), 60%(U.S.)	CH(100%) / WW(R*)	12,908
Ulilediimab (TJD5)	CD73	P2 (CH), P2 (U.S.)	(Roche)/(Junshi)	Solid tumors (w/ PD-1/L1 combo)	2026	2,285	15%(CH), 15%(U.S.)	WW (100%)	8,664
Eftansomatropin Alfa (TJ101)	Long-acting rhGH	Reg	Genexine	PGHD	2024	1,453	90%	CH(100%)	3,674
Felzartamab (TJ202) +/-CD47(TJC4)	CD-38 mAb	Reg	MorphoSys	Multiple myeloma (3L, 2L and 1L)	2023	652	90%	CH(100%)	1,617
Plonmarlimab (TJM2)	GM-CSF mAb	P2		CRS (severe COVID-19, CAR-T), RA	2023	827	40%	WW(100%)	3,023
Efineptakin Alfa (TJ107)	IL-7 Long-acting	P2	Genexine	Lymphopenia/CPI booster-	2025	315	40%	CH(100%)	665
Olamkicept (TJ301)	IL-6 inhibitor	P2	Ferring	Ulcerative Colitis (UC)	2026	37	20%	CH(100%)	80
Enoblituzumab	B7-H3 mAb	P1	MacroGenics	Solid tumors	2026	83	10%	CH(100%)	140
Others (C5aR mAb, BsAbs, etc.)									201
Net cash									**2,438**
Valuation (RMB mn)									**33,409**
No of shares (mn)									134
Valuation per share (RMB)									**249**
Valuation per ADR share (USD) (10ADS:23common shares; 6.5RMB/USD)									**88.1**
BD premium									**20%**
TP (USD)									**106**

*Sources: Company data, CMS (HK) estimates, Notes1: CRC: colorectal cancer, GC: gastric cancer, NSCLC: non-small cell lung cancer, I/O: immuno-oncology, RCC: renal cell carcinoma, NHL: non-Nodgkin lymphoma, HCC: hepatocellular carcinoma; Notes2: * represents Royalty; **represents the lead indication of the molecule, ***represents the highest PoS of indication of the molecule*

We present below the assumption of PoS and peak year for I-Mab's key molecules by major indications in China and ex-China market.

Figure 73: Our key assumptions for I-Mab's major core pipelines

Core portfolios (RMB mn)	Partner	MoA	Indications	Region	Stage	Launch Yr	PoS	Risk adj. Peak Sales	rNPV
Lemzoparlimab (TJC4)						**2025**		**6,432**	**12,908**
lemzoparlimab + azacitidine (AZA)			AML/MDS	CN	Reg	2025	60%	217	689
lemzoparlimab + Rituxan (CD20)			nHL (DLBCL, FL)	CN	Reg	2025	60%	127	402
lemzoparlimab + felzartamab (TJ202)	MorphoSys (TJ202)		Multiple Myeloma	CN	Reg	2025	40%	39	118
lemzoparlimab + PD-1 combo		CD47 mAb	Solid tumor (OC, CRC, GC, HNSCC, melanoma)	CN	P2	2027	15%	693	1,916
lemzoparlimab + azacitidine (AZA)	AbbVie		AML/MDS	WW	Reg	2026	60%	1,090	2,486
lemzoparlimab + CD20, or + BCL2 (venetoclax)	AbbVie		nHL (DLBCL, FL)	WW	Reg	2026	60%	1,217	2,648
lemzoparlimab + felzartamab (TJ202)	AbbVie		Multiple Myeloma	WW	n.a.	2026	40%	695	1,616
lemzoparlimab + PD-1 combo	AbbVie		Solid tumor (OC, CRC, GC, HNSCC)	WW	P2	2027	15%	2,354	3,032
Uliledlimab (TJD5)						**2026**		**2,285**	**8,664**
Uliledlimab (TJD5) + PD-1 (TUOYI)	Junshi		adv. solid tumor (BC, OC, NSCLC)	CN	P2	2026	15%	294	882
Uliledlimab (TJD5) + PD-1			CRC, Pancreatic cancer	CN	P2	2026	15%	155	481
Uliledlimab (TJD5) + PD-1		CD73 mAb	Other solid tumor	CN	P1	2028	5%	82	210
Uliledlimab (TJD5) + PD-L1 (Atezolizumab)	Roche		adv. solid tumor (BC, OC, NSCLC)	WW (ex-CN)	P2	2026	15%	1,016	4,232
Uliledlimab (TJD5) + PD-L1 (Atezolizumab)	Roche		CRC, Pancreatic cancer	WWI (ex-CN)	P2	2026	15%	410	1,720
Uliledlimab (TJD5) + PD-L1 (Atezolizumab)	Roche		Other solid tumor	WW (ex-CN)	P1	2028	5%	329	1,138
Plonmarlimab (TJM2)						**2023**		**827**	**3,023**
Plonmarlimab (TJM2)	AZ	GM-CSF mAb	CRS-COVID-19	WW	P2	2023	40%	264	417
Plonmarlimab (TJM2)	AZ		CRS	WW	P2	2024	40%	411	2,034
Plonmarlimab (TJM2)	AZ		RA	WW	P2	2026	20%	152	571
Eftansomatropin Alfa (TJ101)	Genexine	Long-acting growth hormone	PGHD	CN	Reg	2024	90%	1,453	3,674
Felzartamab (TJ202) +/-CD47(TJC4)	MorphoSys	CD-38 mAb	Multiple myeloma (1L, 2L and 3L)	CN	Reg	2023	90%	591	1,519
			SLE	CN	P1b	2027	20%	62	98

Source: Company data, CMS(HK) estimates

- We assume that lemzoparlimab (TJC4, αCD47 mAb) in peak year should treat 106k patients in China (2032E) and 37k patients in the U.S (2032E). The underlying assumptions are 20-30% molecule penetration rate and 25% patient share in that molecule. We assume the lemzoparlimab will be priced at RMB4,000-5,000/mo in China, based on the pricing range of current I/O therapeutic. We reckon the full treatment cost would actually vary across indications depending on how long patients can stay on the course. In addition, we assume the lemzoparlimab will be priced at RMB75,000-80,000/mo in the U.S., which is largely in line with current major I/O therapeutics.
- We assume that ulilediimab (TJD5, αCD73 mAb) in peak year should treat 92.4k patients in China (2033E) and 28k patients in the U.S (2033E). The underlying assumptions are 5-10% molecule penetration rate and 25% patient share in that molecule. We assume the ulilediimab will be priced at RMB4,000-5,000/mo in China, based on pricing range of current I/O therapeutic. We reckon the full treatment cost would actually vary across indications depending on how long patients can stay on the course. In addition, we assume the ulilediimab will be priced at RMB75,000-80,000/mo in the U.S., which is largely in line with current major I/O therapeutics.
- We assume that eftansomatropin alfa (TJ101, rhGH) in peak year should treat 38.4k patients in China (2029E). The underlying assumptions represent 9% penetration rate of rhGH in the China PGHD addressable market and 20% patient share of TJ101. We assume TJ101 will be priced at RMB42,000/yr (70% discount to Jintrolong's current treatment cost) for the peak sales periods.
- We assume that felzartamab (TJ202, αCD38 mAb) in peak year in China should treat 7.8k MM patients (2029E) and 15.4k SLE pts (2033E). The underlying assumptions are 25% molecule penetration rate with 35% patient share in MM indication, and 5% molecule penetration rate with 25% patient share in the SLE indication. For pricing of MM indication, we assume that TJ202 will be priced at RMB120k/yr (launching price at RMB200k/yr, representing ~60% discount to current J&J daratumumab's pricing at RMB480k) in China for peak sales periods. For pricing of SLE indication, we model that TJ202 will be priced at ~RMB20k/yr in China for peak sales periods given highly competitive SLE market in China.
- We assume that plonmarlimab (TJM5, GM-CSF mAb) in peak year in China should treat 51.4k CRS patients (2028E) and 79.1k RA pts (2034E). The underlying assumptions are 50% molecule penetration rate with 50% patient share in CRS indication, and 5% molecule penetration rate with 15% patient share in the RA indication. We assume that TJM5 will be priced at ~RMB20k/yr for these two indications in China for peak sales periods. Worth noting, we reckon TJM5 has potential to treat 33.8k severe COVID-19 pts in the U.S. in peak year (2025E) with a treatment cost of USD3,000 (RMB19,500, in line with largely in line with a five-day course of remdesivir costs as much as USD3,120)

Probability of Success factor in our rNPV model

- This measures the probability of approvals in a certain indication. In general, we assume 15% likelihood of approval for a molecule in ph1, 30%-40% for ph2, and 60%-70% for ph3, 85% for BLA/NDA stage.
- In the case that the molecule received overseas approvals or the similar MoA agents demonstrated positive PoC or pivotal trial data, we use 10-15% probability for the drug in the preclinical to ph1 stage, 35%-45% for the drug in ph2, 70%-80% for the drug in ph3, and 90% for BLA/NDA stage, to reflect a bit higher likelihood of success rate for approval.

Penetration factor in our rNPV model

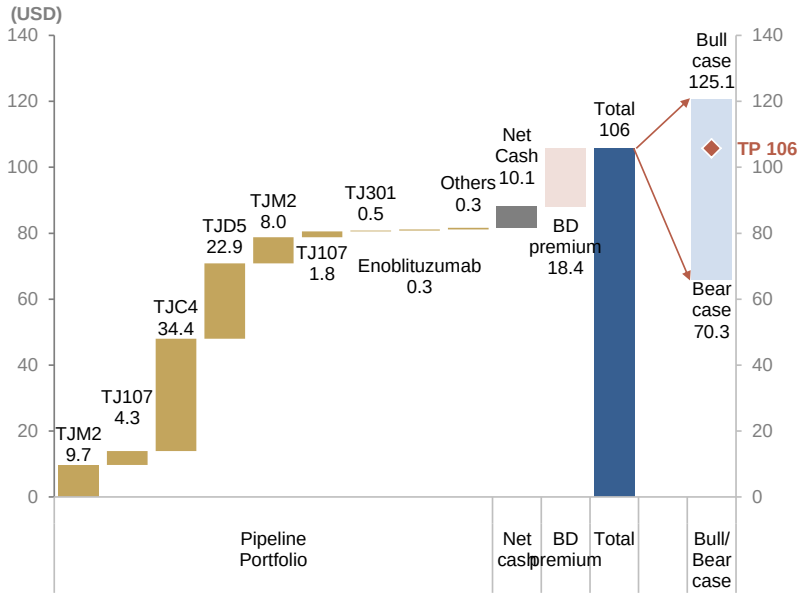
- This measures I-Mab's patient share in the addressable patient population in a certain indication. It is defined as the multiplication of the molecule penetration rate (the percentage of the addressable population being treated with this drug) and I-Mab's patient share.
- In general, the molecule penetration rate is 15-50% depending on its overseas approvals, pivotal trial data and competitive landscape.
- We also assume that I-Mab's patient share should be 15-50% depending on its order of entry into the market, the strength of collaboration with MNCs, and synergistic potential with its existing portfolio.

Other key assumptions and rationales:

- We assume 40% "normalized" FCF and NOPAT margin for in-house pipelines. The underlying assumption is that over long term, the maintenance CAPEX should equal to depreciation and amortization, and that the additional working capital investment should be miniscule.
- We assume 30% "normalized" FCF and NOPAT margin for in-licensed pipelines. The lower margin than in-house pipelines is due to royalty payment to partners.
- We apply 20% of capital allocation premium to the SOTP valuation to arrive at the equity value. This is because we reckon that I-Mab's MoA-differentiated pipelines with blockbuster potential (i.e. ulilediimab, lonmarlimab) are uniquely positioned to achieve potential BD catalyst for value creation.

We present below sensitivity exercise for I-Mab. The main variables in our assumptions are the peak sales (+/-30% relative to our base case) in each marketed molecule, the probability of success (+/-30% relative to our base case) in each molecule in the pipeline.

Figure 74: SOTP and sensitivity analysis



Source: Company data, CMS (HK) estimates

Figure 75: WACC assumption

Cost of equity (%)	
Risk free rate (%)	3.0
Beta	0.8
Equity risk premium (%)	8.8
CAPM unleveraged discount rate	**10.0**
Cost of debt (%)	
Average spread over risk-free rate (%)	8.0
Pre-tax cost of debt (%)	11.0
Average corporate tax rate for company (%)	15.0
Post-tax cost of debt (%)	**9.4**
Estimated target gearing (net debt/EV) (%)	10.0
WACC (%)	**10.0**

Source: CMS (HK) estimates

Financial Summary

Balance Sheet

RMB mn	2019	2020	2021E	2022E	2023E
Non-current assets	**376**	**990**	**982**	**974**	**965**
PP&E	30	25	28	30	31
Intangible assets	149	120	119	117	116
Prepaid lease payments	16	15	6	(3)	(12)
Goodwill	163	163	163	163	163
Interests in JV/Asso	-	665	665	665	665
Others	18	2	2	2	2
Current assets	**1,361**	**5,344**	**4,274**	**2,892**	**1,435**
Inventories	-	-	-	-	2
Loan and account receivables	-	130	-	-	23
Prepayments and other receivables	136	423	423	423	423
Others	32	32	32	32	32
Short-term investments	56	-	-	-	-
Bank balances and cash	1,137	4,759	3,820	2,438	955
Total assets	**1,738**	**6,334**	**5,256**	**3,866**	**2,399**
Current liabilities	**588**	**576**	**576**	**576**	**579**
Trade and bills payables	-	-	-	-	3
Other payables	7	8	8	8	8
Due to a related party	274	561	561	561	561
ST bank debt	50	-	-	-	-
Others	258	8	8	8	8
Non-current liabilities	**80**	**131**	**131**	**131**	**131**
Long-term payables	68	-	-	-	-
Contract liabilities	-	-	-	-	-
LT bank loans	-	-	-	-	-
Others	11	131	131	131	131
Shareholders' funds	**1,069**	**5,627**	**4,550**	**3,160**	**1,690**
Minorities	**-**	**-**	**-**	**-**	**-**
Total liability and equity	**1,738**	**6,334**	**5,256**	**3,866**	**2,399**

Cashflow Statement

RMB mn	2019	2020	2021E	2022E	2023E
Operating cash flow	**(868)**	**434**	**(1,024)**	**(1,448)**	**(1,522)**
Pretax profit	(1,441)	471	(1,077)	(1,390)	(1,470)
Operating profit before WC chg	(1,067)	674	(1,155)	(1,448)	(1,500)
Net working capital change	199	(241)	130	-	(22)
Income tax paid	-	-	-	-	-
Interest paid	-	-	-	-	-
Investing cash flow	**212**	**(202)**	**85**	**66**	**39**
Purchase of PPE	(12)	(8)	(10)	(10)	(10)
Purchase/disposal of subsidiaries	-	-	-	-	-
Purchase/disposal of JV&Asso.	-	-	-	-	-
Interest received	-	-	95	76	49
Others	225	(194)	-	-	-
Financing cash flow	**153**	**3,440**	**-**	**-**	**-**
Proceeds from IPO net of fees	184	3,481	-	-	-
Issurance of equity shares	-	-	-	-	-
Bank borrowings, net	(31)	(50)	-	-	-
Others	-	-	-	-	-
Beginning cash	**1,681**	**1,193**	**4,759**	**3,820**	**2,438**
Forex	*15*	*(107)*	-	-	-
End cash	**1,193**	**4,759**	**3,820**	**2,438**	**955**

Profit & Loss

RMB mn	2019	2020	2021E	2022E	2023E
Consolidated revenue	**30**	**1,543**	**520**	**650**	**1,075**
Cost of goods sold	-	-	-	-	(20)
Gross profit	**30**	**1,543**	**520**	**650**	**1,055**
(–) Total SG&A expense	(655)	(402)	(412)	(453)	(494)
Administrative expenses	(655)	(402)	(402)	(423)	(444)
Selling and distribution costs	-	-	(10)	(30)	(50)
(–) R&D expense	(840)	(985)	(1,280)	(1,664)	(2,080)
(+/–) Other income/expense	-	-	-	-	-
(+/–) Profit from JV&Asso.	-	-	-	-	-
Adj. EBITDA	**(1,082)**	**672**	**(655)**	**(748)**	**(600)**
Stock-Based Compensation	(367)	(493)	(500)	(700)	(900)
Total Depreciation and amortisation	(16)	(23)	(18)	(18)	(19)
Adj. EBIT	**(1,098)**	**649**	**(673)**	**(767)**	**(619)**
(+/–) Finance expense - net	28	23	95	76	49
(+/–) Others, net	(4)	304	-	-	-
Profit before tax	**(1,441)**	**483**	**(1,077)**	**(1,390)**	**(1,470)**
(–) Tax	-	(12)	-	-	-
Net Profit	(1,441)	471	(1,077)	(1,390)	(1,470)
(+/–) Minority interest	-	-	-	-	-
Attributable net profit	**(1,441)**	**471**	**(1,077)**	**(1,390)**	**(1,470)**
Adjusted net profit	**(1,085)**	**964**	**(577)**	**(690)**	**(570)**
EPS Fully diluted (USD)	**(47.8)**	**2.3**	**(1.4)**	**(1.8)**	**(1.5)**

Financial Ratios

	2019	2020	2021E	2022E	2023E
Growth (%)					
Consolidated revenue	n.a.	5,042%	(66%)	25%	65%
Gross profit	n.a.	5,042%	(66%)	25%	62%
Adjusted net profit	n.a.	n.a.	n.a.	n.a.	n.a.
Profitability (%)					
Gross margin (%)	100%	100%	100%	100%	98%
Adj. net profit margin (%)	n.a.	n.a.	n.a.	n.a.	n.a.
ROE	n.a.	n.a.	n.a.	n.a.	n.a.
ROA	n.a.	n.a.	n.a.	n.a.	n.a.
Efficiency					
Inventory days	n.a.	n.a.	n.a.	n.a.	n.a.
Accounts receivable days	n.a.	n.a.	n.a.	n.a.	n.a.
Accounts payable days	n.a.	n.a.	n.a.	n.a.	n.a.
Cash cycle days	n.a.	n.a.	n.a.	n.a.	n.a.
Liquidity					
FCF (RMB mn)	(880)	426	(1,034)	(1,458)	(1,532)
Net gearing (%)	(107)	(85)	(84)	(77)	(57)

Sources: Company data, CMS (HK) estimates

Investment Ratings

Industry Rating	Definition
OVERWEIGHT	Expect sector to outperform the market over the next 12 months
NEUTRAL	Expect sector to perform in-line with the market over the next 12 months
UNDERWEIGHT	Expect sector to underperform the market over the next 12 months

Company Rating	Definition
BUY	Expect stock to generate 10%+ return over the next 12 months
NEUTRAL	Expect stock to generate +10% to -10% over the next 12 months
SELL	Expect stock to generate loss of 10%+ over the next 12 months

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