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Dyadic International, Inc. (DYAI - NASDAQ)

New Alliance with Chinese CDMO

Based on our DCF model and a 15% discount rate, Dyadic International is valued at approximately $10.00 per share. We assume a 22.5% probability of ultimate success for C1, based on historical drug approval rates and number of projects in the pipeline. The model assumes revenue contributions from sources worldwide.

Current Price (3/31/2020)	$5.20
Valuation	**$10.00**

OUTLOOK

Dyadic has developed a gene expression system based on C1, its proprietary fungal expression system that can produce a variety of recombinant proteins. C1 is already commercial in industrial applications and is in development for use in the development and production of pharmaceutical grade proteins. C1 exhibits potential to economically produce biologic vaccines, virus like particles, antibodies, Fc-fusion, enzymes, AAVs and other biopharmaceuticals.

In 2015, the company sold its industrial business to DuPont for $75 million and retained the exclusive right to sublicense C1 for use in animal and human pharmaceutical applications. Proceeds from the DuPont sale provided cash for share repurchase and further development of the C1 platform for production of biologics. Additional R&D funding comes from partners. Dyadic is currently working with several biopharmaceutical companies and government organizations to validate the technology.

In the near term, we expect growing R&D revenue as additional partners are added. By 2020, we anticipate first sales-related revenues from C1, which represent licensing fees, upfront payments, milestones and royalties.

SUMMARY DATA

52-Week High	**8.00**
52-Week Low	**2.51**
One-Year Return (%)	**60**
Beta	**0.20**
Average Daily Volume (sh)	**274,883**
Shares Outstanding (mil)	**27.4**
Market Capitalization ($mil)	**142.3**
Short Interest Ratio (days)	**3.6**
Institutional Ownership (%)	**16.2**
Insider Ownership (%)	**45.5**
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 2019 Estimate	**N/A**
P/E using 2020 Estimate	**N/A**
Zacks Rank	**N/A**

Risk Level	**Above Average**
Type of Stock	**Small-Growth**
Industry	**Med-Biomed/Gene**

ZACKS ESTIMATES

Revenue

(In millions of USD)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2018	$0.2 A	$0.2 A	$0.3 A	$0.7 A	$1.3 A
2019	$0.4 A	$0.4 A	$0.5 A	$0.4 A	$1.7 A
2020					$2.2 E
2021					$3.0 E

Earnings per Share

	Q1	Q2	Q3	Q4	Year
2018	-$0.07 A	-$0.06 A	-$0.06 A	-$0.02 A	-$0.21 A
2019	-$0.08 A	-$0.10 A	-$0.06 A	-$0.06 A	-$0.31 A
2020					-$0.30 E
2021					-$0.31 E

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WHAT'S NEW

Full Year 2019 Financial & Operational Results

Dyadic International Inc. (NASDAQ: DYAI) released full year 2019 financial and operational results on March 30, 2020. Revenues were $1.7 million and represented research and development proceeds from partners working to develop C1. Total expenses were $11.0 million and net loss was ($8.3) million after adding interest income. On a per share basis, net loss was ($0.31). Total cash and investments were $34.2 million as of December 31, 2019, equivalent to ~$1.27 per share.

For 2019 and year to date Dyadic has produced a continuous series of new partnerships and collaborations. Since our brief update at the beginning of the year, Dyadic has entered into six additional relationships. Opportunities for infectious disease have emerged and the relationships have expanded with the Israeli Institute of Biological Research (IIBR) and Zoonoses Anticipation and Preparedness Initiative (ZAPI). Other work by partners to develop a treatment or vaccine against the coronavirus using C1 have also emerged. This includes efforts by a consortium of academics from Erasmus Medical Center, Utrecht University, University of Veterinary Medicine Hannover and Ufovax, a spin-off company from Scripps Research.

2019 revenues increased 30% to $1.7 million reflecting a greater number of research collaborations compared to the prior year. Total expenses in the twelve month period increased 23% to $11.0 million. Research and development[1] was up 25% equaling $5.4 million on the addition of new research projects partially offset by the completion of a research program with BDI. General and administrative expenses rose 22% to $5.5 million on account of increases in noncash share based comp expenses, options vesting upon NASDAQ uplisting, business development and IR costs, insurance costs and legal costs related to the uplisting offset by lower executive comp costs related to the company's former CFO. Net loss was ($8.3) million for the period, compared to ($5.7) million in 2018. On a per share basis, net loss was ($0.31) compared to ($0.21) in the prior year.

The company originally guided for cash burn of ($8) to ($10) million in 2019; however, based on our calculation of free cash flow, it was a less than expected ($5.8) million, due to contributions from additional research collaborations and tax incentives. Cash and equivalents were $34.2 million on December 31, 2019 down from $41.5 million at the end of 2018.

Animal Health

Dyadic announced another animal health partnership as part of its fourth quarter update. It now has relationships with three of the top four animal health companies. The most recent addition is a fully-funded feasibility study to develop two proteins. Animal health is particularly attractive to Dyadic as it could provide a faster route to commercialization and ultimate royalty and licensing revenues for the company. This brings the total to six collaborations in this space. As we have mentioned, cost pressures are acute in animal health and require efficiencies that can effectively address large populations of livestock and pets. This competitive framework requires a focus on cost and efficiency which favors the use of an efficient expression system such as C1.

The work with ZAPI is providing exposure of C1's capabilities not only to the European public-private partnership that serves to respond to new infectious disease threats, but also to the other partners contributing to the effort. This includes a broad collection of large pharmaceuticals such as AstraZeneca and Boehringer Ingelheim and the academic community in the veterinary and infectious disease spaces.

Research Collaborations

Since the beginning of 2020, Dyadic has entered into six new agreements to explore the use and potential of C1 to express proteins and other biological materials. There have also been two expansions of existing agreements with IIBR to create both a vaccine and antibody and ZAPI where two additional targets were added.

One of the new agreements announced pairs with WuXi Biologics. This company is a global contract development and manufacturing organization (CDMO) with a broad portfolio of services to the biologics industry including drug discovery, microbial expression and fermentation, cell culture derived products and other platforms to help sponsors and developers advance candidates through the research and development and ultimately commercialization

[1] Total R&D includes Cost of R&D Revenue, R&D and R&D Related Party amounts.

process. The deal that Dyadic entered into with WuXi is a non-exclusive research license. We see this as an important collaboration as it provides C1 services broadly for mass production. Many of the interested parties that have signed agreements with Dyadic do not have the facilities to produce commercial volumes of product and the availability of a CDMO with C1 as one of its offerings provides a clear pathway to commercialization for these sponsors.

Another new feasibility study announced is with Ufovax[2], which is a spin off from Scripps Research in La Jolla, California. Ufovax will employ C1 to produce a single-component self-assembling protein nanoparticle (1c-SApNP) for HIV and coronavirus. Another relationship made public is an arrangement with the University of Oslo to conduct a feasibility study to express an antigen presenting cell (APC) targeted influenza proteins. The results of the work may lead to further collaborations and expansion of the vaccines produced with C1. Also of interest is the consortium of academics that are working on a coronavirus vaccine. This collaboration was a product of relationships forged at ZAPI and has led to Dyadic partnering with three of the top 20 experts in the field to produce larger quantities of more potent recombinant vaccines and drugs at lower cost using C1.

Exhibit I – Summary of Dyadic Collaborations[3]

Collaborator	Deal	Ownership	Description	Date
WuXi Biologics	Nonexclusive research license	0.0%	Vaccine, drug, biologics	30-Mar-20
Animal Health Co.	Funded feasibility study	0.0%	Two proteins	30-Mar-20
Small Unidentified	Funded feasibility study	0.0%	No detail	30-Mar-20
EU Consortium	Feasibility Study	0.0%	Corona vaccine	17-Mar-20
Ufovax/Scripps Research	Feasibility Study	0.0%	HIV and Corona vaccine	17-Mar-20
University of Oslo	Feasibility Study	0.0%	Influenza antigens	17-Mar-20
Leading Animal Health Co.	Research funding, full	0.0%	3 Protein Types	28-Oct-19
Top Tier Pharma	Proof of Concept (PoC)	0.0%	3 Protein Classes	13-Aug-19
Microbial division	Fermentation evaluation		Microbial division	3Q:19
Affiliate	Evaluate & experiment with C1		C1 commercialization goal	4Q:19
Serum Institute of India	PoC, Royalty, Milestone	0.0%	8 antibodies & 4 vaccines	7-May-19
Alphazyme	Sublicense, Milestone, Royalties	7.5%	Molecular Enzymes	5-May-19
Luina Bio/Novovet	Sublicense, Milestone, Royalties	20.0%	Animal Health	26-Apr-19
Sanofi Aventis	PoC, Research funding	0.0%	Biologics & Vaccines	Sep-18
Mitsubishi Tanabe	PoC, Research funding	0.0%	Difficult to express proteins	Mar-18
Pharma 1	PoC, Research funding	0.0%	undisclosed proteins	Dec-18
Pharma 2	PoC, Research funding	0.0%	undisclosed protein	Feb-19
Pharma 3	PoC, Research funding	0.0%	undisclosed proteins	Apr-19
Pharma 4	PoC, Research funding	0.0%	Primary metabolite	Feb-18
Pharma 5	PoC, Research funding	0.0%	undisclosed protein	4Q:19
Israel Institute of Bio Research	Partner in-house research/Expanded	0.0%	Antigen,Enzyme,Corona&proteins	1Q:18
University of Iowa	Partner in-house research	0.0%	Undisclosed protein	2Q:19
Structural Genomics/Oxford	Partner in-house research	0.0%	Undisclosed proteins	3Q:18
Fraunhofer/Molecular Biotech	Partner in-house research	0.0%	Undisclosed vaccines	4Q:18
ZAPI	Research funding/Expanded	0.0%	Epidemic Vaccines	2015
VTT/Internal	CRO	0.0%	Metabolites/Nivolumab	2015
VLPbio	CRO	16.1%	Virus Like Particles	2017
BDI	CRO	16.1%	Certolizumab/AAV	2017

Dyadic continues to hold discussions with prospects and continues to sign non-disclosure agreements with them. We have seen an accelerating rate of partner additions and expansions of relationships as momentum builds. One of the longest and most important collaborations is with Sanofi where Dyadic was able to express all seven of the therapeutic and vaccine proteins that were identified in the project. More than 50% of the proteins were expressed

[2] UFO is short for "uncleaved prefusion-optimized" rather than what we initially hoped was a focus on the study of alien DNA. It refers to a process for efficiently producing envelope proteins.
[3] Source: Zacks Research and Dyadic corporate filings. Green highlight indicates animal health collaboration. Blue highlight indicates academic collaborator.

above target levels and now Dyadic is preparing the final presentation to Sanofi to determine next steps. This is expected to occur mid-year 2020. We are optimistic on the other research collaborations with large pharmaceutical companies as they allow potential acquirers of this technology to evaluate C1's potential and have a stake in its success. With numerous interested parties invested in developing the technology we anticipate that if a bidding war begins, substantial value will accrue to Dyadic shareholders.

Other Projects

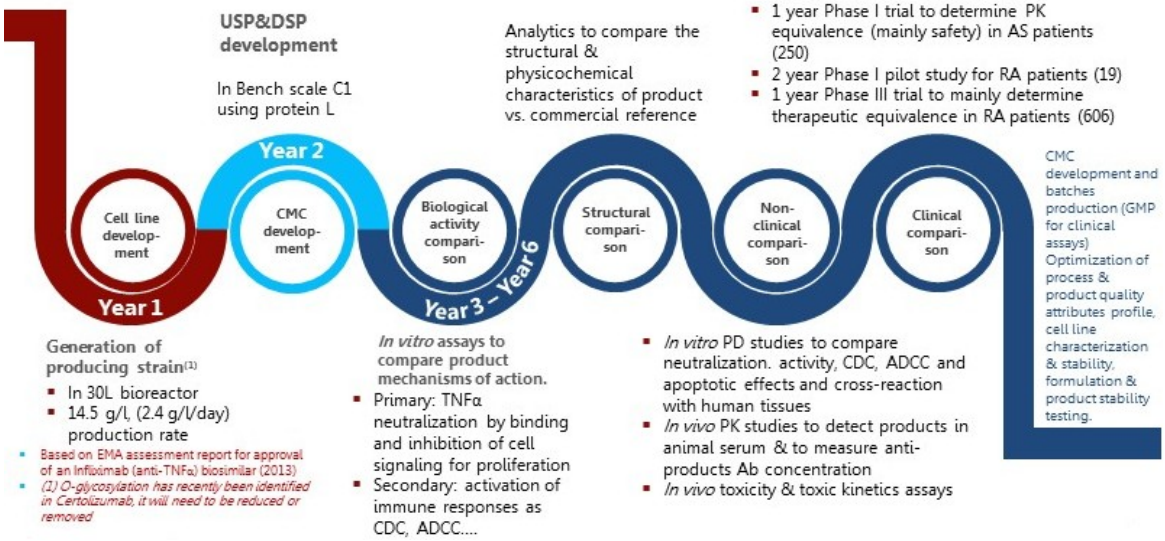
Dyadic's internal projects include four publicized efforts advancing at the company with two in the monoclonal antibody space (mAbs) and two others in non-traditional areas. On the biosimilars side, BDI and VTT are synthesizing certolizumab and nivolumab respectively. Certolizumab was a good first choice as it is a relatively simple antigen binding fragment (Fab) mAb which Dyadic was able to produce with biological activity that compares favorably with Cimzia. The other biosimilar, nivolumab, represents an increased level of complexity. This biologic is a glycosylated structure which has also been successfully expressed by C1. Currently, glyco-engineering efforts are underway to potentially make it a biobetter as compared to Opdivo.

Adeno-associated viruses (AAVs), which are used to deliver gene sequences for gene therapy are another area of investigation for Dyadic. BDI is developing AAVs to meet increasing demand for this product which is in short supply. The fourth pursuit targets secondary metabolites which are important for digestion of nutrients, functional health of cells and also used in cosmetic applications. Dyadic is seeking to demonstrate that C1 can produce these metabolites and may either to fund this internally through continued efforts with VTT or partner with third parties.

Glycosylation

In February, Dyadic announced that it had achieved G2 human-like glycosylation with its partner VTT. C1 was able to produce a G2 glycan level of over 76% using host cell proteins. This follows the achievement of G0 in November 2019. Dyadic can additionally produce high concentrations of Man_{3-9} and Man_3 which along with G0 and G2 allows C1 to produce vaccines, mAb and other biologics that are either immunogenic or recognized as self by the immune system. Dyadic expanded its contract with VTT in the first quarter, paying an additional €700,000 over the next 19 months to accelerate the development of G0F and G2F. We expect to hear updates on these glycolforms later this year.

Exhibit II – Certolizumab Development Pathway[4]



[4] Source: Dyadic Corporate Presentation, October 29, 2019.

Milestones

Dyadic has performed well since we initiated coverage adding numerous new collaborations. We include below recently achieved milestones and others we expect in the near term:

- NASDAQ Listing – April 2019
- Advances in glycoengineering of C1
- Additional protease deletions in C1
- Advancements in nivolumab development
- Comparison work completed for certolizumab vs. Cimzia
- VTT Contract Extension – July 2019
- New collaborations – 2019/2020
- Addition to Russell Microcap Index – 3Q:19
- VTT PEGS Lisbon: Update on glycosylation – November 21, 2019
- Additional detail on glycosylation progress including G0F & G2F – 1H:20
- Update on Sanofi arrangement – mid-year 2020
- Potential cash inflow from licensing or development arrangement – 2020/2021

Summary

Dyadic experienced a whirlwind year in 2019 and has started 2020 with several new agreements and expansions. These achievements include the addition of several new collaborations addressing influenza, coronavirus, animal health and other indications. Internal programs are also advancing for certolizumab and nivolumab, secondary metabolites and AAVs as well as progress with protease deletions and achieving additional glycosylation forms. These all contribute to the "shots on goal" which we believe will eventually lead to a billion dollar opportunity.

As we move our discounted cash flow model ahead by one year and contemplate the additional optionality of new deals, we increase our target price to $10.00 per share. We anticipate that there will be additional arrangements signed in 2020, some of which may include upfront cash flows. The coronavirus crisis may provide an accelerated pathway forward for C1 to be used as an expression system producing vaccines and treatments in clinical trials, which would be a tremendous achievement. C1 may be able to provide much higher volumes of output with improved characteristics compared to current approaches, which solves one of the bottlenecks faced when addressing large populations during a pandemic.

We see opportunities for additional equity interest in fast growing partnerships, upfronts, milestones and royalties from larger partnerships and potentially a buyout. There is a substantial level of value in Dyadic's broad portfolio of options and in their exciting technology that can revolutionize the protein expression industry. Future favorable catalysts include the addition of more collaborators, achieving output milestones and entering the clinical trial process. We increase our target price to $10.00 per share.

PROJECTED FINANCIALS

Dyadic International, Inc. - Income Statement

Dyadic International, Inc.	2018 A	Q1 A	Q2 A	Q3 A	Q4 A	2019 A	2020 E	2021 E
Total Revenues	**$1.3**	**$0.4**	**$0.4**	**$0.5**	**$0.4**	**$1.7**	**$2.2**	**$3.0**
YOY Growth	*71%*	*118%*	*142%*	*73%*	*-37%*	*30%*	*31%*	*36%*
Cost of R&D Revenue	$1.0	$0.3	$0.3	$0.4	$0.4	$1.5	$1.8	$2.4
Provision for Contract Losses	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
R&D	$2.1	$0.7	$0.8	$0.8	$0.7	$3.1	$3.2	$3.5
R&D Related Party	$1.2	$0.4	$0.3	$0.1	$0.0	$0.9	$1.8	$2.0
G&A	$4.5	$1.4	$1.9	$1.1	$1.2	$5.5	$4.6	$4.8
Foreign Currency Exchange	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Income from operations	($7.6)	($2.4)	($3.0)	($1.9)	($1.9)	($9.3)	($9.1)	($9.7)
Operating Margin	*-586%*	*-606%*	*-758%*	*-428%*	*-447%*	*-552%*	*-415%*	*-323%*
Interest Income	$0.9	$0.3	$0.3	$0.2	$0.2	$1.0	$0.6	$0.5
Other	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Pre-Tax Income	($6.7)	($2.2)	($2.7)	($1.7)	($1.7)	($8.3)	($8.5)	($9.2)
Provision for Income Tax	($1.0)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Tax Rate	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Net Income	**($5.7)**	**($2.2)**	**($2.7)**	**($1.7)**	**($1.7)**	**($8.3)**	**($8.5)**	**($9.2)**
Net Margin	*-439%*	*-540%*	*-690%*	*-374%*	*-401%*	*-494%*	*-386%*	*-307%*
Reported EPS	**($0.21)**	**($0.08)**	**($0.10)**	**($0.06)**	**($0.06)**	**($0.31)**	**($0.30)**	**($0.31)**
YOY Growth	*178%*	*12.2%*	*76.4%*	*12.7%*	*233.2%*	*50%*		
Shares Outstanding	27.67	26.71	26.83	27.18	27.29	27.00	28.63	29.50

Source: Company Filing // Zacks Investment R

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HISTORICAL STOCK PRICE

Dyadic International, Inc. – Share Price Chart



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