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AmpliPhi Biosciences Corp. (APHB-NYSE American)

APHB: Case Study on AB-PA01 Presented at ISHLT Annual Meeting…

Based on our probability adjusted DCF model that takes into account potential future revenues from the company's personalized phage therapies, AB-SA01, and AB-PA01, APHB is valued at $4.00/share. This model is highly dependent upon continued clinical and regulatory success and will be adjusted accordingly based upon future results.

Current Price (05/17/18)	$1.09
Valuation	**$4.00**

OUTLOOK

On May 15, 2018, AmpliPhi Biosciences Corp. (APHB) announced financial results for the first quarter of 2018 and provided a business update. The company is continuing to treat patients with lead development products AB-SA01 and AB-PA01 under an expanded access program. Previously announced results showed that six of the first seven patients treated achieved "treatment success", which was either complete resolution or significant improvement of baseline signs and symptoms.

The company is continuing to treat patients with a goal of meeting with the FDA in mid-2018 to map out a registration path forward and potentially initiate a Phase 2 or registrational clinical trial as early as the fourth quarter of 2018.

SUMMARY DATA

52-Week High	**$1.87**
52-Week Low	**$0.71**
One-Year Return (%)	**24.93**
Beta	**2.84**
Average Daily Volume (sh)	**146,801**
Shares Outstanding (mil)	**16**
Market Capitalization ($mil)	**$18**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**3**
Insider Ownership (%)	**2**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**N/A**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/A**
P/E using 2018 Estimate	**-1.4**
P/E using 2019 Estimate	**-1.5**

Risk Level	**High**
Type of Stock	**Small-Value**
Industry	**Med-Biomed/Gene**

ZACKS ESTIMATES

Revenue
(in millions of $)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2017	0.0 A	0.0 A	0.0 A	0.0 A	0.1 A
2018	0.0 A	0.0 E	0.0 E	0.0 E	0.0 E
2019					0.0 E
2020					0.0 E

Earnings per Share

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2017	-$1.94 A	-$1.21 A	-$0.09 A	-$0.24 A	-$2.01 A
2018	-$0.23 A	-$0.19 E	-$0.14 E	-$0.14 E	-$0.69 E
2019					-$0.63 E
2020					-$0.66 E

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Business Update

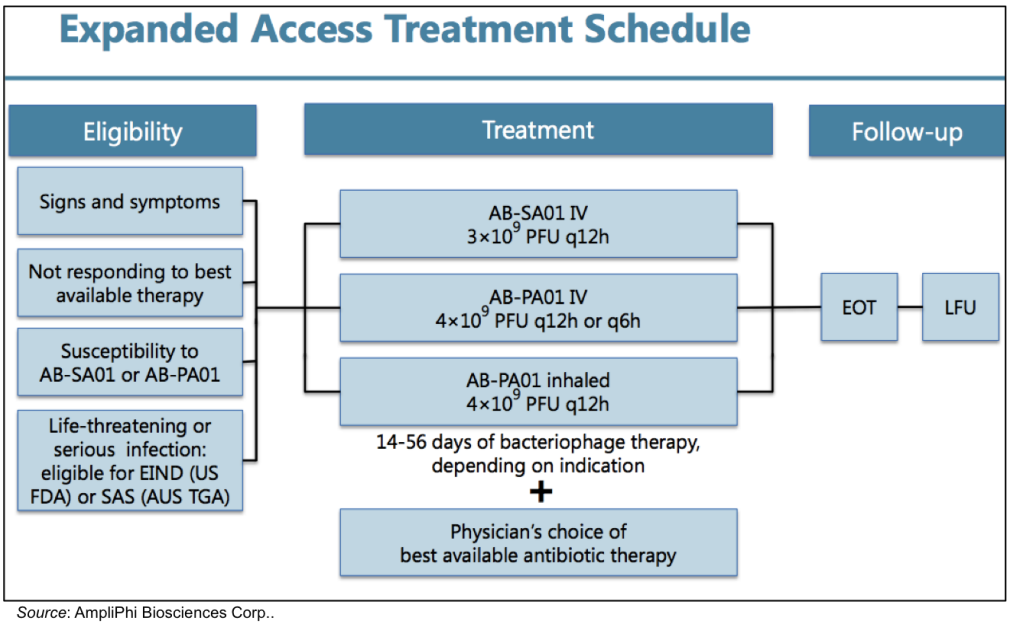
Presentation of Case Study Involving AB-PA01

On April 3, 2018, AmpliPhi Biosciences Corp. (APHB) announced a case study involving a lung transplant patient that was administered AB-PA01 as part of a treatment for a resistant *Pseudomonas aeruginosa* lung infection was presented at the International Society for Hearth and Lung Transplantation 38th Annual Meeting. The case involved a 67-year old male patient that received a double lung transplant and then developed a recurring multi-drug resistant *P. aeruginosa* pneumonia. The patient was treated with AB-PA01 as an adjunctive treatment to antibiotics. Following treatment, the patient's recurrent pneumonia stopped and commensal respiratory flora were re-established. This is an excellent example of the ability of bacteriophage therapy to treat recurrent infections while not having any long-term negative impact on the normal flora.

Positive Interim Results for Single-Patient Expanded Access Program

In January 2018, AmpliPhi announced positive interim results from the company's single-patient expanded access program. A total of seven patients with serious or life-threatening infections, which were not responding to antibiotic therapy, were treated with AB-SA01 (n=4) or AB-PA01 (n=3). Six out of the seven patients (86%) achieved "treatment success", which was defined as complete resolution or significant improvement of baseline signs and symptoms.

The company's strategy is to use single patient expanded access protocols (Emergency IND in the U.S. and Special Access Scheme in Australia) to derive real-world data using AB-SA01 and AB-PA01 in patients suffering from severe, multidrug-resistant (MDR) infections. The following schematic shows the treatment schedule for the expanded access protocol. In order for a patient to qualify, they would need to have a serious or life-threatening infection that was not responding to antibiotics and that was also susceptible to either AB-SA01 or AB-PA01. Testing to confirm susceptibility to AB-SA01 or AB-PA01 can be performed in approximately 48 hours.



Source: AmpliPhi Biosciences Corp..

The characteristics of the seven patients reported on thus far are in the following slide. The APACHE II (Acute Physiology And Chronic Health Evaluation II) score is designed to measure the severity of disease of patients admitted to the intensive care unit (Knaus *et al.*, 1985). The score (0-71) is calculated from the patient's age and 12 physiological measurements, with a higher score signifying more severe disease and a higher risk of death.

Patient Characteristic (ITT Population)	**Value** (N=7)
Age, years, mean (range)	52 (26-77)
Male / female	57% / 43%
Indications	Bacteremia Endocarditis (native valve) Endocarditis (prosthetic valve) Lung infection (cystic fibrosis) Lung infection (post-transplant) Ventilator-associated pneumonia
Bacterial pathogen *S. aureus* *P. aeruginosa*	 4 3
APACHE II score*, mean (range) <35 ≥35	23 (6-47) 4 patients 3 patients

Source: AmpliPhi Biosciences Corp..

Importantly, both AB-SA01 and AB-PA01 were safe and well-tolerated with no treatment-related serious adverse events (SAE). A total of 90 intravenous (IV) doses of AB-SA01 and a total of 402 IV and 92 inhaled doses of AB-PA01 were administered.

The following slide shows the clinical outcomes for the seven patients. Six of the seven were classified as "treatment success", meaning that they had a complete resolution or significant improvement of baseline signs and symptoms while one patient failed treatment. The patient who failed presented with septic shock and an APACHE II score of 47 at baseline (which equates to a predicted mortality risk of 97%). The patient was not responding to antibiotic treatment and following three days of bacteriophage therapy they died during surgery on day 3. The treating physician deemed the death as unrelated to bacteriophage treatment.

Clinical Outcome (Physician's Assessment) (ITT Population)	**Value** (N=7)
Treatment Success	6 (86%)
Improvement	0
Failure	1 (14%)*

Physician's Assessment:

- Treatment Success: complete resolution or significant improvement of baseline signs and symptoms.
- Improvement: clinically meaningful improvement of baseline signs and symptoms.
- Failure: no resolution of baseline signs and symptoms, or death.

Source: AmpliPhi Biosciences Corp..

The following slide shows that while there was one death during the first 28 days following treatment, there were no deaths reported in the Day 28-90 period, with some follow-ups still ongoing. We believe this is indicative of the bacteriophage treatment helping to eliminate the infection, and not just delay a negative outcome. The average APACHE II predicted mortality for the seven patients was 46% (with three patients predicted mortality >85%), thus having a mortality rate of only 14% in this group is very encouraging.

Mortality (ITT Population)	**Value** (N=7)
28-day all-cause mortality	1 (14%)*
90-day all-cause mortality	No mortality between Days 28 and 90 to-date, follow-up ongoing
Mortality predicted by APACHE II scores, mean**	46% 3 patients with predicted mortality >85%

Source: AmpliPhi Biosciences Corp..

Additional Preclinical Studies for AB-SA01

On May 3, 2018, AmpliPhi announced it will use the Therapeutics Development Services funding by the National Institute of Allergy and Infectious Disease (NIAID) to conduct additional preclinical studies of AB-SA01. This program funds the necessary *in vitro* and *in vivo* preclinical studies that are required for advancing promising anti-infective therapeutics and applications are accepted by invitation only.

Collaborations for Expanded Access Programs

On March 13, 2018, AmpliPhi announced a Cooperative Research and Development Agreement (CRADA) with the U.S. Department of Veterans Affairs (VA) Palo Alto Health Care System in regards to expanded access to AB-SA01 and AB-PA01. The Principal Investigator for the collaboration is Mark Holodniy, MD, Professor of Medicine at Stanford University and the VA Palo Alto Health Care System. The CRADA will support the administration of AB-SA01 and AB-PA01 in patients at the VA Palo Alto Health Care System who have serious or life-threatening infections, do not respond to antibiotics, and meet the criteria for treatment under the FDA's Expanded Access program.

On March 19, 2018, AmpliPhi announced a collaboration with the Western Sydney Local Health District and the Westmead Institute for Medical Research for the compassionate use of AB-SA01 and AB-PA01 in patients with severe infections. Several patients have been treated thus far at the Westmead Hospital under the single-patient expanded access program and this collaboration will allow for additional patients with serious or life-threatening infections to receive AB-SA01 and AB-PA01.

Financial Update

On May 15, 2018, AmpliPhi announced financial results for the first quarter of 2018. R&D expenses for the first quarter of 2018 and 2017 were $1.5 million, with an increase in clinical expenses in 2018 partially offset by a decrease in professional and consulting expenses. G&A expenses were $1.6 million for the first quarter of 2018 compared to $1.9 million for the first quarter of 2017. The decrease was primarily due to a decrease in legal and professional fees. Net loss for the first quarter of 2018 was $3.1 million, or $0.23 per share, compared to a net loss of $3.2 million, or $1.94 per share, in the first quarter of 2017.

As of March 31, 2018, the company had approximately $8.2 million in cash and cash equivalents. Cash burn during the first quarter of 2018 was $3.5 million. AmpliPhi has completed two public offerings thus far in 2018: In January 2018 the company sold 4.0 million shares of common stock at a price of $1.00 per share for gross proceeds of $4 million and in March 2018 the company sold 2.7 million shares of common stock at $1.10 per share for gross proceeds of $3.0 million. We anticipate the company has enough capital to fund operations into the fourth quarter of 2018. As of May 10, 2018, AmpliPhi had approximately 16.5 million shares of common stock outstanding and when factoring in in stock options and warrants a fully diluted share count of approximately 25.7 million.

Conclusion

We believe the data that AmpliPhi has compiled thus far from the expanded access program has been very encouraging. We continue to believe that the company will have compiled sufficient data by mid-2018 to approach the FDA about a registration pathway for AB-SA01 and AB-PA01 with a Phase 2 trial possibly starting in the fourth quarter of 2018. Our current valuation is $4.00 per share. However, we believe there is likely to be significant upside to our model once we learn more about what indications the company will be targeting later in 2018 for Phase 2 studies, at which time we may also get a better sense of timelines for approval.

PROJECTED FINANCIALS

AmpliPhi Bio	2017 A	Q1 A	Q2 E	Q3 E	Q4 E	2018 E	2019 E	2020 E
AB-PA01 (*P. aeruginosa*)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth								
AB-SA01 (*S. aureus*)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth								
Licensing & Royalties	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth	-	-	-	-	-	-	-	-
Total Revenues	**$0.1**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**
YOY Growth	-	-	-	-	-	-	-	-
Cost of Sales	$0	$0	$0	$0	$0	$0	$0	$0
Product Gross Margin	-	-	-	-	-	-	-	-
General & Administration	$7.6	$1.6	$1.5	$1.5	$1.6	$6.2	$7.0	$8.0
Research & Development	$2.9	$1.5	$1.2	$1.2	$1.2	$5.1	$5.5	$6.5
Other Operating Expenses	$5.8	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Operating Income	($16.2)	($3.0)	($2.7)	($2.7)	($2.8)	($11.3)	($12.5)	($14.5)
Operating Margin	-	-	-	-	-	-	-	-
Non-Operating Expenses (Net)	$2.0	($0.1)	$0.0	$0.0	$0.0	($0.1)	$0.0	$0.0
Pre-Tax Income	($14.1)	($3.1)	($2.7)	($2.7)	($2.8)	($11.3)	($12.5)	($14.5)
Income Taxes Paid	($1)	$0	$0	$0	$0	$0	$0	$0
Tax Rate	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Deemed Dividends	$0	$0	$0	$0	$0	$0	$0	$0
Net Income	($12.8)	($3.1)	($2.7)	($2.7)	($2.8)	($11.3)	($12.5)	($14.5)
Net Margin	-	-	-	-	-	-	-	-
Reported EPS	**($2.01)**	**($0.23)**	**($0.19)**	**($0.14)**	**($0.14)**	**($0.69)**	**($0.63)**	**($0.66)**
YOY Growth	*-92%*	-	-	-	-	*-66%*	*-9%*	*5%*
Basic Shares Outstanding	6.4	13.3	14.0	19.0	19.5	16.4	20.0	22.0

Source: Zacks Investment Research, Inc. *David Bautz, PhD*

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