

**Dyadic International, Inc.****(DYAI: NASDAQ)****DYAI: Capital Raise to Accelerate Near Term Revenue Growth****OUTLOOK**

Our valuation approach employs a DCF model and a 15% discount rate. 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.

Dyadic has developed C1, its proprietary fungal expression system that can produce a variety of recombinant proteins. C1 has been commercialized in industrial applications and is in development for 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 further development of the C1 platform for production of biologics. Additional R&D funding is provided by partners. Dyadic is working with several biopharmaceutical companies and government organizations to validate the technology and completed a Phase I trial evaluating the effectiveness of its COVID vaccine in 2023.

In the near term, we expect growing R&D revenue as additional partners are added with C1 and Dapibus.

Current Price (3/29/2024) **\$1.67**  
**Valuation** **\$9.00**

**SUMMARY DATA**

52-Week High **2.40**  
 52-Week Low **1.19**  
 One-Year Return (%) **12.1**  
 Beta **0.6**  
 Average Daily Volume (sh) **22,070**

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

Shares Outstanding (mil) **29.0**  
 Market Capitalization (\$mil) **48.4**  
 Short Interest Ratio (days) **6.5**  
 Institutional Ownership (%) **15.7**  
 Insider Ownership (%) **30.4**

Annual Cash Dividend **\$0.00**  
 Dividend Yield (%) **0.00**

5-Yr. Historical Growth Rates  
 Sales (%) **31**  
 Earnings Per Share (%) **N/A**  
 Dividend (%) **N/A**

P/E using TTM EPS **N/A**  
 P/E using 2023 Estimate **N/A**  
 P/E using 2024 Estimate **N/A**

Zacks Rank **N/A**

**ZACKS ESTIMATES****Revenue**

(In millions of USD)

	Q1	Q2	Q3	Q4	Year
	(Mar)	(Jun)	(Sep)	(Dec)	(Dec)
2022	\$0.6 A	\$0.7 A	\$0.9 A	\$0.7 A	\$2.9 A
2023	\$1.0 A	\$0.8 A	\$0.4 A	\$0.7 A	\$2.9 A
2024					\$4.2 E
2025					\$6.1 E

**Earnings per Share**

	Q1	Q2	Q3	Q4	Year
2022	-\$0.09 A	-\$0.12 A	-\$0.06 A	-\$0.08 A	-\$0.34 A
2023	-\$0.03 A	-\$0.07 A	-\$0.06 A	-\$0.07 A	-\$0.24 A
2024					-\$0.29 E
2025					-\$0.37 E

## WHAT'S NEW

### 2023 Operational & Financial Results

Dyadic International Inc. (NASDAQ: DYAI) provided 2023 operational and financial results in a [press release](#) on March 28, 2024, filed its [Form 10-K](#) with the SEC and held a [conference call](#) with investors. Dyadic announced a slate of new, repeat or expanded arrangements with at least seven counterparties since the company's previous earnings update in November. These include a top 10 pharmaceutical company, Phibro Animal Health, Cygnus Technologies and an albumin manufacturer. Other news of note includes changes to the board of directors including a new Chairman and the elevation of Joe Hazelton to Chief Operating Officer. Dyadic also added to this a heavy load of attendance at investor, trade and scientific meetings including BIO CEO, Future Food Tech, World Vaccine Congress and JP Morgan Healthcare Conference. Finally, the company executed a \$6 million capital raise with convertible notes that will be allocated towards accelerating near term revenue growth and commercialization.

Highlights include:

- [Sale](#) of Alphazyme interest – January 2023
- INZYMES Collaboration – September 2023
- bYoRNA Collaboration – September 2023
- [Inclusion](#) in self-assembling vaccine consortium with [Mass General](#) – October 2023
- Topline [announcement](#) for DYAI-100 Phase I trial – November 2023
- Collaboration [agreement](#) with leading global biopharmaceutical company – February 2024
- [Partnership](#) with Cygnus Technologies for C1 HCP ELISA Kit – February 2024
- New [collaboration](#) with IIBR – February 2024
- Strategic partnership with Rabian BV for rabies vaccines – February 2024
- \$6.0 million in convertible notes [issued](#) – March 2024
- [Nature Publication: C1 produced mAbs in animal models for COVID](#) – March 2024
- Phibro Animal Health/ Abic Biological Labs collaboration expansion (poultry) – March 2024
- Research collaboration with top ten pharmaceutical company (mAb) – March 2024

Financial results for the quarter ending December 31, 2023, compared to prior year period:

- Revenues were \$2.9 million, essentially flat with the prior year period. Revenue was generated from 16 collaborations vs. 14. A slight increase in license revenue was offset by a decrease in research and development revenue;
- Research and development expenses totaled \$5.3 million, down 20%. The decrease was attributable to the reduction in expenses related to the DYAI-100 clinical trial;
- General and administrative expenses were \$5.8 million, down 9% from \$6.4 million. Reduced management incentives, business development and investor relations expenses, insurance expenses and legal expenses were partially offset by other miscellaneous increases;
- Interest income increased to \$417,000 from \$180,000 due to higher yields on securities held;
- Other income was \$1.0 million compared to \$250,000 and reflected the sale of the company's interest in Alphazyme;
- Net loss amounted to (\$6.8) million compared to (\$9.7) million. On a per share basis, net loss was (\$0.24) vs. (\$0.34).

As of December 31, 2023, cash, equivalents and short-term securities totaled \$7.3 million compared to \$12.6 million at the end of 2022. 2023 cash burn was (\$6.7) million compared with (\$8.1) million in 2022. Financing cash flows were zero. As of year-end 2023, Dyadic held no debt on its balance sheet. However, in March of 2024, the company closed a \$6.0 million convertible note issuance with the proceeds available for development of the C1 and Dapi-bus platforms.

Dyadic has maintained its high intensity pace of working on development projects with others. Several new collaborations and partnerships were signed in 2024 building on last year's efforts. To support these new arrangements and to advance the efforts with a global albumin manufacturer and distributor, Dyadic was able to secure additional funding that is expected to help deliver Dyadic's serum albumin products into the market within the next year.

## **New Collaborations and Partnerships**

### *Rubic and Afreximabank*

Last November, the company [announced](#) an expansion of development efforts with its African licensee, Rubic One Health with funding entity Afreximabank. Afreximabank has signed an agreement with Rubic that will fund the vaccine manufacturing facility using the C1 platform in South Africa. Production from this facility will supply the entire continent of Africa. The presence of a biologics manufacturing facility will provide a base for production of many therapeutic proteins that can be expressed using Dyadic's C1 platform.

### *Global Biopharmaceutical Company*

An unidentified global biopharmaceutical company [signed](#) a new research and development collaboration agreement with Dyadic, as shared on February 6<sup>th</sup>. The fully funded agreement includes a commercial option and will support the development and design of four recombinant proteins produced by C1.

### *Cygnus Technologies*

On February 13<sup>th</sup>, Dyadic [announced](#) that it is working with Cygnus Technologies to develop an enzyme-linked immunosorbent assay (ELISA) test to evaluate C1 derived proteins for impurities and to quantify host cell proteins (HCPs). [Cygnus](#), which was acquired by Maravai LifeSciences in 2016, develops a wide variety of assays, kits and other biologics testing products. It has been working with Dyadic to develop an ELISA test which is critical for evaluating monoclonal antibody outputs from C1 to determine if there are any contaminants that may produce an undesired immune response or impact drug stability. While this type of testing is not necessary for vaccines, it is required for other proteins such as monoclonal antibodies before they can be used in humans. Furthermore, biopharmaceutical manufacturers monitor HCPs to demonstrate reproducibility of their purification process, ensure HCP clearance and perform product lot release testing. The antibody deployed in the Cygnus C1 ELISA kit has been evaluated for over 1,000 HCPs that have appeared in C1-produced product, as determined by antibody affinity extraction and mass spectrometry methods. The availability of the test is an important tool for Dyadic collaborators and partners as it makes testing easier, faster and more accurate compared to other methods.

### *Israel Institute for Biological Research (IIBR)*

Dyadic [deepens](#) its ties with the Israel Institute for Biological Research (IIBR) targeting bio-threats and emerging disease. During the COVID pandemic, Dyadic worked with the IIBR to develop a vaccine. However, after the Pfizer and Moderna vaccines were shown to be effective, these collaborations were suspended. The parties have picked up the relationship again now to rejuvenate the partnership to utilize Dyadic's expertise in microbial platforms for flexible scale protein bioproduction and the IIBR's antibodies and antigens discovery capabilities to develop and manufacture solutions for addressing emerging diseases and potential bio-threats. Through this collaboration, both parties will work to develop effective treatments and vaccines for emerging threats.

### *Rabian BV*

Dyadic's Dutch subsidiary, Dyadic Nederland BV, has [signed](#) a strategic partnership with Rabian BV to develop rabies prophylactics and vaccines using C1. Rabian has received government and agency funding from the EU and related entities to support developing a vaccine for rabies. Rabian will receive €1.7 million to support the project. In return for its expertise and contribution of its protein expression platform, Dyadic will receive an equity stake, fully funded research and development costs, and specified product milestones and royalties upon commercialization. Rabian's scientists have previously been acquainted with Dyadic through their work together on the ZAPI project and other EU vaccine initiatives.

### *Top 10 Pharmaceutical Company*

In late March, Dyadic announced that it had entered into another collaboration with a top ten pharmaceutical company to develop an infectious disease monoclonal antibody and vaccine antigen.

### *Biftec Incorporated*

Dyadic entered into a co-promotion agreement with Biftec Incorporated which provides animal-free growth medium supplement. The product is intended to reduce the cost of culture media and will employ Dyadic's platform technology for production.

## **\$6.0 Million Convertible Note Issuance**

On March 11<sup>th</sup>, Dyadic [closed](#) a private placement of \$6.0 million in convertible notes. The instruments yield 8.0% in cash and have a conversion price of \$1.79 per share. This equates to 558.66 shares per \$1,000 principal note. The notes are due on March 8<sup>th</sup>, 2027. Proceeds will support efforts to further develop the C1 and Dapibus protein production platforms across pharmaceutical and non-pharmaceutical applications. Dyadic CEO Mark Emalfarb anticipates that Dyadic will benefit from multiple revenue streams that were enabled by this cash infusion. Management cites the recent catalyst of successful safety from a C1 produced vaccine driving further interest in the platform expanding collaborations and partnerships that will be supported by these funds.

## **Management and Board Changes**

A March 28<sup>th</sup> [press release](#) notified stakeholders that Dyadic's Chairman of the Board, Michael Tarnok, will be replaced as chairman by board member Patrick Lucy. Mr. Tarnok will continue to sit on the board through the end of his current term which will end in June 2025. Dr. Barry Buckland, who also sits on the board, will retire at the end of his current term this year. In the executive suite, Joseph Hazelton, who had been serving as Chief Business Officer, will now ascend into the role of Chief Operating Officer. He will lead the effort to expand the internal pipeline of high-value biologic products and accelerate the commercialization of assets.

## **DYAI-100 Phase I Topline Results**

In November, Dyadic [announced](#) topline results from its Phase I DYAI-100 study evaluating a C1-derived antigen used in a vaccine to prevent COVID. Dyadic's partner Rubic One Health ran the study in South Africa which enrolled 30 healthy adults who were administered the vaccine at two dose levels. The C1 SARS-CoV-2 RBD single booster vaccine achieved its primary endpoint and demonstrated safety and reactogenicity of the DYAI-100 recombinant protein. Both dose levels were considered safe and well tolerated. The final clinical study report has since been completed for this first-in-human clinical trial which is the first incidence of a vaccine antigen produced using a filamentous fungal cell line. In the press release, the CEO of partner Rubic noted that the C1-produced product is particularly well suited to Africa due to its relatively low cost and ability to produce product that does not require ultra-cold storage and that can be distributed throughout remote areas of Africa.

## **Summary**

Since the third quarter report, Dyadic has adds several new collaborations and partnerships to its stable. The company also shared some preclinical data related to its COVID vaccine in the journal Nature. A capital raise with convertible bonds was conducted with the proceeds intended to accelerate commercialization activities, mostly oriented towards the albumin initiative. Management continues to interact with investors, prospects and scientific teams around the globe in investor, trade and scientific conferences. We maintain our valuation of \$9 per share.

## Research Collaboration Summary

### Exhibit I – Summary of Dyadic Collaborations<sup>1</sup>

Collaborator	Deal	Ownership	Description	Date
Biftek Inc	Co-promotion/Revenue share		Growth medium supplement	Mar '24
Top 10 Pharma	Fully Funded		Vaccine Antigen	25-Mar-24
Rabian BV	Fully Funded	Yes	Rabies vaccine	28-Feb-24
Israel Institute of Bio Research	Targeting commercialization		Emerging diseases & biothreats	Feb '24
Cygnus Technologies	Co-development		ELISA test	13-Feb-24
Unnamed Global Biopharma	Fully funded		4 recombinant proteins	6-Feb-24
Unnamed CDMO	Fully funded		Injected drug enzyme	8-Nov-23
Unnamed Multinational Pharma	Fully funded		mAbs for infectious disease	8-Nov-23
Unnamed Biopharma	Fully funded		mAbs for Ebola/Marburg	8-Nov-23
Vaccine & Immunotherapy Center	Antigen for infectious disease vaccine		Self Assembling Vaccine	5-Oct-23
bYoRNA SAS	Dev & commercial of mRNA production		mRNA vaccines/RNAi therapies	26-Sep-23
Inzymes	License agreement		Dairy enzymes/Food products	18-Sep-23
Animal Health Co.	Fully funded R&D collaboration		Livestock antigen	Jun-23
Fondazione Biotec di Siena	MoU for epidemic research		Vaccine & antibody develop	24-May-23
Uvax Bio	Research collaboration		Infectious disease vaccine	Jun-23
Fermbox Bio	Funded development & marketing		Animal free proteins	8-May-23
Top 5 Pharma	Research collaboration		Vaccine Antigen	2Q:23
Virovax	Collaboration		Vaccine Candidates	2021
Top tier pharma company	Funded R&D collab & license agmt		Companion animal	mid-2022
Leprino Foods	Funded R&D collab & license agmt		Animal free proteins	11-May-22
Phibro Animal Health	Exclusive License - expanded Mar '24		Poultry/livestock vaccine-2 targets	10-Feb-22
Undisclosed academic collaborator	Fully funded R&D collaboration		Pharmaceutical / antibody	Nov '21
Rubic Consortium	Co-development research collaboration		COVID Vaccine Clin Trials	July'21
Syngene International	Co-development research collaboration		COVID Vaccine	May'21
IDBiologics, Inc	Expansion/Fully funded collaboration	0.4%	mAbs for infectious disease	April '21
Unnamed Collaborator	Fully funded R&D collaboration		Viral antigen	11-Mar-21
CR2O	Fully funded R&D collaboration		COVID antibody	22-Apr-21
TurtleTree Scientific	Fully funded R&D collaboration		Recomb protein growth factor	2-Feb-21
Epygen Biotech	Non exclusive license agreement		Paper & pulp enzymes	12-Oct-20
Jiangsu Hengrui Medicine	Fully funded R&D collaboration		Biologic drug development	17-Sep-20
Animal Health Co.	Funded feasibility study		Top 4	8-Jul-20
WuXi Biologics	Nonexclusive research license		Vaccine, drug, biologics	30-Mar-20
University of Oslo	Feasibility Study		Influenza antigens	17-Mar-20
Leading Animal Health Co.	Research funding, full		3 Protein Types	28-Oct-19
Top Tier Pharma	Proof of Concept (PoC)		3 Protein Classes	13-Aug-19
Microbial division	Fermentation evaluation		Microbial division	3Q:19
Affiliate	Evaluate & experiment with C1		C1 commercialization goal	4Q:19
Sanofi Aventis	PoC, Research funding		Biologics & Vaccines	Sep-18
Pharma 1	PoC, Research funding		undisclosed proteins	Dec-18
Pharma 3	PoC, Research funding		undisclosed proteins	Apr-19
Pharma 5	PoC, Research funding		undisclosed protein	4Q:19
VTT/Internal	CRO		Metabolites/Nivolumab	2015

<sup>1</sup> Source: Zacks Research, Dyadic corporate filings and Dyadic Press Releases. Green highlight indicates animal health collaboration. Blue highlight indicates academic collaborator, orange indicates a follow-on project with a previous partner.

## PROJECTED FINANCIALS

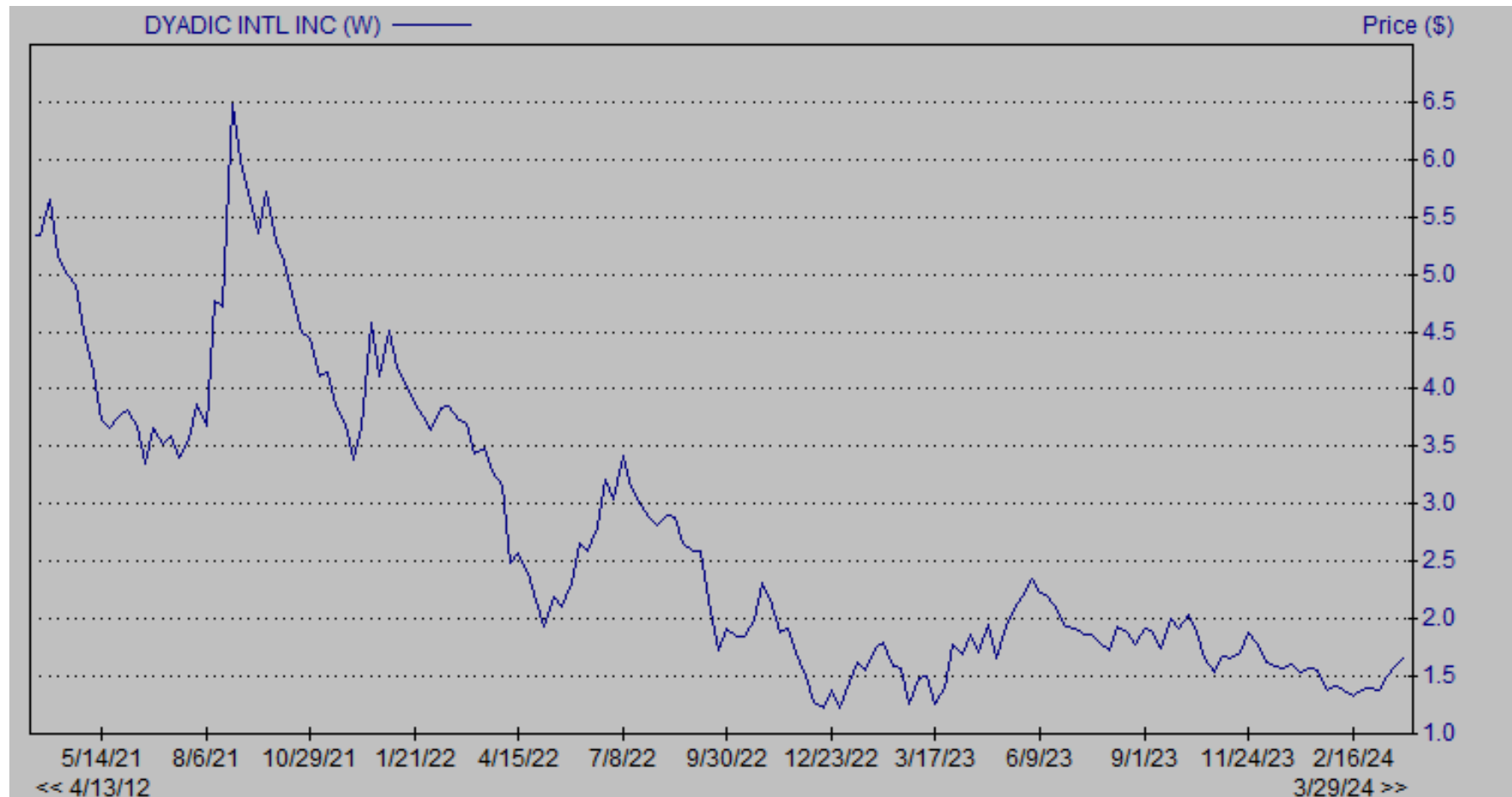
### Dyadic International, Inc. - Income Statement

Dyadic International, Inc.	2022 A	Q1 A	Q2 A	Q3 A	Q4 A	2023 A	2024 E	2025 E
<b>Total Revenues</b>	<b>\$2.9</b>	<b>\$1.0</b>	<b>\$0.8</b>	<b>\$0.4</b>	<b>\$0.7</b>	<b>\$2.9</b>	<b>\$4.2</b>	<b>\$6.1</b>
<i>YOY Growth</i>	22%	51%	27%	-55%	-8%	-1%	45%	45%
Cost of R&D Revenue	\$2.1	\$0.7	\$0.8	\$0.1	\$0.4	\$2.0	\$16.1	\$23.3
R&D	\$4.5	\$0.8	\$0.9	\$0.7	\$0.9	\$3.3	\$4.8	\$5.0
G&A	\$6.4	\$1.5	\$1.4	\$1.3	\$1.7	\$5.8	\$6.5	\$6.6
Foreign Currency Exchange	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
<b>Income from operations</b>	<b>(\$10.2)</b>	<b>(\$2.1)</b>	<b>(\$2.3)</b>	<b>(\$1.7)</b>	<b>(\$2.2)</b>	<b>(\$8.2)</b>	<b>(\$23.2)</b>	<b>(\$28.8)</b>
<i>Operating Margin</i>	-347%	-210%	-274%	-433%	-316%	-284%	-551%	-472%
Interest Income	\$0.2	\$0.1	\$0.1	\$0.1	\$0.1	\$0.4	\$0.5	\$0.5
Other	\$0.3	\$1.0	\$0.0	\$0.0	\$0.0	\$1.0	\$0.0	\$0.0
<b>Pre-Tax Income</b>	<b>(\$9.7)</b>	<b>(\$1.0)</b>	<b>(\$2.2)</b>	<b>(\$1.6)</b>	<b>(\$2.1)</b>	<b>(\$6.8)</b>	<b>(\$22.7)</b>	<b>(\$28.3)</b>
Provision for Income Tax	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$3.0
<i>Tax Rate</i>	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	200.0%	300.0%
<b>Net Income</b>	<b>(\$9.7)</b>	<b>(\$1.0)</b>	<b>(\$2.2)</b>	<b>(\$1.6)</b>	<b>(\$2.1)</b>	<b>(\$6.8)</b>	<b>(\$22.7)</b>	<b>(\$31.3)</b>
<i>Net Margin</i>	-332%	-98%	-257%	-407%	-302%	-234%	-539%	-513%
<b>Reported EPS</b>	<b>(\$0.34)</b>	<b>(\$0.03)</b>	<b>(\$0.07)</b>	<b>(\$0.06)</b>	<b>(\$0.07)</b>	<b>(\$0.24)</b>	<b>(\$0.66)</b>	<b>(\$0.90)</b>
Shares Outstanding	28.36	28.76	28.81	28.81	28.81	28.80	34.34	34.91

Source: Company Filing // Zacks Investment Research, Inc. Estimates

## HISTORICAL STOCK PRICE

Dyadic International, Inc. – Share Price Chart<sup>2</sup>



<sup>2</sup> Source: Courtesy of barchart.com

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