

MabVax Therapeutics (MBVX - \$1.74)

MSKCC's CAR-T Therapeutics Research Agreement Leveraging HuMab-5B1 Binding Motifs is Encouraging

Yesterday, MBVX announced a research agreement with the Memorial Sloan Kettering Cancer Center (MSKCC) for the development of potential CAR-T-cell therapeutics using antibody targeting sequences derived from MBVX's HuMab-5B1 and a second monoclonal antibody.

- Details.** The agreement with the MSKCC is to investigate the potential safety and efficacy of CAR-T-cell products that incorporate antibody targeting sequences derived from HuMab-5B1 and a second monoclonal antibody for possible treatment of pancreatic, small cell lung cancer (SCLC), and other CA19-9 expressing tumors. MBVX is responsible for funding the development. Under the agreement, the researchers at the MSKCC will construct various CAR-T configurations and assess their effects in xenograft models of pancreatic and SCLC. The objective of these CAR-T-cell *in vitro* and in animal model studies is advancing these products into IND enabling pre-clinical studies in the future. MBVX will be entitled to certain rights of the new CAR T-cell inventions, including an exclusive time-limited option to license MSKCC's new CAR-T-cell constructs developed during this collaboration. Dr. Michel Sadelain, who is the Director of Center for Cell Engineering and Gene Transfer and Gene Expression at the MSKCC will conduct the research.
- Implications.** We view yesterday's news positively given this could re-affirm the key value proposition of MBVX's core technology. Specifically, the selected monoclonal antibodies, as well as their target binding motifs, derived from positively responding cancer patients previously treated with a cancer vaccine could be a valuable cancer treatment. This is not only for monoclonal antibody, but also can be used in other treatment modalities. Although this collaboration is still in a very early stage, if successful, we believe the potential could be substantial as certain CAR-T therapies are already heading to clinical approval. In addition, we also view the information learned from the CAR-T preclinical studies could potentially provide greater insights and feedback to facilitate the development of MBVX's current monoclonal antibodies.
- Action.** We are reiterating our Buy rating and \$18 price target to reflect our view on highly encouraging developments of the broad HuMab-5B1-based platform. The valuation is based on peer comparable, probability adjusted DCF and sum-of-the-parts analyses.

Healthcare/Biotechnology

Ticker: **MBVX**
Rating: **Buy**
Price Target: **\$18.00**

Trading Data:

Last Price (5/31/2017)	\$1.74
52-Week High (9/9/2016)	\$6.05
52-Week Low (5/24/2017)	\$1.59
Market Cap. (MM)	\$15
Shares Out. (MM)	4.858

Earnings Estimates: (per share)

(Dec)	1Q	2Q	3Q	4Q	FY	P/E
FY-17E	-0.85A	-0.69	-0.70	-0.70	-2.91	NM
FY-16A	-0.15	-0.92	-0.86	-0.81	-3.64	NM
FY-15A	-6.25	-0.29	-0.20	-1.03	-13.44	NM
FY-14A	-	-	-	-	-9.51	NM

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Source: Laidlaw & Company estimates

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Anticipated milestones in 2017 and beyond

Product	Indication	Event	Timing	Importance
MVT-5873	Pancreatic adenocarcinoma (PDAC)	Report top-line results of the single agent Phase I /II study at the ASCO	June 3rd, '17	***
		Report interim results of the combination Phase I /II study	2H17	****
		Report results of the combination Phase I /II study	2H17	****
MVT-1075	Pancreatic adenocarcinoma (PDAC)	Potentially start Phase I study	June, '17	***
		Potentially report early Phase I data	2H17	***
HuMab-5B1 ADC	Pancreatic adenocarcinoma (PDAC)	Potentially start Phase I study	2018	***
MVT-2163	Pancreatic adenocarcinoma (PDAC)	Report Phase I study top-line results at SNMMI	June, 11 & 13, '17	****
		Potentially report early Phase I data	2H17	***
HuMab-Tn		Potentially report preclinical data	2H17	***
		Potential partnership for further development	2017	****
Sarcoma vaccine	Sarcoma	Potentially report Phase II study OS results	2017	***
Ovarian cancer vaccine	Ovarian cancer	Potentially report Phase II study OS results	1H17	***

**** / ***** Major catalyst event that could impact share price very significantly while *** event is more informative

Source: Laidlaw & Company estimates and company presentation.

Major risks

Clinical study failure could have a major impact on MBVX share value. Despite promising pre-clinical results of the company's lead products, HuMab-5B1 and HuMab-5B1-PET, it remains too early to predict the longer term safety and efficacy from the upcoming clinical studies. Given that clinical validation has not been established, it would be critical for these studies to demonstrate efficacy and a positive safety profile in order to increase the assets and shareholder value. Negative results of Phase I and future clinical studies could have a materially negative impact on the shareholder value; especially since the company has a very diverse-limited pipeline profile.

Yet-to-be-validated vaccinated patient derived monoclonal antibody (Mab) screening platform could remain uncertain. Although monoclonal antibodies have been established as a validated cancer treatment modality; currently there is no Mab derived from vaccinated patients that has been approved or is in a late clinical development stage to demonstrate efficacy. As such, clinical risks for monoclonal antibody based cancer therapy derived from successfully vaccinated patients are higher than similar products generated from other more proven development platforms.

Product may not be approved or reach anticipated sales. Although MBVX's current pipeline products have exhibited the potential to generate positive clinical outcomes from current and future trials; it remains too early to project whether any of these products would be approved by regulatory agencies. Even if the products were to enter the market, sales could be significantly below projections due to the specific product label under approval, physician consensus for prescribing the drug, changes of treatment paradigms, entrance of competitors, and the possible changes in pricing flexibility and payer reimbursement. A revenue outlook below expectations could also negatively affect MBVX shareholder value.

Additional financings could dilute shareholder value. Although the company currently has ~\$10MM (pro forma) cash after its recent financing, MBVX most likely would need more financial resources going forward if they want to expand and further develop their pipeline. Should the future operational expenses, especially from R&D, increase significantly, products not receive FDA approval, or product revenue not reach expectations; the company might need to issue new equity to raise additional cash. Under such a scenario, the share value of existing shareholders could be diluted.

Limited trading liquidity limits shareholder options. Given that MBVX shares only entered the public market recently; daily trading volume and name recognition are relatively modest. As such, shareholders wanting to increase or reduce their positions more substantially in a volatile stock market may face constraints.

Figure 1: Income Statement

MabVax Therapeutics – Income Statement												
(\$ '000)	2014	2015	2016	1Q17	2Q17E	3Q17E	4Q17E	2017E	2018E	2019E	2020E	2021E
Revenue												
Grants	304	1,267	148	0	0	-	-	0	1	1	0	0
Product revenue	10	0	0	0	0	-	-	0	0	0	1,500	3,383
Total revenues	314	1,267	148	0	0	0	0	0	1	1	1,500	3,383
Gross revenue											1,500	3,383
Research and development	3,503	9,597	7,801	2,818	2,959	3,018	3,200	11,996	14,275	16,987	20,554	24,049
General and administrative	5,204	9,795	9,010	2,274	2,069	2,111	2,132	8,586	9,444	10,294	11,118	11,896
Marketing and sales												
Total operating costs and expenses	8,707	19,392	16,811	5,092	5,029	5,129	5,331	20,581	23,719	27,281	31,672	35,945
Operating Incomes (losses)	(8,393)	(18,125)	(16,663)	(5,092)	(5,029)	(5,129)	(5,331)	(20,581)	(23,718)	(27,280)	(30,172)	(32,562)
Interest and other income (expense)	(0)	(0)	(997)	(263)	(250)	(340)	(270)	(1,123)	(1,123)	(1,123)	(1,123)	(1,123)
Change in fair value of warrant liability	475	20	0	0	0	-	-	0	0	0	0	0
Tax												
Net Income (Loss)	(7,918)	(18,105)	(17,660)	(5,355)	(5,279)	(5,469)	(5,601)	(21,704)	(24,841)	(28,403)	(31,295)	(33,684)
Deemed dividend on Series A-1 preferred-stock	(2,215)	(9,018)	0	0	0	-	-	0	0	0	0	0
Deemed dividend on Series A-1 warrant		(179)	0	0	0	-	-	0	0	0	0	0
Deemed dividend on Series B preferred stock		(8,656)	0	0	0	-	-	0	0	0	0	0
Accretion of preferred stock dividends	(445)	(93)	0	0	0	-	-	0	0	0	0	0
Net loss allocable to common stockholders	(10,578)	(36,051)	(17,660)	(5,355)	(5,279)	(5,469)	(5,601)	(21,704)	(24,841)	(28,403)	(31,295)	(33,684)
Basic and diluted net loss per share	(\$9.51)	(\$13.44)	(\$3.64)	(\$0.85)	(\$0.69)	(\$0.70)	(\$0.70)	(\$2.91)	(\$2.38)	(\$2.11)	(\$2.02)	(\$1.93)
Shares used to calculate the basic and diluted net loss per share	1,112	2,682	4,858	6,302	7,644	7,844	8,044	7,459	10,459	13,459	15,459	17,459
Margin Analysis (% of Sales/Revenue)												
Costs of goods										15%	15%	15%
R&D	1115%	757%	5269%	NA	NA	NA	NA	NA	1427487%	1698709%	1370%	711%
SG&A	1657%	773%	6086%	NA	NA	NA	NA	NA	944429%	1029427%	741%	352%
Operating Income (loss)	-2671%	-1430%	-11255%	NA	NA	NA	NA	NA	-2371815%	-2728036%	-2011%	-962%
Pretax	-2520%	-1429%	-11928%	NA	NA	NA	NA	NA	-2484069%	-2840290%	-2086%	-996%
Tax Rate												
Net Income	-705%	-2845%	-11928%	NA	NA	NA	NA	NA	-2484069%	-2840290%	-2086%	-996%
Financial Indicator Growth Analysis (YoY%)												
Total Revenue	NA	303%	-88%	-100%	NA	NA	NA	-100%	NA	0%	149904%	126%
R&D	NA	174%	-19%	66%	85%	81%	13%	54%	19%	19%	21%	17%
SG&A	NA	88%	-8%	-14%	7%	-13%	6%	-5%	10%	9%	8%	7%
Operating Income (Losses)	NA	116%	-8%	21%	43%	25%	10%	24%	15%	15%	11%	8%
Pretax Income	NA	241%	-51%	22%	39%	26%	10%	23%	14%	14%	10%	8%
Net Income	NA	241%	-51%	22%	39%	26%	10%	23%	14%	14%	10%	8%
EPS	NA	41%	-73%	463%	-25%	-19%	-14%	-20%	-18%	-11%	-4%	-5%
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Source: Bloomberg LP; Company reports; Laidlaw & Company estimates.

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Rating and Price Target Change History

3 Year Rating Change History

Date	Rating	Closing Price (\$)
04/13/2...	Buy (B)	5.18

3 Year Price Change History

Date	Target Price (\$)	Closing Price, (\$)
04/13/2...	18.50**	5.18

** Split Adjusted



Source: Laidlaw & Company

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			Investment Banking	Brokerage
Strong Buy (SB)	Expected to significantly outperform the sector over 12 months.	0.00%	0.00%	0.00%
Buy (B)	Expected to outperform the sector average over 12 months.	63.64%	29.55%	2.27%
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Sell (S)	Returns expected to significantly underperform the sector average over 12 months.	0.00%	0.00%	0.00%

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