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I-MAB

New Buy with US$80.0 PO: Pushing the boundaries of transformational medicine

David Li >>
davidbo.li@bofa.com
Research Analyst
Merrill Lynch (Hong Kong)
+852 3508 4531

Chen Wang >>
carlisle.wang@bofa.com
Research Analyst
Merrill Lynch (Hong Kong)

Ethan Cui >>
ethan.cui@bofa.com
Research Analyst
Merrill Lynch (Hong Kong)

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IMAB US

Initiating Coverage Price Price Objective Upside Market Cap Average Daily Value

Key takeaways

- We initiate I-Mab, a clinical-stage biopharmaceutical company, at Buy with a PO of US$80.0.
- I-Mab has a highly differentiated pipeline, from in- and out-licensing strategy, under partnerships with reputable players
- We apply DCF methodology to access the equity value of I-Mab. Our PO of US$80.0 represents equity value of around US$5.8bn.

Glossary:
MM: multiple myeloma
NSCLC: non-small cell lung cancer
SLE: systemic lupus erythematosus
UC: ulcerative colitis
RA: rheumatoid arthritis
AML: acute myeloid leukemia
CMC: Chemistry Manufacturing and Controls
CRI: Cancer Research Institute
APC: antigen-presenting cells
GHD: Growth Hormone Deficiency
ISS: idiopathic short stature
IUGR: Intrauterine growth retardation
GHND: Growth hormone neurosecretion disorders
MPHD: Multiple pituitary hormone deficiency

ADC: antibody-drug conjugate
AHD: antecedent hematologic disorder

Focus on high-potential IO/autoimmune disease treatment

We initiate I-Mab, a clinical-stage biopharmaceutical company, at Buy with a PO of US$80.0 (38% potential upside). We believe I-Mab's key focus areas of immuno-oncology (IO) and autoimmune diseases have huge business opportunity. I-Mab's pipelines provide solutions to a variety of hematologic malignancies, like multiple myeloma (MM)/ lymphoma, acute myeloid leukemia (AML), and solid tumors, like head and neck cancer/ non-small cell lung cancer (NSCLC)/ breast cancer. For autoimmune diseases, the company's target indications include systemic lupus erythematosus (SLE), ulcerative colitis (UC), rheumatoid arthritis (RA), and other IL-6-implicated autoimmune diseases. According to Frost & Sullivan, the market size of IO therapies in China would see a 5-year CAGR of 61.8% during 2020-25. It also estimates China's autoimmune disease treatment market to register a 5-year CAGR of 38.1% during 2020-25.

Highly differentiated pipelines

I-Mab has established a highly differentiated pipeline focusing on IO, from in-licensing and out-licensing strategy, under partnerships with reputable players, including MorphoSys, Genexine, MacroGenics, and Ferring. The company now has 13 key assets, including 5 in-licensed assets in China portfolio and 8 assets with global rights. It is constructing an integrated platform from in-house innovative research, CMC, clinical development to commercialization. The pilot plant is now under construction in Hangzhou with 4,000L capacity targeting production in 2022, and another 8*2,000L commercial-scale capacity planned in 2023.

Valuation and risks

We apply a discounted cash flow (DCF) methodology to assess the equity value of I-Mab given the company has no product sales currently and a majority of the company's value comes from its pipelines. Our PO of US$80.0 represents an equity value of approximately US$5.8bn based on DCF analysis, assuming 10.2% WACC and 3.0% terminal growth rate. We apply an 11-year horizon to arrive at a steady state.

Estimates & Valuation

Estimates (Dec) (CNY)	2019A	2020A	2021E	2022E	2023E
Net Income (Adjusted - mn)	(1,485)	471	(357)	(39)	197
EPS	(201.19)	6.52	(4.95)	(0.533)	2.73
EPS Change (YoY)	-226.1%	NM	NM	89.2%	NM
Dividend / Share	0	0	0	0	0

Free Cash Flow / Share	(125.87)	4.08	(9.89)	(0.287)	3.07
Valuation (Dec)					
P/E	NM	56.05x	NM	NM	132.93x
Dividend Yield	0%	0%	0%	0%	0%
EV / EBITDA*	NM	137.45x	NM	NM	NM
Free Cash Flow Yield*	-3.56%	1.13%	-2.73%	-0.079%	0.849%

* Click for full definitions of *iQmethod*℠ measures.

Stock Data

Price	55.90 USD
Price Objective	80.00 USD
Date Established	22-Apr-2021
Investment Opinion	B-1-9
52-Week Range	13.60 USD-65.94 USD
Mrkt Val / Shares Out (mn)	4,022 USD / 71.9
Average Daily Value (mn)	21.11 USD
Free Float	100.0%
BofA Ticker / Exchange	IMAB / NAS
Bloomberg / Reuters	IMAB US / IMAB.OQ
ROE (2021E)	-6.6%
Net Dbt to Eqty (Dec-2020A)	-84.47%
Price to Book Value	5.0x

Investment summary

Ample opportunities in IO/autoimmune disease

According to Frost & Sullivan, the market size of IO therapies in China would see a 5-year CAGR of 61.8% during 2020-25. It also estimates China's autoimmune disease treatment market to register a 5-year CAGR of 38.1% during 2020-25. I-Mab's pipeline covers a variety of hematologic malignancies, like MM/ lymphoma/ AML, and solid tumors, like head and neck cancer/ NSCLC/ breast cancer. For autoimmune diseases, the company's target indications include SLE, UC, RA, and other IL-6-implicated autoimmune diseases.

Innovative and highly differentiated pipeline

I-Mab has established a highly differentiated pipeline, under partnerships with reputable players, including MorphoSys, Genexine, MacroGenics, and Ferring. The company now has 13 key assets, including 5 in-licensed assets in China portfolio and 8 assets with global rights. For Global portfolio, it has: TJC4, a CD47 mAb with unique RBC-sparing differentiation indicated for treatment of AML/MDS; TJD5, a CD73 antibody indicated for thyroid cancer, lung cancer, colorectal cancer; TJM2, a GM-CSF mAb for RA, CRS and CAR-T-related Therapies. For China portfolio, it has: TJ202 (Felzartamab), a CD38 mAb indicated for MM and SLE; TJ101 (Eftansomatropin), a long-lasting recombinant human growth hormone indicated for PGHD; TJ301 (Olamkicept), an IL-6 inhibitor indicated for UC and other inflammatory diseases. For TJC4, We projected I-Mab to receive cooperation revenue of RMB650mn/ RMB487.5mn/RMB650mn in 2021/22/23. We expect Co. to file BLA in YE21 for 3L MM for TJ202 and contribute to revenue from 2022. We model a risk-adjusted peak sales of RMB1.3bn. We expect TJM2 to launch in the US in 2022 with indication of CRS, followed by RA in 2026. We model a risk-adjusted peak sales of RMB556.8mn.

A risk-diversified integrated platform

I-Mab is constructing an integrated platform from in-house innovative research, CMC, clinical development to commercialization. The pilot plant is now under construction in Hangzhou with 4,000L capacity targeting production in 2022, and another 8*2,000L commercial-scale capacity planned in 2023. I-Mab consistently in-licenses innovative drugs to China market to ride on fast-growing industry trend while advancing its novel in-house candidates in global trials to expand addressable market and cut risk exposure to future China price cut policy on innovative drugs. We see the potential for I-Mab to develop into a multinational biopharm company in the future.

We initiate at Buy with PO of US$ 80.0

We apply a discounted cash flow (DCF) methodology to assess the equity value of I-Mab given the company has no product sales currently and a majority

of the company's value comes from its pipelines. Our PO of US$80.0 represents a fair value of approximately US$5.8bn based on DCF analysis, assuming 10.2% WACC and 3.0% terminal growth rate. We apply an 11-year horizon to arrive at a steady state.

Exhibit 1: Valuation contribution by assets (%)
Peak sales are risk-adjusted (for TJc4, peak sales only refer to China market)

Assets	Valuation contribution by assets (%)	NPV (US$m)	Peak sales*
TJ202 (Felzartamab, CD38)	14.5%	5,456.0	1,291.6
TJ107 (Efineptakin Alfa, IL-7)	3.2%	1,198.4	360.3
TJ101 (Eftansomatropin)	18.5%	6,963.5	2,007.0
TJ301 (Olamkicept, IL-6)	1.2%	450.0	121.5
TJM2 (Plonmarlimab, GM-CSF)	7.5%	2,797.7	556.8
TJC4 (Lemzoparlimab, CD47)	17.5%	6,560.4	836.2
TJD5 (Uliledlimab, CD73)	24.9%	9,359.8	4,159.3
Net cash	12.7%	4,758.8	-
Total	100.0%	37,544.6	9,332.7

Source: BofA Global Research

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Highly differentiated pipeline

I-Mab has established a highly differentiated pipeline focusing on IO, from in-licensing and out-licensing strategy under partnerships with reputable players, including MorphoSys, Genexine, MacroGenics and Ferring. The company now has 13 key assets, including 5 in-licensed assets in China portfolio, and 8 assets with global rights. It is constructing an integrated platform from in-house innovative research, CMC, clinical development to commercialization. The pilot plant is now under construction in Hangzhou, with 4,000L capacity targeting production in 2022, and another 8*2,000L commercial-scale capacity is planned for 2023.

Exhibit 2: I-Mab's pipeline
I-Mab's highly differentiated China and global pipelines focus on oncology and autoimmune diseases

Drug Candidate	Originator	Target	Indication/Therapeutic area	Commercial Rights	Preclinical	Phase 1	Phase 2	Phase 3	Expected Timeline	Clinical trials
China Portfolio										
Felzartamab TJ202	MorphoSys	CD38	Multiple myeloma & SLE	Greater China					BLA: 2021&2023	NCT03860038 NCT03952091
Eftansomatropin TI101	Genexine		Pediatric growth / hormone deficiencv	Greater China					BLA : 2023	NCT02946606 NCT03309891

Olamkicept TJ301	**Ferring**	**IL-6**	**Ulcerative colitis / Autoimmune disease**	**Greater China & South Korea**		**NCT03235752**
Enoblituzumab	**MacroGenics**	**B7-H3**	**Head and Neck Cancer / Oncology**	**Greater China**		**NCT02475213 NCT02923180 NCT02381314 NCT02982941**
Efineptakin Alfa TJ107	**Genexine**	**IL-7**	**GBM / Oncology-related lymphopenia**	**Greater China**		**NCT04001075**
				Global Portfolio		
Plonmarlimab TJM2	**In-house**	**GM-CSF**	**CRS & RA / Autoimmune disease**	**Global**		**NCT03794180**
Lemzoparlimab TJC4	**In-house**	**CD47**	**AML, MDS / Oncology**	**Global**		**NCT03934814**
Ulileldimab TJD5	**In-house**	**CD73**	**Solid tumors / Oncology**	**Global**		**NCT03835949**
TJ210	**MorphoSys**	**C5aR**	**Solid tumors / Oncology**	**Greater China Global shared**	**IND: Feb 2021**	
TJX7	**In-house**	**CXCL13**	**Autoimmune disease**	**Global**		
TJCD48	**In-house**	**Claudin 18.2 X 4-1BB**	**Gastric & Pancreatic cancers**	**Global Shared**		
TJL14B	**In-house**	**PD-L1 X 4-1BB**	**Oncology**	**Global Shared**		
TJL1A3	**In-house**	**PD-L1 X LAG3**	**Oncology**	**Greater China**		
Other Bi-specifics: TJC4GM, TJL1C4	**In-house**		**Oncology**	**Global**		

Source: Company data, BofA Global Research

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I-Mab's China pipeline consists of:

1. TJ202 (Felzartamab), a CD38 mAb indicated for multiple myeloma and SLE (systemic lupus erythematosus); 2. TJ101 (Eftansomatropin), a long-lasting

recombinant human growth hormone indicated for pediatric growth hormone deficiency (PGHD); 3. TJ301 (Olamkicept), an IL-6 inhibitor indicated for UC (ulcerative colitis) and other inflammatory diseases; 4. Enoblituzumab, a B7-H3 targeting mAb indicated for SSCHN, NSCLC; 5. Efineptakin Alfa, a long-acting rhIL-7 for the treatment of GBM and cancer-related lynphopenia.

Its global pipeline consists of:

1. TJC4, a CD47 mAb with unique RBC-sparing differentiation indicated for treatment of AML/MDS; 2. TJD5, a CD73 antibody indicated for thyroid cancer, lung cancer, colorectal cancer and some other solid tumors where CD73 is expressed; 3. TJM2, a GM-CSF mAb for Rheumatoid Arthritis, cytokine release syndrome (CRS) and CAR-T-related Therapies; 4. TJ210, an antibody against human C5aR1 indicated for cancer and potentially autoimmune diseases; 5. TJX7, a CXCL14 mAb indicated for Sjögren's syndrome, RA, multiple sclerosis, and SLE; 6. Other key assets: TJ-L14B (4-1BB X Claudin 18.2 bi-specific), TJL14B (PD-L1 X 4-1BB bi-specific), TJL1A3 (PD-L1 X LAG3 bi-specific) and some other bi-specifics.

Global portfolio

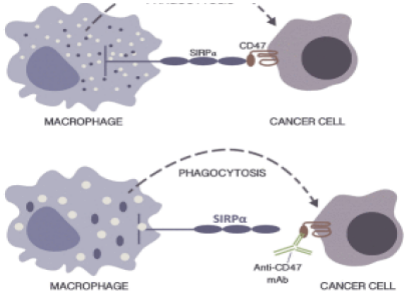
Lemzoparlimab (TJC4), a leading CD47 antibody with differentiated profile

Mechanism of action

CD47 is a transmembrane protein that binds signal-regulatory protein alpha (SIRPα). CD47-SIRPα pathway is involved in tumor progression by protecting tumors from attacks by macrophages through sending a "don't eat me" signal to tumor-engulfing macrophages. CD47 is highly expressed on many different types of cancers, including AML, gastric cancer, lung cancer, NHL, and ovarian cancer.

By blocking the interaction between CD47 expressed on cancer cells and SIRPα expressed on macrophages, TJC4 could increase phagocytosis of cancer cells by macrophages. The process could promote anti-tumor T cell responses as well, which trigger from increased tumor antigen presentation by macrophages and dendritic cells. It is shown that CD47 blockade also potentially involves in the enhancement of antibody-dependent cellular cytotoxicity (ADCC), programmed cell death of cancer cells, differentiation of cancer stem cells, and metastasis inhibition.

Exhibit 3: MoA of TJC4 (anti-CD47 mAb)
CD47 antibodies disrupt the CD47/SIRPa axis and enable the phagocytosis of cancer cells.



Source: Company data

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Differentiated product profile with good safety data

Exhibit 4: Differentiated product profile of TJC4 (1)
Minimal RBC binding shown in TIC4

Exhibit 5: Differentiated product profile of TJC4 (2)
The RBC-sparing property of TIC4 is attributed to its recognition of a unique

	Company 1	Company 2	Company 3	I-Mab
Affinity	8×10^{-9}	4×10^{-9}	8×10^{-10}	5×10^{-10}
RBC binding	++	++	++	Minimal
RBC clumping	++	-	-	-
Anti-tumor activity	++	++	++	++
Phase 1	Anemia	Anemia NHL(on-going) AML(Stopped)	Anemia (Suspended)	1st patient cohort dosed inUS
Phase 2	On-going Combo trial			Dosing of 1st patient in Ph1/2a in China

Source: Company data, BofA Global Research

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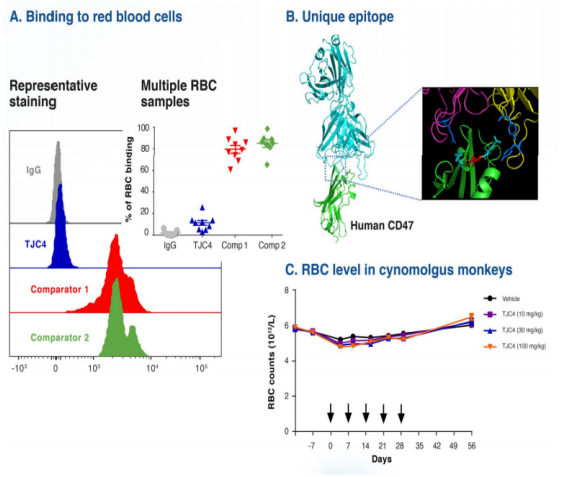
glycol-epitope of CD47 that is shielded by glycosylation on RBC



Source: SITC2020

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Though valuable anti-tumor activity was observed, many CD47 antibodies exhibited significant hematologic adverse effects, such as severe anemia, resulting from inherent epitope sharing between tumor cells and normal red blood cells (RBCs).

TJC4 has shown differentiating feature in RBC binding from other antibodies in the same class. By implementing additional RBC counter-screening to select rare antibody clones that bind to CD47 with high affinity while binding minimally (or not) to RBCs. After screening, only 0.5% of total CD47 antibody leads was RBC-sparing, according to I-Mab. The RBC-sparing property of TJC4 is attributed mechanistically to its recognition of a unique glycol-epitope of CD47, which is shielded by glycosylation on RBC. The pre-clinical data showed that: (1) TJC4 exhibits only minimal RBC-binding even at high antibody concentrations; (2) TJC4 does not induce RBC agglutination; and (3) TJC4 does not cause significant hematologic changes or systemic toxicological effects.

In a clinical phase 1 study (NCT03934814) to evaluate safety, tolerability, maximal tolerable dose, PK/PD and recommended phase 2 dose of lemzoparlimab

for advanced R/R solid tumors and lymphoma, 20 patients were enrolled into monotherapy dose escalation. No dose-limiting toxicities or drug-related SAEs were reported and all TRAEs were grade-1/2 except one grade-3 lipase increase.

Exhibit 6: Treatment-related Adverse Events by cohort
No >= grade-3 anemia and only one-grade 3 lipase increase

	1 mg/kg (n=4)		3 mg/kg (n=4)		10 mg/kg (n=4)		20 mg/kg (n=4)		30 mg/kg (n=4)		Total (n=20)
Adverse Event	GR ANY	GR3	GR ANY	GR3	GR ANY	GR3	GR ANY	GR3	GR ANY	GR3	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: SITC2020, BofA Global Research

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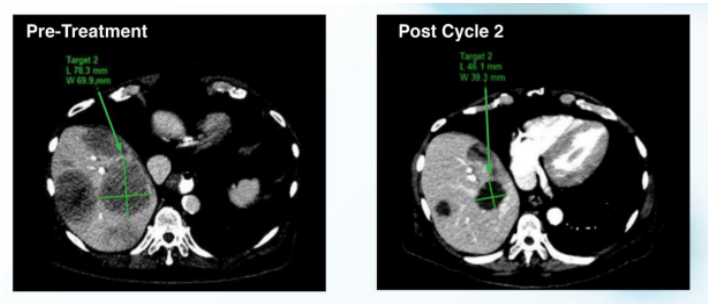
The phase 1 monotherapy study showed preliminary efficacy results. One confirmed Partial Response (PR) was observed from a patient who had metastatic melanoma and had received prior systemic treatment of nivolumab and ipilimumab. The PR was observed in 30mg/kg monotherapy cohort. The data cutoff was after 5 cycles of ongoing 30 mg/kg Q1W treatment.

Exhibit 7: Responding Hepatic Metastases in Melanoma Patient
Target shrunk from 78.3mm *69.9mm to 46.1mm*39.3mm



Source: SITC2020, BofA Global Research

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Leading position in domestic market

The CD47/SIRPα clinical development landscape can be found in Exhibits 7 and 8. For the global market, Gliead and ALX oncology are front-runners in terms of indication coverage and clinical status. For domestic players, Innovent, immuneOnco and I-Mab are in leading positions, while Hengrui, Zai Lab and Akeso follow closely.

Exhibit 8: Global CD47 targeting drug competition landscape
11 candidates in clinical trials; Gilead and ALX oncology front-runners

Candidate	Molecule	Company	Indication	Phase	Status	(Est.) Start date	NCT no.
Magrolimab	CD47 mAb	Gilead	Myeloid Malignancies	Phase 2	Not yet recruiting	2021-03-31	NCT04778410
			Non Hodgkin Lymphoma	Phase 1/2	Recruiting	2016-11-01	NCT02953509
			Hematological Malignancies	Phase 1	Recruiting	2017-09-08	NCT03248479
			Acute Myeloid Leukemia	Phase 3	Not yet recruiting	2021-04-30	NCT04778397
			MDS	Phase 3	Recruiting	2020-09-09	NCT04313881
ALX148	CD47 SIRPα fusion protein	ALX oncology	Colorectal Cancer & Solid Tumor	Phase 1/2	Completed	2016-11-02	NCT02953782
			Ovarian Cancer	Phase 1	Completed	2018-05-23	NCT03558139
			Head and Neck Cancer	Phase 2	Not yet recruiting	2021-01-31	NCT04675333
			Higher Risk MDS	Phase 1/2	Recruiting	2020-10-02	NCT04417517
			Acute Myeloid Leukemia	Phase 1/2	Not yet recruiting	2021-04-30	NCT04755244

			NHL	Phase 1	Recruiting	2017-02-03	NCT03013218
TTI-621	CD47 SIRPα fusion protein	Trillium Therapeutics	Solid Tumor & Hematologic Malignancies	Phase 1	Recruiting	2016-01-31	NCT02663518
TTI-622	CD47 SIRPα fusion protein	Trillium Therapeutics	Myeloma & Lymphoma	Phase 1	Recruiting	2018-05-01	NCT03530683
AO-176	CD47 mAb	Arch Oncology	Multiple Myeloma	Phase 1/2	Recruiting	2020-11-30	NCT04445701
			Solid Tumor	Phase 1/2	Recruiting	2019-02-04	NCT03834948
TG-1801	CD47/CD19 Bispecific	TG Therapeutics	B-Cell Lymphoma	Phase 1	Recruiting	2019-03-05	NCT03804996
DSP107	CD47/41BB Bispecific	Kahr Medical	NSCLC & Advanced Solid Tumor	Phase 1/2	Recruiting	2020-10-07	NCT04440735
SRF231	CD47 mAb	Surface Oncology	Hematologic Cancers & Advanced Solid Cancers	Phase 1	Completed	2018-03-13	NCT03512340
IMC-002	CD47 mAb	ImmuneOncia	Lymphoma & Solid Tumor	Phase 1	Recruiting	2020-06-05	NCT04306224
HX009	PD-1/CD47 Bispecific	Waterstone Hanxbio	Advanced Solid Tumor	Phase 1	Recruiting	2019-06-12	NCT04097769
		Shattuck Labs	HNSCCs & cSCC	Phase 1	Not yet recruiting	2020-10-31	NCT04502888
SL-172154	CD47 SIRPα fusion protein		PPC & Fallopian Tube Cancer & OC	Phase 1	Recruiting	2020-06-29	NCT04406623

Source: Pharmcube, BofA Global Research

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Exhibit 9: China CD47 targeting drug competition landscape
Innovent, ImmuneOnco and I-Mab are in leading positions

Candidate	Molecule	Company	Indication	Phase	Status	(Est.) Start date	Trial no.
IBI188	CD47 mAb	Innovent	Acute Myeloid Leukemia	Phase 1/2	Recruiting	2020-09-25	NCT04485052
			Advanced Malignancies	Phase 1	Recruiting	2018-12-11	NCT03717103
			Myelodysplastic Syndromes	Phase 1	Not yet recruiting	2020-08-02	NCT04485065

IBI322	CD47/PD-L1 Bispecific	Innovent	Advanced Malignancies	Phase 1	Recruiting	2020-07-31	NCT04328831
			Advanced Malignancies	Phase 1	Not yet recruiting	2021-04-30	NCT04338659
SHR-1603	CD47 mAb	Hengrui	Advanced Cancer & Immunotherapy & Hematologic Neoplasms & Lymphoma etc.	Phase 1	Not yet recruiting	2018-11-30	NCT03722186
ZL-1201	CD47 mAb	Zai Lab	Advanced Cancer	Phase 1	Recruiting	2020-05-11	NCT04257617
AK117	CD47 mAb	Akeso	Neoplasms Malignant	Phase 1	Recruiting	2021-01-27	NCT04728334
				Phase 1	Not yet recruiting	2020-04-25	NCT04349969
IMM0306	CD47/CD20 Bispecific	ImmuneOnco	B-cell Non-Hodgkin's Lymphoma	Phase 1	Not yet recruiting	2021-03-15	NCT04746131
IMM01	CD47 mAb		Lymphoma	Phase I/II	Recruiting	8/3/2019	ChiCTR1900024904
MIL95	CD47 mAb	Mabworks Bio	Advanced Malignancies	Phase 1	Not yet recruiting	2020-12-31	NCT04651348
TJC4	CD47 mAb	I-Mab	Myelodysplastic Syndromes & Acute Myeloid Leukemia	Phase 1/2	Recruiting	2020-03-25	NCT04202003
			Lymphoma & Solid Tumor	Phase 1	Recruiting	2019-05-08	NCT03934814

Source: Pharmcube, BofA Global Research

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I-Mab entered into a global immune-oncology strategic partnership with AbbVie in September 2020. AbbVie needed to pay a $180mn upfront payment, $20mn immediate millstone (based on phase 1 results) to I-Mab for the exclusive global license, excluding Greater China, to develop and commercialize lemzoparlimab. I-Mab will also be eligible to receive up to $1.74bn in milestone, including $840mn for clinical development and regulatory approval, and the rest for commercialization. AbbVie also needs to pay royalties from low- to mid-teens digits on global net sales outside of Greater China. I-Mab and AbbVie will collaborate on combination therapies with lemzoparlimab and venetoclax (triple combination). I-Mab will share manufacturing responsibilities with AbbVie as the primary manufacturer for global supply. We view this deal as a recognition on lemzopalimab's differentiated profile and commercial potential. It may also help accelerate R&D and commercial production operations in China. We expect lemzoparlimab to launch in 2025 in China and estimate a risk-adjusted peak sales of RMB836.2m for lemzoparlimab in China market.

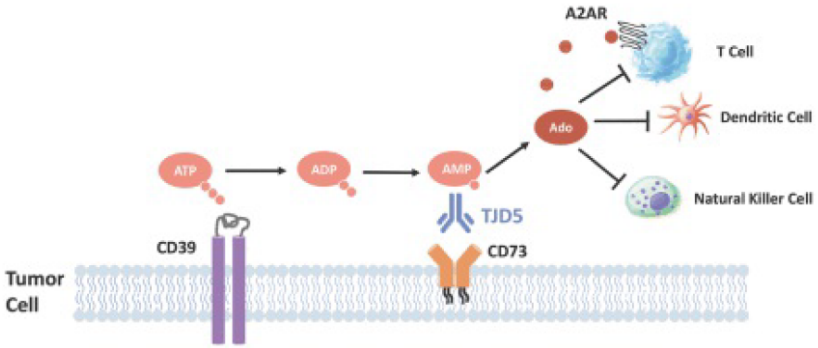
Uliledlimab (TJD5) - a competitive CD73 antibody with first-to-market potential in China

Mechanism of action

Adenosine is a potent immunosuppressive signaling molecule which plays a critical role for tissue homeostasis outside cells. CD73 is the rate-limiting

enzyme that serves to convert adenosine monophosphate (AMP) to adenosine. By preventing the inactive CD73 dimer from changing into the active conformation in a substrate non-competitive manner, TJD5 allosterically inhibits the CD73 enzyme and decreases the adenosine production in the tumor micro-environment, resulting in an increase of T-cell anti-tumor activity.

Exhibit 10: MoA of TJD5
CD73-catalyzed adenosine (Ado) generation and immunosuppression by Ado in the tumor microenvironment



Source: Company data

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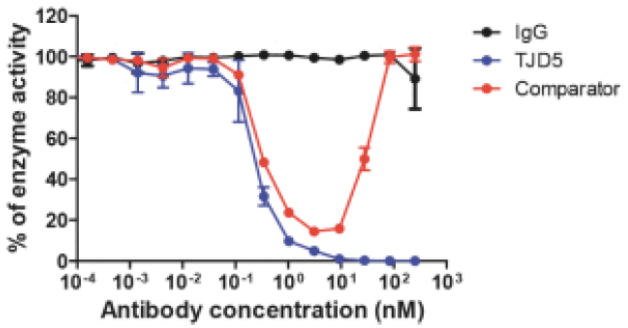
No "hook effect" as a key differentiation feature

According to pre-clinical results, TJD5 achieved complete inhibition of soluble CD73 enzymatic activity (IC 50= 0.22nM) without the "hook effect". For many of its peers, higher concentrations often result in a paradoxical reverse of enzymatic activity probably caused by its inter-dimer binding mode. TJD5 binds to a novel epitope in C-terminal domain of CD73 to avoid the "hook effect". Besides, TJD5 has a non-competitive pathway, hence will not be blunted by high levels of CD73 enzyme substrates.

Exhibit 11: Inhibition of soluble CD73 enzymatic activity by CD73 antibodies

Exhibit 12: Anti-tumor Activities in combo with PD-L1
TJD5 showed synergy with PD-L1

No "hook effect" for TJD5



Source: Company data

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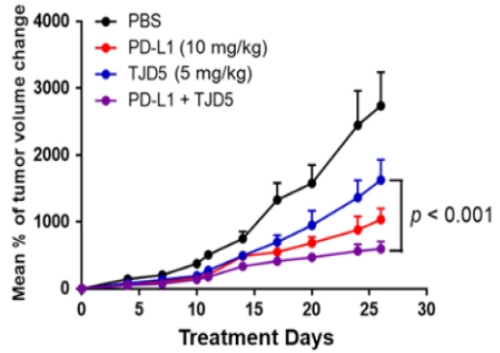

Source: Company data

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Anti-tumor effect in combo with PD-L1

According to pre-clinical results, TJD5 showed moderate anti-tumor effect in monotherapy in mouse xenograft model against A375 melanoma cells. TJD5 in combination with PD-L1in the same model showed enhanced anti-tumor effect. The combo group achieved 68% inhibition of tumor growth, which is statistically significantly better than vehicle along and TJD5 monotherapy.

Potential first to market CD73 in China

Exhibit 13: Global CD73 competition landscape

AstraZeneca, Corvus and Arcus Bio are leading competitors

Candidate	Company	Indication	Phase	Status	(Est.) Start date	NCT no.
Oleclumab	AstraZeneca	Metastatic mCRPC and Prostate Cancer	Phase 2	Recruiting	2019-08-29	NCT04089553
		Triple Negative Breast Neoplasms	Phase 1/2	Recruiting	2018-12-21	NCT03742102
		Non-Small Cell Lung Cancer	Phase 2	Recruiting	2017-12-18	NCT03334617
		Metastatic NSCLC	Phase 1	Recruiting	2018-12-27	NCT03819465
		Metastatic Pancreatic Adenocarcinoma and Carcinoma	Phase 1/2	Recruiting	2018-06-21	NCT03611556
		Advanced Solid Tumors	Phase 1	Recruiting	2020-03-03	NCT04261075
		Metastatic Castration Resistant Prostate Cancer (mCRPC)				

NZV930	Novartis	Renal Cell Carcinoma (RCC) Ovarian Cancer Colorectal Cancer Microsatellite Stable (MSS) Pancreatic Ductal Adenocarcinoma (PDAC) Triple Negative Breast Cancer (TNBC) Non-small Cell Lung Cancer (NSCLC)	Phase 1	Recruiting	2018-07-18	NCT03549000
BMS-986179	BMS	Solid Tumors	Phase 1	Recruiting	2020-02-20	NCT04237649
GS-1423	Gilead Sciences	Malignant Solid Tumor	Phase 1/2	Active, not recruiting	2016-06-21	NCT02754141
LY3475070	Eli Lilly	Advanced Solid Tumors	Phase 1	Active, not recruiting	2019-06-03	NCT03954704
AB680	Arcus Biosciences	Advanced Cancer	Phase 1	Recruiting	2020-01-16	NCT04148937
		Metastatic Colorectal Cancer	Phase 1/2	Not yet recruiting	2021-02-26	NCT04660812
		Prostatic Cancer	Phase 1/2	Recruiting	2020-07-07	NCT04381832
		Advanced Pancreatic Cancer	Phase 1	Recruiting	2019-11-06	NCT04104672
		COVID-19	Phase 1	Recruiting	2020-07-01	NCT04464395
CPI-006	Corvus	NHL and multiple advanced solid tumours	Phase 1	Recruiting	2018-04-25	NCT03454451
		Covid-19	Phase 3	Recruiting	2021-02-25	NCT04734873
AK119	Akeso	Coronavirus Disease 2019 (COVID-19)	Phase 1	Recruiting	2020-09-30	NCT04516564
		Advanced or Metastatic Solid Tumors	Phase 1	Not yet recruiting	2020-11-30	NCT04572152
TJ004309	Tracon Pharma	Metastatic Cancer and Solid Tumor	Phase 1	Recruiting	2019-07-26	NCT03835949
Sym021	Symphogen A/S	Solid Tumor and Metastatic Cancer	Phase 1	Recruiting	2020-11-19	NCT04672434
TJD5	I-Mab	Advanced Solid Tumor	Phase 1/2	Recruiting	2020-05-09	NCT04322006
		Advanced or Metastatic Cancer	Phase 1	Recruiting	2020-07-26	NCT03835949

Source: Pharmcube, BofA Global Research

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According to Pharmcube, I-Mab and Akeso are two domestic leading companies in CD73 antibody market. I-Mab plans to develop TJD5 in parallel. It launched a phase-I trial for advanced solid tumors to evaluate TJD5 monotherapy and combo with atezolizumab. According to management, we expect to see preliminary results at ASCO 2021. I-Mab also initiated a phase-I/II clinical trial in advanced or metastatic cancer in China. The combo PD-1 in this trial is toripalimab from Junshi Bio. We expect TJD5 could be potentially the first to market CD73 to launch in 2026 in both China and the US. We estimate a risk-adjusted peak sales of RMB4.2bn.

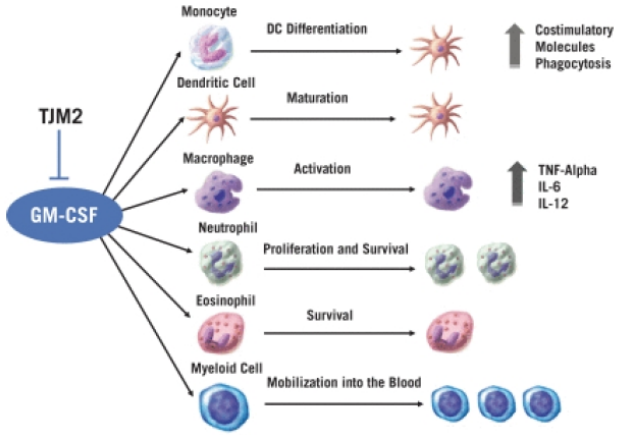
Plonmarlimab (TJM2) - a GM-CSF mAb with broad indications

Mechanism of action

Granulocyte-macrophage colony-stimulating factor (GM-CSF) is a monomeric glycoprotein produced by macrophages, T cells, mast cells, natural killer cells, endothelial cells and fibroblasts that function as cytokine in orchestrating an innate immune response during inflammation. GM-CSF plays a crucial role in the pathogenesis and disease progression of multiple autoimmune conditions.

By binding with high affinity to GM-CSF, TJM2 is designed to block GM-CSF from binding to its receptor so that downstream signaling and target cell activation could be prevented. It can inhibit inflammatory responses and reduce tissue inflammation and damage.

Exhibit 14: Role of GM-CSF in immune response
TJM2 binds with GM-CSF to prevent downstream signaling and target cell activation



Source: Company data

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Preclinical and clinical data with acceptable safety profile and efficacy potential

According to previous pre-clinical trials evaluating pharmacology, PK and toxicology profiles of plonmarlimab, it could bind and neutralize to human and monkey GM-CSF. Plonmarlimab showed linear PK behavior in single dose IV and single subcutaneous (SC) injection from 5, 25 to 50 mg/kg, with no apparent sex difference observed. Plonmarlimab was evaluated using type II collagen-induced arthritis (CIA) model, which has been a recognized animal model for RA. Researchers use collagen to induce disease in monkeys then initiated 40mg/kg plonmarlimab with vehicle control. The results indicated that plonmarlimab significantly decreases the severity of CIA, which was measured by arthritis score and correlated with decrease in STAT5 phosphorylation in PBMCs 24 hours post-injections.

Followed by the preclinical studies, I-Mab initiated a first-in-human phase-I study in and a clinical study for clinical study report (CRS) associated with

severe COVID-19 patients. According to the first-in-human CRS, plonmarlimab was well tolerated up to 10 mg/kg single IV dose in healthy volunteers with no MTD reached and no serious adverse events reported. The PD study showed that induction of pSTAT5 in monocyte population was inhibited by over 70% in single dose of plonmarlimab for all dose groups compared with placebo. The GM-CSF-stimulated pSTAT5 level was inhibited by more than 90% in the 3mg/kg and 10mg/kg cohorts from 4 hours to 2 weeks after dosing. A double-blind, placebo-controlled phase 1b trial indicated for RA has been started in China. We expect to see interim data readout for US COVID-19 trial in 2H21 and potential launch for CRS in 2H22.

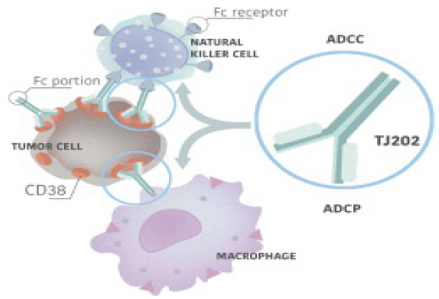
China portfolio

Felzartamab (TJ202) - a leading CD38 antibody near to launch

Mechanism of action

Felzartamab is a highly differentiated mAb targeting CD38. It can bind to CD38 overexpressed tumor cells, pathogenic CD38 high-expression B cells and plasma cells then kill its mediator by inducing antibody-dependent cellular cytotoxicity (ADCC) and antibody-dependent cellular phagocytosis (ADCP). Felzartabmab is indicated for multiple myeloma (MM), systemic lupus erythematosus (SLE), and some other autoimmune diseases.

Exhibit 15: MoA of TJ202 (1)
TJ202 kills tumor cells by inducing ADCC and ADCP



Source: Company data

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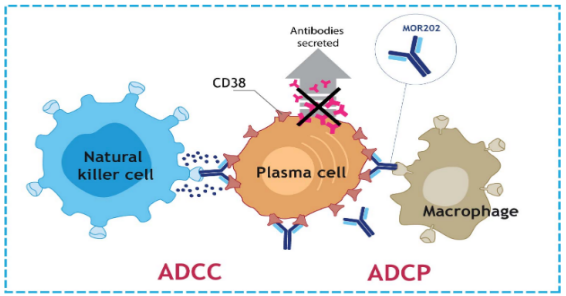
Exhibit 16: MoA of TJ202 (2)
TJ202 kills CD38-bearing plasma cells by inducing ADCC and ADCP



Source: MorphoSys

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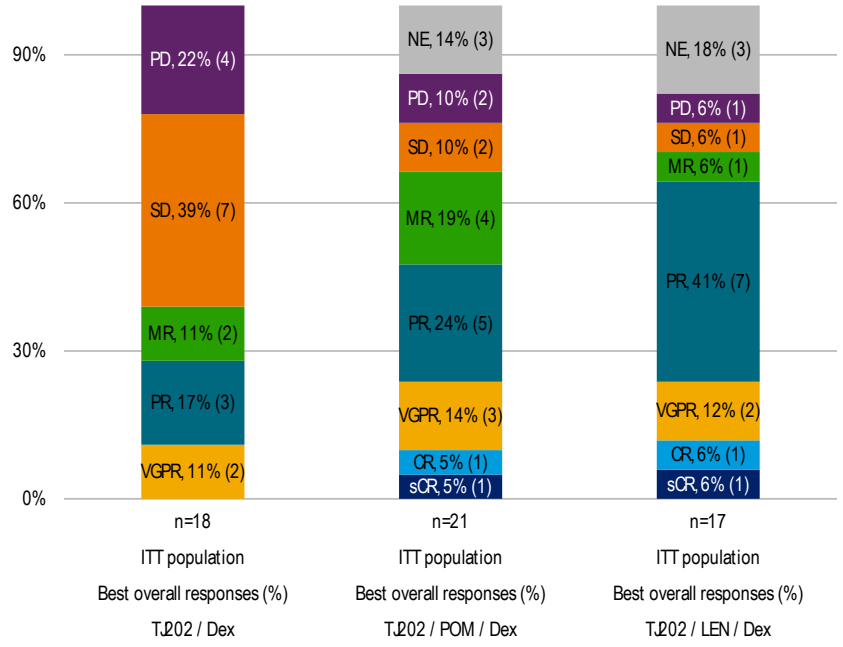
Comparable efficacy data with potentially better safety profile

MorphoSys conducted a phase I/IIa study for R/R MM in Austria and Germany. The trial design was 3+3 dose escalation trial to explore the maximum tolerated dose (MTD), recommended dose and combo with dexamethasone (DEX) + pomalidomide (POM) or DEX+ lenalidomide (LEN). The efficacy data was acceptable as ORR of 28%, 48% and 65% was achieved in TJ202 in combination with DEX, POM/DEX and LEN/DEX, respectively. The median PFS was

8.4m and 17.5m for TJ202/DEX and TJ202/POM/DEX, respectively.

Exhibit 17: Best overall response and ORR
ORR was 28%, 48% and 65% in TJ202/DEX, TJ202/POM/DEX and TJ202/LEN/DEX group, respectively



Source: Company data, BofA Global Research

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By cross-trial comparison, we found that the combination of LEN and POM can clearly provide synergy to anti-CD38 drugs (mono). Though due to the difference in dose of anti-CD38, characteristics of patient and line of treatment, the efficacy data of daratumumab combos were generally higher (91%-93% in LEX/DEX, 59% in POM/DEX). We saw that TJ202 combos are comparable with similar combo trial data of isatuximab and daratumumab in terms of efficacy.

Exhibit 18: Cross-trial comparison of anti-CD38 drugs
TJ202 seems comparable with peers in terms of efficacy

	TJ202 + LEN / Dex	Daratumumab + LEN / Dex	Daratumumab + LEN / Dex	TJ202 + POM / Dex	Isatuximab + POM / DEX	Daratumumab + POM / Dex
Trial	**NCT01421186**	**NCT02076009**	**NCT02252172**	**NCT01421186**	**NCT02990338**	**NCT01998971**
Phase	**1/2**	**3**	**3**	**1/2**	**3**	**1**
No. of patients	**n=17**	**n=286**	**n=368**	**n=21**	**n=154**	**n=103**
Line of treatment	**2L+**	**2L+**	**1L**	**3L+**	**3L+**	**3L+**

Dose of anti-CD38	8 or 16 mg/kg	16 mg/kg	16 mg/kg	8 or 16 mg/kg	10 mg/kg	16 mg/kg
Dose of DEX	40mg/w (20mg/w for >75yr)	40mg/w (20mg/w for >75yr)	40mg/w (20mg/w for >75yr)	40mg/w (20mg/w for >75yr)	40mg/w (20mg/w for >75yr)	40mg/w (20mg/w for >75yr)
Dose of LEN/POM	25mg/d, 21d/28d cycle	25mg/d, 21d/28d cycle	25mg/d, 21d/28d cycle	4mg/d, 21d/28d cycle	4mg/d, 21d/28d cycle	4mg/d, 21d/28d cycle
Efficacy results						
NE	18%			14%		
PD	6%			10%		
SD	6%			10%		
MR	6%			19%		
PR	41%	17%	14%	24%	29%	18%
VGPR	12%	32%	32%	14%	27%	28%
CR	6%	25%	17%	5%	5%	6%
sCR	6%	18%	30%	5%		8%
ORR	65%	91%	93%	48%	60%	59%

Source: Company data, FDA label, J&J, BofA Global Research

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According to data from Morphosys and J&J, after similar pre-medications of dexamethasone, anti-pyretics and anti-histamines, felzartamab required only 0.5 to 2 hours for infusion, compared with 3.5 to 6.5 hours for daratumumab and isatuximab at the first infusion. The IRR of TJ202 was lowered to 7% in combo trials compared with 46% for daratumumab and 38% for Isatuximab, according to FDA labels. The advantages of TJ202 result from its lack of antibody CDC activity and are likely to translate into clinical benefits, in terms of tolerability, patient compliance and economic benefits. We expect TJ202 to have a superior safety profile as infusion reactions were the most common AE among competitors.

Exhibit 19: Advantages compared with peers
Lower IRR and shorter duration of infusion

	TJ202 mono	TJ202 combo	Dratumumab	Isatuximab
No. of pateints	35	56	1166	154
Duration of infusion	0.5-2hrs	0.5-2hrs	W1:7hrs W2:4hrs W3:3hrs	1st Infusion: 3.33hrs 2nd infusion: 1.88hrs Subsequent infusions: 1.25hrs
IRR	40%	7%	46%	38%

Source: The Lancet, FDA label, BofA Global Research

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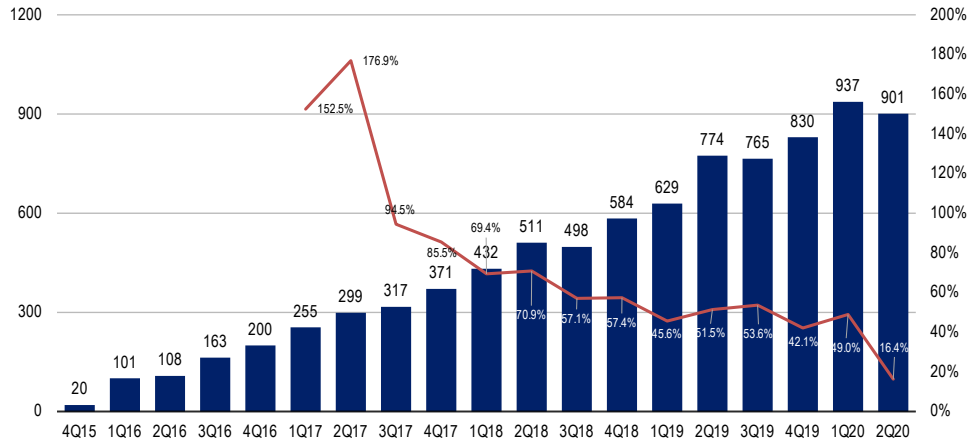
Exhibit 20: Daratumumab sales ramped up quickly
After indication expansion of ASCT eligible 1L MM, daratumumab sales may maintain growth



Source: J&J, BofA Global Research

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The first-to-market CD38 antibody, daratumumab, was approved by NMPA in July 2019 in China and recorded USD1,838mn globally in 1H20 despite COVID-19 impact. Later in March 2020, isatuximab was approved by the FDA as the second CD38 antibody for 3L MM.

We expect I-Mab could be the second CD38 antibody in China given that the company is planning to submit a BLA in YE21 for 3L MM and potentially launch in 2H22. The company indicated that it will file BLA for 2L MM in YE22 and SLE in 2023. We model a risk-adjusted peak sales of RMB1.3bn for felzartamab.

Eftansomatropin (TJ101) - a long-acting growth hormone

Mechanism of action

TJ101 plays a similar role in stimulating the production of (IGF-1) insulin-like growth factor 1 in the liver. IGF-1, as a key mediator of eftansomatropin's growth-promoting activity, can simulate osteoblast and chondrocyte activities which are related to bone growth.

Exhibit 21: Schematic presentation of the structure of TJ101
TJ101 plays a similar role in stimulating the production of IGF-1

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

(Source: Genexine)

Source: Company data

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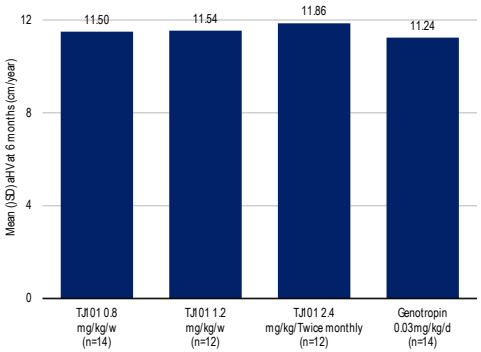
Good efficacy and safety data compared with Genotropin

TJ101 seems to have a better efficacy profile compared with Genotropin. The mean aHV at 6 months of treatment with TJ101 was evaluated in 0.8 mg/kg/week-2.4 mg/kg/twice monthly groups. Patients who were administrated with TJ101 at 0.8 mg/kg weekly, 1.2 mg/kg weekly, and 2.4 mg/kg twice monthly recorded growth rates of 11.50, 11.54, and 11.86 cm/year, respectively, which are all higher than the control group who had Genotropin 0.03mg/kg/d.

Exhibit 22: Potentially better efficacy profile
All TJ101 group achieved better growth rate than control group



Source: Company data, BofA Global Research

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Exhibit 23: Comparable safety profile
TJ101 has comparable safety profile with lower Injection site reactions

Drug candiate	Eftansomatropin	Genotropin
Patients	40 (C1:14,C2:13,C3:13)	14
Dose	C1: 0.8 mg/kg/w C2: 1.2mg/kg/w C3: 2.4 mg/kg/0.5m	0.03 mg/kg/d
AEs	69.2%-84.6%	0.571
Treatment-related AEs	C1: 14.3% C2: 23.1% C3: 15.4%	0
Discountinue due to AE	C1: 0 C2: 7.7% C3: 7.7%	0
ISRs	32.5%	78.5%

Source: Company data, BofA Global Research

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Eftansomatropin has advantages in patient compliance as it can be injected weekly or biweekly. It is now under a phase III trial with 165 patients with

Eftansomatropin has advantages in patient compliance as it can be injected weekly or biweekly. It is now under a phase III trial with 150 patients with PGHD. As the observation time is 12 months, we expect I-Mab to file BLA in a 2023 and launch it in 2024. We model a risk-adjusted peak sales of RMB2.0bn for Eftansomatropin.

Olamkicept (TJ301) - an IL-6 inhibitor for inflammatory diseases

Mechanism of action

Olamkicept is a homodimer of a fusion protein consisting of the extracellular domains of human glycoprotein130 ("gp130") and the fragment crystallizable (Fc) domain of human IgG1. As a cytokine driver, interleukin-6 (IL-6) plays an important role in the propagation and maintenance of chronic inflammation in autoimmune diseases. Olamkicept is a selective IL-6 inhibitor which could provide IL-6 mediated inflammation without impacting some normal physiological functions of IL-6, including acute immune response against infection and metabolic regulation.

Trans-signaling pathway to provide a better safety profile

The existing IL-6/IL-6R inhibitors block all of IL-6 signaling and cause significant adverse events in the clinic, including infection, gastrointestinal perforation, metabolic disturbances, and insulin resistance. Olamkicept, on the other hand, works through a different mechanism, the trans-signaling pathway, to reduce the side-effects on lipid, glucose or bone metabolism. It also has no agonistic activities which could activate receptors or trigger detrimental immune cascades. The improved safety profile could be crucial in treatment in chronic inflammation, like ulcerative colitis. In a phase I (multiple dose ascending trial) and a phase IIa study (FUTURE study: biomarker study in active IBD) in patients conducted by Ferring, Olamkicept demonstrated a well-tolerated safety profile. AEs reported in FUTURE study were unspecific and showed no signs of immune suppression. Though five SAEs were recorded, none of them were life-threatening or related to Olamkicept.

Efficacy data on UC was sufficient, target to launch in 2023

According to preliminary clinical data for UC and CD patients, Olamkicept recorded 55% (5/9) ORR in patents with UC with 22% (2/9) reached clinical remission. Data on CD patients were slightly weaker, with an ORR of 29% (2/7). I-Mab has initiated a phase II trial in China and South Korea in active UC patients to evaluate PK, safety and efficacy of Olamkicept. I-Mab also indicated he possibility to expand indication to other autoimmune conditions, including systemic sclerosis and Castleman's disease. We expect to see data readout for this phase II trial in 1H21 and potentially launch in 2023.

Efineptakin (TJ107) - potential FIC long-acting recombinant human IL-7

Mechanism of action

IL-7 is a cytokine, which plays a crucial part in the survival and homeostatic proliferation of naïve and memory T cells. It can bind to and activate the

receptor, which is expressed primarily on lymphocytes, such as lymphoid precursors, developing T and B cells, naive T cells, and memory T cells, but not on tumor-protecting Tregs. Efineptakin, by augmenting the number and functionality of T cells, could enhance anti-tumor immunity as a monotherapy. Besides, it may also work with an immune checkpoint inhibitor, cancer vaccine or CAR-T to improve the anti-tumor response by boosting T cell numbers, reconstituting T cell pools and reinvigorating exhausted T cells.

Potential first-in-class as a T lymphocyte-booster for cancer-related immunotherapy

Efineptakin differentiates itself from short-acting rhIL-7 and IL-2 by its advantages in selective immune functions, improved stability, developability and extended half-life. The exclusive rights to develop and commercialize Efineptakin in greater China were in-licensed from Gnexine in Dec. 2017. I-Mab initiated a phase Ib study (NCT04001075) in China in patients with advanced solid tumors for dose escalation. The preliminary results of three patients with colorectal cancer was posted at SITC 2019. TJ107 was well tolerated and no DLTs were reported during the first cycle at this dose level. The most common TEAEs was transient decrease in lymphocyte count, which resulted from the TJ107-induced lymphocyte homing. The only SAE was an event of hospitalization due to melaena on a patient with colorectal cancer, which was considered unlikely related to efineptakin. The PK study showed that TJ107 reached serum peak concentration around 24 hours post-dose and remained detectable in serum till day 14 post-dose. The PD study demonstrated TJ107 activated IL-7 pathway and expanded T cells in cancer patients. Increase in numbers of CD4 T cells, CD8 T cells and NTK cells were observed without affecting the number of regulatory T cells. An increase in the diversity of the TCR repertoire post-dose was also reported. According to I-Mab, the company has initiated a phase II study in GBM patients with lymphopenia. We expect the company to launch efineptakin in 2024 and estimate a risk-adjusted peak sale of RMB360.3mn in 2031.

Other assets

Enoblituzumab - a leading B7-H3 antibody

Enoblituzumab is a leading humanized antibody targeting B7-H3, one of B7 family of T cell checkpoint regulators. B7-H3 is widely expressed across multiple tumor types and is crucial in regulating immune response against cancers, hence is considered a promising IO target. Multiple clinical evidences have demonstrated potential synergy from a combo of B7-H3 and PD-1 targeting drugs in treating cancer.

Originated by MacroGenics, enoblituzumab was designed to enhance anti-tumor ADCC function and has been tested clinically in combo with CTLA-4 and PD-1 therapy in B7-H3-expressing cancers. MacroGenics has reported high levels of B7-H3 expression at the 2+ positivity cutoff, most notably in 100% of SCCHN samples. Researchers are also evaluating its monotherapy as a neoadjuvant treatment in patients with intermediate and high-risk localized prostate cancer. Clinical study has demonstrated that enoblituzumab is well-tolerated, and can increase CD8 T cell infiltration in tumors with more-focused T cell repertoires in patients treated with enoblituzumab as a monotherapy. MacroGenics are also actively exploring anti-tumor effects in combination with PD-1 drugs in treating SCCHN and NSCLC. In July 2019, I-Mab acquired the rights to develop and commercialize in Greater China enoblituzumab from

MacroGenics and agreed to pay a $15mn upfront fee and up to $135mn in development and regulatory milestones, as well as tiered double-digit royalties.

Management suggested that it expects to participate in future global studies conducted by MacroGenics and hopefully accelerate the filing process in China by leveraging data from global trials.

Examine the opportunity

Promising market with strong growth momentum

I-Mab's key treatment areas of immuno-oncology (IO) therapies and autoimmune diseases have huge business opportunity. The company's pipelines can provide novel treatments to a variety of hematologic malignancies, such as multiple myeloma (MM)/ lymphoma, acute myeloid leukemia (AML), and solid tumors, like head and neck cancer/ non-small cell lung cancer (NSCLC)/ breast cancer. For autoimmune diseases, companies' target indications include systemic lupus erythematosus (SLE), ulcerative colitis (UC), rheumatoid arthritis (RA), and other autoimmune diseases.

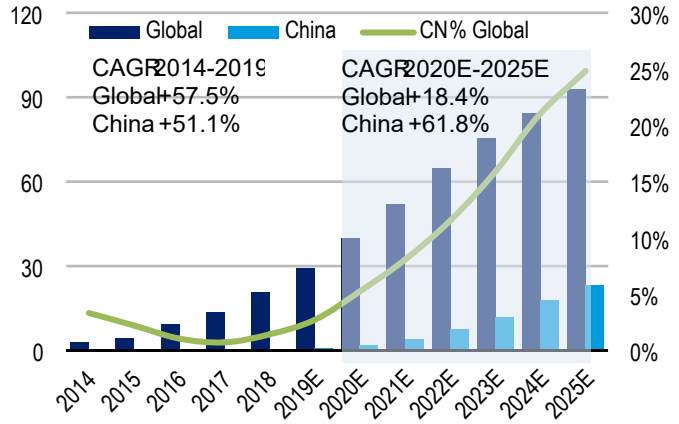
IO is a biologic treatment which boosts the body's natural defenses to stop the growth of cancer. The IO market started when the anti-CTLA-4 therapy was launched in 2013 and got well noted in 2014 when anti PD-1 therapies were launched. The global and China IO therapies market booked rapid growth during 2014-19, with a 5-year CAGR of +57.5% and 51.1%, respectively. IO is still at its early stage in China. Frost & Sullivan estimates the IO therapies market to see a 5-year CAGR of +61.8% during 2020-25.

An autoimmune disease is a condition in which the immune system mistakenly attacks our body. Depending on which part of the body is affected, autoimmune diseases are of >80 types. With the changes in diet and lifestyle, the worldwide population of autoimmune disease is increasing, which lifts the treatment market. According to Frost & Sullivan, the global and China biologics markets for autoimmune disease treatment saw a 5-year CAGR of +9.2% and 25.7%, respectively, during 2014-19.

Exhibit 24: Global and China Immuno-Oncology Therapies Market (2021-2025E) (USD Bn)

Exhibit 25: Global and China Biologics for Autoimmune Disease Treatment Market (2021-2025E) (USD Bn)

China to count ¼ of global market in 2025



Source: Frost & Sullivan Report

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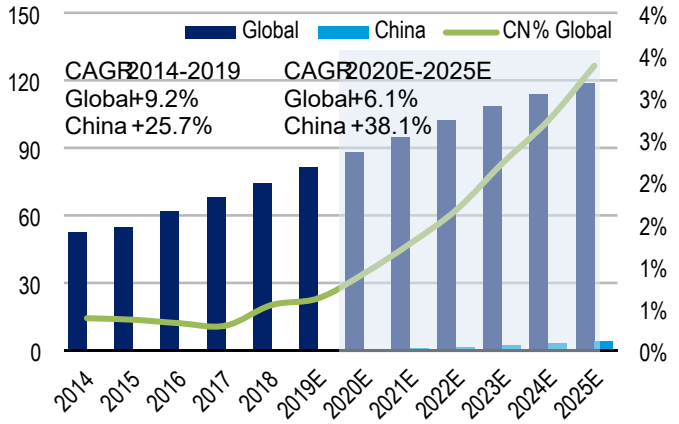
China market to increase at a 5yr CAGR of +38.1% 2020-2025



Source: Frost & Sullivan Report

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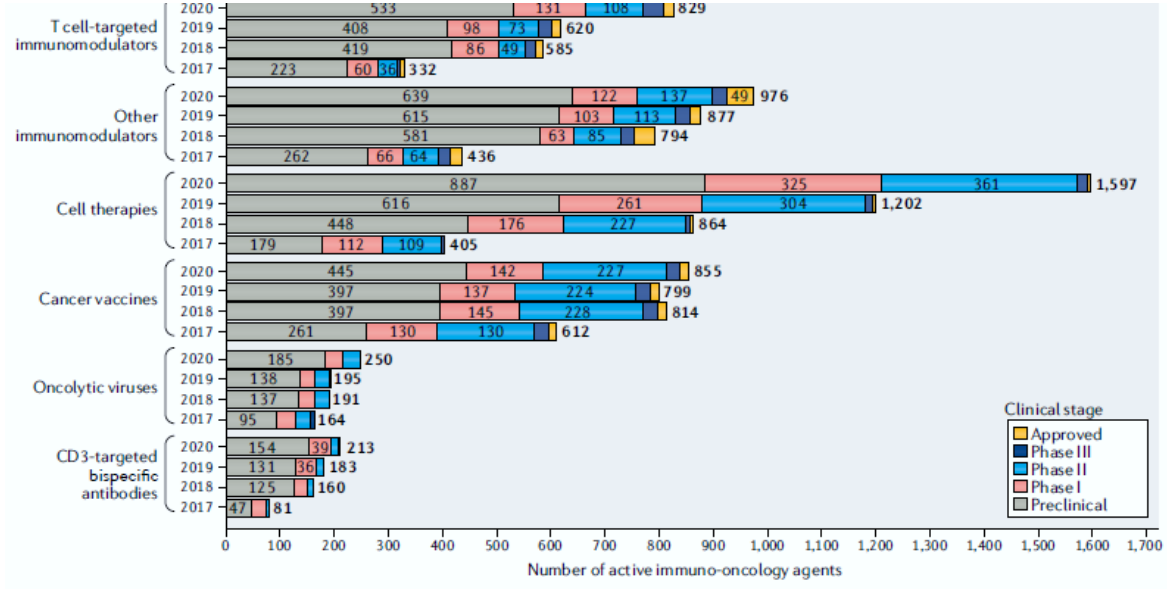
Solid pipeline to support the growth of IO field

Large amount of developments and trials in IO indicate a promising market potential for IO. According to the Cancer Research Institute (CRI), the number of IO drugs under development has increased to 4,720 in 2020 from 3,876 drugs in 2019, 22% increase. The number of IO trials is also increasing fast: 6,281 active clinical trials (source: ClinicalTrials.gov) are testing IO agents in 2020, which represents 14% YoY growth.

Exhibit 26: Trends in the immuno-oncology drug development pipeline

Hundreds of new cell therapies have been added each year, nearly quadrupling since 2017



Source: Nature Reviews Drug Discovery (2020)

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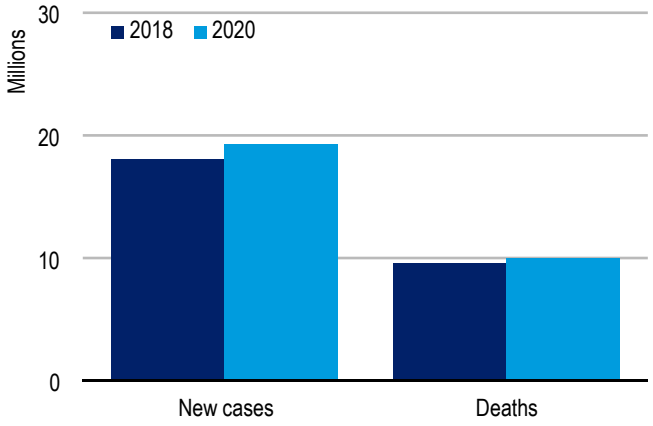
Solid tumors, a large market for IO

A large group of cancer patients are with solid tumors, including non-small cell lung cancer (NSCLC), squamous cell carcinoma of the head and neck (SSCHN), melanoma, pancreas caner, bladder cancer, etc. New cases of cancers around the world reached 19.3mn in 2020 from 18.1mn in 2018, representing 3.3% CAGR. Similar trend could also be found on new deaths numbers.

Exhibit 27: New cases and deaths of cancer in 2018 and 2020E global

Exhibit 28: New cases by cancer site in 2020 (Rank, percentage %)

18,078,957 new cases of cancer globally in 2020E



Source: GLOBOCAN

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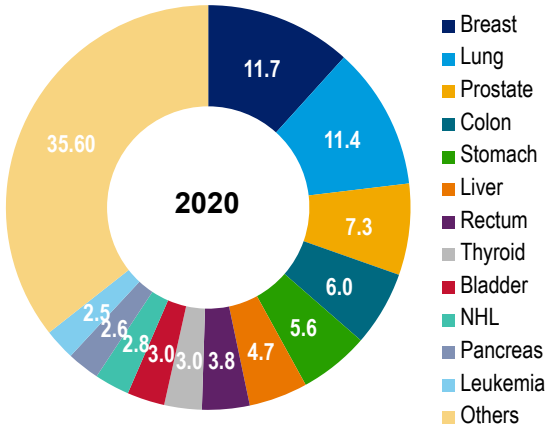
New cases of breast cancer is 11.7% of all sites



Source: GLOBOCAN

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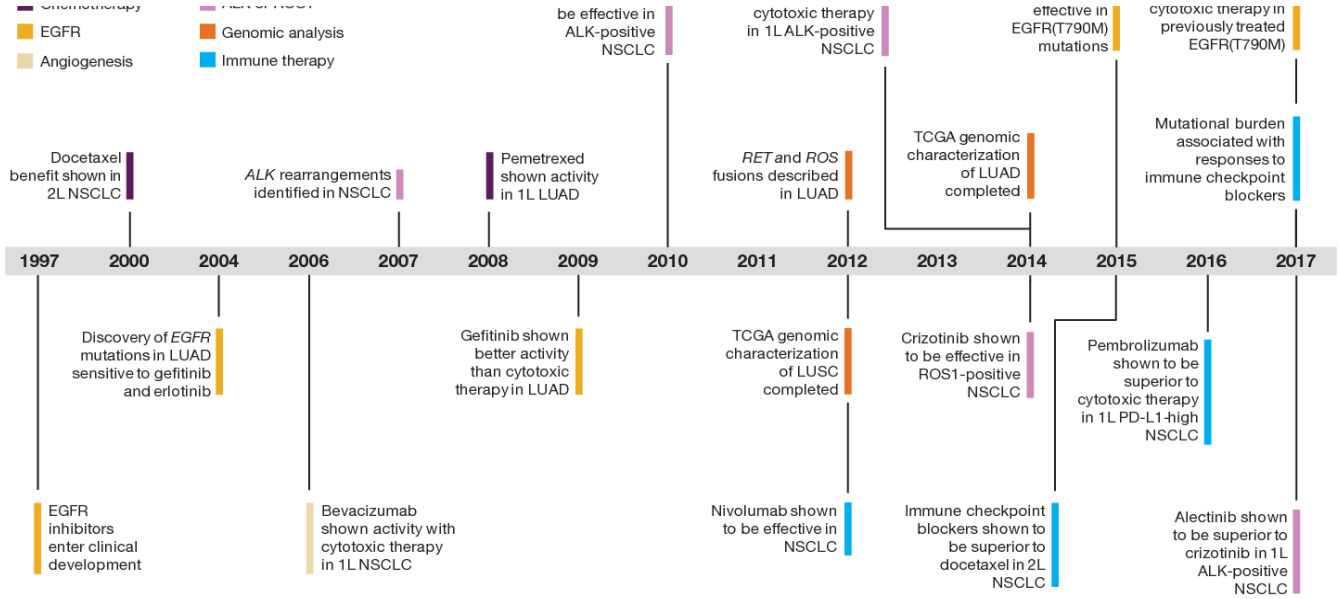
NSCLC

NSCLC accounts for about 85% of lung cancer, which leads the cause of cancer deaths and new cases of cancer in the world. 2,206,771 new cases were diagnosed with lung cancer (11.4% of total cases) globally, as GLOBOCAN estimated in 2020.

The treatment of NSCLC has achieved many important progresses after years of research. The use of small molecule tyrosine kinase inhibitors and immunotherapy has brought noticeable survival benefits in particular patients.

Exhibit 29: The development of targeted therapies and immunotherapies for the treatment of NSCLC

Immunotherapies are getting popular after showing the effectiveness in NSCLC in 2012



Source: Nature (2019)

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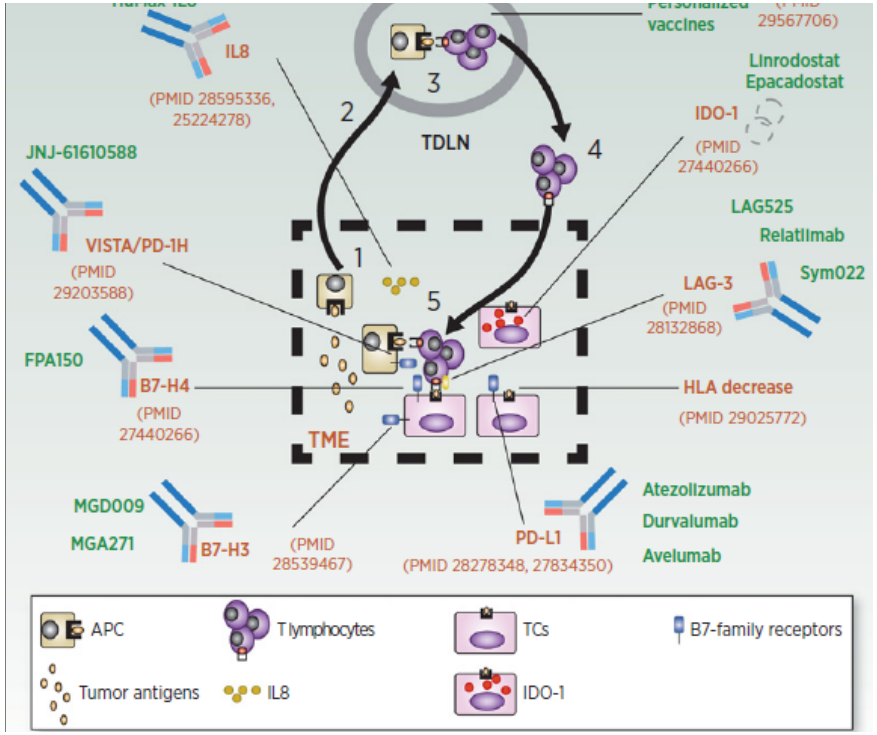
Despite the success of checkpoint inhibitors, such as PD-1 and PD-L1, market demand for other treatment is still high given lots of patients do not respond to PD-1/PD-L1 monotherapies.

Exhibit 30: New immune target opportunities
Different immune-escape mechanisms developed by lung tumors (brown) and available immunotherapies targeting these mechanisms (green) to stimulate an antitumor immune response



Source: AACR

(1) Antigen uptake and processing by antigen-presenting cells (APC); (2) migration of APCs to lymphoid organs; (3) antigen presentation, activation, and costimulatory and coinhibitory regulation of na€ ve T cells to become effector T cells in lymphoid organs; (4) exit of effector T cells into peripheral blood and trafficking to tumor tissues; and (5) tumor antigen recognition and tumor lysis. Targets include IL8, VISTA/PD-1H, B7-H4, B7-H3, IDO-1, LAG-3, HLA class I, and tumorspecific neoantigens. B7-H3, B7-homolog 3; B7-H4, B7-homolog 4; HLA, human leukocyte antigen; IDO-1, indoleamine 2,3-dioxygenase-1; IL8, interleukin-8; LAG-3, lymphocyte-activation gene 3; PD-1H, programmed death-1 homolog; TDLN, tumor-draining lymph node; TME, tumor micorenvironment; VISTA, V-domain Ig suppressor of T-cell activation.

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To address the unmet medical needs, many biotech companies are developing drugs for new immune targets and novel combination therapies, which may provide an effective treatment option for those who do not respond to classical targets.

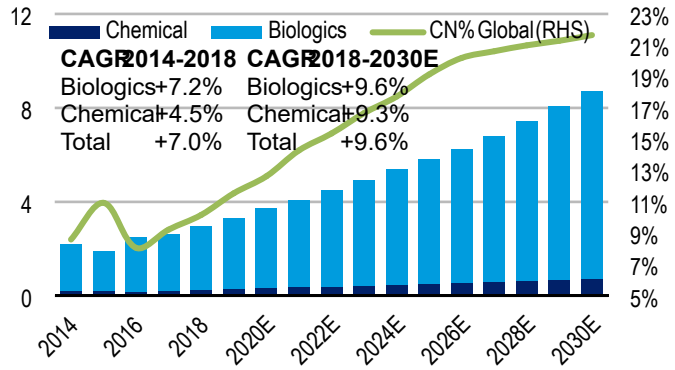
SCCHN with limited treatment option

The cancers that occur in head and neck, including the mouth, nose, throat, larynx, sinuses, and salivary glands are all head and neck cancers, which are mostly (>90%) classified as SCCHN. Patients with late-stage and relapse SCCHN, representing 76% of all actively treated patients (according Data monitor Healthcare's epidemiology forecast 2016-36), need treatment with efficacy.

The head and neck cancer therapeutics market of China and the world witnessed a +12.5% and +7.0% 4-year CAGR during 2014-18, respectively, according

to Frost & Sullivan. The biologics version is estimated to have a higher increasing rate (+20% 12-year CAGR 2018-30) compared with chemical versions.

Exhibit 31: Global Head and Neck Cancer Therapeutics Market Size (2014-2030E) (USD Bn)
China to attribute 20% of global head and neck market by 2030



Source: Frost & Sullivan Report

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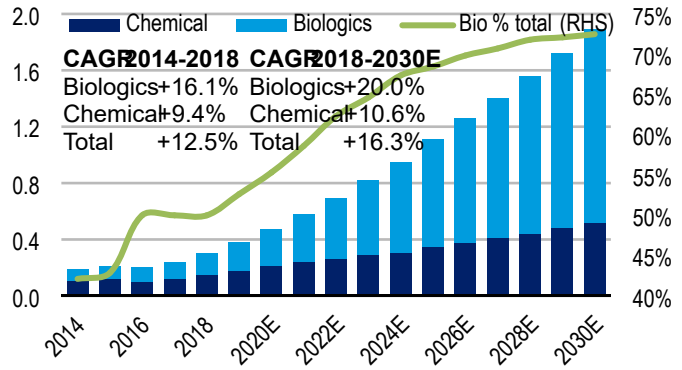
Exhibit 32: China Head and Neck Cancer Therapeutics Market Size (2014-2030E) (USD Bn)
Biologics therapeutics increase much faster than chemical drug



Source: Frost & Sullivan Report

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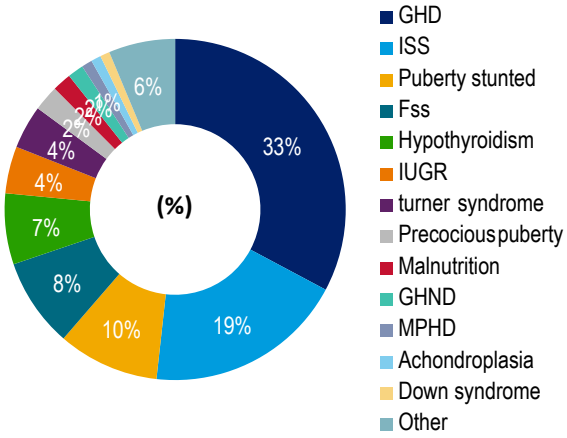
GHD - opportunities behind low penetration

Growth Hormone Deficiency (GHD) is a condition caused by insufficient amounts of growth hormones in the body. The growth hormone plays an important role in increasing height during childhood, raising calcium retention levels, and strengthening and improving bone mineralization. GHD can lead to short stature in children and other physical ailments in both children (pediatric GHD/ PGHD) and adults (adult GHD/ AGHD).

Recombinant human growth hormone (RhGH) has a huge potential space in China's domestic market due to the low drug penetration rate. About 33% of the short stature in China is caused by GHD. According to Chinese Medical Association (CMA), the number of short-stature children in China is nearly 40mn in 2019, among which 7mn children aged 4-15 need treatment. However, the number of patients treated each year is <300,000.

Exhibit 33: Causes of short stature
GHD causes about 33% of short stature



Source: chyxx,

Abb: ISS: idiopathic short stature, Fss: Familial short stature, IUGR: Intrauterine growth retardation, GHND: Growth hormone neurosecretion disorders, MPHD: Multiple pituitary hormone deficiency

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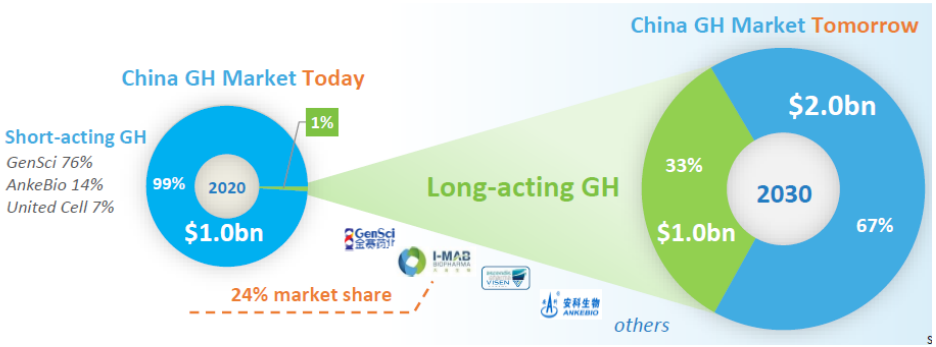
Long-acting rhGH met the demand to improve patient compliance. Dosing regimen puts a substantial burden on pediatric patients and their families since the injections of rhGH now need drug preparation and needle injection every day, which is painful and inconvenient, leading to poor patient compliance and reducing the efficacy of the treatment. We see a substantial medical need for long-acting growth hormone therapies that are effective with low injection frequency.

Exhibit 34: Structure of China GH market 2020 and 2030E
Long-acting GH to contribute 33% of the market in 2030



Source: Frost & Sullivan

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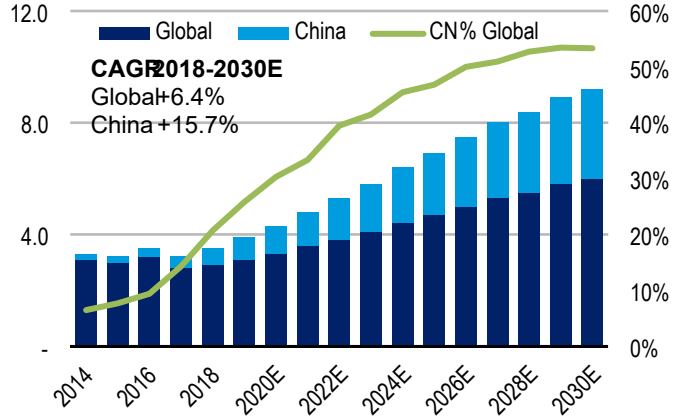
Due to the low treatment penetration and unmet demand, the PGHD therapeutics market in China will enjoy a much higher grow rate than global. According to Frost & Sullivan, China market will increase to USD3.2bn in 2030 from USD0.6bn in 2018, with a 12-year CAGR of 15.7%.

Exhibit 35: Global and CN PGHD Therapeutics Mkt. Size (2014-2030E)
China to reach ~40% of the global market in 2022



Source: Frost & Sullivan Report

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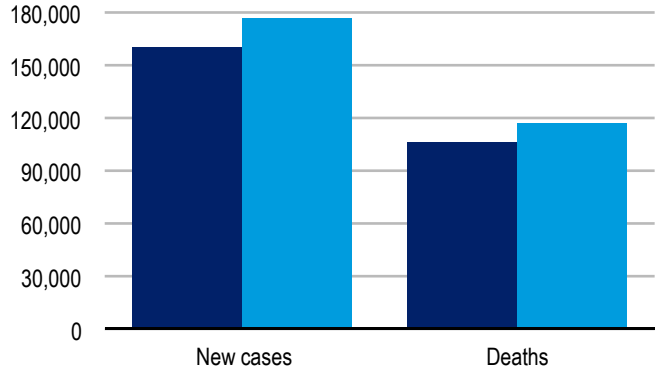
MM - unmet clinical demand

Multiple Myeloma (MM) is the second most frequent hematological disease worldwide. According to the statistics of GLOBOCAN, MM accounted for 0.9% of all new cancer cases and 1.2% of all cancer deaths in 2020. Also, the new cases of global MM registered a higher 2-year CAGR (+5.0%) than cancer (+3.3%) during 2018-20.

Exhibit 36: New cases and deaths of MM in 2018 and 2020E global
159,985 new cases of global MM in 2020E



Source: GLOBOCAN

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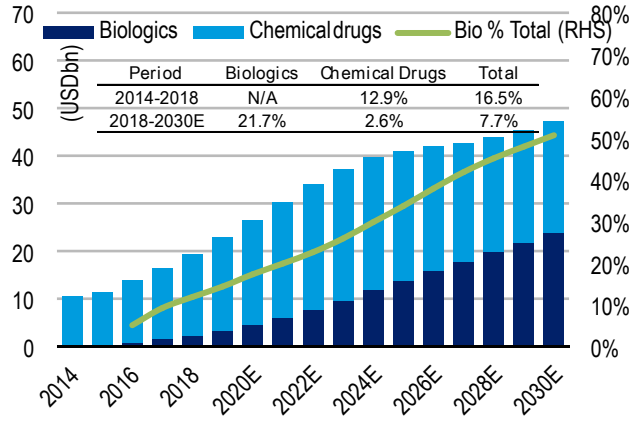
A safer and convenient-to-use drug is needed for MM. Currently, the primary treatment regimens are cytoreductive chemotherapies, in combination with stem cell transplants, if necessary. The treatment plan of specific patient is based on a lots of factors. Also, there is still no effective treatment for relapsed/refractory MM.

The market size of global MM therapeutics is expected to register a 12-year CAGR of +7.7% over 2018-30, according to Frost & Sullivan.

Exhibit 37: Global MM Therapeutics Market Size (2014-2030E)

Exhibit 38: China MM Therapeutics Market Size (2014-2030E)

Biologics to contribute one-half of the market in 2023



Source: Frost & Sullivan Report

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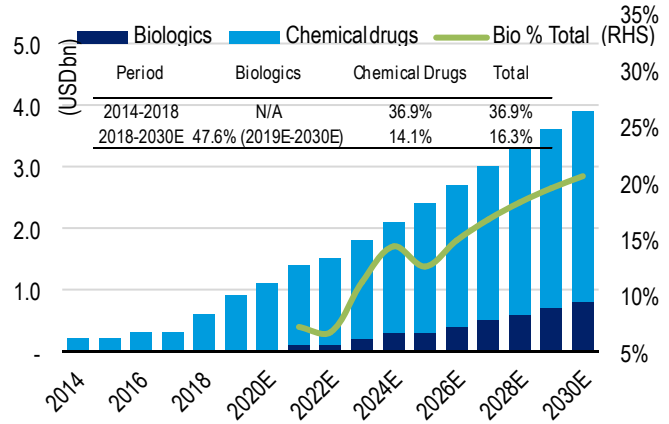
Biologics of MM therapeutics market to increase fast (+47.6% 12-year CAGR)



Source: Frost & Sullivan Report

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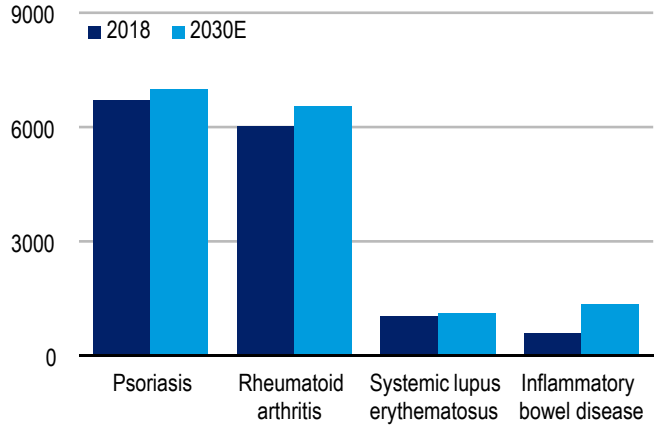
Autoimmune disease - a promising market

The autoimmune disease population for China is large too. In 2018, Systemic Lupus Erythematosus (SLE), Ulcerative Colitis and RA (Rheumatoid Arthritis) had approximately 1.0mn, 0.4mn and 5.9mn patients in China, respectively. The estimated prevalence of SLE is approximately 1.08mn by 2023, implying a CAGR of 0.8%.

Exhibit 39: Thousand prevalence of autoimmune disease in 2018 and 2030E China

Exhibit 40: Thousand prevalence of autoimmune disease in 2018 and 2030E Global

RA patients in China are projected to reach 6.5mn in 2030



Source: Frost & Sullivan Report

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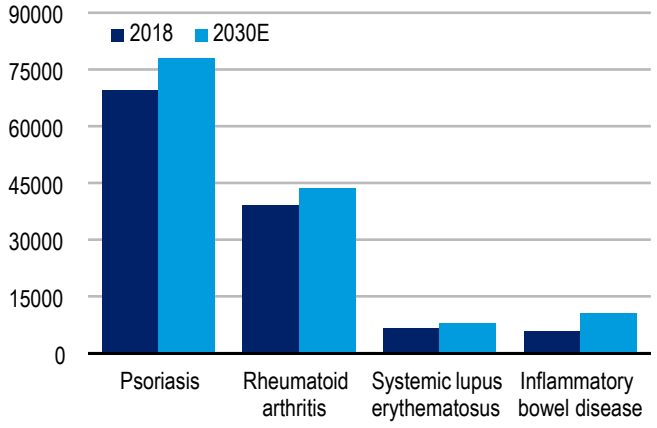
Global RA patients are projected to reach 43.6mn in 2030



Source: Frost & Sullivan Report

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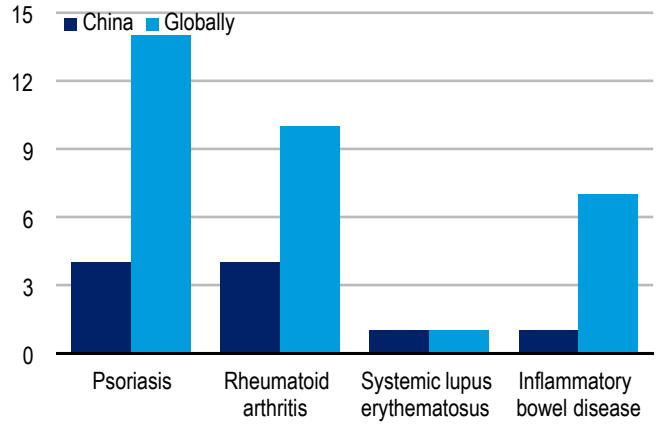
Effective autoimmune diseases therapy in need

Although the population of autoimmune diseases is large, the treatment options for patients are limited. Many innovative biologics approved to treat autoimmune diseases in the US and the EU are not yet available in China.

Exhibit 41: Number of approved original biologics in China and globally

Exhibit 42: Biologics for autoimmune diseases launched in China

China's number of approved original biologics is far below global



Source: Frost & Sullivan Report (as of 2019 Aug)

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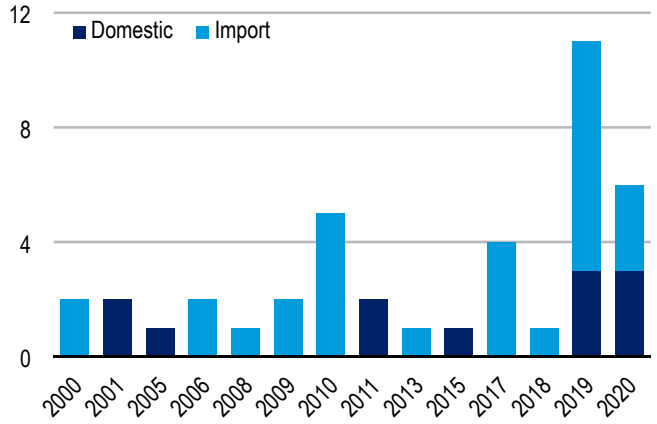
2019 is a peak of biologics launching of autoimmune diseases



Source: PharmCube, BofA Global Research

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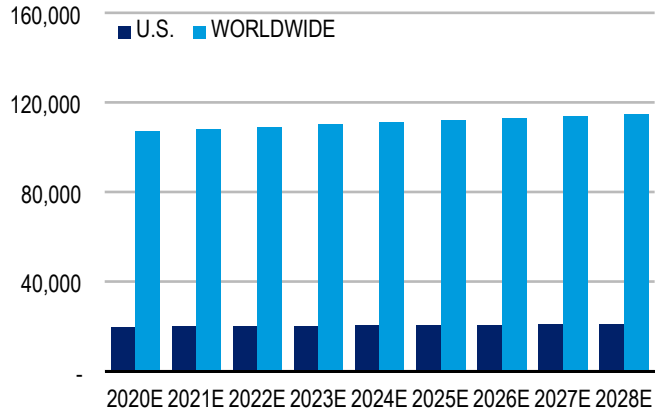
AML therapy market increasing with aging population and high relapse rates

Acute Myeloid Leukemia (AML) is the most common acute leukemia in adults. This heterogeneous hematologic malignancy is characterized by the clonal expansion of myeloid blasts in the peripheral blood, bone marrow and/or other tissues. The rising incidence rate is mainly due to the aging population and the fact that AML can be linked to chemotherapy for other cancers. The median age of AML diagnosis is 67, with approximately one-third are diagnosed >75-year old (NCCN 2019).

Exhibit 43: Projected AML incidence 2020E-2028E (new cases)

Incidence in countries except the US is expected to increase faster



Source: Clarivate Analytics Incidence and Prevalence Database

Note: Projections account for the increase in population size over time

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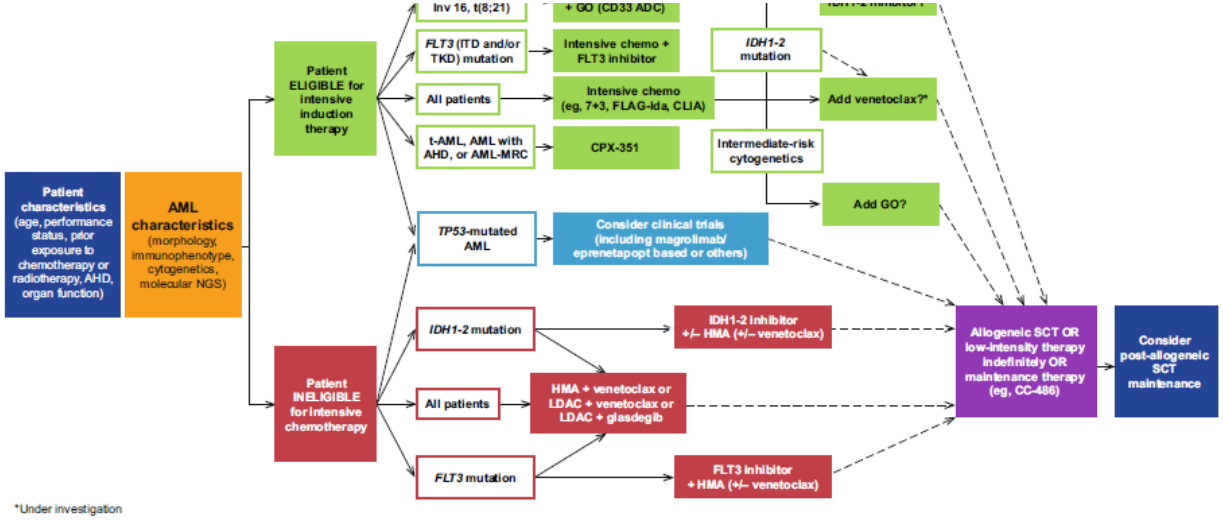
Driven by an increase in incident cases of AML, as well as the approval and uptake of premium-priced products, the market of AML is growing rapidly. 21,450 new patients and 10,920 deaths was diagnosed with AML in 2019 in US alone (data from MD Anderson Cancer Center). Global Data estimates the sales for AML in the seven major markets will increase by almost three-fold from USD342mn in 2014 to USD932mn in 2024, a CAGR of 10.5%.

Unmet clinical demand for elderly patients

The major part of AML patients - elderly patients - still has lots pain points in the treatments, including low complete response rate (CRR), low overall survival (OS) and intolerance of standard treatment.

Exhibit 44: Diagnostic and treatment paradigm of newly diagnosed AML

The treatment is complex with different situations



Source: Blood Cancer (2020)

7 + 3, 7 days of standard-dose cytarabine plus 3 days of anthracycline; ADC antibody-drug conjugate; AHD antecedent hematologic disorder; AML acute myeloid leukemia; AML-MRC AML with myelodysplasia-related changes; CBF core binding factor; CLIA cladribine-idarubicin-Ara-C; CPX-351 liposomal formulation of a fixed combination of daunorubicin and cytarabine; GO gemtuzumab ozogamicin; FLAG-Ida fludarabine-Ara-C-filgrastim plus idarubicin; FLT3 FMS-like tyrosine kinase; HMA hypomethylating agent; IDH isocitrate dehydrogenase; LDAC low-dose cytarabine; NGS next-generation sequencing; SCT stem cell transplantation; t-AML therapy-related AML.

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Novel therapies of RA driven by the unreached remission

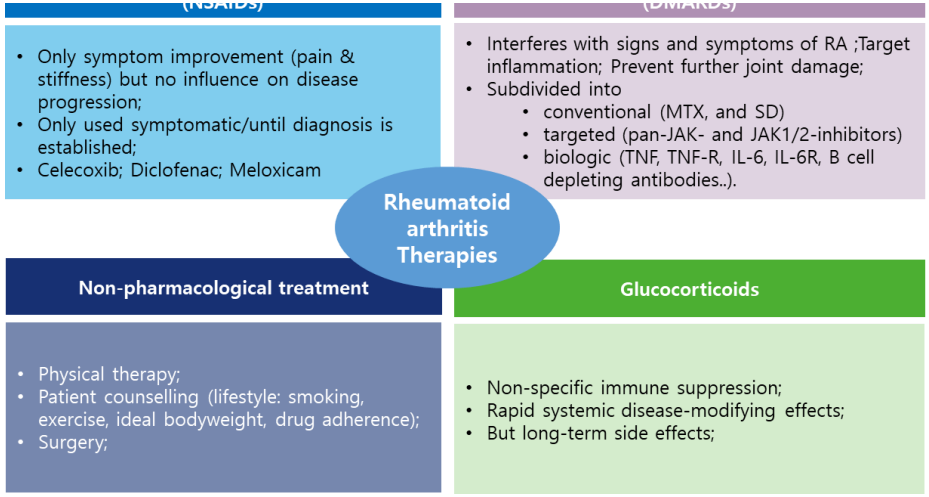
Rheumatoid arthritis (RA) is an autoimmune disease that involves multiple joints bilaterally, which is characterized by an inflammation of the tendon (tenosynovitis), resulting in both cartilage destruction and bone erosion.

RA is one of the most prevalent chronic inflammatory diseases. The prevalence ranging from 0.3% to 1.3% of the population depending on both sex (women are affected 2-3 times more often than men) and age (frequency of new RA diagnoses peaks in the age of 60s). According to clinical data, the prevalence of RA in China is about 0.3%, and there are about 4mn RA patients, lots of whom are young people aged 15-30. Among them, about 1mn patients have varying degrees of disability, and 150,000-200,000 patients are severely disabled.

Goals for RA treatment are (1) eliminating signs and symptoms (such as joint pain, swelling, and stiffness); (2) preventing joint damage or its progression; and (3) maximizing physical function and quality of life.

Exhibit 45: Overview over the available treatment for RA patients
Traditional therapies generally use slow-acting anti-rheumatic drugs

Non-steroidal anti-inflammatory drugs (NSAIDs)	Disease-modifying anti-rheumatic drugs (DMARDs)



Source: Cells (2020)

Abb.: TNF: tumor necrosis factor. MTX: methotrexate, HCQ: hydrochloroquine, SD: sulfadiazine,

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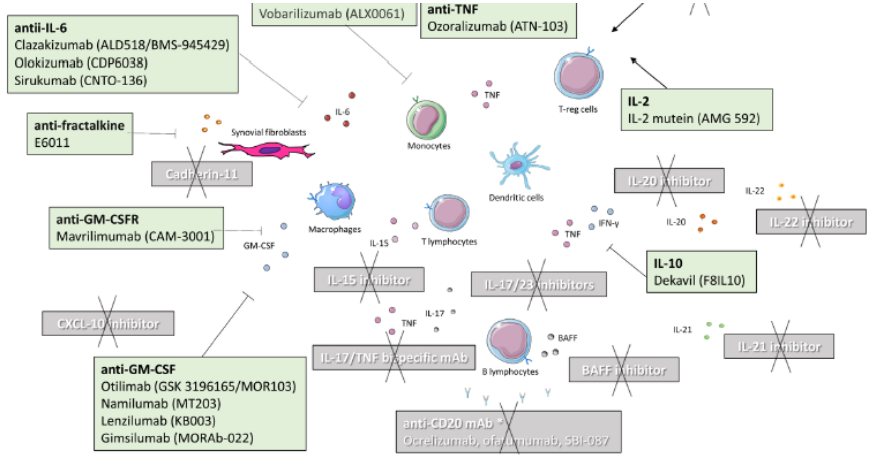
Despite some progression in the rational therapies, they are associated with considerable side-effects and high financial costs. Traditional therapies generally use slow-acting anti-rheumatic drugs for treatment; the recurrence rate is high, the safety is limited, and the remission effect is not obvious. Researchers have therefore turned to biological therapies.

Exhibit 46: Potential biological therapies for the management of rheumatoid arthritis

Black text shows therapies that were effective, although some of the drugs are not further evaluated. White text shows therapies that failed to prove efficacy or whose clinical trials were terminated owing to safety concerns.



Source: F1000Reserach (2019)

Black text shows therapies that were effective in the treatment of rheumatoid arthritis, although some of the drugs are not further evaluated in rheumatoid arthritis owing to company prioritization. White text shows therapies that failed to prove efficacy or whose clinical trials were terminated owing to safety concerns. *However, anti-CD20 monoclonal antibody such as rituximab is effective and licensed for the treatment of rheumatoid arthritis. BAFF, B-cell activating factor; CXCL, C-X-C motif ligand; GM-CSF, granulocyte-macrophage colonystimulating factor; GM-CSFR, granulocyte-macrophage colony-stimulating factor receptor; IL, interleukin; mAb, monoclonal antibody; TNF tumor necrosis factor; Treg, T regulatory

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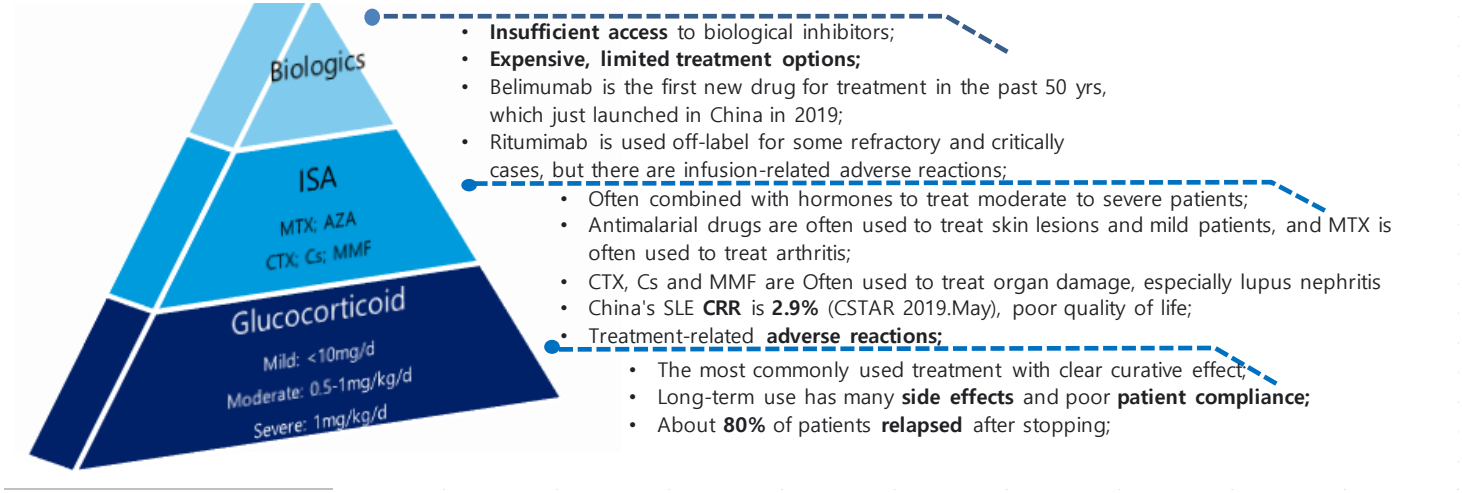
Challenges for SLE therapy, low IRR and side effects

Systemic Lupus Erythematosus (SLE) is the most common type of lupus. As a chronic, multi-system and incurable autoimmune disease in which the immune system attacks its own tissues, SLE can potentially lead to serious organ damage, systemic complications and even death.

Since SLE is a chronic disease, patients with mild SLE are often managed by non-steroidal anti-inflammatory drugs, which aim to manage symptoms and reduce the frequency of disease flares. Patients who are more severe may need corticosteroids or immunosuppressants, which can cause severe drug-related side-effects and a lack of disease-modifying effect. According to Chinese SLE Treatment and Research group (CSTAR), as of Sep.2020, more than 85.6% of SLE patients use hormones. The organ involvement is common, which affects the long-term survival. More effective therapies for SLE are in great clinical need.

Exhibit 47: The current situation faced by SLE patients
Access to biologics, which shows better efficiency, is limited



Source: CSTAR/CRDC., BofA global Research

Abbreviation: ISA: immunosuppressant; MTX: Methotrexate, AZA: Azathioprine, CTX: Cyclophosphamide, Cs: Cyclosporine, MMF: Mycophenolate mofetil

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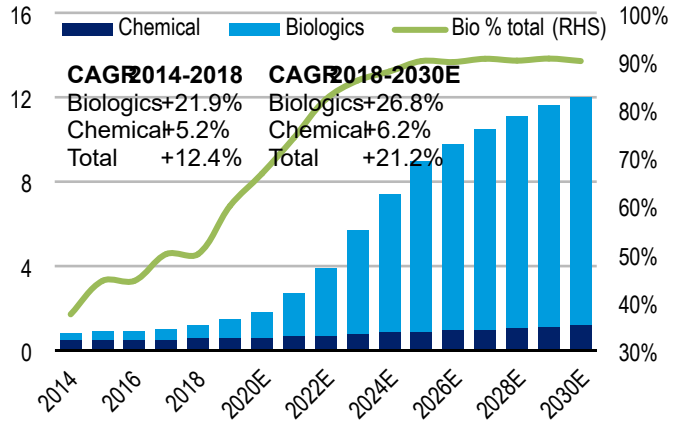
Giver their better performance (convenience of use and a lower IRR), biologics are more favorable treatment agent in the long-term clinical management of SLE. Frost & Sullivan estimates the global and China SLE biologics therapeutics market to reach USD10.8bn and USD1.8bn, a CAGR of 26.8% and 78.5% over 2018-30 and 2019-30, respectively.

Exhibit 48: Global SLE Therapeutics Market Size (2014-2030E)

Exhibit 49: China SLE Therapeutics Market Size (2014-2030E)

About 90% market will come from biologic in 2024E



Source: Frost & Sullivan Report

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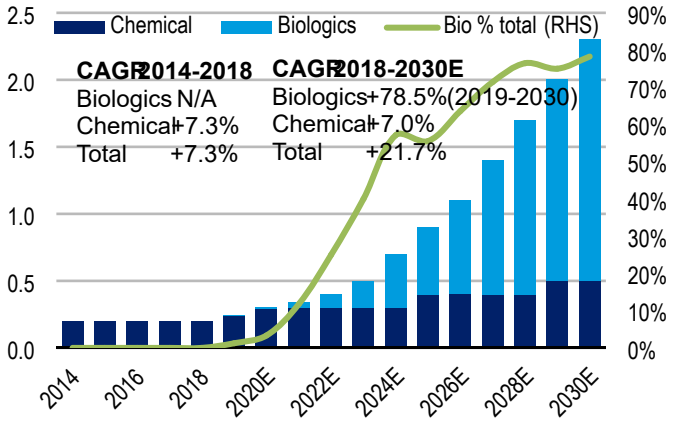
Biologics market to boost after 2020



Source: Frost & Sullivan Report

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UC - chronic disease with rapidly increasing incidence

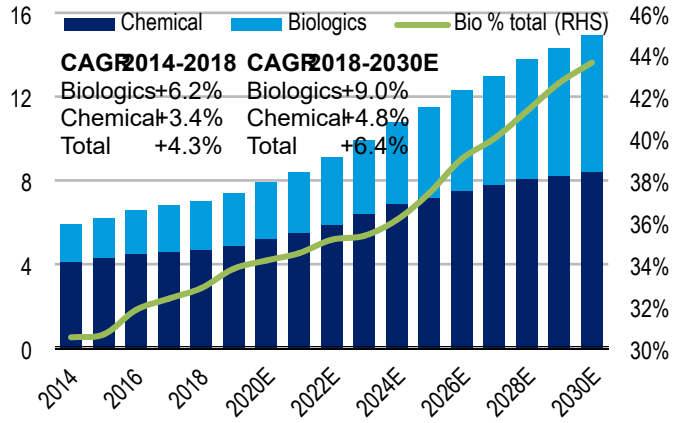
Ulcerative colitis (UC) is a chronic inflammatory bowel disease (IBD) that causes inflammation in and ulceration in the digestive tract. UC patients experience rectal bleeding, bloody diarrhea, abdominal cramps, and pain. No cure for UC now. Most of the approved biologics for UC are TNF-α inhibitors, which has natural side-effects and do not work in all patients. Not much treatment options for UC patients, especially moderate-to-severe ones.

The increasing incidence of UC has led to large unmet medical needs. UC affected approximately 370,100 patients in 2018. According to a Frost & Sullivan Report, the number is predicted to increase to nearly 543,700 cases in 2023, a CAGR of 8.0%.

Exhibit 50: Global UC Therapeutics Market Size (2014-2030E)

Exhibit 51: China UC Therapeutics Market Size (2014-2030E)

Solid growth at high-single digit



Source: Frost & Sullivan Report

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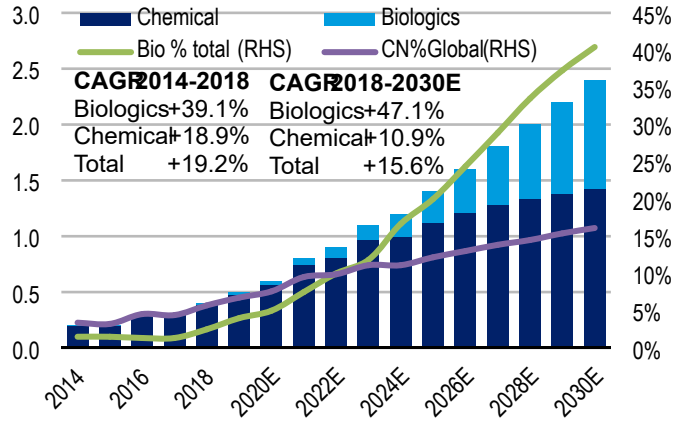
Large absolute number of patients in CN implies a large share (one-fourth in 2025)



Source: Frost & Sullivan Report

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Valuation

We use the discounted cash flow (DCF) methodology to assess the equity value of I-Mab given the company has no product sales currently and a majority of the company's value comes from its pipelines. We derive a PO of US$80.0, which represents a fair value approximately US$5.8bn based on DCF analysis, assuming 10.2% WACC and 3.0% terminal growth rate. We apply an 11-year horizon to arrive at a steady state.

Exhibit 52: DCF valuation
PO of US$80.0 implied by DCF model 2021-2031E

DCF model

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
- Operating cash flow	(314.2)	29.3	271.8	623.1	1,577.8	3,754.2	3,363.4	3,458.8	3,799.5	4,124.9	4,431.5
- Interest expense * (1-tax rate)	(0.2)	(0.4)	(0.6)	(0.8)	(1.0)	(1.2)	(1.4)	(1.6)	(1.8)	(2.0)	(2.2)
- Capex	(400.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)	(50.0)
Free cash flow	(714.4)	(21.1)	221.2	572.3	1,526.8	3,703.0	3,312.0	3,407.2	3,747.7	4,072.9	4,379.3

WACC Calculation

Equity/ total assets 88.8%

Debt/ total assets	11%
Risk free rate	4%
Market premium	7%
Beta	1.0
Cost of equity	11.0%
Cost of debts	5.0%
Tax shield (1- effective tax rate)	85.0%
WACC	**10.2%**
Terminal growth	3.0%

Free cash flow (Rmb m)	**(714.4)**	**(21.1)**	**221.2**	**572.3**	**1,526.8**	**3,703.0**	**3,312.0**	**3,407.2**	**3,747.7**	**4,072.9**	**4,379.3**
Discount factor	0.93	0.84	0.76	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.35
discounted cash flow (Rmb m)	(664.0)	(17.8)	169.2	397.0	960.6	2,113.2	1,714.4	1,599.8	1,596.1	1,573.4	1,534.5
Total discounted cahs flow (Rmb m)	10,976.3										
Remaining value (Rmb m)	21,809.5										
Deduct: bank loans (Rmb m)	0.0										
Add: cash and cash equivalent (Rmb m)	4,758.8										
Equity value (Rmb m)	37,544.6										
Equity value (USD m)	**5,776.1**										
Total shares m	72.2										
Price Objective (USD)	**80.00**										
Upside potential	38.0%										
Current stock price (USD)	58.07										

Source: BofA Global Research

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Exhibit 53: Valuation contribution by assets (%)
Peak sales are risk-adjusted (for TJc4, peak sales only refer to China market)

Assets	Valuation contribution by assets (%)	NPV (US$m)	Peak sales*
TJ202 (Felzartamab, CD38)	14.5%	5,456.0	1,291.6
TJ107 (Efineptakin Alfa, IL-7)	3.2%	1,198.4	360.3
TJ101 (Eftansomatropin)	18.5%	6,963.5	2,007.0
TJ301 (Olamkicept, IL-6)	1.2%	450.0	121.5
TJM2 (Plonmarlimab, GM-CSF)	7.5%	2,797.7	556.8

TJC4 (Lemzoparlimab, CD47)	17.5%	6,560.4	836.2
TJD5 (Uliledlimab, CD73)	24.9%	9,359.8	4,159.3
Net cash	12.7%	4,758.8	-
Total	100.0%	37,544.6	9,332.7

Source: BofA Global Research

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Exhibit 54: Key modeling assumptions
7 key drugs under 3 treatment areas in our model

	Drug candidate	Indication	Launch year	Peak market share	Launch annual price	POS	Risk adjusted peak sales (Rmb m)
Oncology	Felzartamab TJ202 - differentiated CD38 antibody	Multiple Myeloma/ Systemic Lupus Erythematosus	2022/2024	30%/6%	Rmb350k/ Rmb50K	80%/60%	1,291.6
	Efineptakin Alfa TJ107 - Long-acting Recombinant Human IL-7	GBM	2024	15%	Rmb200K	60%	360.3
	TJC4 - CD47 Antibody for Immuno-Oncology	Acute myeloid leukemia/ Myelodysplastic syndrome*	2025	30%/15%	Rmb200k/Rmb150k	50%	836.2
	TJD5 - CD73 antibody	NSCLC/ Breast cancer	2026	10%	Rmb150k-Rmb500k	40%	4,159.3
Hormone deficiency	Eftansomatropin TJ101 - Long-Acting Growth Hormone	Pediatric growth hormone deficiency	2024	13%	Rmb40k	60%	2,007.0
Autoimmune	Olamkicept TJ301 - Soluble gp130 IL-6 inhibitor	Ulcerative Colitis	2023	10%	Rmb50k	10%	121.5
	TJM2 - A GM-CSF Monoclonal Antibody	Rheumatoid Arthritis / CRS	2026/2022	26%/20%	Rmb100k/Rmb50k	40%/80%	556.8

Source: BofA Global research; * for TJC4, we only refer to its China market

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Exhibit 55: Biotech companies listed in HK
Market cap comparison

Ticker	Company	Market cap/Acquisition value (US$ bn)	Revenue 2022 (US$ mn)	Revenue 2023 (US$ mn)	Revenue growth 2022 (%)	Revenue growth 2023 (%)	Therapeutic areas
IMAB US	I-MAB	4.0	211	278	198%	132%	Oncology: breast cancer, urothelial cancer; autoimmune disease; cardio-renal disease; infectious disease
BGNE US	Beigene	28.2	1,330	2,174	81%	63%	Oncology: immuno-oncology, many cancer types
1877 HK	Junshi	10.4	734	784	-4%	2%	Oncology: immuno-oncology, many cancer types; autoimmune disease; cardiovascular disease; osteoporosis; migraine
1801 HK	Innovent	14.1	1,036	1,222	32%	18%	Oncology: immuno-oncology, many cancer types; autoimmune disease; ophthalmology; metabolic disease
ZLAB US	Zai Lab	14.4	434	790	128%	82%	Oncology: immuno-oncology, many cancer types; infectious disease
9966 HK	Alphamab	1.3	28	76	1093%	168%	Oncology: immuno-oncology, breast cancer; autoimmune disease
2552 HK	Hua Medicine	0.5	129	287	N/A	123%	Diabetes
6855 HK	Ascentage	1.0	45	317	425%	604%	Oncology: liquid tumors, lung cancer; HBV
1672 HK	Ascletis	0.4	46	N/A	19%	N/A	HCV, HBV
	Immunomedics*	21.0	N/A	N/A	N/A	N/A	Oncology: breast cancer, lung cancer, urothelial cancer

Source: BofA Global research, Bloomberg for non- covered companies, *-not listed

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Brief summary of key assumptions

We expect I-Mab to start to book revenue from drug sales from 2022 when its TJM2 and TJ202 get launched in the US and China, respectively. Its revenue from drug sales would reach RMB1.1bn and RMB2.0bn in 2023 and 2024, representing 32.1% and 81.2% YoY increase, respectively. Considering the revenue from licensing and cooperation, its total revenue could reach to RMB1.4bn/ RMB1.8bn/ RMB2.7bn in 2022/ 2023 /2024. From 2023, I-Mab's net profit will turn from negative to positive again. Its attributable profit would hike to RMB541.2mn/RMB1488.0mn in 2024 /2025 in our model, representing 174.4%/ 174.9% YoY increase.

We also expect the company to keep its speed on R&D to further move its pipeline. Total R&D expenditures in the next four years would range from

RMB1.0bn to RMB1.5b. In terms of peak sales for its key drugs:

- TJD5 - CD73 antibody: we expect this drug candidate to launch in the US and China markets in 2026 with indication of NSCLC and breast cancer. Its risk-adjusted peak sales in China and the US would reach to RMB2.0bn and RMB2.1bn, respectively. The Probability of Success (POS) we assumed in our model is 40%. This candidate completed phase I clinical trial in the US. In China, it is in phase I stage.
- TJ101 - Long-Acting Growth Hormone: we expect this drug to launch in China in 2024 with indication of PGHD. Its risk-adjusted peak sales would be RMB2bn. The POS we assumed in our model is 60%. This candidate is now in phase III stage in China.
- TJC4 - CD47 Antibody for Immuno-Oncology: I-Mab and AbbVie entered into a global strategic partnership on this drug candidate. We projected I-Mab to receive cooperation revenue of RMB650mn/ RMB487.5mn/RMB650mn in 2021/22/23. For its future risk-adjusted peak sales in China, we expect it would be RMB836.2mn. The POS we assumed in our model is 50%. This candidate is now in phase I stage in China/the US.
- TJ202 - differentiated CD38 antibody: we expect this drug to launch in China in 2022 with indication of MM, followed by indication of SLE in 2024. Its risk-adjusted peak sales would be RMB1.3bn. The POS we assumed in our model is 80%/60% for myeloma /SLE. We view I-Man to submit its BLA in 2021.
- TJM2 - A GM-CSF Monoclonal Antibody: we expect this drug to launch in the US in 2022 with indication of CRS, followed by indication of Rheumatoid Arthritis (RA) in 2026. Its risk-adjusted peak sales would be RMB556.8mn. The POS we assumed in our model is 80%/40% for CRS /RA.

Financial analysis

Exhibit 56: Income Statement
Profit to turn positive again by 2023 2018-2023E

Income Statement (Rmb m)	2018	2019	2020	2021E	2022E	2023E
Revenue	53.8	30.0	1,542.7	692.0	1,370.9	1,805.1
- Licensing and collaboration revenue	53.8	30.0	1,542.7	692.0	531.6	696.3
- sales of drugs	0.0	0.0	0.0	0.0	839.3	1,108.8
Expenses						
- Cost of drugs sales	0.0	0.0	0.0	0.0	(251.8)	(332.6)
- R&D expense	(426.0)	(840.4)	(984.7)	(1,083.2)	(1,191.5)	(1,310.6)
- Administrative expenses	(66.4)	(654.6)	(402.4)	(442.6)	(486.9)	(535.6)
Income (loss) from operations	(438.6)	(1,465.0)	155.6	(833.8)	(559.3)	(373.8)
Interest income	4.6	30.6	24.2	22.6	21.6	22.0
Interest expense	(11.7)	(3.0)	(1.0)	(0.2)	(0.4)	(0.6)
Other expenses	(16.8)	(20.2)	412.9	454.2	499.6	549.6
Equity in loss of an affiliate	0.0	0.0	(108.6)	0.0	0.0	0.0
Fair value change of warrants	61.4	5.6	0.0	0.0	0.0	0.0

Fair value change of warrants	0.1	0.0	0.0	0.0	0.0	0.0
Income (loss) before income tax expense	**(401.1)**	**(1,452.0)**	**483.1**	**(357.3)**	**(38.5)**	**197.2**
Income tax expense	(1.7)	0.0	(12.2)	0.0	0.0	0.0
Net income attributable to I-Mab	**(402.8)**	**(1,452.0)**	**470.9**	**(357.3)**	**(38.5)**	**197.2**
Deemed dividend to series C-1 preferred shareholders	0.0	(5.3)	0.0	0.0	0.0	0.0
Deemed dividend to series B and C preferred shareholders	0.0	(27.8)	0.0	0.0	0.0	0.0
Net income attributable to ordinary shareholders	**(402.8)**	**(1,485.0)**	**470.9**	**(357.3)**	**(38.5)**	**197.2**

Source: BofA Global Research

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Exhibit 57: Balance sheet
Strong cash position in next three years

Balance sheet (Rmb m)	**2018**	**2019**	**2020**	**2021E**	**2022E**	**2023E**
Current Assets						
Cash and cash equivalents	1,588.3	1,137.5	4,758.8	4,048.0	4,030.6	4,255.7
Restricted cash	92.7	55.8	0.0	0.0	0.0	0.0
Accounts receivable	0.0	0.0	130.5	137.0	143.9	151.1
Contract assets	11.0	0.0	227.4	227.4	227.4	227.4
Short-term investments	0.0	32.0	31.5	33.1	34.8	36.5
Prepayments and other receivables	89.0	136.0	195.5	205.2	215.5	226.3
Other financial assets	256.0	0.0	0.0	0.0	0.0	0.0
Total current assets	**2,036.9**	**1,361.3**	**5,343.7**	**4,650.7**	**4,652.1**	**4,896.9**
Non Current assets						
PPE	27.7	30.1	25.3	424.0	452.8	480.2
Operating lease right-of-use assets	0.0	16.4	15.0	14.2	13.5	12.9
Intangible assets	148.8	148.8	120.4	120.4	120.4	120.4
Goodwill	162.6	162.6	162.6	162.6	162.6	162.6
Investment accounted for using the equity method	0.0	0.0	664.8	664.8	664.8	664.8
Other non-current assets	0.0	18.3	2.0	2.2	2.4	2.7
Total non Current assets	**339.1**	**376.3**	**990.1**	**1,388.3**	**1,416.6**	**1,443.6**
Current Liability						

Current Liability						
Short term borrowings	(80.0)	(50.0)	0.0	(5.0)	(10.0)	(15.0)
Accruals and other payables	(67.7)	(273.6)	(560.6)	(616.6)	(678.3)	(746.1)
Advance from customers	(14.2)	0.0	0.0	0.0	0.0	0.0
Operating lease liabilities	0.0	(6.8)	(8.1)	(8.9)	(9.8)	(10.7)
R&D funding received	(178.7)	0.0	0.0	0.0	0.0	0.0
Ordinary shares to be issued to Everest	0.0	(258.1)	0.0	0.0	0.0	0.0
Warrant liabilities	(5.6)	0.0	0.0	0.0	0.0	0.0
Deferred subsidy income	0.0	0.0	(7.5)	(7.9)	(8.3)	(8.7)
Total current Liability	**(346.2)**	**(588.5)**	**(576.1)**	**(638.4)**	**(706.3)**	**(780.5)**
Non current liability						
Convertible promissory notes	(67.0)	(68.2)	0.0	0.0	0.0	0.0
Put right liabilities	0.0	0.0	(116.0)	(116.0)	(116.0)	(116.0)
Operating lease liabilities	0.0	(7.5)	(5.5)	(5.8)	(6.1)	(6.4)
Deferred subsidy income	(2.5)	(3.9)	0.0	0.0	0.0	0.0
Other non-current liabilities	0.0	0.0	(9.0)	(9.0)	(9.0)	(9.0)
Total non current liability	**(69.5)**	**(79.6)**	**(130.5)**	**(130.8)**	**(131.1)**	**(131.4)**
Total liability	**(415.7)**	**(668.1)**	**(706.6)**	**(769.2)**	**(837.4)**	**(911.9)**
Shareholder's equity						
Series A convertible preferred shares	687.5	687.5	0.0	0.0	0.0	0.0
Series B convertible preferred shares	921.2	921.2	0.0	0.0	0.0	0.0
Series C convertible preferred shares	1,306.6	1,306.6	0.0	0.0	0.0	0.0
Series C-1 convertible preferred shares	0.0	188.8	0.0	0.0	0.0	0.0
Ordinary shares	0.0	0.0	0.1	0.1	0.1	0.1
Treasury stock	(0.0)	0.0	0.0	0.0	0.0	0.0
Additional paid-in capital	0.0	389.4	7,701.1	7,701.1	7,701.1	7,701.1
Accumulated other comprehensive income	59.4	70.1	(50.8)	(50.8)	(50.8)	(50.8)
Accumulated deficit	(1,014.5)	(2,494.2)	(2,023.3)	(2,380.5)	(2,419.1)	(2,221.9)
Total equity	**1,960.3**	**1,069.5**	**5,627.1**	**5,269.9**	**5,231.4**	**5,428.6**
Total liability and equity	**2,375.9**	**1,737.6**	**6,333.8**	**6,039.1**	**6,068.8**	**6,340.5**

Total liability and equity	2,375.9	1,737.6	6,333.8	6,039.1	6,068.8	6,340.5
Total assets	2,375.9	1,737.6	6,333.8	6,039.1	6,068.8	6,340.5

Source: BofA Global Research

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Exhibit 58: Cash flow statement
Cash flow estimate in next three years

Cash flow statement (Rmb m)	**2018**	**2019**	**2020**	**2021E**	**2022E**	**2023E**
Cash flow from operating activity						
Net loss	(402.8)	(1,452.0)	470.9	(357.3)	(38.5)	197.2
Adjustments to reconcile net loss to net cash used in operating activities						
Depreciation of PPE	6.7	9.8	6.0	1.3	21.2	22.6
Loss on disposal of PPE	0.0	0.0				
Interest expenses of convertible promissory notes and onshore convertible loans	7.0	0.0				
Fair value change of warrants	(61.4)	(5.6)				
Fair value change of other financial assets	0.0	(0.0)				
Income from other financial assets	(13.6)	0.0				
Share-based compensation	3.5	366.9				
Loss from conversion of 2017 Notes	18.4	0.0				
Loss from conversion of onshore convertible loans	8.5	0.0				
Loss from issuance of 2018 Notes	5.1	0.0				
Loss on termination agreement with Everest	-	23.0				
Amortization of right-of use assets and interest of lease liabilities	-	5.8	1.4	0.7	0.7	0.7
Fair value change of short-term investments	-	(0.7)				
Contract assets	(11.0)	11.0				
Account receivable	-76.276	-48.831	(130.5)	(6.5)	(6.9)	(7.2)
Prepayments and other receivables	(76.3)	(48.8)	(59.4)	(9.8)	(10.3)	(10.8)
Accruals and other payables	55.6	188.4	303.3	55.9	61.4	67.6
Contract liabilities	(15.8)	0.0				
Advance from customers	14.2	(14.2)				
Research and development funding received	178.7	53.1				
Deferred subsidy income	2.5	1.4	3.6	0.4	0.4	0.4
Lease liabilities	-	(6.2)	(0.7)	1.1	1.2	1.3
Net cash used in operating activities	(357.0)	(916.8)	594.7	(314.2)	29.3	271.8

Cash flows from investing activities						
Cash acquired from acquisition of a subsidiary	0.0	0.0				
Purchase of PPE	(14.4)	(12.2)	(300.0)	(400.0)	(50.0)	(50.0)
Proceeds from disposal of short-term investments	0.0	102.0				
Purchase of short-term investments	0.0	(134.0)	0.5	(1.6)	(1.7)	(1.7)
Cash paid for investments in other financial assets	(30.0)	0.0	0.0	0.0	0.0	0.0
Cash received from disposal of other finan2018cial assets	40.0	256.0				
Cash received on income from short-term investments	0.0	0.7				
Cash received on income from other financial assets	13.9	0.0				
Net cash (used in) generated from investing activities	**9.5**	**212.5**	**(299.5)**	**(401.6)**	**(51.7)**	**(51.7)**
Cash flows from financing activities						
Proceeds from issuance of shares	1,306.6	183.5	3,420.8	0.0	0.0	0.0
Proceeds from issuance of redeemable non-controlling interest	0.0	0.0				
Proceeds from issuance of convertible promissory notes	59.7	0.0	(68.2)	0.0	0.0	0.0
Proceeds from issuance of onshore convertible loans	0.0	0.0				
Proceeds from issuance of warrants	0.0	0.0				
Proceeds from exercise of warrants	132.3	0.0				
Proceeds from bank borrowings	80.0	50.0	20.0	20.0	20.0	20.0
Repayment of bank borrowings	(99.0)	(80.0)	(15.0)	(15.0)	(15.0)	(15.0)
Payment of initial public offering costs	0.0	(0.8)				
Net cash generated from financing activities	**1,479.7**	**152.7**	**3,357.6**	**5.0**	**5.0**	**5.0**
Effect of exchange rate changes on cash and cash equivalents	59.8	15.2	0.0	0.0	0.0	0.0
Net increase (decrease) in cash and cash equivalents and restricted cash	**1,191.9**	**(536.5)**	**3,652.7**	**(710.8)**	**(17.4)**	**225.1**
Cash, cash equivalents, and restricted cash, beginning of year	412.7	1,604.7	1,068.2	4,758.8	4,048.0	4,030.6
Cash, cash equivalents, and restricted cash, end of the year	**1,604.7**	**1,068.2**	**4,720.9**	**4,048.0**	**4,030.6**	**4,255.7**
Cash and cash equivalents end of the year	1,512.0	1,012.4	**4,720.9**	**4,048.0**	**4,030.6**	**4,255.7**

Source: BofA Global Research

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Exhibit 59: Risk-adjusted revenue by drug
Drugs portfolio in China 2022E-2031E

Drugs portfolio in China	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
Felzartamab TI202 (from										

Morphosys)-differentiated CD38 antibody										
- Multiple Myeloma										
Multiple myeloma cancer incidence (China)	20332.3	20738.9	21153.7	21576.8	22008.3	22448.5	22897.4	23355.4	23822.5	24298.9
2L&3L+ Treatment rate	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
2L&3L+ Treatment number of patients	10166.1	10369.5	10576.8	10788.4	11004.1	11224.2	11448.7	11677.7	11911.2	12149.5
Drugs Penetration rate	7.0%	15.0%	20.0%	25.0%	26.0%	27.0%	28.0%	29.0%	30.0%	30.0%
Patients number	711.6	1555.4	2115.4	2697.1	2861.1	3030.5	3205.6	3386.5	3573.4	3644.8
Annual cost per person (RMB)	350000.0	350000.0	350000.0	350000.0	350000.0	350000.0	350000.0	350000.0	350000.0	350000.0
Revenue (RMB m)	249.1	544.4	740.4	944.0	1001.4	1060.7	1122.0	1185.3	1250.7	1275.7
POS	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Risk-adjusted revenue (RMB m)	**199.3**	**435.5**	**592.3**	**755.2**	**801.1**	**848.6**	**897.6**	**948.2**	**1000.5**	**1020.6**
- Systemic Lupus Erythematosus										
Systemic Lupus Erythematosus incidence (China)			436968.0	445707.4	454621.5	463713.9	472988.2	482448.0	492096.9	501938.9
2L&3L+ Treatment rate			30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
2L&3L+ Treatment number of patients			131090.4	133712.2	136386.5	139114.2	141896.5	144734.4	147629.1	150581.7
Drugs Penetration rate			3%	6%	6%	6%	6%	6%	6%	6%
Patients number			3932.7	8022.7	8183.2	8346.9	8513.8	8684.1	8857.7	9034.9
Annual cost per person (RMB)			50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0
Revenue (RMB m)			196.64	401.14	409.16	417.34	425.69	434.20	442.89	451.74
POS			60%	60%	60%	60%	60%	60%	60%	60%
Risk-adjusted revenue (RMB m)			**118.0**	**240.7**	**245.5**	**250.4**	**255.4**	**260.5**	**265.7**	**271.0**
Total TJ202			**710.3**	**995.9**	**1046.6**	**1099.0**	**1153.0**	**1208.8**	**1266.3**	**1291.6**
Efineptakin Alfa TJ107 (from Genexin e) - Long-										

acting Recombinant Human IL-7								
- Glioblastoma/ GBM								
Brain cancer incidence (China)	132885.0	137046.9	141292.6	145622.4	150037.8	150037.8	150037.8	150037.8
Incidence rate (%)	92.5%	95.2%	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%
WHO Class IV/GBM rate (%)	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%
WHO Class IV/GBM incidence	20890.3	22190.9	23564.8	24286.9	25023.3	25023.3	25023.3	25023.3
Treatment rate (%)	80%	80%	80%	80%	80%	80%	80%	80%
# GBM Pts treated	16712	17753	18852	19430	20019	20019	20019	20019
Market share (%)	5%	8%	10%	13%	15%	15%	15%	15%
# patients on drug	835.6	1420.2	1885.2	2525.8	3002.8	3002.8	3002.8	3002.8
Annual cost per person (RMB)	200000	200000	200000	200000	200000	200000	200000	200000
Revenue (RMB m)	167.1	284.0	377.0	505.2	600.6	600.6	600.6	600.6
POS	60%	60%	60%	60%	60%	60%	60%	60%
Risk-adjusted revenue (RMB m)	**100.3**	**170.4**	**226.2**	**303.1**	**360.3**	**360.3**	**360.3**	**360.3**
Eftansomatropin TJ101 (from Genexine) - Long-Acting Growth Hormone								
- PGHD								
PGHD patients (China)	5600000.0	5712000.0	5826240.0	5942764.8	6061620.1	6182852.5	6306509.5	6432639.7
% Patients that accept hormone treatment	10%	10%	10%	10%	10%	10%	10%	10%
Number of patients that accept hormone treatment	560000.0	571200.0	582624.0	594276.5	606162.0	618285.2	630651.0	643264.0
Drugs Penetration rate	6%	8%	0.1	12%	13%	13%	13%	13%
Patients number	33600.0	45696.0	58262.4	71313.2	78801.1	80377.1	81984.6	83624.3
Annual cost per person (RMB)	40000.0	40000.0	40000.0	40000.0	40000.0	40000.0	40000.0	40000.0
Revenue (RMB m)	1344.0	1827.8	2330.5	2852.5	3152.0	3215.1	3279.4	3345.0
POS	60%	60%	60%	60%	60%	60%	60%	60%
Risk-adjusted revenue (RMB m)	**806.4**	**1096.7**	**1398.3**	**1711.5**	**1891.2**	**1929.0**	**1967.6**	**2007.0**

Olamkicept TJ301 (from Ferring) - Soluble gp130 IL-6 inhibitor									
- Ulcerative Colitis									
Ulcerative colitis prevalence (China)	543485.9	586700.0	633350.2	681484.8	734640.6	791942.6	853714.1	920303.8	992087.5
Moderate severity %	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Severe severity %	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Total patient pool	19022.0	20534.5	22167.3	23852.0	25712.4	27718.0	29880.0	32210.6	34723.1
Drug market share (%)	5%	10%	10%	10%	10%	10%	10%	10%	10%
# patients on drug	951.1	2053.5	2216.7	2385.2	2571.2	2771.8	2988.0	3221.1	3472.3
Annual cost per person (RMB)	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0
Revenue (RMB m)	47.6	102.7	110.8	119.3	128.6	138.6	149.4	161.1	173.6
POS	70%	70%	70%	70%	70%	70%	70%	70%	70%
Risk-adjusted revenue (RMB m)	**33.3**	**71.9**	**77.6**	**83.5**	**90.0**	**97.0**	**104.6**	**112.7**	**121.5**

Source: BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 60: Risk-adjusted revenue by drug
Global drugs portfolio 2022E-2031E

Global drugs portfolio	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**	**2030E**	**2031E**
TJM2 - A GM-CSF Monoclonal Antibody										
- Rheumatoid Arthritis (US market)										
RA prevalence in US					1569802.2	1601198.2	1633222.2	1665886.6	1699204.4	1733188.5
Patients need drug treatment %					10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
# total RA patients applicable for drug treatment					156980.2	160119.8	163322.2	166588.7	169920.4	173318.8
Proportion of severity: moderate to severe					30%	30%	30%	30%	30%	30%

Drug treatment penetration rate for RA					47094.1	48035.9	48996.7	49976.6	50976.1	51995.7
Drug market share (%)					15%	18%	20%	22%	24%	26%
# patients on drug					7064.1	8646.5	9799.3	10994.9	12234.3	13518.9
Annual cost per person (RMB)					100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Revenue (RMB m)					706.4	864.6	979.9	1099.5	1223.4	1351.9
POS					40%	40%	40%	40%	40%	40%
Risk-adjusted revenue (RMB m)					**282.6**	**345.9**	**392.0**	**439.8**	**489.4**	**540.8**
- CRS (US market)										
Covid-19 infected population in US	8000000.0	4000000.0	2000000.0	500000.0	300000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Patients need CRS treatment %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
# total Covid-19 patients applicable for CRS treatment	160000.0	80000.0	40000.0	10000.0	6000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Penetration rate	10%	20%	20%	20%	20%	20%	20%	20%	20%	20%
# patients on drug	16000.0	16000.0	8000.0	2000.0	1200.0	400.0	400.0	400.0	400.0	400.0
Cost per person (RMB)	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0
Revenue (RMB m)	800.0	800.0	400.0	100.0	60.0	20.0	20.0	20.0	20.0	20.0
POS	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Risk-adjusted revenue (RMB m)	**640.0**	**640.0**	**320.0**	**80.0**	**48.0**	**16.0**	**16.0**	**16.0**	**16.0**	**16.0**
Total TJM2	**640.0**	**640.0**	**320.0**	**80.0**	**330.6**	**361.9**	**408.0**	**455.8**	**505.4**	**556.8**
TJC4 - CD47 Antibody for Immuno-Oncology										
Collaboration revenue from partner (US) (Rmb m)	**487.5**	**650**	**650**	**1170**	**1462.5**	**390**	**0**	**0**	**0**	**0**
- Acute myeloid leukemia (China)										
Multiple myeloma cancer incidence				45000.0	45900.0	46818.0	47754.4	48709.4	49683.6	50677.3

2L&3L+ Treatment rate				40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
2L&3L+ Treatment number of patients				18000.0	18360.0	18727.2	19101.7	19483.8	19873.5	20270.9
Drugs Penetration rate				30%	30%	30%	30%	30%	30%	30%
Patients number				5400.0	5508.0	5618.2	5730.5	5845.1	5962.0	6081.3
Cost per person (RMB)				200000.0	200000.0	200000.0	200000.0	200000.0	200000.0	200000.0
Revenue (RMB m)				1080.0	1101.6	1123.6	1146.1	1169.0	1192.4	1216.3
POS				50%	50%	50%	50%	50%	50%	50%
Risk-adjusted revenue (RMB m)				**540.0**	**550.8**	**561.8**	**573.1**	**584.5**	**596.2**	**608.1**
- Myelodysplastic syndrome (China)										
myelodysplastic syndrome incidence				60,000.0	61,200.0	62,424.0	63,672.5	64,945.9	66,244.8	67,569.7
2L&3L+ Treatment rate				30%	30%	30%	30%	30%	30%	30%
2L&3L+ Treatment number of patients				18,000.0	18,360.0	18,727.2	19,101.7	19,483.8	19,873.5	20,270.9
Drugs Penetration rate				15%	15%	15%	15%	15%	15%	15%
Patients number				2,700.0	2,754.0	2,809.1	2,865.3	2,922.6	2,981.0	3,040.6
Cost per person (RMB)				150,000.0	150,000.0	150,000.0	150,000.0	150,000.0	150,000.0	150,000.0
Revenue (RMB m)				405.0	413.1	421.4	429.8	438.4	447.2	456.1
POS				50%	50%	50%	50%	50%	50%	50%
Risk-adjusted revenue (RMB m)				**202.5**	**206.6**	**210.7**	**214.9**	**219.2**	**223.6**	**228.0**
Total TJC4				**742.5**	**757.4**	**772.5**	**787.9**	**803.7**	**819.8**	**836.2**
Global drugs portfolio	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**	**2030E**	**2031E**
TJD5 - CD73 antibody										
- NSCLC (China)										
NSCLC incidence					750000.0	765000.0	750001.0	765001.0	750002.0	765002.0
2L&3L+ Treatment rate					30%	30%	30%	30%	30%	30%
2L&3L+ Treatment number of patients					225,000.0	229,500.0	225,000.3	229,500.3	225,000.6	229,500.6
Drugs Penetration rate					5%	6%	7%	8%	9%	10%
Patients number					11,250.0	13,770.0	15,750.0	18,360.0	20,250.1	22,950.1
Cost per person (RMB)					150,000.0	150,000.0	150,000.0	150,000.0	150,000.0	150,000.0
Revenue (RMB m)					1,687.5	2,065.5	2,362.5	2,754.0	3,037.5	3,442.5
POS					40%	40%	40%	40%	40%	40%

Risk-adjusted revenue (RMB m)	**675.0**	**826.2**	**945.0**	**1,101.6**	**1,215.0**	**1,377.0**
- NSCLC (US)						
NSCLC incidence	250,000.0	255,000.0	260,100.0	265,302.0	270,608.0	276,020.2
2L&3L+ Treatment rate	30%	30%	30%	30%	30%	30%
2L&3L+ Treatment number of patients	75,000.0	76,500.0	78,030.0	79,590.6	81,182.4	82,806.1
Drugs Penetration rate	5%	6%	7%	8%	9%	10%
Patients number	3,750.0	4,590.0	5,462.1	6,367.2	7,306.4	8,280.6
Cost per person (RMB)	500,000.0	500,000.0	500,000.0	500,000.0	500,000.0	500,000.0
Revenue (RMB m)	1,875.0	2,295.0	2,731.1	3,183.6	3,653.2	4,140.3
POS	40%	40%	40%	40%	40%	40%
Risk-adjusted revenue (RMB m)	**750.0**	**918.0**	**1,092.4**	**1,273.4**	**1,461.3**	**1,656.1**
- Breast cancer (China)						
Breast cancer incidence	340,000.0	346,800.0	353,736.0	360,810.7	368,026.9	375,387.5
2L&3L+ Treatment rate	30%	30%	30%	30%	30%	30%
2L&3L+ Treatment number of patients	102000.0	104040.0	106120.8	108243.2	110408.1	112616.2
Drugs Penetration rate	5%	6%	7%	8%	9%	10%
Patients number	5100.0	6242.4	7428.5	8659.5	9936.7	11261.6
Cost per person (RMB)	150000.0	150000.0	150000.0	150000.0	150000.0	150000.0
Revenue (RMB m)	765.0	936.4	1114.3	1298.9	1490.5	1689.2
POS	40%	40%	40%	40%	40%	40%
Risk-adjusted revenue (RMB m)	**306.0**	**374.5**	**445.7**	**519.6**	**596.2**	**675.7**
- Breast cancer (US)						
Breast cancer incidence	113,333.3	115,600.0	117,912.0	120,270.2	122,675.6	125,129.2
2L&3L+ Treatment rate	30%	30%	30%	30%	30%	30%
2L&3L+ Treatment number of patients	34,000.0	34,680.0	35,373.6	36,081.1	36,802.7	37,538.7
Drugs Penetration rate	10%	10%	10%	10%	10%	10%
Patients number	3,400.0	3,468.0	3,537.4	3,608.1	3,680.3	3,753.9
Cost per person (RMB)	300,000.0	300,000.0	300,000.0	300,000.0	300,000.0	300,000.0
Revenue (RMB m)	1,020.0	1,040.4	1,061.2	1,082.4	1,104.1	1,126.2
POS	40%	40%	40%	40%	40%	40%
Risk-adjusted revenue	**408.0**	**416.2**	**424.5**	**433.0**	**441.6**	**450.5**

(RMB m)

Source: BofA Global Research

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iQprofile^{SM} I-MAB

Company Description

I-Mab has established a highly differentiated pipeline focusing on IO, from in-licensing and out-licensing strategy under partnerships with reputable players, including MorphoSys, Genexine, MacroGenics and Ferring. The company now has 13 key assets, including 5 in-licensed assets in China portfolio, and 8 assets with global rights. It is constructing an integrated platform from in-house innovative research, CMC, clinical development to commercialization.

Investment Rationale

I-Mab's key focus areas of immuno-oncology (IO) and autoimmune diseases have a large business opportunity. I-Mab's pipelines provide solutions to a variety of hematologic malignancies, solid tumors and autoimmune disease. According to Frost & Sullivan, the market size of IO therapies in China would see a 5-year CAGR of 61.8% during 2020-25. It also estimates China's autoimmune disease treatment market to register a 5-year CAGR of 38.1% during 2020-25.

Key Income Statement Data (Dec) (CNY Millions)	2019A	2020A	2021E	2022E	2023E
Sales	30	1,543	692	1,371	1,805
Gross Profit	30	1,543	692	1,119	1,472
Sell General & Admin Expense	(655)	(402)	(443)	(487)	(536)

Operating Profit	(1,465)	156	(834)	(559)	(374)
Net Interest & Other Income	13	436	477	521	571
Associates	0	(109)	0	0	0
Pretax Income	(1,452)	483	(357)	(39)	197
Tax (expense) / Benefit	0	(12)	0	0	0
Net Income (Adjusted)	(1,485)	471	(357)	(39)	197
Average Fully Diluted Shares Outstanding	7	72	72	72	72

Key Cash Flow Statement Data

Net Income	(1,452)	471	(357)	(39)	197
Depreciation & Amortization	10	6	1	21	23
Change in Working Capital	91	113	40	44	50
Deferred Taxation Charge	NA	NA	NA	NA	NA
Other Adjustments, Net	435	4	2	2	2
Cash Flow from Operations	(917)	595	(314)	29	272
Capital Expenditure	(12)	(300)	(400)	(50)	(50)
(Acquisition) / Disposal of Investments	224	0	(2)	(2)	(2)
Other Cash Inflow / (Outflow)	1	0	0	0	0
Cash Flow from Investing	212	(300)	(402)	(52)	(52)
Shares Issue / (Repurchase)	184	3,421	0	0	0
Cost of Dividends Paid	NA	NA	NA	NA	NA
Cash Flow from Financing	153	3,358	5	5	5
Free Cash Flow	(929)	295	(714)	(21)	222
Net Debt	(1,080)	(4,753)	(4,037)	(4,015)	(4,234)
Change in Net Debt	506	(3,648)	716	22	(220)

Key Balance Sheet Data

Property, Plant & Equipment	30	25	424	453	480
Other Non-Current Assets	346	965	964	964	963
Trade Receivables	0	130	137	144	151

Cash & Equivalents	1,137	4,759	4,048	4,031	4,256
Other Current Assets	224	454	466	478	490
Total Assets	1,738	6,334	6,039	6,069	6,340
Long-Term Debt	NA	NA	NA	NA	NA
Other Non-Current Liabilities	72	125	125	125	125
Short-Term Debt	50	0	5	10	15
Other Current Liabilities	538	576	633	696	766
Total Liabilities	668	707	769	837	912
Total Equity	1,069	5,627	5,270	5,231	5,429
Total Equity & Liabilities	1,738	6,334	6,039	6,069	6,340

*iQ*method SM - Bus Performance*

Return On Capital Employed	-78.0%	4.7%	-13.1%	-9.0%	-5.8%
Return On Equity	-98.0%	14.1%	-6.6%	-0.7%	3.7%
Operating Margin	-4,883.2%	10.1%	-120.5%	-40.8%	-20.7%
EBITDA Margin	-4,850.5%	10.5%	-120.3%	-39.3%	-19.5%

*iQ*method SM - Quality of Earnings*

Cash Realization Ratio	NM	1.3x	NM	NM	1.4x
Asset Replacement Ratio	1.2x	49.9x	NM	2.4x	2.2x
Tax Rate (Reported)	NM	2.5%	NM	NM	NM
Net Debt-to-Equity Ratio	-101.0%	-84.5%	-76.6%	-76.7%	-78.0%
Interest Cover	NM	NM	NM	NM	NM

Key Metrics

* Click for full definitions of *iQmethod*SM measures .

Price Objective Basis & Risk

I-MAB (IMAB)

We use the discounted cash flow (DCF) methodology to assess the equity value of I-Mab given the company has no product sales currently and a majority of the company's value comes from its pipelines. We derive a PO of US$80.0, which represents a fair value approximately US$5.8bn based on DCF analysis, assuming 10.2% WACC and 3.0% terminal growth rate. We apply an 11-year horizon to arrive at a steady state.
Downside risks: 1)delay or failure in pipeline drug development, 2) fiercer competition landscape, 3)price cut on innovative drugs.

Analyst Certification

I, David Li, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

Coverage Cluster

APR - Healthcare Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Asahi Intecc	AHICF	7747 JP	Ritsuo Watanabe
	Aurobindo Pharma	XLZFF	ARBP IN	Girish Bakhru, CFA
	AVITA	AVHHL	AVH AU	Lyanne Harrison
	AVITA	RCEL	RCEL US	Lyanne Harrison
	Burning Rock	BNR	BNR US	David Li
	Cadila Healthcare	XMQLF	CDH IN	Girish Bakhru, CFA
	Cansino Bio	CASBF	6185 HK	David Li
	Cipla	XCLAF	CIPLA IN	Girish Bakhru, CFA
	CSL Limited	CMXHF	CSL AU	Lvanne Harrison

Daiichi Sankyo	DSKYF	4568 JP	Tatsuyuki Arai
Divis Laboratories	XXQPF	DIVI IN	Girish Bakhru, CFA
Dr Reddy's Labs	DRYBF	DRRD IN	Girish Bakhru, CFA
Everest Medicine	XMLKF	1952 HK	David Li
Fisher & Paykel Healthcare	FSPKF	FPH NZ	Lyanne Harrison
Frontage	FGHQF	1521 HK	David Li
Gland Pharma	XGLPF	GLAND IN	Girish Bakhru, CFA
Glenmark Pharmaceuticals	GMKPF	GNP IN	Girish Bakhru, CFA
Hansoh	HNSPF	3692 HK	David Li
HBM Holdings	XHIHF	2142 HK	David Li
Hengrui Medicine	XMOKF	600276 CH	David Li
I-MAB	IMAB	IMAB US	David Li
Innovent	IVBXF	1801 HK	David Li
JCR Pharm.	JCRRF	4552 JP	Tatsuyuki Arai
Jinyu Bio-Tech	XMTDF	600201 CH	Thomas Zhu, CFA
JMDC	XEQQF	4483 JP	Ritsuo Watanabe
Joinn Lab	XQTSF	6127 HK	David Li
Joinn Lab	XWSEF	603127 CH	David Li
Kyowa Kirin	KYKOF	4151 JP	Tatsuyuki Arai
Lupin	XEFSF	LPC IN	Girish Bakhru, CFA
Nippon Shinyaku	NPNKF	4516 JP	Tatsuyuki Arai
Olympus Corp.	OCPNF	7733 JP	Ritsuo Watanabe
Olympus Corp.	OCPNY	OCPNY US	Ritsuo Watanabe
Pharmaron	XLHTF	3759 HK	David Li
Pharmaron	XLYGF	300759 CH	David Li
Polynovo	CALZF	PNV AU	Lyanne Harrison

Polynovo	CALZF	PNV AU	Lyanne Harrison
Praram 9 Hospital	XPNHF	PR9 TB	Charti Phrawphraikul
Ramsay Health Care Limited	RMSYF	RHC AU	Lyanne Harrison
Samsung Biologics	XBIIF	207940 KS	Girish Bakhru, CFA
Shionogi	SGIOF	4507 JP	Tatsuyuki Arai
Sino Biopharm	SBMFF	1177 HK	David Li
SMS	SMSZF	2175 JP	Paul Dewberry
Sonic Healthcare Limited	SKHCF	SHL AU	Lyanne Harrison
Sosei	SOLTF	4565 JP	Tatsuyuki Arai
Takeda Pharm.	TKPHF	4502 JP	Tatsuyuki Arai
Takeda Pharm.	TAK	TAK US	Tatsuyuki Arai
TigerMed	XHTHF	300347 CH	Paul Dewberry
TigerMed	XZHTF	3347 HK	Paul Dewberry
Wuxi Apptec	WUXIF	2359 HK	David Li
Wuxi Apptec	XLUHF	603259 CH	David Li
WuXi Biologics	WXIBF	2269 HK	David Li
Zai Lab	ZLAB	ZLAB US	David Li
Zai Lab	XZAIF	9688 HK	David Li
Zhifei	XCHOF	300122 CH	David Li

NEUTRAL

Asymchem Laboratories	XALPF	002821 CH	Thomas Zhu, CFA
Bangkok Chain Hospital	BKKFF	BCH TB	Charti Phrawphraikul
Bangkok Dusit Medical Services	BDUFF	BDMS TB	Charti Phrawphraikul
Beigene	XBETF	6160 HK	David Li
Beigene	BGNE	BGNE US	David Li
Biocon	XLOFF	BIOS IN	Girish Bakhru, CFA
Bumrungrad Hospital	BHHHF	BH TB	Charti Phrawphraikul

Bumrungrad Hospital	BUHHF	BH TB	Charti Phrawphraikul
Celltrion Healthcare	XCOOF	091990 KS	Girish Bakhru, CFA
Cochlear Limited	CHEOF	COH AU	Lyanne Harrison
Eisai	ESALF	4523 JP	Tatsuyuki Arai
Eisai	ESALY	ESALY US	Tatsuyuki Arai
Healius Limited	PHCRF	HLS AU	Lyanne Harrison
Medley	XEQNF	4480 JP	Ritsuo Watanabe
Ono Pharm.	OPHLF	4528 JP	Tatsuyuki Arai
ResMed Inc	RSMDF	RMD AU	Lyanne Harrison
ResMed Inc.	RMD	RMD US	Lyanne Harrison
Santen Pharm.	SNPHF	4536 JP	Tatsuyuki Arai
Sysmex	SSMXF	6869 JP	Ritsuo Watanabe
Terumo	TRUMF	4543 JP	Ritsuo Watanabe
Torrent Pharma	TOPHF	TRP IN	Girish Bakhru, CFA

UNDERPERFORM

Ain Holdings	AINPF	9627 JP	Ritsuo Watanabe
Astellas Pharma	ALPMF	4503 JP	Tatsuyuki Arai
Celltrion	CONIF	068270 KS	Girish Bakhru, CFA
Chugai Pharm.	CHGCF	4519 JP	Tatsuyuki Arai
IHH Healthcare Berhad	IHHHF	IHH MK	Swati Chopra
IHH Healthcare Bhd	XFAHF	IHH SP	Swati Chopra
Kangji Medical	KMHLF	9997 HK	David Li
M3	MTHRF	2413 JP	Ritsuo Watanabe
Medipal Holdings	MEPDF	7459 JP	Ritsuo Watanabe
Nanosonics Limited	NNCSF	NAN AU	Lyanne Harrison
Otsuka HD	OTSKF	4578 JP	Tatsuyuki Arai

Sawai Group Holdings	XFQNF	4887 JP	Ritsuo Watanabe
Sun Pharma	XPUCF	SUNP IN	Girish Bakhru, CFA

Disclosures

Important Disclosures

Equity Investment Rating Distribution: Health Care Group (as of 31 Mar 2021)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	217	60.78%	Buy	147	67.74%
Hold	76	21.29%	Hold	42	55.26%
Sell	64	17.93%	Sell	24	37.50%

Equity Investment Rating Distribution: Global Group (as of 31 Mar 2021)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1909	58.54%	Buy	1218	63.80%
Hold	653	20.02%	Hold	395	60.49%
Sell	699	21.44%	Sell	356	50.93%

* Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
Buy	≥ 10%	≤ 70%

Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

* Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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