ANNUAL REPORT 2016

IderaPharma.com

FOCUSED FORWARD

Fellow Idera Shareholders,

Greetings, and I hope your 2017 is off to an outstanding start. I compose this letter with great optimism about Idera's direction as we continue building on the foundations we have established since I joined Idera in late 2014.

Over the past two years, we took important steps to foster an organizational culture deeply rooted in a set of shared values that I believe are paramount to generating success in our business. These values reflect and reinforce our belief that success is delivering to patients approved therapies that address severe unmet needs.

To that end, in 2016 we prioritized our portfolio and built strategic development plans that chart a pathway to approval, continued to recruit and hire the best and brightest team members, strengthened our financial resources, and made significant progress on executing our clinical programs. We also forged an agreement licensing our compound IMO-9200 to Vivelix Pharmaceuticals for autoimmune GI conditions, which, though promising, fell outside of our core focus on oncology and rare diseases. The deal provided us with additional capital immediately, along with future milestone payments upon Vivelix's successful development of IMO-9200.

Today, I see Idera as a company well positioned for progress and success in our goal of developing and commercializing treatments to help patients in need.

Idera is well positioned for progress and success in developing and commercializing treatments that help patients in need.

IMO-2125

Our highest-priority clinical program in 2017 is IMO-2125. In 2016, through our partnership with MD Anderson Cancer Center, we completed the dose-escalation portion of our Phase 1 trial with intratumoral IMO-2125 in combination with ipilimumab for patients who were refractory to prior PD1 therapy. We presented the first clinical update from this trial in the second half of 2016, and we continue to be excited about the durable results. Achieving these results is particularly meaningful because these patients have, for the most part, run out of viable options.

Also in 2016, our team established a full strategic development plan for IMO-2125, which serves as a guiding path for our activities moving forward. We are in the midst of launching preclinical and clinical trials for IMO-2125 to explore expansion opportunities beyond PD1-refractory melanoma, including trials with other checkpoint inhibitors, additional tumor types, and collaborations.

IMO-8400

2017 is a critical year in developing IMO-8400 for the treatment of dermatomyositis (DM), a rare and debilitating condition with limited therapy options. We expect to complete the enrollment of our Phase 2 trial for DM in the United States and Europe in the second half of this year, positioning us for a full data read-out in the first half of 2018. We are hopeful that after completing this trial, we may be closer to offering patients with DM a potentially life-changing therapy.

Third-Generation Antisense (3GA)

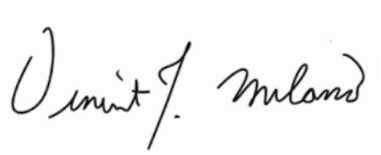
Idera's 3GA technology platform is a key pillar upon which we will build for years to come. In 2016, we selected a gene target that we plan to take into the clinic in 2018 to provide proof of concept for the platform. We have yet to disclose the specifics of our chosen target and disease indication. Our plan is to announce them towards the end of this year, closer to filing our IND and initiating our first human clinical trial.

Our partnership with GSK to apply our 3GA platform in the treatment of selected targets in renal disease has also continued to progress, and they are planning to select their first clinical candidate in the early part of 2018. This collaboration further broadens the utility of our 3GA platform beyond our areas of focus.

Looking Forward

With hard work and diligence on our part in 2017, we believe that each of these programs has the capacity to serve as a springboard for Idera's growth. Our team is focused, and our path forward is clear. I look forward to keeping you apprised of our progress, and wish you and your families a wonderful and rewarding year.

Regards,



Vin Milano
Chief Executive Officer, Idera Pharmaceuticals

ADVANCING A STRATEGICALLY FOCUSED DEVELOPMENT PIPELINE

PROGRAM	MECHANISM	DISCOVERY | PHASE 1 | PHASE 2 | PIVOTAL
IMMUNO-ONCOLOGY		
Refractory PD-1 metastatic melanoma *IMO-2125 / CPI combination*	TLR9 agonist	
Additional tumor types *IMO-2125 monotherapy*	TLR9 agonist	
Additional tumor types *IMO-2125 / CPI combination*	TLR9 agonist	
RARE DISEASES		
Dermatomyositis *IMO-8400*	TLR7,8,9 antagonist	
Undisclosed rare liver condition *3GA*	3GA undisclosed target	
Undisclosed indication *3GA*	3GA-NLRP3	
Undisclosed indication *3GA*	3GA-DUX4	
PARTNERED PROGRAMS		
Renal diseases *3GA**	3GA	
Autoimmune diseases *IMO-9200†*	TLR7,8,9 antagonist	
PARTNERING OPPORTUNITIES | Idera-sponsored clinical development suspended		
B-cell lymphoma *IMO-8400*	TLR7,8,9 antagonist	

*Commercial rights belong to GSK.
†Commercial rights belong to Vivelix.

REFLECTING ON 2016:
SIGNIFICANT STEPS TOWARD DEVELOPING THERAPIES FOR PATIENTS WITH UNMET NEEDS

- Completed enrollment in Phase 1 dose escalation IMO-2125 trial (ipilimumab arm)
- Commenced dosing Phase 1 dose-escalation IMO-2125 trial (pembrolizumab arm)
- Presented clinical and translational data on IMO-2125 at Society for Immunotherapy of Cancer scientific meeting
- Designed clinical program to approval in PD-1 refractory melanoma
- Planned additional IMO-2125 trials beyond PD-1 refractory melanoma
- Opened IMO-8400 Phase 2 trial in dermatomyositis: >20 sites initiated, enrollment progressing
- Increased number of 3GA compounds for potential development to 22 gene targets
- Forged out-licensing agreement for IMO-9200 to Vivelix
- Strengthened company balance sheet, extending cash runway through second quarter of 2018

Idera Pharmaceuticals is a clinical-stage biopharmaceutical company developing novel nucleic acid-based therapies for the treatment of certain cancers and rare diseases. Idera's proprietary technology involves using a TLR-targeting technology, to design synthetic oligonucleotide-based drug candidates to act by modulating the activity of specific TLRs.

In addition to its TLR programs, Idera is advancing a third-generation antisense technology platform using its proprietary technology to inhibit the production of disease-associated proteins by targeting messenger RNA.

BOARD OF DIRECTORS

Sudhir Agrawal, D Phil, FRSC
President of Research

Julian C. Baker
Managing Partner, Baker Brothers Investments

Youssef El Zein
Managing Partner, Pillar Investment Limited

James A. Geraghty
Chairman of the Board

Mark Goldberg, MD
Former Executive Vice President,
Global Medical and Regulatory Strategy, Synageva

Maxine Gowen, PhD
President and Chief Executive Officer, Trevena

Vincent Milano
Chief Executive Officer

Kelvin M. Neu, MD
Managing Director, Baker Brothers Investments

William S. Reardon, CPA
Retired Audit Partner, Pricewaterhouse Coopers, LLP

LEADERSHIP TEAM

Sudhir Agrawal, D Phil, FRSC
President of Research

Louis J. Arcudi III, MBA
Senior Vice President of Operations,
Chief Financial Officer and Treasurer

Mark J. Casey
Senior Vice President, General Counsel
and Secretary of the Board of Directors

Jill Conwell
Vice President, Human Resources

Robert Doody Jr.
Vice President, Corporate Communications
and Investor Relations

Clayton Fletcher
Senior Vice President, Business Development
and Strategic Planning

Joanna Horobin, MB, ChB
Senior Vice President, Chief Medical Officer

Vincent Milano
Chief Executive Officer

Jonathan Yingling, PhD
Senior Vice President, Early Development

STOCKHOLDERS' MEETING

The 2017 Annual Meeting of Shareholders will be held at the Company's offices at 505 Eagleview Drive, Suite 212, Exton, PA, on June 7, 2017, at 8:30 AM ET. A notice of the meeting, proxy statement and proxy voting card have been mailed to stockholders with this Annual Report.

INVESTOR RELATIONS

Additional copies of this Annual Report, which includes the Company's Annual Report on Form 10-K for the year ended December 31, 2016, as filed with the Securities and Exchange Commission, are available upon request to:

Investor Relations
Idera Pharmaceuticals, Inc.
505 Eagleview Boulevard, Suite 212
Exton, PA 19341
Phone: 1-617-679-5515
Email: rdoody@iderapharma.com
IderaPharma.com

REGISTRAR & TRANSFER AGENT

Computershare
P.O. Box 30170
College Station, TX 77842-3170
Computershare.com/investor

Overnight Correspondence:
Computershare
211 Quality Circle, Suite 210
College Station, TX 77845

Toll-Free Number: 1-877-206-1150
- TDD Hearing Impaired: 1-800-952-9245
- Foreign Stockholders: 1-201-680-6578
- TDD Foreign Stockholders: 1-781-575-4592

LEGAL COUNSEL

WilmerHale
60 State Street
Boston, MA 02109

INDEPENDENT AUDITORS

Ernst & Young, LLP
200 Clarendon Street
Boston, MA 02116

COMMON STOCK SYMBOL

NASDAQ: **IDRA**

FORWARD-LOOKING STATEMENT

Any statement that we may make in this Annual Report about future expectations, plans and prospects for the Company constitutes forward-looking statements for the purposes of the safe harbor provisions under the Private Securities Litigation Reform Act of 1995. Actual results may differ materially from those indicated by these forward-looking statements as a result of various factors including the risks set forth under the caption "Risk Factors" in Idera's Annual Report on Form 10-K for the year ended December 31, 2016. Idera disclaims any intention or obligation to update any forward-looking statements.

"This past year was incredibly important to drive Idera's future direction and opportunities for success, and I am extremely proud of every member's contributions throughout 2016. As we enter 2017, we are sharply focused on our core priorities to prepare for what promises to be a pivotal year for our company, our patients and our shareholders."

– Vin Milano

idera

505 Eagleview Boulevard, Suite 212
Exton, PA 19341

167 Sidney Street
Cambridge, MA 02139

IderaPharma.com