Life Science Leader
Connect. Collaborate. Contribute.
APRIL 2017

What's The Backbone Of Vivek Ramaswamy's

Life Science Leader

Connect. Collaborate. Contribute.

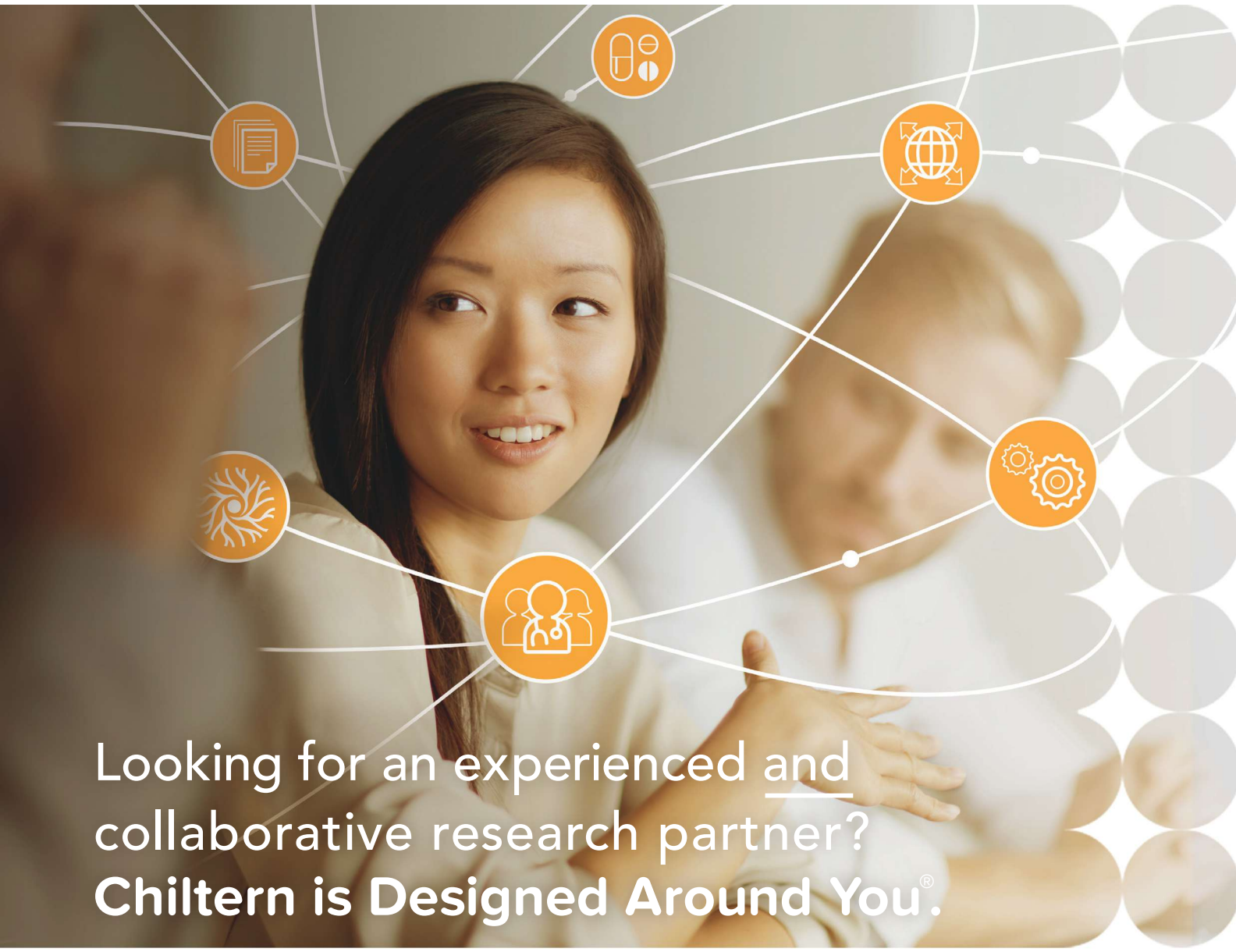
APRIL 2017

What's The Backbone Of Vivek Ramaswamy's Success?

An exclusive interview with the man some have called the next wizard of Wall Street for "conjuring drug companies from thin air." **p. 16**

VIVEK RAMASWAMY
Founder & CEO,
Roivant Sciences

VISIT US AT BOOTH #15
April 24-28 at the CDISC Europe Interchange



Looking for an experienced and collaborative research partner? **Chiltern is Designed Around You®.**

At Chiltern you are key, because you are at the center of what we do. As you strive every day to bring better, more personalized products to market for your patients, we strive to provide you a better, more personalized experience than any other CRO.

We're building clinical development solutions around you — your program, your investigators, your patients.
Chiltern. A Collaborative Approach Designed Around You®.

CHILTERN
Designed Around You®

Connect with Chiltern

U.S. +1 910 338 4760
Europe +44 0 1753 512 000
Chiltern.com

Clinical Development • Medical & Scientific Affairs • Data & Analysis
Pharmacovigilance • Strategic Regulatory

Single Best Way To Deliver

Differentiate Your Products With Innovative Dosage Forms

Unistick® single unit dose liquid stick packs are user-friendly, convenient, and affordable. They help patients take their medicine on-time and in the right amount, and can reduce the need for artificial preservatives.

Speak to Unither Pharmaceuticals today to differentiate your products and improve your patient's experience without increasing costs.

Unither is a global development and manufacturing partner for pharmaceutical dosage forms, with facilities in Europe and North America.

Visit us at **InformEx/CPhI North America booth#2836**
Philadelphia, PA, May 16-18, 2017

www.unither-pharma.com

UNITHER
PHARMACEUTICALS

CONTENTS

Welcome to

Life Science Leader

APRIL 2017 VOL. 9 NO. 4

@LifeSciLeader1 linkedin.com/company/life-science-leader facebook.com/LifeScienceLeader WWW.LIFESCIENCELEADER.COM

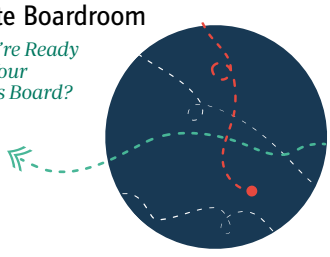
CORRECTION: *In our March issue, we incorrectly labeled the photo on the* Companies To Watch *page. It should have said, Brian Leuthner, President & CEO.*

16 Cover Story: ROIVANT

Read why Roivant Sciences founder and CEO Vivek Ramaswamy has been portrayed by some as being the next wizard of Wall Street for "conjuring drug companies from thin air."

Features:

22
Journey To The Corporate Boardroom
Think You're Ready To Build Your Company's Board?



26
Companion Diagnostics 101
A Primer From Roche Diagnostics' Chief Medical Officer

30
Industry Explorers Blaze On
Leading Business With Science: Geert Cauwenbergh of RXi

LIFE SCIENCE LEADER (ISSN: 21610800) Vol. 9, No. 4 is published monthly by Jameson Publishing, Inc. at Knowledge Park, 5340 Fryling Road, Suite 300, Erie, PA 16510-4672. Phone (814) 897-9000, Fax (814) 899-5587. Periodical postage paid at Erie, PA 16510 and additional mailing offices. **SUBSCRIPTION RATES** For U.S. based subscribers, $295 for one year. If your mailing address is outside the U.S. the subscription price is $445 for one year. **POSTMASTER:** Send address corrections (Form 3579) to Life Science Leader, Knowledge Park, 5340 Fryling Road, Suite 300, Erie, PA 16510-4672. **PUBLICATIONS AGREEMENT:** No. 40722524 c/o AIM, 7289 Torbram Road, Mississauga, ON L4T 1G8.

FILLED WITH EXPERTISE

Richard's Unique Expertise Meets Your Demanding Biologics Fill and Finish Needs.

Richard is one of the many manufacturing technicians at Althea that deliver the highest quality drug product to our clients on a daily basis. At Althea, we are aware of the innate properties of biologics and we have a strong understanding of how fill finish processes and equipment can affect quality and stability. Our technical experience, combined with an impeccable regulatory track record, enable Richard and the Althea team to meet your most demanding biologics fill and finish needs.

Learn more. Visit AltheaCMO.com

ALTHEA | THE POWER TO MAKE®

A MEMBER OF THE AJINOMOTO GROUP

11040 Roselle Street, San Diego, CA 92121 | 1.888.425.8432 | 858.882.0123

PROCESS DEVELOPMENT • DRUG SUBSTANCE MANUFACTURING • DRUG PRODUCT MANUFACTURING • ANALYTICS • HPAPI & ADC

Are We Encouraging The New Pharma Entrepreneurs?

ROB WRIGHT Chief Editor

In this month's issue you will find a feature involving Vivek Ramaswamy, founder and CEO of Roivant Sciences. I begin telling the story of the interview by describing my rumination on two sayings: "Invest in what you know" and "If it sounds too good to be true, it probably is." These are just a two of the many pieces of wisdom (probably picked up from my father) that I have imparted to my two children over the years. I imagine they would tell you that my approach to sharing such advice involves an inordinate amount of repetition. Well, apparently it worked, because during the holidays both of these now young adults used these (and other) phrases while sharing about their recent semester experiences. Now, I will readily admit to taking great delight when hearing these phrases parroted back and have actually gotten much better at biting my tongue and not saying, "I told you so."

These recent conversations must have been rolling around in the back of my mind as I sat waiting to interview Ramaswamy — an entrepreneur perhaps 25+ years younger than those I typically interview. At 31 years of age, Vivek Ramaswamy is (in my opinion) young. However, being youthful does not by default imply being unwise. Because, though there is much to be said for the wisdom one accumulates from having "been there, done that," there are also some major benefits to the contrary. Let me explain.

Earlier in the day (prior to meeting with Ramaswamy), I attended one of the keynote lunches at the 35th Annual J.P. Morgan Healthcare Conference in San Francisco. Randomly picking a table near the back of the room, I struck up a conversation with the person seated next to me. Nicolas Roelofs, Ph.D., introduced himself as a serial corporate board member. During our discussion, I told him about one of the projects I was currently working on (i.e., the "Journey To The Board Room" series, Part 2 of which can be found on p. 22 of this issue), and soon we exchanged business cards. As we chatted about the differences between corporate board service and working as a company executive (something the former Agilent SVP now serving on about seven different corporate boards should know a thing or two about), Roelofs shared a rather profound insight. As a board member he noted there is a significant difference between working with a founder of a startup who is young versus one a bit older. According to Roelofs, board members, and perhaps even investors for that matter, are more likely to support those founders with a great idea who may be a bit less seasoned, for they have much less understanding of the mountain they are about to climb.

In support of Roelofs' supposition, many of the company founders I've spoken with often admit that had they known how difficult starting a biopharmaceutical company would be, they would have likely never embarked on the journey in the first place. So rather than burden such budding entrepreneurs as Ramaswamy with skepticism and doubt cloaked in "words of wisdom," maybe we could be a bit more encouraging.

Life Science Leader
APRIL 2017 VOL. 9 NO. 4

LIFE SCIENCE LEADER
5340 Fryling Rd., Suite 300
Erie, PA 16510-4672
Telephone: 814 897 7700
Fax: 814 899 5587
WWW.LIFESCIENCELEADER.COM

SVP OF PUBLISHING/PRODUCT DEVELOPMENT
Jon Howland / Ext. 203
jon.howland@lifescienceconnect.com

EDITORIAL DIRECTOR
Dan Schell / Ext. 284
dan.schell@lifescienceleader.com

CHIEF EDITOR
Rob Wright / Ext. 140
rob.wright@lifescienceconnect.com

EXECUTIVE EDITOR
Wayne Koberstein
wayne.koberstein@lifescienceleader.com

EDITORS
Louis Garguilo
louis.garguilo@lifescienceconnect.com

Bob Marshall
bob.marshall@lifescienceconnect.com

Ed Miseta
ed.miseta@lifescienceconnect.com

Anna Rose Welch
anna.welch@lifescienceconnect.com

VP OF AUDIENCE DEVELOPMENT
Michael Bennett
michael.bennett@lifescienceconnect.com

DIRECTORS OF STRATEGIC PARTNERSHIPS
Tim Bretz / 724-940-7555 / Ext. 123
tim.bretz@lifescienceconnect.com

Cory Coleman / Ext. 108
cory.coleman@lifescienceconnect.com

Tracy Tasker / Ext. 297
tracy.tasker@lifescienceconnect.com

Perry Rearick / Ext. 263
perry.rearick@lifescienceconnect.com

Derek Van Slyke / Ext. 217
derek.vanslyke@lifescienceconnect.com

PUBLISHER/BIOPHARM & LAB
Shannon Primavere / Ext. 279
shannon.primavere@lifescienceconnect.com

GROUP PUBLISHER/OUTSOURCING
Ray Sherman / Ext. 335
ray.sherman@lifescienceconnect.com

BUSINESS DEVELOPMENT MANAGER
Mike Barbalaci / Ext. 218
mike.barbalaci@lifescienceconnect.com

SR. ACCOUNT EXECUTIVE
Scott Moren / Ext. 118
scott.moren@lifescienceconnect.com

DIRECTOR OF DATA ANALYTICS
Kevin Morey
kevin.morey@lifescienceconnect.com

PRODUCTION DIRECTOR
Lynn Netkowicz / Ext. 205
lynn.netkowicz@jamesonpublishing.com

Finesse

Next stop: Never.

Continuous processing speeds up production and brings down costs.

Today, more and more biopharma companies are moving to continuous processes for their small- and large-scale operations. Find out why manufacturers are turning to Finesse for their continuous processing solutions. Finesse offers a universal control platform, plug-and-play flexibility, and the expert integration you need to get going fast. We'll also customize systems to fit your existing infrastructure, so you can keep expenses low. Learn more at www.finesse.com.

LSL

ASK THE BOARD

Have a response to our experts' answers? Send us an email to atb@lifescienceconnect.com.

EAB

EDITORIAL ADVISORY BOARD

Q What are some common mistakes to avoid when fundraising for a biopharma or med device startup?

A WHILE THERE IS NO SILVER BULLET to successful financial fundraising, there are three general keys to successful fundraising that may help:

1. Develop a comprehensive, flexible operating plan. Translate the plan into a financial plan. Communicate the plan and milestones internally and externally (be aggressive internally and conservative to outside parties).
2. Develop financing optionality. Do not limit your financing to the "home run." Include equity, government incentives (U.S. and worldwide), debt, leasing, etc.
3. While raising money for the current round, think of the future. Many think you start the next round as soon as you finish the current round. You are really starting the next round while pitching each investor. Look at many turndowns as opportunities for the next round – selectively stay in touch.

RICHARD BARON
is a pharmaceutical and medical device executive and board member with 30+ years' experience. He has completed multiple IPOs, financings, acquisitions, and sales of companies in excess of $2 billion.

Q What's the fastest route to creating a high-performing team?

A TO ELEVATE YOUR TEAM'S PERFORMANCE to the highest level, do what I advise my Fortune 50 clients. 1. Be crystal clear about what you are trying to achieve. Quickly uncover and address areas of ambiguity, confusion, or misalignment around your vision and goals. 2. Make sure you've got the right people in the right roles doing the right things. Do you have the best and brightest? Are people in roles that play to their strengths? Is the team working proactively and focused on priorities 90 percent of the time? 3. Get your people talking to each other. Make it clear that everyone is to work collaboratively, transparently, and respectfully to realize your vision and achieve remarkable results.

LIZ BYWATER, PH.D.
is a leadership expert, popular speaker, and author of the forthcoming *Slow Down to Speed Up!* She helps top executives drive growth, propel innovation, and lead change.

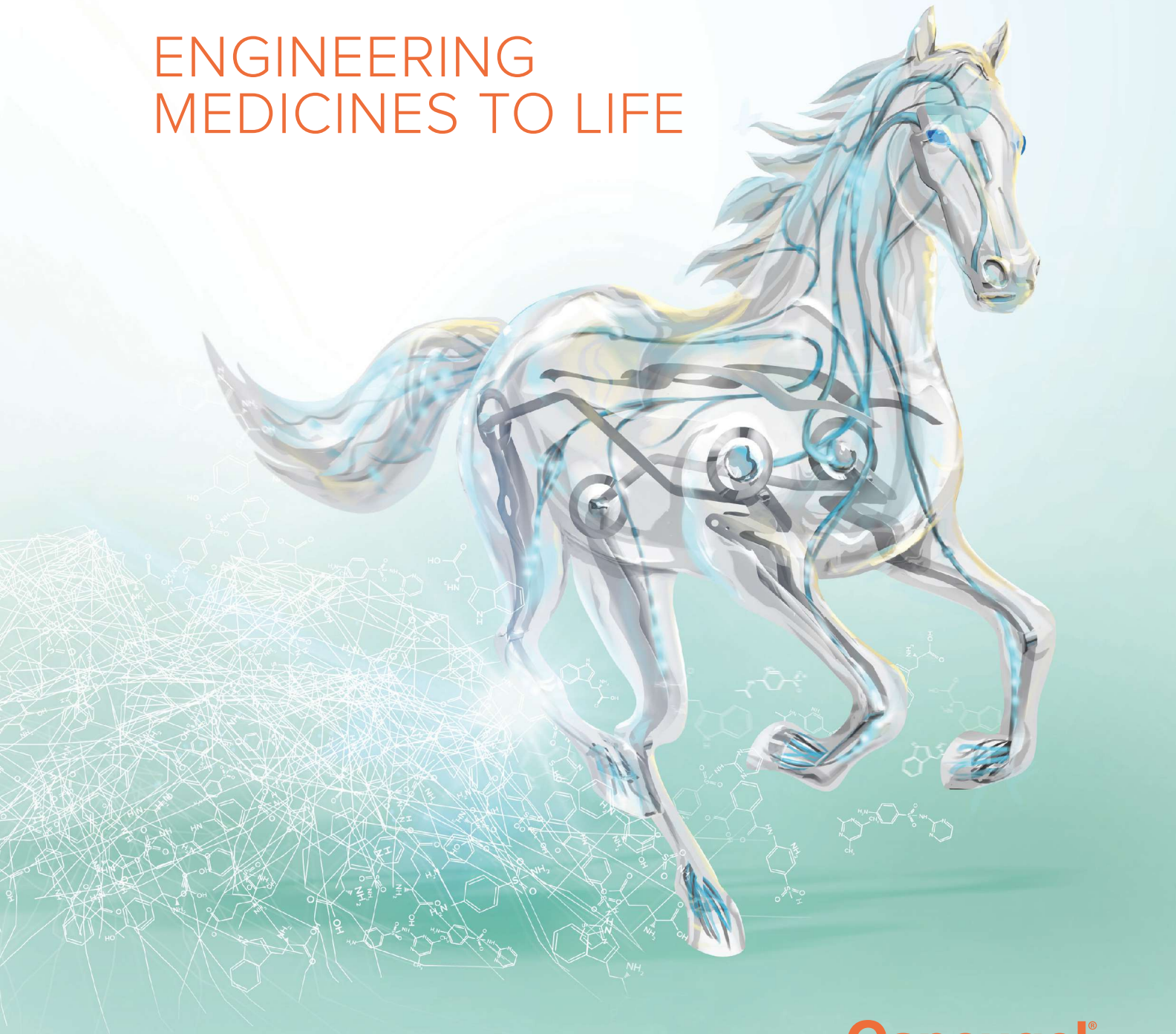
Q What role is played by state bioscience associations in the current healthcare debate?

A STATE BIOSCIENCE ASSOCIATIONS represent the grassroots voice to convey the value of innovative therapies and devices to patient care. State groups put a homegrown face on the bio industry, serve as a go-to source for locally relevant information, and make it easier for elected officials to see member bioscience companies and their employees as constituents and part of a community. State bio associations are best positioned to educate policymakers on the costs and benefits of biopharma and medtech products through direct policymaker interactions and/or industry-specific legislative caucuses, legislator visits to companies, media opportunities, and wherever possible using research scientists, industry leaders and patients as compelling and ardent advocates.

STEPHEN RAPUNDALO
is president and CEO of MichBio. A former elected official, Rapundalo has 20 years of pharmaceutical industry experience.

WWW.CAPSUGEL.COM

ENGINEERING MEDICINES TO LIFE



Capsugel®

DRIVING PULMONARY DELIVERY FORWARD

Capsugel's unique capabilities and expertise in product design and particle engineering can prove crucial for enhancing the bioperformance of inhaled therapeutics. We design and optimize formulations using an array of specialized tools, including micronization, spray dry processing and nanocrystal technologies. Combined with formulation expertise for both small and large molecules, specialized DPI capsules, and finished product manufacturing capabilities to commercial scale, Capsugel is the right partner to bring your product from concept to market.

Repeal & Replace Confronts Trump's Base

JOHN MCMANUS The McManus Group

To understand the political peril Republicans confront in their effort to repeal and replace Obamacare, it is worth noting that many of the areas that gained the most coverage from Obamacare are the working-class districts carried by President Trump with the largest margins. Gallup polling found that counties characterized as "Working-Class Country" gained the most health insurance coverage since 2008 — 6.8 percent — and were carried by Trump by a 46 percent margin.

Conversely, a January CNN poll found the 18 to 34 age demographic group supports Obamacare by the widest margin (59 percent favor and 38 percent oppose), yet it is that same demographic that has refused to participate in the exchanges, a key factor making the risk pool for insurers fundamentally unworkable and leading to a mass exodus of plans. The individual mandate, which Republicans seek to repeal, cannot compel enough young people to purchase coverage for an underlying policy they profess to support.

The Republican "Repeal and Replace" legislation, known as the American Health Care Act working its way through the House, would sunset Medicaid expansion, which has provided coverage to 11 million low-income Americans, in 2020. While just 31 states opted for the 90 percent federal match to cover additional populations of nondisabled adults, they included West Virginia, Ohio, Michigan, Kentucky, Indiana, and Arkansas, all of which Trump carried.

CBO'S TORTURED ASSUMPTIONS ON THE UNINSURED

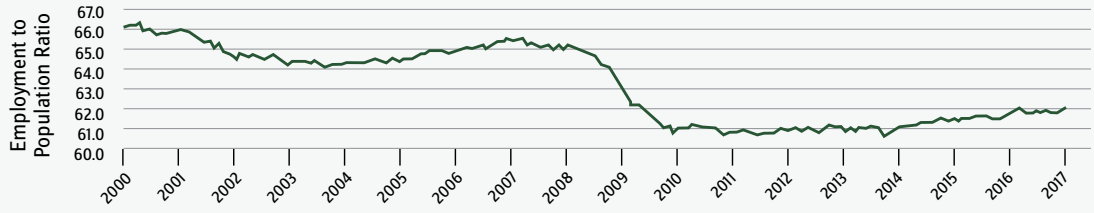
Shortly after the House Energy & Commerce and Ways & Means committees worked through the night in marathon sessions to approve the American Health Care Act, the Congressional Budget Office (CBO) released its analysis of the legislation's impact on coverage — debilitating at first glance but rather sanguine when the underlying assumptions of its estimates are unpacked. The headline hoopla: CBO predicts that 14 million more individuals would be uninsured in 2018, rising to 24 million in 2026 under the GOP plan.

Problem #1: CBO's fixation on the individual mandate. CBO says most of the initial group would immediately drop coverage due to repeal of the individual mandate. This figure includes 5 million Medicaid enrollees who are too poor to pay taxes (and therefore the mandate penalty), but whom the CBO curiously believes would abandon free healthcare due to the absence of a mandate that has never applied to them.

Problem #2: CBO's use of faulty baseline assumptions.

- When the ACA was enacted, CBO projected twice the number to be in the insurance exchanges as are actually enrolled today. Despite the recent mass exodus of plans (leaving only one plan in 40 percent of the counties) and relatively flat enrollment since 2015, the CBO baseline still projects the number of people enrolled in exchange plans to increase by 8 million, or almost 75 percent. Since CBO predicts the Republican plan will result in continued flat enrollment — POOF! — the GOP plan will mean 8 million people losing coverage (despite never being enrolled).
- Despite seven years of heated debate and thorough contemplation of the fiscal and human implications of expanding Medicaid, 19 states have chosen not to do so, yet CBO believes the vast majority of those remaining states will do so shortly. This results in another 2 to 5 million "losing" coverage they do not now have.

EMPLOYMENT TO POPULATION RATIO FOR 20+ POPULATION: UNITED STATES, 2000-17 (SEASONALLY ADJUSTED)



MIDDLE AMERICA'S CHALLENGE: NON-WORKING ADULTS

Medicaid's critical growing role of providing health coverage reflects a broader demographic trend that is plaguing the country — the absence of work, and therefore work-related insurance coverage — in huge swaths of the population. In 2013, the Census Bureau found that over one-fifth of all men between 25 and 55 are on Medicaid; and of the non-working male Anglo population, 57 percent were collecting one or more government disability benefits.

In a seminal essay in *Commentary Magazine*, Nicholas Eberstadt observed, "Work rates have fallen off a cliff since the year 2000 and are at their lowest levels in decades." Data from the Bureau of Labor Statistics shows that the overall work rate for Americans age 20 and older plunged nearly 5 percentage points (from 64.6 to 59.7).

Eberstadt concludes, "Postwar America never experienced anything comparable.... From peak to trough, the collapse in work rates for U.S. adults between 2008 and 2010 was roughly twice the amplitude of what had previously been the country's worst postwar recession back in the early 1980s. In that previous recession, it took America five years to re-attain the adult work rates recorded at the start of 1980. This time, the U.S. job market has as yet, in early 2017, scarcely begun to claw its way back up to the work rates of 2007 — much less back to the work rates from early 2000."

This hollowing out of the workforce explains much of the electorate's angry populism that drove Donald Trump to the White House and also created resonance for socialist senator Bernie Sanders in the Democratic primaries, despite the soaring stock market and Washington's characterization of low unemployment rates, which exclude those not actively looking for work.

Nearly half of labor-force dropouts — 7 million in total — are addicted to opioids, often with tragic consequences. A 2015 report by the Drug Enforcement Administration found that more Americans died of drug overdoses (largely related to opioid abuse) than from either traffic fatalities or guns.

Medicaid has both financed this plague by covering almost the entire cost of prescribed opioids (which are often resold on the black market for thousands of dollars) and provided important treatment and rehabilitation for the addicted. Could requiring states to take more responsibility for Medicaid spending result in more stringent controls to deter opioid abuse, or will it lead to the gutting of critical drug addiction treatment programs? That remains unclear.

What is clear is that Donald Trump did not win the White House by threatening to gut the social safety net. Rather, he appealed to middle America by promising to deliver a better, more productive and prosperous life to hard-hit communities that are increasingly in despair. The slow-rolling collapse of Obamacare presents an opportunity for President Trump and the Republican Congress.

But now is not the time for unserious, philosophical dogmatism. Rep. Mark Meadows (R-NC), leader of the far-right "Freedom Caucus," dubbed the American Health Care Act "Obamacare Lite" and construed the refundable tax credit as a new entitlement that freedom-loving conservatives could not support. Yet Meadows and about one-third of the Freedom Caucus cosponsored then Rep. Tom Price's Empowering Patients First Act, which featured — you guessed it — a refundable tax credit. Indeed, refundable tax credits have been a key feature of all Republican health reform legislation for more than a decade.

But how can a $2,000 to $4,000 refundable tax credit for health insurance be enough for an individual making $20,000 a year? Avik Roy, president of the Foundation for Research on Equal Opportunity, says the American Health Care Act "isn't flawed because it offers financial assistance to the uninsured. It's flawed because it doesn't provide enough assistance to them, making premiums unaffordable for many poor people." He suggests changing the flat credits that vary only by age to be greater for those with lower income and gradually decline as income rises.

That would be a positive change for the voters that propelled President Trump to the White House. L

JOHN MCMANUS is president and founder of The McManus Group, a consulting firm specializing in strategic policy and political counsel and advocacy for healthcare clients with issues before Congress and the administration. Prior to founding his firm, McManus served Chairman Bill Thomas as the staff director of the Ways and Means Health Subcommittee, where he led the policy development, negotiations, and drafting of the Medicare Prescription Drug, Improvement and Modernization Act of 2003. Before working for Chairman Thomas, McManus worked for Eli Lilly & Company as a senior associate and for the Maryland House of Delegates as a research analyst. He earned his Master of Public Policy from Duke University and Bachelor of Arts from Washington and Lee University.

Understanding The Many Faces Of Innovation

MICHAEL NOVINSKI

By its very definition, innovation may travel long and painful paths, require repeated failure, and invite numerous mistakes to gather experience for bringing forward something new. Lady luck also intervenes occasionally, as well. We also can loosely associate innovation with the premise that knowledge is gained only through experience or mistakes. That "something new" can be a simple behavioral approach to an existing problem, or it can be an entirely new idea to improve our quality of life. Whatever it may be, innovation is rarely simple and straightforward. In most instances, if innovation is to be truly successful, it is filling a market need. After all, what's the point of having a better mousetrap if you don't need one? If you are thinking about being an innovator, get prepared for a pretty bumpy road, but know that it eventually smooths out and becomes an exhilarating ride.

INNOVATION EXAMPLES IN SPORTS & DRUG DEVELOPMENT

Let's look at two very different examples of innovation. The game of basketball was changed many years ago by the three-point shot. Initially, many people saw this as a gimmick, not innovation. But today, the three-point shot defines the game; rosters are built on a team's ability to get this extra point. Still, it took many years of failing by a few innovative coaches who eventually figured out the value of this shot — not only how it could improve their game but also how the paying customer would accept it. The three-point shot was originally introduced by the ABA, which was in existence from 1967 to 1976. The NBA finally adopted the shot in 1979. Now, years later, voila! We have the fast-paced, exciting game we all know.

The second example involves drug development, an expensive area for innovators that also benefits from a little luck every once and awhile. In this industry, only a true innovator can look at a side effect of a drug that is in development and failing to meet the primary endpoint based on the original investment and interpret that side effect as an opportunity. Of course, I'm talking about Viagra. Let's be honest: Until Viagra, discussions about erectile dysfunction were awkward (and sometimes still are). But today, it's not uncommon to turn on the TV and see a beautiful female model in a commercial talking about this problem and its solution.

> *"The next time you fail, just think, you actually may be on to something that will truly change the quality of life for someone — or many people."*

Remember, not everyone can visualize the opportunity that can come from a failure. But failure is likely the result of a mistake, and a mistake is experience, and experience brings knowledge. Innovators know this.

Viagra (sildenafil citrate) was synthesized in 1989. It was originally intended for heart problems, but it didn't show much promise in early trials. However, some of the volunteers in those trials were reporting erections after several days of taking a certain dose. The rest is history. The patent was granted in 1996, the product was approved in 1998, and sales peaked close to 2 billion dollars in 2008. In fact, the counterfeit market has been estimated in the range of $54 billion!

TOP 10 MARKET TRENDS FOR 2017

Innovation often leads to trends in a market, and the following are "US Life Science Top 10 Market Trends for 2017" according to a new report from IDC Health Insights.

1. Comprehensive eClinical platforms will become the norm.
2. Active patient engagement will become integral in clinical trials and beyond.
3. Actionable analytics will begin the expansion to cognitive computing, machine learning, and more.
4. Life science data consortia clouds will proliferate.
5. Service providers will cement their role in delivering industry-specific noncore competencies.
6. Life science cybersecurity will rise to the level of cross-industry best practices.
7. ACA changes will be a speed bump (not a roadblock) for outcome-based drug pricing.
8. IoT will ensure safety and efficiency in life science cold chains.
9. Using analytics, pharmas will provide digital product info "as you like it" for busy healthcare providers.
10. Drug Quality and Security Act (DQSA) serialization will offer a secret benefit – plugging the holes in revenue leakage.

Innovation indicates something new, and it requires patience. Sure, there are some short paths to innovation ... occasionally. For instance, Chrysler's introduction of the mini-van or the Caravan was an instantaneous success. But usually, innovators are very familiar with failure. Bob Dylan's first band lost a high school competition to a tap dancer. Steve Jobs began his career hacking into landlines to get free long-distance phone calls. Thomas Edison never thought he failed. He just explained it as, "I found 10,000 ways that don't work." Abraham Lincoln lost eight elections before becoming President and won the only two elections that mattered, both for President of the United States. In fact, Abraham Lincoln is the only U.S. President who held a U.S. patent. The patent involved a flotation device for boats to lift them over shoals or obstructions where they would often get stuck. Previously, the crews would have to unload cargo until the boat raised enough to get off the obstruction. The invention was never commercialized, but it showed how Lincoln was an innovator. Fortunately, other issues would become a priority for this great leader. He would establish himself and this nation on a path to freedom and preservation of the constitution.

INNOVATION FOLLOWS MANY PATHS

No one has a crystal ball that predicts the next great innovation. Still, some people on Wall Street will try to convince you that they have all the answers. I would be careful how you weigh these conversations. Innovation is going on all around us; it's springing up everywhere. Of course, so is failure. We develop these innovations and learn how to move forward. For me, the path has stayed around healthcare. And, where I have been involved in the development of many innovative ideas that have become products, I have also gained exposure to various therapeutic fields with a variety of healthcare professionals from research to treatment and everything in between. Innovation follows many paths for any industry. It's not always evident. It's frustrating, yet rewarding. In fact, as mentioned earlier, it's exhilarating! But often, this exhilaration comes only at the end of the innovation cycle. We experience many levels of failure, and the conclusion comes with the pragmatic application of innovation. True innovators recognize this.

Indeed, failure and experience are often synonymous and accompany innovation much of the time. So, the next time you fail, just think, you actually may be on to something that will truly change the quality of life for someone — or many people. It helps if you pause and reflect on those failures and the lessons learned and the distance traveled. Innovators need a mechanism for motivation. Many times this is internal motivation. Good luck and stay persistent!

MICHAEL NOVINSKI is the CEO and cofounder of Androvia Life Sciences, a biotechnology company focused on solving male fertility issues.

Aridis Pharmaceuticals

An anti-infective immunotherapy developer on a mission to replace antibiotics with engineered antibodies and novel mechanisms

WAYNE KOBERSTEIN Executive Editor
@WayneKoberstein

SNAPSHOT

Aridis Pharmaceuticals is a private, anti-infective immunotherapy company developing engineered monoclonal antibodies derived from the B-cells of infection survivors to activate the immune system against targeted bacteria and viruses. It has one antibody ready to enter in Phase 3 to treat hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP), one in Phase 2b/3 for pneumonia and sepsis, and one in Phase 2b for pneumonia and cystic fibrosis. It also has a single small molecule drug (gallium) with a unique, broad-spectrum antibiotic mechanism (iron-pathway inhibition) ready to enter the clinic.

WHAT'S AT STAKE

Most middle-school kids nowadays could recite the weaknesses of conventional antibiotics — stomach aches and diarrhea, risk of fungal infections, poor matching of disease to therapy, rampaging drug resistance, and so on. And business analysts will readily tell you why the field lies barren for lack of industry interest in the discovery and development of new antimicrobials. It seems only small startup companies have the courage to take on such a risky mission with an uncertain expectation of potential rewards. When the emerging science is compelling, a company like Aridis will step forward in an attempt to raise the bar.

Everything in the business model of Aridis depends on drug mechanisms — the play-by-play pathway by which a therapeutic agent works to defeat a disease or condition. Drugs are mechanistic because diseases are mechanistic. Contemporary antibiotics target a variety of metabolic and reproductive pathways in certain bacterial species, usually with the aim of hitting the widest possible variety or spectrum. Most of the Aridis compounds in development, however, apply the company's antibody technology to tap the power of our oldest bacterial defense: the immune system. Rather than attacking and invading bacteria directly as antibiotics do, the antibodies attach to bacteria-cell antigens to activate and orchestrate a full immune response, up to blocking bacterial toxins, as in sepsis.

Aridis "mines" the antibodies from people who have survived bacterial and viral infections through immune response or natural immunity — and from the data that identifies the particular immune cells and antibodies protecting those rare survivors. According to the company, the B-cells of people in those tiny subsets produce potent monoclonal antibodies that can be reproduced without the need for genetic engineering.

"We didn't want to be just another developer of a second-, third-, or fourth-generation resistant class of antibiotics," says Vu Truong, Ph.D., Aridis' founder and CEO. "Large databases have emerged from which we can mine data, allowing us to discover and screen human B-cells faster than ever before." The Aridis discovery platform, MabIgX, not only pinpoints the protective B-cells in a patient but also selects B-cells that are genetically stable and have high antibody productivity. "Then we have a highly engineered fusion-partner cell line that is designed to fuse with the discovered B-cell, which allows us to move directly into clinical manufacturing," Truong says. "It is a hybridoma cell line that is stable and immortalized, and it is actually the factory that makes the drug itself. Because our method bypasses the need for recombinant DNA, we can move from patient blood to GMP clinical material in about half a year."

Aridis' trials generally compare the standard antibiotic treatment alone to standard plus the company's candidate, aiming to show significant improvements in survival, symptoms, and care cost. Those parameters stand out in contrast against the background of hospital care with HAP and VAP, the initial targeted indication for the company's lead candidate. "What we saw is a very nice, consistent trend toward clinical improvement," Truong says. He sees irony in the public's view of anti-infectives as commodities, considering the rapidly diminishing options in practice, the already skyrocketing costs of drug resistance, and the financial risk impeding new-drug R&D in the field.

VU TRUONG, PH.D.
Founder & CEO

Vital Statistics

25
Employees

Headquarters
San Jose, CA

Finances

Total Raised
$55M
VC Rounds

High net-worth individual investors, Shenzhen Hepalink Pharmaceutical Co.

Research Partnership Funding

Nondilutive Grant Funding
(>16 grants) from NIH, DoD, BARDA et al.

Current
Cystic Fibrosis Foundation, NIH, undisclosed top-3 pharma partner, and Shenzhen Hepalink Pharmaceutical Co.

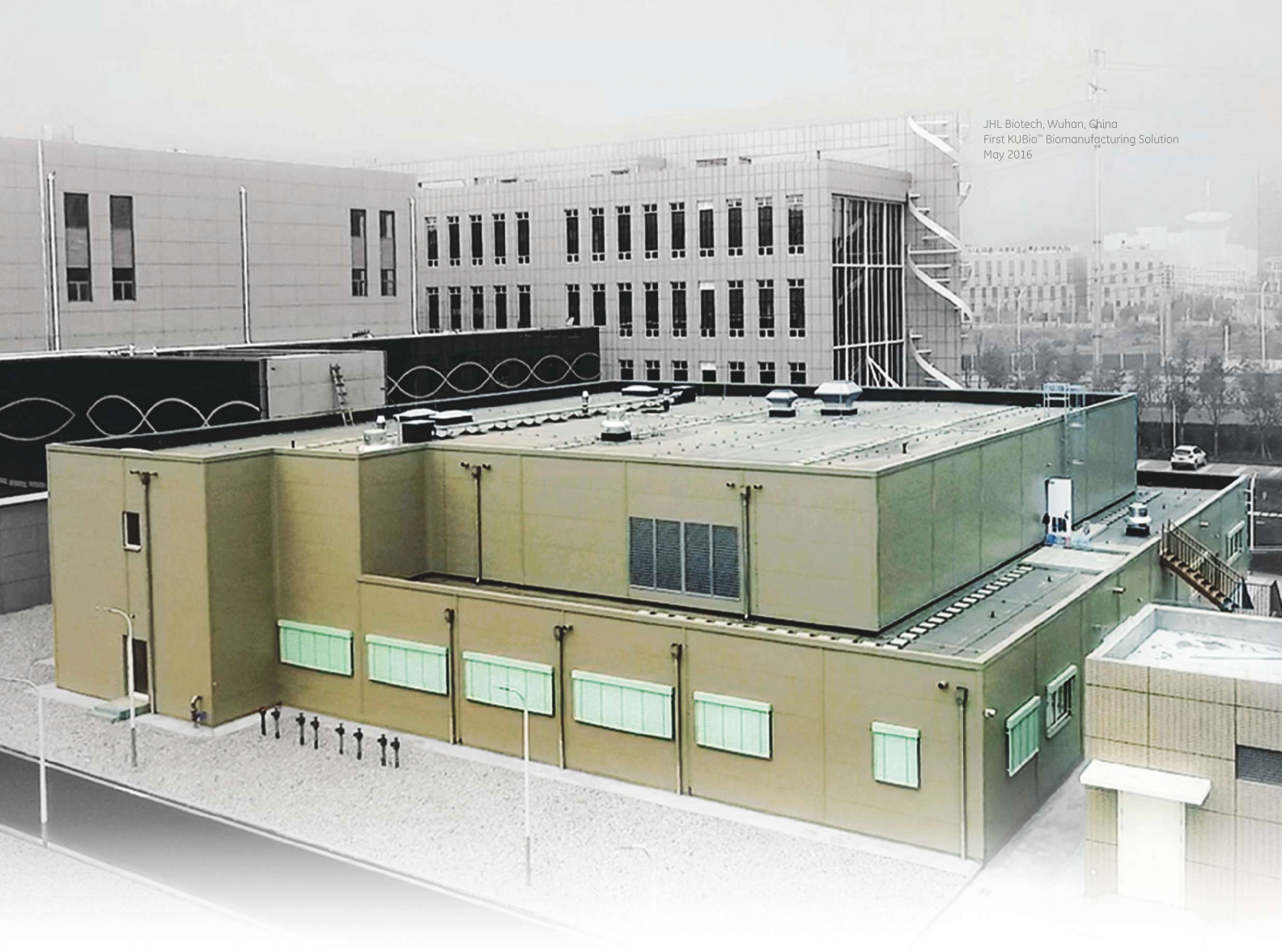
Other Partners

Outlicensed company technologies to two undisclosed pharma partners

Latest Updates

January 2017
Therapeutics development award from Cystic Fibrosis Foundation Therapeutics

January 2017
Positive clinical data from Phase 1/2a of human mAb AR-301 for treating pneumonia



JHL Biotech, Wuhan, China
First KUBio™ Biomanufacturing Solution
May 2016

Transform biomanufacturing

Whether launching a new molecule for the first time, bringing biosimilars to emerging markets, or moving toward commercial manufacturing, GE's Enterprise Solutions provides you with real options at every stage of biomanufacturing. With renewed flexibility, speed and efficiency, we help you extend the availability of quality biologics to regions where they are needed most.

Apply a range of comprehensive solutions including a fully functional facility, flexible single-use platform, integrated automation and a suite of tailored services to accelerate your bioprocessing journey.

gelifesciences.com/enterprise

GE Healthcare Bio-Sciences AB, Björkgatan 30, 751 84 Uppsala, Sweden.

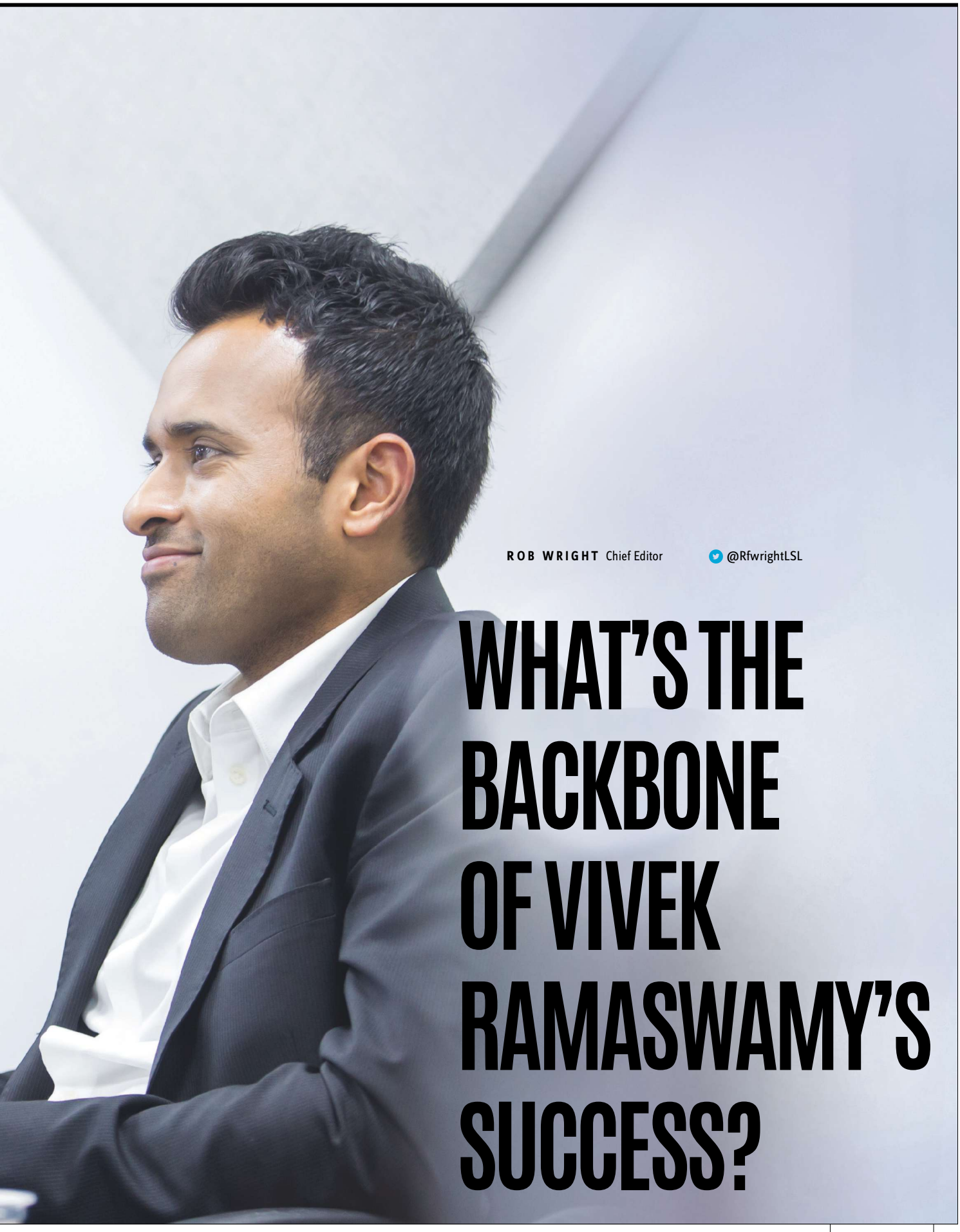
29215294 AA 03/2017

Sitting on the bottom step of a narrow, dimly-lit, back-hallway staircase at the Handlery Union Square (a 1920s-era hotel in San Francisco), I find myself ruminating on two sayings: "Invest in what you know;" and, "If it sounds too good to be true, it probably is." It is Wednesday, January 11, during the 35th Annual J.P. Morgan Healthcare Conference (i.e., JPM), and I am waiting to enter a room in this hallway where I'll meet with Roivant Sciences' founder and CEO, Vivek Ramaswamy.

Ramaswamy has been portrayed by some as the next wizard of Wall Street by "conjuring drug companies from thin air." Perhaps this is the reason behind my recent contemplation — a poke from my subconscious to uncover if what Ramaswamy is trying to do (i.e., liberate undeveloped drug candidates from the R&D shelves of other companies) is in fact too good to be true. I am soon greeted by Pavan Cheruvu (see sidebar "What Type Of Top Talent Do You Surround Yourself With?"), a member of Ramaswamy's team, who ushers me into the room where I take a seat at a round table. When Ramaswamy arrives, he looks weary, no doubt from the seemingly endless meetings, receptions, and peripheral events surrounding JPM. Still, he manages that trademark smile that has graced the pages of *Forbes*, and as I explain that we are not interested in writing a similar story — namely one perpetuating his wunderkind stereotype — that smile turns to a look of intrigue. I know that look because it's the same one I had when I first heard about Ramaswamy. I was curious. Yes, I wanted to know why he had chosen this path, but more importantly, I wanted to know how he had done it. After all, it's not every day that a 31-year-old tries to change the rules of how a traditional pharma company should operate.

THE IMPETUS BEHIND THE MISSION OF LIBERATING THE LANGUISHING

First, let's do a quick review of why Ramaswamy has garnered so much attention. For years as an investor, he had his eye on the biopharmaceutical industry. In 2008, as an analyst for QVT Financial, Ramaswamy began buying shares of Pharmasset at about $5 a share. By the time Gilead decided to acquire the company in 2011 for about $137 a share he was one of Pharmasset's top shareholders. He repeated this "buy low, sell high" exercise with Inhibitex in 2012 netting a 25-fold increase over QVT's initial investment when the company was acquired by Bristol-Myers Squibb. All this success led to his being a partner at QVT at the age of 28, but he aspired to do more. "As an investor and industry observer, you can offer commentary and feedback," he shares. "But beyond allocating capital, there isn't much you can do to impact the system." In his investor role he was frustrated to see the number of promising drugs languishing in company R&D departments. "For reasons related more to corporate strategy than science, many potential drugs seemed to have gotten stuck in an industrywide logjam," Ramaswamy analogizes. While he understands the importance of biopharma companies wanting to focus on key therapeutic categories to stay competitive, this practice doesn't necessarily help the patient. So, he decided to try to fix the problem from the inside-out by starting his own company, Roivant. "Every time there's a dead-end investment into a promising drug, that cost gets spread out over every



ROB WRIGHT Chief Editor @RfwrightLSL

WHAT'S THE BACKBONE OF VIVEK RAMASWAMY'S SUCCESS?

> LOOK, THIS IS MY FIRST TIME IN THIS ROLE. INITIALLY, WHEN HEARING OTHER SENIOR LEADERS REPEATEDLY TALK ABOUT THE IMPORTANCE OF CULTURE, I WAS SKEPTICAL.
>
> VIVEK RAMASWAMY | Founder & CEO, Roivant Sciences

drug that ultimately makes it," he says. "So beyond rescuing drugs, the hope is that we can reduce the average time and cost of the drug-development process."

One of his first rescue projects involved an Alzheimer's disease drug at a company no longer focusing its resources on neurosciences. "It's a curious fact that the top two drugs for the treatment of Alzheimer's disease, Aricept (donepezil hydrochloride) and Namenda (memantine HCI) had both been sitting on shelves and required revival before eventually gaining U.S. approval," he explains. Compelling science resulted in Axovant Sciences (a Roivant company), acquiring a drug candidate, Intepirdine, from GSK for $5 million upfront. (But not every acquisition goes as planned — see sidebar — "How A Lost Opportunity Led To Roivant's Core Business.")

Like most stories chronicling Ramaswamy's success, that one ended with the acquisition of a previously unused asset that may be revitalized. But there's more to this story and the others that make up the mythos of Roivant and Ramaswamy. For example, what's often not mentioned about the acquisition of that particular drug is that Ramaswamy brought on board Larry Friedhoff, M.D., Ph.D., to spearhead its development. Friedhoff, who was responsible for developing Aricept, is now Axovant's chief development officer. While many outsiders focus on invalidating how Ramaswamy (a non-Ph.D. scientist) could possibly be successful in picking which idle drug candidates could be the next breakthrough, perhaps what they should pay attention to is how he manages to surround himself with staff that — as Ramaswamy readily admits — are truly the backbone of the company's success.

WHAT'S THE BEST PREDICTOR OF FUTURE PERFORMANCE?

"We prefer doers over talkers," says Ramaswamy while pondering how the Roivant family of companies has grown to employ 170 people. "But because interviews are all about talking, the process of interviewing makes it difficult to ferret out the doers." One thing Roivant does during the interview process is to put candidates through some type of exercise that replicates some of the duties of the job they are seeking. "We learn a tremendous amount from how people respond to this process," he relates. "Some people get very motivated and do an outstanding job." In fact, he says one recent candidate stated that even if she didn't get the job she'd like Roivant to continue giving her assignments. "Her current job was so unmotivating, and these assignments were so much more fulfilling and in line with what she'd rather be doing, that she was willing to do them for us for free," Ramaswamy laughs. "Predictably, we ended up hiring her." But not all approach the process with such energy and vigor. "Others go through the exercise but don't do as well as their talk might have suggested," he shares. "Those are the kind of people who may very well get ahead through political maneuvering, managing their manager, or highlighting their own accomplishments, but when push comes to shove, might not have the chops to actually get something done." (see sidebar — What Type Of Top Talent Do You Surround Yourself With?) Roivant also employs some newer technologies to help it find its "exceptional" candidates, including an app designed to determine which qualities exhibited in the interview process correlate with subsequent on-the-job performance.

Ramaswamy believes that every senior-level manager has to be capable of actually doing the primary work of their direct reports. "This supports the idea of oversight being inextricably linked with the actual action itself," he says. This is why Roivant places such a premium on seeing not only how someone does during the assigned task component of the interview process, but also how they respond to just being given an assignment.

AN UNUSUAL APPROACH TO EMPLOYEE RETENTION

Most of you are probably familiar with the concept of golden handcuffs, a collection of financial incentives

HOW A LOST OPPORTUNITY LED TO ROIVANT'S CORE BUSINESS

For Roivant to be successful, biopharmaceutical companies not only must agree that the company is trying to help solve one of its biggest challenges (i.e., R&D prioritization), but be willing to open its R&D cupboards to Roivant's scientific team for review. And while Roivant's founder and CEO, Vivek Ramaswamy, admits that after three years the process has gotten a bit easier, it wasn't always that way.

"In 2014, a large-cap biopharmaceutical company had a promising compound for a very specific biological target," he reflects. "We studied what we could from the publicly available information and thought it had the potential to deliver a major medical advance in an area of unmet need." According to Ramaswamy, Roivant tried to get in touch with senior R&D decision makers for the project but were unsuccessful. "We were able to establish contact with some lower-level folks in the organization who were quite receptive, as they were under the impression the compound was not moving forward," he states. As a result, Roivant spent several months putting together an extensive development plan for the compound. "We approached these junior-level people with a potential deal to acquire the asset, something we felt to be a real win-win," he says. The 50-page document was presented to the other company's research committee. "It was decided that this was exactly the plan they should be adopting in taking the drug forward themselves," he says in exasperation. "Not once, neither before, nor after, did we have any contact with the senior-level team members responsible for making that decision." Ramaswamy admits that this was quite demotivating at first. "At the time we were a small organization – less than fifteen people – working out of a shared, windowless office that didn't even have air conditioning," he recalls. "We had put a lot of eggs in this basket, not financial per se, but intellectual resources, and time, which was our scarcest commodity." While the Roivant team was disappointed about losing the opportunity to add the compound to its pipeline, of greater import was how the experience made them question their business model. "Was this going to be an obstacle that would happen time and again when approaching the goal line?" they wondered. "But we took a step back and looked at our organizational mission – to participate in the process of delivering drugs to market that otherwise would not have seen the light of day," says Ramaswamy. "That had occurred, even if we were not the company to move it forward."

So rather than dwell on the missed opportunity, Ramaswamy used it as an opportunity to rethink the company's approach. "We received feedback that it would have been much more productive to have had an R&D exchange between teams rather than trying to make it a transactional relationship," he explains. "Furthermore, though we were a well-capitalized company, there were questions as to how a 15-person company could develop the drug into an approved medicine." As a result, Roivant not only redoubled its efforts to find the next opportunity but also set about quickly building an internal research infrastructure. "We learned the importance of developing intellectually connected R&D relationships at very senior levels of leadership versus approaching opportunities strictly from a transactional basis. And we learned the importance of dealing directly with decision makers." All of these lessons helped sow the seeds for what eventually became Roivant's core business model – being a solutions provider to these companies, rather than a "transactional counterparty."

designed to encourage employee retention (e.g., stock options that can be exercised three years after being granted to those still employed at a company). And while such tools are useful, Ramaswamy is employing more of a golden parachute approach to employee retention. "It's modeled on a similar policy at Zappos and is more aligned with the culture we are aspiring to create." The goal of the program is to make sure people hired by Roivant are truly prepared and committed to taking the leap. Here's how it works.

During the first two months of an employee's tenure, each new hire goes through orientation along with a substantial onboarding program. "At some point in those two months, I meet with every new hire, either individually or as a group," Ramaswamy explains. "At the end of the two months, we give everyone a form that gives them the option to either opt in — meaning they want to continue working here, and we ask them to state their reasons why — or opt out." The latter option includes a very attractive financial package and is intended to determine the employee's commitment to working at Roivant. Ramaswamy feels that many people, after decades of working at large multinational firms, continue going to work out of a passive habit, rather than remembering the active choice they once made. "Opting in [i.e. turning down the large opt-out financial package] symbolizes that each day an employee walks in the front door, they want to be here." I think this process helps people affirm that," he says.

Ramaswamy doesn't view the decision to opt out as being a bad one. Rather, by allowing some self-selection at Roivant (and its affiliated organizations), the company is more likely to have an appropriate fit between the people and the pace/intensity of the work being done. "We encourage people who don't want to be here to leave," he states candidly. "But if someone's just not meeting our standards, we believe in showing them gracefulness and letting them know we appreciate the risk they took by joining us." In such circumstances, the company allows these employees to participate in something closely resembling the opt-out program and assists them in finding another job better suited to their manner of working.

The opt-out program plays a key role in the corporate culture Ramaswamy is striving to create. "Look, this is my first time in this role," he admits. "Initially, when hearing other senior leaders repeatedly talk about the importance of culture, I was skeptical." But his preliminary perception of its being "corporate mumbo jumbo that didn't relate to getting any actual work done" soon changed. "We were scaling Roivant up from startup into a professionally managed firm," he shares. "During the transition we encountered microcosms of unproductive behavior and work not meeting our standards, yet we were only at a size of perhaps 10 very capable individuals." Ramaswamy says the concept he had heard preached regarding the importance of proactively managing corporate culture must have nestled somewhere in his subconscious. For when he saw first-hand what was happening, it really clicked. "I quickly realized that getting the company on the path I wanted it to go required proactively setting cultural norms," he states. "I feel like I'm speaking to you as though I'm some practiced and accomplished corporate culture guru — far from it. I consider myself very much a student and experimental scientist with respect to many of the initiatives we have implemented. All I can tell you is that we have thought a lot about the things we are trying, with the awareness that there is substantial room for improvement."

While it remains to be seen if what Ramaswamy is doing via his collection of corporate "vants" (Axovant, Myovant, Enzyvant, Dermavant, etc.) is "too good to be true," what can't be denied is his willingness to invest in that which he knows: people. L

WHAT TYPE OF TOP TALENT DO YOU SURROUND YOURSELF WITH?

If you took the time to review the leadership teams and corporate boards of various Roivant companies, you would see a rather impressive cadre. For example, Laura Williams, M.D., head of clinical development at Myovant Sciences, spent her previous 18 years working in R&D at Abbott/AbbVie. Mark Altmeyer, president and chief commercial officer at Axovant Sciences, previously served as president and CEO of Otsuka America Pharmaceuticals. Other executives and board members hail from J&J, Merck, Pfizer, and Roche (to name a few). But what about those employees whose bios can't be found prominently listed on Roivant corporate websites? After all, most leaders attribute their success to being surrounded by "great teams" or "top talent." Let's look at some of the other team members Vivek Ramaswamy (Roivant founder and CEO) has recruited to surround himself with.

Pavan Cheruvu (mentioned in the main article) earned his medical degree from Harvard Medical School in 2009. During medical school, he took a year's leave to conduct preclinical studies of a diagnostic catheter at Infraredx (a startup cardiovascular imaging company). He also has a Bachelor of Science in biomedical engineering, electrical engineering, and chemistry from Duke University. He did a summer internship at Guidant Corp. designing cardiac device technology. He then completed a Master of Science as a Rhodes Scholar at the University of Oxford. Cheruvu joined Roivant after emailing Ramaswamy telling him he needed a chief of staff and that he would like to fill the role. Ramaswamy agreed.

Roivant's most recent c-suite hire is Dan Rothman, the company's CIO. He previously worked for Goldman Sachs as the head of digital structuring (i.e., responsible for the strategic development of internal and external technology platforms). Prior to this, he worked at Lehman Brothers, Banque Nationale de Paris, Kidder Peabody, and Xilinx. Rothman completed his Bachelor of Science in electrical engineering at MIT in just three years, before going on to complete a Master of Science in electrical engineering and computer science, also from MIT. He is responsible for ensuring that Roivant remains innovative in its use of technology across the entirety of the company.

Karen Segal, Ph.D., is a VP of clinical research at Roivant. With 19 years of leadership experience in clinical development and medical affairs, Segal most recently worked at Mesoblast where she was the therapeutic head and medical lead for a cell therapy product for metabolic and inflammatory disease. Her previous work experience includes stints at Hoffmann-La Roche, Sanofi-Aventis, Academic Medical Development Corporation, Regeneron, and J&J. Segal completed a Bachelor of Arts in English literature at Wesleyan University before going on to complete a Master of Arts, a Master of Education, a Ph.D. in Clinical Physiology, as well as a postdoctoral fellowship, all at Columbia University. Segal is currently working extensively on Roivant's rare disease work at its wholly-owned subsidiary, Enzyvant.

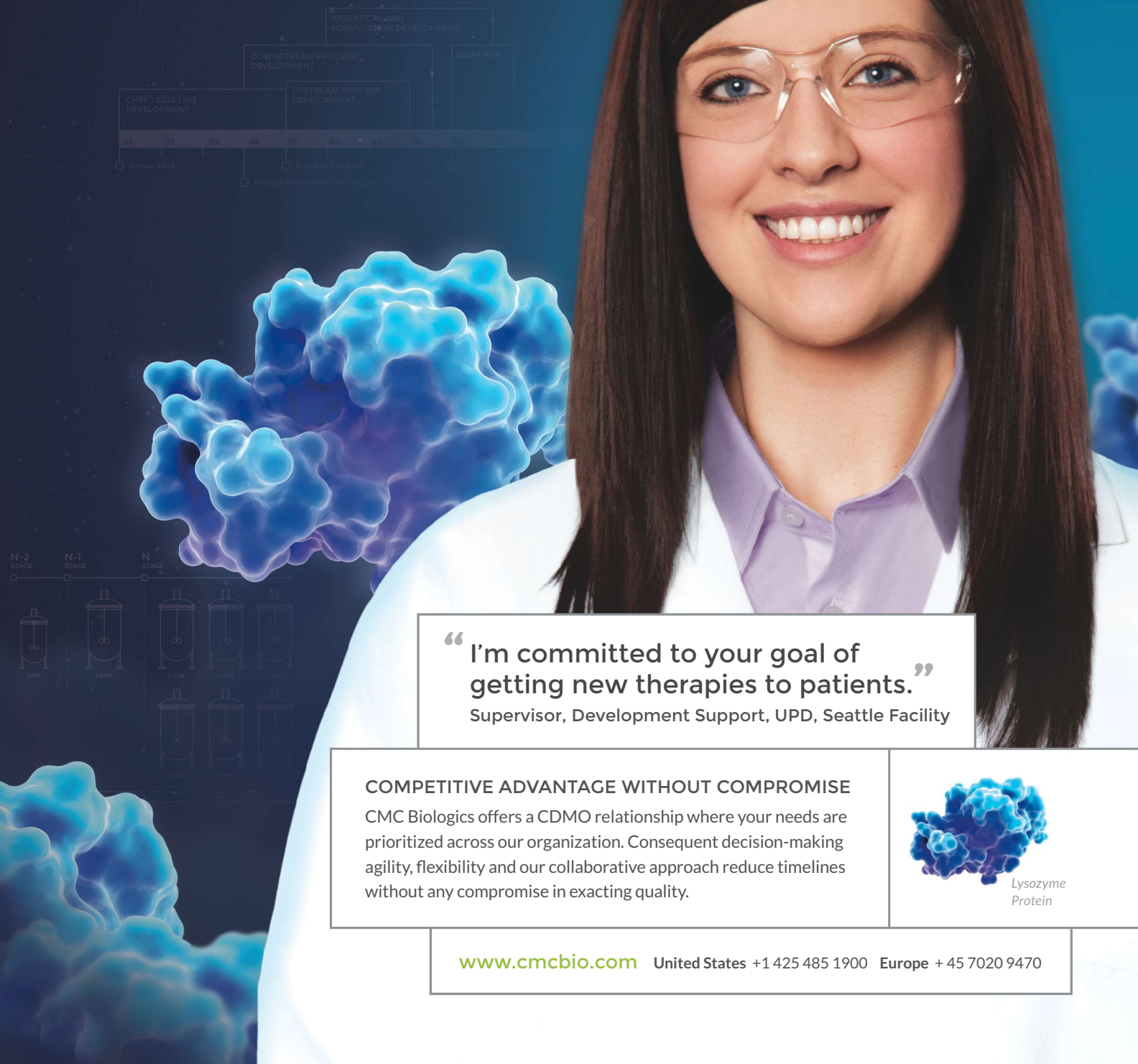
Finally, Melissa Rhodes is working as the VP of nonclinical research at Roivant. Rhodes joined the team in 2015 after working for nine years at GSK, where she held several positions in safety assessment. Rhodes is responsible for overseeing pharmacology, DMPK (drug metabolism and pharmacokinetics), bioanalytical sciences, and toxicology for multiple programs. In her two years at Roivant, she has managed over a hundred nonclinical trials. Rhodes completed a Bachelor of Science in Zoology at North Carolina State University before earning a Ph.D. in Pharmacology and Toxicology at Duke University. She is based in Roivant's Durham, NC office, located within the historic downtown American Tobacco Campus.

Visit us at Outsourced Pharma
Boston | April 26 - 27 | Booth #115

CMC biologics

Right. On Time.

As a global CDMO our commitment to your process development and cGMP manufacturing needs is prioritized across our entire organization.



"I'm committed to your goal of getting new therapies to patients."
Supervisor, Development Support, UPD, Seattle Facility

COMPETITIVE ADVANTAGE WITHOUT COMPROMISE

CMC Biologics offers a CDMO relationship where your needs are prioritized across our organization. Consequent decision-making agility, flexibility and our collaborative approach reduce timelines without any compromise in exacting quality.

Lysozyme Protein

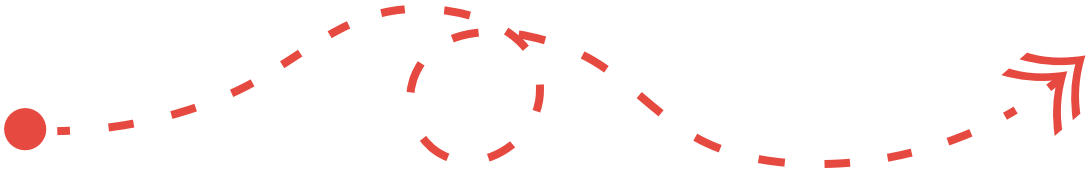
www.cmcbio.com **United States** +1 425 485 1900 **Europe** + 45 7020 9470

ROB WRIGHT Chief Editor @RfwrightLSL

JOURNEY TO THE CORPORATE BOARDROOM

PART 2:
THINK YOU'RE READY TO BUILD YOUR COMPANY'S BOARD?

In Philadelphia this past December, BioBreak and Drexel University brought together a number of thought leaders to discuss issues regarding corporate boards, prompting *Life Science Leader* to create a "Journey To The Boardroom" series of articles. In part 1, we provided information on how to go about seeking corporate board opportunities. In part 2, we dig into what company leadership should think about when building a corporate board. To be sure, one aspect all companies should be considering is how to make their boards more diverse. In fact, on January 10, 2017, the Massachusetts Biotechnology Council (MassBio) published an open letter of guiding principles for gender diversity, noting it should be a priority for the biopharmaceutical industry. Perhaps here is one of the reasons why: For though S&P 500 companies can currently boast 99 percent of its members having at least one woman serving on a board, the reality is that less than a quarter (20 percent) of these publicly traded company board positions are presently filled by women. Common sense indicates that we can certainly do better. Maybe this is why last year 13 of the world's most well-known and influential business leaders got together to develop the Commonsense Principles of Corporate Governance, of which diversity is point number two. But beyond diversity (gender and otherwise), what else should leaders be thinking about when building their companies' boards? For this we engage the following six executives in a directed Q&A: Richard Baron, former CFO and board member Zynerba Pharmaceuticals; Madeline Bell, RN, president and CEO of Children's Hospital of Philadelphia (CHOP) and Comcast board member; Rich Daly, president, CEO, and chairman of the board for Neuralstem; Nance Dicciani, Ph.D., former president and CEO of Honeywell Specialty Materials and former member of the U.S. President's Council of Advisors on Science and Technology (currently on the boards of Halliburton, LyondellBasell, Praxair, and AgroFresh); Kirk Gorman, former CFO Jefferson Health Systems and board member of several companies (e.g., BioTelemetry); and Barbara Yanni, former head of licensing at Merck and board member of Trevena, Symic Biomedical, and Vaccinex.



LIFE SCIENCE LEADER (LSL): What has been your experience with how boards are built?

RICHARD BARON: Boards are generally developed in one of three ways. A classic scenario typically involves a friend, perhaps a current or former investor, or maybe a former high-level employee of the company contacting someone they know and trust about a board position. Another case involves serial CEOs (i.e., an executive develops several companies) who keep going back to the successful team they worked with in the past. Although in such situations, you'll often see a core group of board members from one company to the next, these CEOs (and their boards) recognize the need to periodically go outside the core to secure specific expertise (e.g., business development).

> **"I can't fill a valuable board seat with somebody who is good at only one thing."**
>
> **RICH DALY**
> President, CEO, Chairman of the Board, Neuralstem

I will draw on my most recent experience to explain a third way a board can be developed. I was involved with a CEO who set up the board based on where he wanted to be from a financing perspective. His goal was to be a public company and to do so very quickly. As such, he developed a public-style board while the company was still private. The board did not involve any venture capitalists (as they tend to be on a board when private, but roll off when going public), but consisted of a diverse group of people with deep expertise in specific therapeutic classes on which the company was working. Having an executive (or a group helping to form a board) knowing what the end play will be can enable a much quicker IPO, which in this case, took less than a year. Building a public-style board when you are still private can be a wise strategy.

LSL: Explain how you revamped the Children's Hospital of Philadelphia's (CHOP) board.

MADELINE BELL: Like most hospitals or universities, we had a large board. In fact, when I became CEO we had 30 board members, which is small when compared to some other boards who consist of 45 to 60 members. The reason for large boards in the nonprofit world is that we are charities, and we are trying to raise money. But there is also a long-standing community commitment, which is often exemplified by having community members serve on the board. Some of CHOP's board members didn't have term limits and had been on the board for 50 years. Again, this is not unusual for a hospital or a university. But as an organization that generates around $2.6 billion in annual revenue and employs 14,000, we needed a board that could not only help us for where we are today but also where we want to grow in the future. The leadership team felt that an ideal situation would be to have a 12-person board, and so that became our goal. We started by determining what we wanted on the board (e.g., competencies, experience, background, diversity). Personally, I wanted a mix of board members who had been CEOs, as not only would they understand what it was like to walk in my shoes, but also they would also have an understanding of the difference between management and governance. We hired a consulting firm to help us develop board member profiles and to facilitate agreement on these between me and the board. Some of our board members used this time as an opportunity to retire and go to emeritus status so that we could keep them engaged. In addition, we went through an assessment process that not only gave board members the opportunity to assess each other, but also gave me the opportunity to assess them. We went from 30 people to 14. And while we didn't quite get to 12, we were able to make some significant changes beyond numbers, such as the inclusion of term limits and the implementation of a staggered approach toward adding new members (i.e., cycle two members off and cycle two new members on every year).

LSL: What does a board look for when considering someone for a position who is also working full time?

RICH DALY: The first thing we look for is an employer's permission to serve, as these conversations can be very time consuming and a waste of time if the person doesn't have permission. Beyond this, I approach securing board members similar to hiring; I ask people what it is they hope to teach as well as what they hope to learn. When it comes to posing such questions to a potential board member, the answer either should never be everything or nothing. Because if a person has done everything, then why are they joining the board? What will they be able to learn? Regarding teaching, this is important because we want somebody to come

onto a board who can help the rest of us learn. Keep in mind, teaching is not someone coming to board meetings to pontificate, as that is just a bad situation. Another thing I look for is a multifaceted player. There are four fundamental parts of every healthcare company — finance, R&D, operations, and sales and marketing. You need to figure out in which of these four spaces you have expertise. And though it is likely someone won't be able to play in all four, someone should be able to play in more than one. I can't fill a valuable board seat with somebody who is good at only one thing. Is it important that they have previous related work experience? If so, then you can expect everyone on your board to be white, male, and 61.3 years of age. We are not interested in that. Of the three boards on which I serve, there is only one female, and that is ridiculous. We want new blood, because that brings diversity.

LSL: What advice would you give to the CEO of a start-up company when building its board?

BARBARA YANNI: You really want to have a range of expertise on your board. It's very helpful to have a strong finance person, as the SEC requires public companies to possess certain financial expertise. While it's a good idea to maybe have somebody from the very beginning who can fulfill that financial role, it is not necessarily mission critical in the very early days. However, the closer you get to going public (assuming that is your goal) the more important it will be to make sure you have the necessary financial expertise. It's also good to have someone with general management experience. Of course, a lot of board selections depend upon the stage of the company. For example, if it is a company in the basic research stage, it may be helpful to have some scientific expertise pertinent to that research area. However, sometimes scientific expertise can be captured through the use of a scientific advisory board instead of the actual board of directors. Try to take a big-picture perspective when building your board, and try to think about what your company needs now and in the near future to be successful.

RICHARD BARON: Try to employ foresight when developing your board. A common malady of CEOs is failing to acknowledge the things they don't do exceptionally well. Don't view a certain lack of expertise as a shortcoming but a gap, and develop your board with a mind-set of seeking members who can fill that gap. If you're not the BD person but know at some point you want to do licensing, find someone having the golden Rolodex of contacts, along with the skills that can help push your agenda forward. In the beginning, small and niche-y might be a good thing. But always try to be one step ahead of yourself. For example, if you are an expert in finance, you may not need a financial expert immediately. However, if you want to go public, you want to have the people with the necessary skills on your board a year or so earlier so they can be listed in the company prospectus, a document people will be looking at very closely as you transition from a private to public company.

NANCE DICCIANI: In a couple of situations I've seen, startup companies pay a great deal of attention to building their management team. They'll make sure they have the right kind of skills and people that not only complement one another but also fit into a desired company culture. But then these same companies rather quickly put their board together (e.g., they want a name, an affiliation with a certain institution, or some sort of special expertise). Spend as much time on building your board as you do building your management team. A CEO building a board should try to think of it as similar to hiring a consultant. Put people on your board who offer advice you would be willing to pay for. In some way you're going to be paying that, so you might as well get what you need.

> **"A lot of these smarter companies understand that having board members with diverse backgrounds, genders, ethnicity, and thought processes provides a competitive advantage."**
>
> **NANCE DICCIANI, PH.D.**
> Former President & CEO, Honeywell Specialty Materials

LSL: What advice would you give to the CEO of an established company when thinking about board composition and evolution?

KIRK GORMAN: When you think about where you want your company to be three or five years from now, you need a couple of board members with the appropriate skill sets to get you there. If you are going to be an international company, you ought to have someone with international experience. If you are planning on an IPO, get someone who has some other public company board experience who can help establish the gover-

nance environment, a finance person to help eventually lead the audit committee. Assess your weaknesses as a CEO and fill in around those gaps. Not to be overlooked is the intensity and stress of the conversations that go on in the boardroom. Pay attention to the way in which board members fit with each other and with the CEO. It has to be an odd mix of challenge, questioning, oversight, and monitoring from the board. People really work better when they get along, trust, and respect each other. If the interpersonal connections between board members (as well as board members with CEO) aren't right, it can be a miserable experience. Board members work better when they get along, so don't overlook the touchy-feely soft spot in all of that. The technical attributes you should be looking for in board members should be where that company is planning to go, not where it presently is. In other words, building a board should have an orientation toward the future.

NANCE DICCIANI: You want people who have lived through certain experiences (e.g., M&A, working in emerging markets, international expansion). In addition, you need people who can honestly and thoughtfully challenge ideas. You certainly don't want a board that's going to rubber stamp an idea, because that might not be what is best for the company. Being able to thoughtfully challenge leadership comes from experience and the confidence of having done those kinds of things in the past.

RICHARD BARON: Being that board chemistry is critical, making a board selection should not be just one person's decision, even in a private company. When you stand back from a typical growth chart, everything seems to always be going up and toward the right. However, if you get close enough you will see there are downs in there as well, and those are tense and struggling situations. Board chemistry is critical in getting through the good, bad, and indifferent times. Remember that you are networking not only with CEOs but also with other board members, and it is often those other board members who lead to other board referral opportunities.

LSL: What are you seeing in terms of gender diversity on boards?

NANCE DICCIANI: In the last few years, even among S&P 500 or Fortune 1000 companies, gender diversity among boards has crept up at a snail's pace. And though it has been slow, more and more companies have at least one female board member, so we are making progress. But if you look at diversity beyond gender, we are actually not doing so well. The last statistics I saw indicated that the number of African Americans serving on S&P 500 boards actually decreased over the last several years. While the Hispanic or Latino's percentage had increased by about 1 percent, it's still very small (i.e., 2 to 3 percent overall). Asian American board membership is currently around 2 percent. I think we'll continue to see more diversity among company boards because more people are talking about it, and the fact that a lot of these smarter companies understand that having board members with diverse backgrounds, genders, ethnicity, and thought processes provides a competitive advantage. L

IN THIS ARTICLE

RICHARD BARON is the former CFO and board member at Zynerba Pharmaceuticals

MADELINE BELL, RN, is the president and CEO of the Children's Hospital of Philadelphia (CHOP).

RICH DALY is president, CEO, and chairman of the board for Neuralstem

NANCE DICCIANI, PH.D., is the former president and CEO of Honeywell Specialty Materials and current board member AgroFresh Solutions, Inc.

KIRK GORMAN is the former CFO and EVP of Jefferson Health Systems.

BARBARA YANNI is the former VP and chief licensing officer for Merck, current board member for Trevena, Symic Biomedical, and Vaccinex.

ALAN WRIGHT, M.D.
Chief Medical Officer
Roche Diagnostics Corporation

COMPANION DIAGNOSTICS 101:

A PRIMER FROM ROCHE DIAGNOSTICS' CHIEF MEDICAL OFFICER

ROB WRIGHT Chief Editor @RfwrightLSL

Since the FDA approval and commercial successes of Roche's Herceptin (trastuzumab) and Novartis' Gleevec (imatinib), the companion diagnostic industry has moved from being viewed skeptically — to essential. What started out as a handful of oncology drugs and corresponding diagnostics has expanded to include additional therapeutic areas. The growth in companion-diagnostic utilization is a trend likely to continue as we close in on realizing the full potential proffered by precision medicine. According to Research and Markets, the global companion diagnostics market is poised to grow at a CAGR of around 18.5 percent over the next decade, potentially reaching $16.24 billion by 2025. "When presenting a companion diagnostic offering to biopharmaceutical executives after a drug has been launched, I have watched their eyes grow bigger and bigger as they realize they have hitched their per-share earnings to a business that doesn't respond to traditional marketing activity," says Alan Wright, M.D., chief medical officer for Roche Diagnostics Corporation in Indianapolis. "Essentially, we have to do Diagnostics 101 with these executives and explain how different the market is from that of biopharma." He should know. After all, Dr. Wright (no relation) not only works for the largest in-vitro diagnostic development company in the world, but in his career prior, he spent more than a decade on the PBM (pharmacy benefit manager) side of the business with CVS Caremark and Advance PCS. Dr. Wright sat down with *Life Science Leader* to share his experienced perspective regarding some of the nuances of launching a drug that requires a companion diagnostic.

LIFE SCIENCE LEADER: Why should biopharma executives care about the companion diagnostics business?

They should care because when a companion diagnostic is essential for the safe and effective use of a drug, the diagnostic is viewed by both the FDA and payers as the gateway to being able to use the therapeutic with patients. In such a situation, the successful deployment of a drug in the medical community becomes dependent on the successful deployment and use of a companion diagnostic. For example, the first companion diagnostic drug combination is HER2 and Herceptin. But back in 1998 when the FDA first approved Herceptin, HER2 wasn't an FDA-approved companion diagnostic. That all changed in August 2011 when the FDA approved Roche Genentech's Zelboraf (vemurafenib, a prescription medicine used to treat a type of skin cancer [i.e., melanoma] possessing a certain type of abnormal BRAF gene) and a companion diagnostic from Roche to determine BRAF mutation-positive metastatic melanoma. What we are now seeing is other companions and drugs being similarly co-approved. The fact that the FDA is now approving the diagnostic with the biopharma in parallel is a fairly recent phenomenon that will likely continue.

LIFE SCIENCE LEADER: What are the most important types of diagnostics?

Two of the most important diagnostics for biopharmaceutical manufacturers to be aware of are companion and complementary. The FDA defines a companion diagnostic as a medical device, often an in vitro device, which provides information that is essential for the safe and effective use of a corresponding drug or biological product. As the definition doesn't specify the diagnostic, it could be a blood test, a tissue test, or an imaging test. So while the definition is broad, the point is that the diagnostic is essential and could be used to diagnose, select proper patients, or monitor patients. People typically think of companion diagnostics in terms of genetic tests, sequencing, and oncology, but the fact is we [Roche] have projects that span diagnostic platforms. As for complementary diagnostics, that is a concept still in evolution. Elizabeth (Liz) Mansfield, Ph.D., director for personalized medicine and molecular genetics within the FDA, had initially defined complementary diagnostics as being distinct from companion diagnostics, noting that complementary diagnostics provide additional information about how a drug might be used, or whether someone should receive a class of drugs, rather than being necessarily required for the safe and effective use of a drug. In other words, complementary diagnostics provide additional information, but aren't essential for prescribing a drug. Here is a scenario where a complementary diagnostic might be used. Say somebody is at risk of complications or has poor performance status, and you have an oncology therapy that has an associated set of side effects. A complementary diagnostic could provide additional information indicating this patient has a high likelihood of responding to the therapy, or that the patient has a low chance, and given other factors (e.g., side effects), may not be a good candidate for this particular therapy. I also have heard people define complementary diagnostics as tests that are not unique to a specific drug but span drug classes.

LIFE SCIENCE LEADER: How long does the companion diagnostic approval process take?

Traditionally, it is similar in length to the approval of a drug. As such, if a company is developing a drug that looks as if it might require a companion diagnostic, you really need to have good and early engagement between the drug manufacturer and a companion diagnostic development company. Imagine you are a biopharma company that benefits from a drug receiving an accelerated approval process. For example, in 2015 Pfizer's Xalkori (crizotinib) received an FDA Breakthrough Therapy and Priority Review designation for the treatment of patients with metastatic non-small cell lung cancer (NSCLC) whose tumors are ROS1-positive. The therapeutic was approved by the FDA on March 11, 2016, based on a multicenter, single-arm Phase 1 study. In a press release announcing the drug's approval it was noted that "an FDA-approved test for the detection of ROS1 rearrangements in NSCLC is not currently available; however, lab-developed tests are available." But imagine if this drug required a novel companion diagnostic, and that lab tests were not available. A key point for all pharma companies to understand is that diagnostic companies have a rigorous and long development process that can often take years. If a therapeutic gets an accelerated approval by the FDA, diagnostic companies need to similarly accelerate their approach. Companion diagnostic companies are much like pharma companies in that we don't necessarily have a shelf-ready diagnostic that can be shipped at the time of launch.

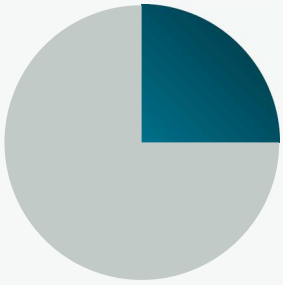
LIFE SCIENCE LEADER: What is the most critical component when preparing to launch a companion diagnostic?

Testing-access readiness is a big issue, because on the day of a drug's approval you want people prepared to run the necessary companion. Getting a lab up and prepared to run a companion diagnostic test can take months. It is not as simple as sending out a letter stating that kits are available, and to please call so we can mail them out so you can get started. To be ready on day one requires walking backward from the anticipated drug launch date. For a lab that serves a medical community to safely and effectively deliver a lab test, you first need to understand what it takes to be able to do so in a CLIA (clinical laboratory improvement amendments) certified fashion. Six to nine months before the actual drug launch date, you need to select sites that can perform this diagnostic and proficiency testing. Before launch, lab staffs need to be trained to perform the test, and pathologists need to be trained to be able to read the slide. This means that comprehensive study materials need to be available for those who will be conducting the tests, which in cases involving very rare conditions can be quite a challenge. Depending on the size of the testing sites to which materials are being deployed, it can be difficult to get all of the quality-control materials moved around appropriately. In addition, testing-access readiness involves the training of office staff and modifications to the laboratory information system to accommodate a new test. One of the issues we often run into is that many laboratories don't continuously modify their information systems, but apply a principle of batching so that new groups of tests are introduced to the lab's information system all at the same time. Ideally, you want to have a new diagnostic test hit that batching cycle at a time that allows for approved labs to become familiar with the test before launch. If that time is missed, you could find yourself having to wait to have the test added in the next batching cycle, which could be post-launch. Labs need to update their directories as well as their interfaces with electronic medical records (EMRs) to include the new test. And, as is often the case, many labs might not have the FDA-approved instrument, but a similar one that the companion diagnostic test can be run on. However, the lab will need to do the appropriate CLIA-lab-developed testing studies to get that test up and running on that piece of equipment.

LIFE SCIENCE LEADER: What are some of the nuances to be aware of in executing a companion-diagnostic testing-access readiness program?

Roche Diagnostics is regulated by the FDA. As such, we are unable to do prelaunch promotion. However, there is a safe harbor with the FDA where an appropriate number (an amount that has been negotiated with the FDA) of lab sites will have companion diagnostic testing available at the time of launch. So while we do have the ability to train certain community sites to ensure sufficient access to the companion diagnostic on day one of a drug launch, there is an "ideal" number of sites that we ultimately want to reach to achieve broad community access to the testing. This "ideal" number varies according to disease. For example, lung cancer is very common and community focused. As such, nearly every community hospital manages patients with lung cancer. So in a situation involving the approval of a drug for lung cancer that required a companion diagnostic, there should have been broad access to testing. However, for some rarer lung cancer tumor types that might require more specialized treatment, one would expect access to a companion diagnostic to be less broad, but available in those more specialized areas (i.e., cancer treatment centers). But for

ROCHE DIAGNOSTICS CORPORATION



Consisting of about 34,000 of Roche's 94,000 total employees globally, the Diagnostics division is responsible for approximately a quarter of Roche's total annual revenue (approximately $50 billion in 2016).

Roche Diagnostics works with nearly every major biopharmaceutical drug manufacturer on companion diagnostic projects, including its parent organization. The company presently has over 300 companion diagnostic projects underway.

purposes of facilitating ideal access to the diagnostics so the pharma companies can effectively deploy their technology, the key is getting those two networks to match (i.e., broad products requiring companion diagnostics have broad access to testing, while specialty products requiring a companion diagnostic have access to testing at a level commensurate with population demand).

Getting ready for testing-access readiness involves determining what the networks should look like, talking to regulators, creating materials, conducting focus groups or medical advisory boards, and conducting research to determine if there are any unforeseen obstacles. Another big consideration is to look at preanalytics handling (i.e., does the specimen require a special handling for the lab) that both the lab and the clinicians need to be trained on (e.g., using a different type of tube, collecting a different type of specimen). There may be a need to think about different companion diagnostic strategies. For example, a clinical study might use one type of specimen, but perhaps a condition in the community is actually diagnosed using three types of specimens. What is the strategy to bring those other specimens in so that the diagnostic can be done? Finally, getting ready for testing-access readiness and actually executing a testing-access readiness program can be a very delicate balancing act. Just as drug companies have to be very careful about what information is provided to the market before a drug is FDA approved, so too do diagnostic companies. When beginning to execute testing-access readiness we are extremely careful not to go beyond the list of FDA-approved sites. Unfortunately, we frequently get requests from labs wanting to be able to do a test on day one. If they are not on the list, we cannot work with them before day one.

LIFE SCIENCE LEADER: Thinking about the approval of a biosimilar that required a companion diagnostic, would the companion diagnostic just be grandfathered in?

Not necessarily. As with all molecular testing, there are often different techniques to assess a target gene, and there are regulatory pathways for labs to get certification for various ways of testing those genes. One of the subtle but important things is that the FDA-approved companion diagnostic be "tuned" to the performance of the drug. Depending upon the platform and technique used to conduct a companion diagnostic, the level of mutation or target detected can (and often does) differ. This can result in a slightly different community patient population being selected for the drug, and thus, the community performance of the drug may (probably will) differ from community performance of the drug in clinical trials. Further, there also can be groups of tests that are used to assess a particular condition that already exists in the marketplace. Though these might not be a companion diagnostic and use completely different analytes and targets, they may sound similar, or actually be called the same thing in the marketplace. As a result, these platforms can be used inappropriately to guide companion diagnostic testing (i.e., using a diagnostic off label).

LIFE SCIENCE LEADER: What does it mean to launch into a fee schedule?

PBMs negotiate the price in the marketplace for what they can charge for a drug. On the diagnostic side, if we have a companion diagnostic that is a PCR-(polymerase chain reaction) or sequencing-based test, the amount that is to be paid for that test is already established. Even though we may be measuring a new analyte, target, or panel, we will still get paid the same amount for the same or similar technique. A pharma company having successfully developed a drug for a rare disease is able to alter/raise the price for a new therapy to defray R&D costs. At least in the U.S., there is practically zero ability for diagnostic companies to set or negotiate a price. As such, when launching a companion diagnostic, we conform to doing so based on a fee schedule. While some might note that drug companies often launch into insurance company-tiered formularies, it is not the same. Because you could have a $100,000 drug being tier-two at one PBM, while at another PBM the drug could be similarly priced but listed as tier-three. The difference in tiers doesn't necessarily affect the price, but provides for either a difference in co-pay or co-insurance.

INDUSTRY EXPLORERS

The stories of longtime leaders, still active in the industry, sharing their historical perspectives on life sciences industry innovation.

WAYNE KOBERSTEIN Executive Editor @WayneKoberstein

Part 1:
Leading Business With Science
Geert Cauwenbergh of RXi

Life roads seldom travel in a straight line. Many if not most of the explorers in this industry have started their careers in one direction before taking another route entirely. Geert Cauwenbergh now can look back at his almost four decades in the industry — from his formative years working with Paul Janssen building a small company into a global phenomenon, to his later years as a startup entrepreneur with RXi — and reflect on how most of it has turned upon a snap decision. It was the early 1970s, and he was a young college entrant in his native Belgium.

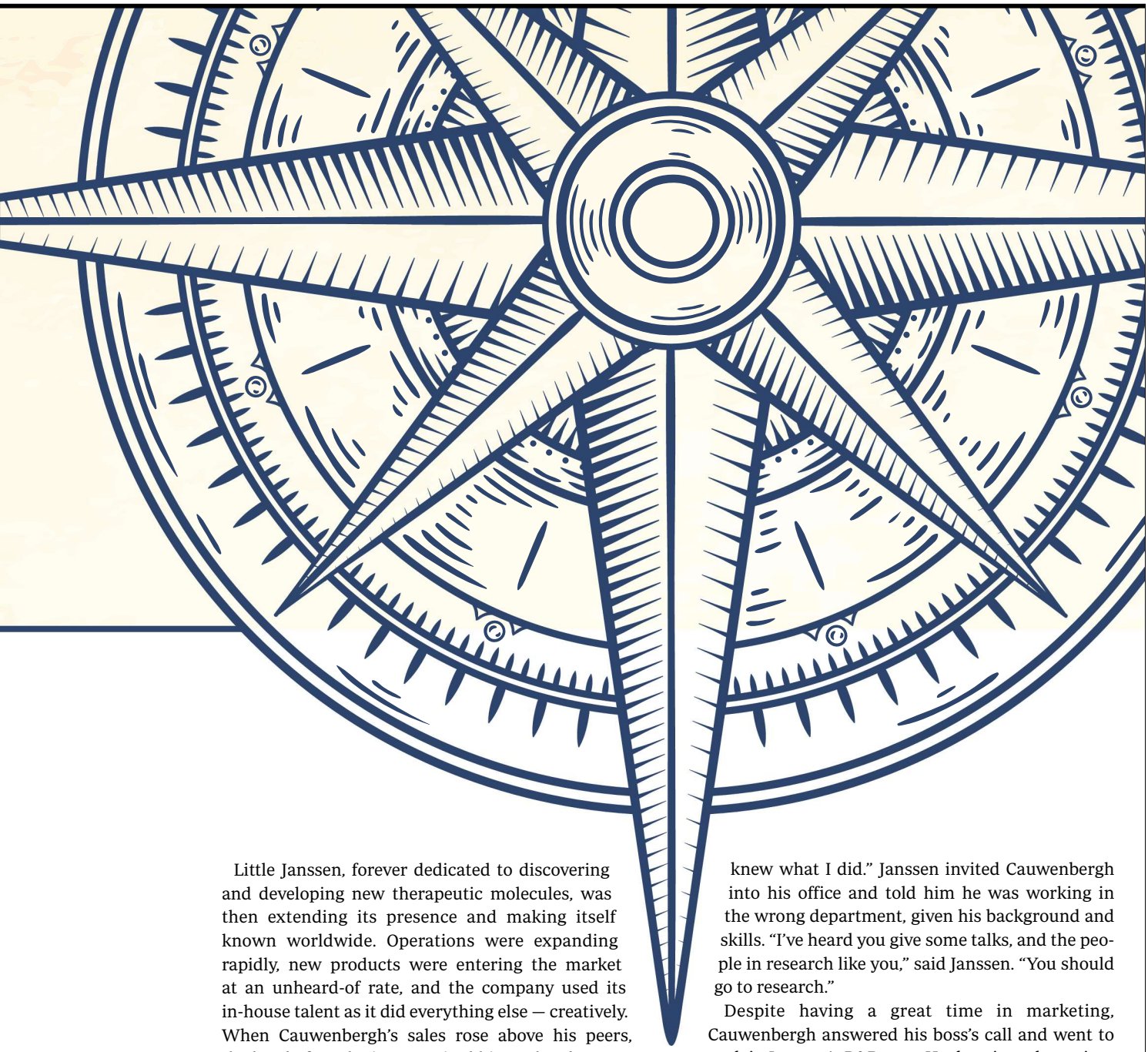
"When I was done with my high school, I told my mom that I wanted to register for medicine," he recalls. "I went to the University of Leuven, and I asked the people at the registration desk how many people have registered so far for the first year of medicine? They said there were about 1,200, and I said, 'What? I don't want to be part of such a big pack. Is there anything in science that is close to medicine where there are not so many people?' And they said, 'You could major in biology, that's close to medicine.' I came back home and my mom asked, 'So, you registered for medicine?' No, biology!"

Explaining Science

Cauwenbergh eventually earned his master's degree in an even less-populated field, especially in a near-landlocked country like Belgium — marine microbiology — thus satisfying both his love of science and preference for traveling in smaller packs. He found the first opportunity to apply his education in an unexpected, though not unlikely place: chocolate.

"A Belgian chocolate factory wanted to get started with microbiology quality control. They realized my education in marine microbiology had nothing to do with food microbiology, but they hired me anyway. And after a year, I had built the first microbiology quality-control lab in the food industry in Belgium."

Impressive as it was for its time, Cauwenbergh's QC lab was just a preamble to his first job in pharmaceuticals. In 1979, after a German company acquired the chocolate factory and centralized all operations, he was left with the menial job of taking samples for a lab in Germany. He eagerly sought other options and soon joined the proto-global Janssen Pharmaceutica in Beerse, Belgium, taking an open sales position.



Little Janssen, forever dedicated to discovering and developing new therapeutic molecules, was then extending its presence and making itself known worldwide. Operations were expanding rapidly, new products were entering the market at an unheard-of rate, and the company used its in-house talent as it did everything else — creatively. When Cauwenbergh's sales rose above his peers, the head of marketing recruited him to head promotional efforts for the company's antifungals, serving in its Belgium and Luxembourg offices. Marketing for Janssen then mainly consisted of explaining and presenting evidence that its new drugs made treatment of some conditions possible for the first time.

Cauwenbergh took to the work instinctively, gleaning the key attributes of a drug and often showing them visually in the clinical data charts. A trip back to Beerse, however, led to a fateful encounter. It was a chance meeting that illustrated how, despite its acquisition by Johnson & Johnson in 1961, the Janssen company still operated quite independently under its founder, "Dr. Paul" Janssen.

"I bumped into Dr. Paul in the elevator, and he said, 'Hi, Geert, how is miconazole marketing doing?' We had never spoken before, but he knew my name and he knew what I did." Janssen invited Cauwenbergh into his office and told him he was working in the wrong department, given his background and skills. "I've heard you give some talks, and the people in research like you," said Janssen. "You should go to research."

Despite having a great time in marketing, Cauwenbergh answered his boss's call and went to work in Janssen's R&D arm. He dove into the assignment and, in only nine months, led the development and won FDA approval of a new, rare-disease indication for the company's second-generation antifungal, ketoconazole (Nizoral). Yet just as his R&D role seemed assured, the lead marketer for Nizoral left the company, and Cauwenbergh was the obvious candidate to fill the empty position. "The head of marketing called me and said, 'You're the only one who knows the product, and you know marketing. Come back.'" His mission: make Nizoral a global product.

Taking It Global

Under Cauwenbergh's leadership, Nizoral grew to become a global market leader. It stayed on WHO's essential drug list from 1984 to 1997, when Janssen and

INTERNATIONAL MEETING ON THE WOUND HEALING EFFECTS OF KETANSERIN
Beerse, Belgium
November 2, 1987

Highlighted in front row:
"Dr. Paul" Janssen (left),
Geert Cauwenbergh (right)

others launched a new generation of better antifungals to replace it. Drawing from company scientists who returned to Belgium from the former African colony, Zaire, Janssen had actually created the antifungal market with miconazole, and other companies were playing catch-up. Janssen researchers' original quest to cure a third-world disease had achieved global success as the fungal-fighting agents took on multiple human, animal, and even agricultural uses. When the company turned its attention to the next wave of new antifungal compounds in its pipeline, Janssen called Cauwenbergh into his office again.

"Remember I said, you belong in R&D," Janssen told him. "That's okay, but I'm having a ball in international marketing," Cauwenbergh replied. Janssen was firm: "No, no, no, I want you in R&D." He had decided to make Cauwenbergh the head of development for the company's emerging dermatology line — which, of course, consisted mostly of antifungals at the time — as well as infectious diseases, a new area for the company.

Janssen's reason for wanting Cauwenbergh in R&D was straightforward: "He felt I was very good at communicating complex scientific messages to the general public, and to nonscientists in the industry. I would say that skill belongs in marketing, but marketing for him was only window dressing; he believed a good product would sell itself on the strength of scientific evidence. Actually, in 1986, he basically abolished international marketing for a while."

To the extent that well-explained science can persuade people — from early stakeholders to gatekeepers down the line — Janssen may have been correct, Cauwenbergh believes: "When you can visualize what something does in clinical form, it hits home." The ability to understand and explain the science of a product begins in development, he adds. "Keep an open mind. Look at early observations in clinical trials. You can learn a lot from them, especially when you have a new compound in a new class."

Credentialing Up

Despite Janssen's insistence, Cauwenbergh's move back to R&D was hardly simple or easy. He knew heading the development group for an entire therapeutic area could exhaust the goodwill he had earned previously with researchers who outranked him in education and experience.

"At that point, I still only had my master's degree in microbiology, and I told Dr. Paul I didn't belong in research. How would the others feel about me running a whole medical clinical department? He saw my point, and we concluded I would need to earn a doctoral degree. He picked up the phone and called the dean of the faculty of medicine at the University of Leuven, my alma mater, and told the dean I would like to do a residency in dermatology."

Learning Cauwenbergh had no medical degree, the dean offered to send Cauwenbergh a list of medical books to read, in preparation for a jury exam to qualify for the residency program. But, as part of the deal with Janssen, while in the residency he would continue working for Janssen on the development of Sporanox (itraconazole), a compound he had just selected from the company's stable of antifungal candidates.

It turned out to be a good selection. Not only did Sporanox eventually see use widely against toenail and fingernail fungus, it was the first oral agent approved for fungal infections in immuno-compromised patients, such as blastomycosis, histoplasmosis, and aspergillosis — affecting thousands of HIV-infected, bone-marrow transplant, and cancer patients.

As the development of Sporanox and other products under his responsibility progressed, Cauwenbergh worked on his doctoral thesis and saw patients once a week supervised by a physician. Five years later, he had earned a Ph.D. in medical sciences degree and would continue leading the dermatology and infectious diseases groups in R&D until Dr. Janssen's retirement from the company in 1994. During the same period,

Cauwenbergh initially took on responsibility for the company's first anti-HIV drugs, the non-nucleoside reverse transcriptase inhibitors, which then had problems with drug resistance and uncertainty over their half-life in vivo, based on animal studies. With the latter, Cauwenbergh literally took the problem into his own hands — testing the drug on himself.

"In those days, I was allowed to inject myself to determine what animal species would be closest to humans in how it metabolized the drug. When I was in charge of the department, I made it a point of honor that I would not test a drug in patients before I used it on myself, and I kept that promise. I'm not allowed by the current rules to do it, otherwise I would. In this case, we found I was very close to a pig, which helped us choose to do the PK studies in pigs instead of rats and dogs."

Once the half-life problem had a solution, Janssen's non-nucleosides continued on the development path. Two of them, Edurant (rilpivirine) and Intelence (etravirine), made it to market and are still used in anti-HIV "cocktail" therapy. Early in the game, however, a new figure entered the scene to continue the company's pioneering achievements in anti-HIV therapy. In 1994, Janssen's other "Dr. Paul," Paul Stoffels, returned to Beerse from Rwanda and subsequently took charge of the company's HIV-drug development.

From left to right:
Dr. Paul Stoffels (then head of infectious diseases, Janssen), Dr. Piet De Doncker (Cauwenbergh's right hand in clinical trial management), Geert Cauwenbergh

But that story begins years earlier, in 1989, when Cauwenbergh was still running dermatology and infectious diseases, and he hired the young, idealistic Stoffels for work in Zaire. Having begun his education in Africa, where he helped treat and study AIDS, Stoffels had just contracted with an NGO (nongovernmental organization) to run a clinic there. "I don't want to work for the pharmaceutical industry," he declared, thus winning Cauwenbergh's admiration for his candor. "But the clinic job does not pay well, and I have three kids and a wife. I'm willing to help you out with supervising and coordinating your AIDS-related clinical trials there. We do a lot of work in cryptococcal meningitis in AIDS patients."

After about a year and a half overseeing trials for Janssen, Stoffels took on responsibility directing all of the company's activities in Zaire. But in short order, those duties evaporated as local violence mounted. What happened next is better narrated in Cauwenbergh's words:

"Paul didn't want to leave Africa. He's in love with Africa. He took his family to Rwanda, and they traveled on my budget, flying to Goma, the Congolese city on the border with Rwanda, on an old DC8. Then he drove into Rwanda and set up shop close to the main hospital, the CHU of Kigali [Kigali University Hospital Center]. For more than a year and a half, I sent him all the latest publications, and he managed a lot of our trials from the hospital. I visited once, and one half of the pharmacy held all clinical trial products in development, and the rest was full of products from all the other drug companies selling there."

When genocidal violence between the Tutsi and Hutu tribes erupted in Rwanda, Stoffels sent his family back to Belgium but remained in Kigali at first, hoping to protect some Tutsi people who were taking care of his house there. Cauwenbergh forced the issue. "Finally, I was told by Janssen management to call him and tell him, 'Paul, you take the next flight out or you have no job anymore.' So he took the next flight out, luckily — that was actually the last flight possible."

Setting The Next Stage

At the outcome of this dramatic interlude, Cauwenbergh's world was in for another big change. Stoffels had returned to become the natural candidate to take over leadership of the infectious diseases development group, most immediately focused on HIV, based on his extensive study of the disease in Africa. With dermatology well in hand, Cauwenbergh suddenly felt at loose ends.

"I was sitting there, supervising two really capable individuals, so I looked for something else to do," he says. "I was focusing more on early clinical trials because I like the observational adjustments you can do at that stage, switching the drug to different tracks as a result of clinical observations."

His first development candidate, ketoconazole, illustrates his point. When testing the drug in high doses

to treat cryptococcal meningitis, he noticed male patients reported a loss of libido. He then decided to measure patients' hormones, and the results showed extremely low, down to "castration levels" of testosterone in those patients. Ketoconazole was causing abnormally low testosterone, which explained the loss of libido. A light went on.

"How about prostate cancer?" — that was the question he asked in the face of the clinical observation. He pushed the idea of developing a separate indication for the drug in prostate cancer, where testosterone-reduction had been an effective strategy. The program gained management approval, and the ultimately successful development program secured indications for ketoconazole in prostate cancer. It is still in use as second-line therapy for advanced disease.

For Penny, For Pound

After Paul Janssen had "retired," only to become cofounder and head of the new Center for Molecular Design, and Stoffels headed off as well — to run the HIV-drug spinoff Tibotec — Cauwenbergh found himself dealing more and more with the corporate bureaucracy, and enjoying it less. "It was becoming too big, with lots of committee meetings I had to attend, and nobody would make a decision," he says. "I would push an idea, and some political person would make sure that the decision got killed. I was fed up."

Time for another fateful encounter. In 1994, Cauwenbergh crossed paths with Ron Gelbman, then J&J's pharmaceutical group chairman, who had always been friendly. "Ron asked me how things were going, and I said 'I'm going to change jobs. I'm going to work with another company.' But he said, 'Come to the United States. We're going to consolidate all J&J dermatology products and companies, prescription and consumer, into one, and we need somebody to lead the R&D group.'" So, instead of fleeing the corporate environment, Cauwenbergh jumped into the center of the maelstrom. He soon moved from the quiet rural setting of Beerse to the New York area, where he would go to work in J&J's New Jersey headquarters in New Brunswick.

"Consolidation didn't sound then the way it sounds these days. Now it means you're spending too much money and you need to cut costs. In those days, I didn't get it yet, I was a pure research guy. I moved over to the States, and I had a ball."

Cauwenbergh did enjoy his time in the job, during which he and his family became true natives of the great metropolis around New York City, as well as "pharma row" in New Jersey. But after giving it the better part of a decade, he had concluded J&J Dermatology was coming to a creative dead end. In his view, the company was constraining the prescription side of its

Geert Cauwenbergh speaking in Venezuela to a group of physicians about opportunistic infections in AIDS patients.

R&D efforts in dermatology in favor of its true comfort zone — retail.

"It became clear consolidation was not taking us anywhere," he says. "J&J didn't want to do further drug development. It is a big skin care company, but really only in consumer skin care, not the development of drugs. J&J's Remicade is used in psoriasis, and it has some successor compounds available, but only intravenous drugs. The company still has no oral drugs in dermatology; that's really not its space anymore."

Once again, at just the right time, came the fateful crossing of paths: In 2001, Cauwenbergh encountered Robert Wilson, then J&J's vice chairman. When Wilson asked how it was going, Cauwenbergh was characteristically frank: "Bob, I have the impression that I'm wasting your money and you are wasting my time," he said. "We're sitting on so much IP in dermatology that we're not using, why not create spin-outs?" Wilson liked the idea. Yet, he advised Cauwenbergh to prepare for selling the concept to the incoming chairman, William Weldon. "One point you have to make — no commercial drugs, no revenue for the spinoff," said Wilson. "It has to be an R&D company only; we don't want to give revenue away."

Weldon was evidently convinced, because Cauwenbergh spent his remaining years at J&J launching dermatology and other R&D spinoffs. Those included DermCo, based on J&J IP as a result of its collaboration with the University of Michigan; Transderm, a topical-delivery company; and others such as a hair-care company and a company based on biodegradable catheter technology. L

See part two in our May issue for the rest of Geert Cauwenbergh's story, when he leaves Big Pharma to go out on his own, into the startup world of biopharma.

OutsourcedPharma
CONFERENCE AND EXHIBITION

THE OUTSOURCING INDUSTRY HAS NEVER TALKED LIKE THIS BEFORE.

BOSTON
APRIL 26-27, 2017
OutsourcedPharmaEvents.com

SPEAKERS INCLUDE

AGIOS PHARMACEUTICALS
Bob Sheroff | *SVP, Technical Operations*

AMAG PHARMACEUTICALS
James Lucie | *Associate Director*

BERKSHIRE STERILE MFG
Shawn Kinney | *CEO*

BIOGEN
Evan Guggenheim | *Sr. Manager, Technical Dev.*

BIOGEN
Thomas Holmes | *Senior Director, Global External Mfg.*

BIOGEN
Clive Patience | *VP, Asset Dev. & Program Mgmt.*

BOSTON INST. OF BIOTECHNOLOGY
Peng Jiao | *CEO*

BOSTON INST. OF BIOTECHNOLOGY
Jared Kaufman | *Associate Scientist*

BRISTOL-MYERS SQUIBB
Keirnan LaMarche | *Senior Research Investigator 1*

CMC TURNKEY SOLUTIONS
Barbara Berglund | *COO*

ELI LILLY AND COMPANY
Mark Butchko, Ph.D. | *Sr. Director, QA - Development*

EMERGENT BIOSOLUTIONS
BJ Hull | *VP/GM*

GENENTECH
Todd Mabe | *Head, Biologics, Drug Sub. Ext. Quality*

FORTRESS BIOTECHNOLOGY
George Avgerinos | *SVP, Biologics Operations*

JOHNSON & JOHNSON
Milan Shah | *Head, Publishing, Global Capabilities IDAR*

MEDIMMUNE
Steve Cook | *Head, Global Biologic Supply Chain Ops.*

MERCK
Anand Ekambaram | *Executive Director*

MERCK
Pamela Rizos | *Project Manager*

MERCK
Kurt Wolf | *Director, Externalization*

METRICS CONTRACT SERVICES
Charles Waldroup | *Director, Project Managemnt*

PATHEON
Franco Negron | *President, Drug Product Services*

RONDAXE PHARMA
Brian James | *SVP, Operations*

SANOFI GENZYME
Piet Houwen | *Head, Contract Mfg. Operations*

SNAPDRAGON CHEMISTRY
Matthew Bio | *President & CEO*

SUNOVION PHARMACEUTICALS
Vince Kosewski | *VP, Supply Chain Operations*

TUNNELL CONSULTING
Julia O'Neill | *Principal*

VERTEX PHARMACEUTICALS
Michelle Bailey | *Associate Director*

XENETIC BIOSCIENCES
Henry Hoppe | *VP, Drug Development*

Tackling The Challenges Of A Rare-Disease Clinical Trial

ED MISETA Chief Editor, Clinical Leader @EdClinical

Regulatory agencies today are looking for Phase 3 trials to demonstrate a reduction in mortality as well as greater patient mobility. Unfortunately, Phase 3 trials also cost a lot of money to run, making them a challenge for small biotech firms. For a rare disease, the challenge is even greater, since patient recruitment is more difficult.

Jean-Louis Dasseux knows just how difficult it can be to run these trials. Dasseux is president and CEO of Cerenis Therapeutics, which is headquartered in France and focused on cures for cardiovascular disease (CVD). "Every year CVD results in the death of 17.3 million people, or one in every three deaths," he explains. Current treatments, which attempt to lower low-density lipoprotein (LDL, also known as bad cholesterol), only reduce cardiovascular events by 25 to 35 percent. The drug in development by Cerenis attempts to mimic the role of natural high-density lipoprotein (HDL, also known as good cholesterol). Low levels of HDL caused by genetics have no current treatment and qualify as a rare disease.

"If we were hoping to reduce CVD events, we would have to perform an outcome trial that looked at the incidence of heart attack and stroke," says Dasseux. "Those trials can last four or five years and would look for a reduction in the mortality rates in those patients. They are also very expensive and require 25,000 to 30,000 patients. That might be a good approach for companies with a lot of money, but not for a small biotech. As such, our strategy in the near term is to tackle a related rare disease. We are focused on fixing the absence of HDL caused by genetic defects."

ONE PATIENT LEADS TO A PHASE 2 STUDY

Cerenis is currently running a Phase 3 clinical trial for patients suffering from two genetic defects that lead to very low levels of (or no) HDL. The company has come a long way from its start years ago when it embarked on an open-label Phase 2 study with just seven patients. The first patient, from a poor community in Sao Paulo, Brazil, had no HDL and was accumulating cholesterol everywhere in his body. Cerenis was contacted by the patient's physician, who was aware of the company's development efforts.

> *"We want to make sure every patient entering the trial understands if they do not complete the study, it could put the whole trial in danger."*
>
> **JEAN-LOUIS DASSEUX**
> President & CEO, Cerenis Therapeutics

"We knew it would be difficult for a small organization to run a trial so far away," says Dasseux. "We realized the preferred scenario would be for the patient to come to Europe. We worked with the Amsterdam Medical Center and were able to fly the patient from Brazil to Amsterdam for treatment. It was his first flight and he was scared, but he also had few options. With the accumulation of lipids he was experiencing, there were xanthoma, or lipids bumps, all over his body, and lipids in the vessel wall lead to heart attacks. He had three bypass surgeries and was getting worse."

The treatment the patient received was effective, and Dasseux notes the drug was able to remove cholesterol from the vessel walls and eliminate it from the body. Based on those findings, seven patients were recruited to take part in the Phase 2 study. In that trial Cerenis demonstrated its ability to reduce the accumulation of lipids. Consequently, the European Medical Agency (EMA) granted two orphan drug designations to the company to fast track the study.

FINDING PATIENTS STILL A CHALLENGE

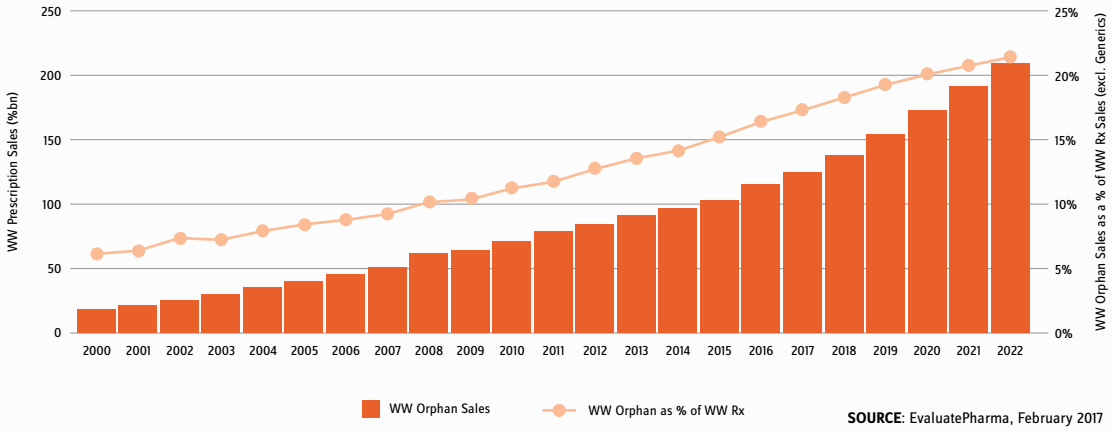
Patients with low HDL are not identified preemptively. If a patient happens to have a heart attack or CVD at a very young age, a blood test looking for low HDL is performed. This is how patients are identified for trials.

"Developing a drug for any rare disease is a challenge," notes Dasseux. "Oftentimes you will be able to locate only one or two patients. You often have to go where the patients are, and that may mean running a trial in multiple countries, which creates additional challenges such as language barriers."

To overcome the language problem, Cerenis works with local CROs for help filling out documents to get patients enrolled in trials. Those CROs also can assist with regulatory submissions. Still, Dasseux notes an even bigger challenge is making physicians aware that help is available for patients. This necessitates reaching out to physicians and clinics that might have potential candidates to let them know there is a drug that can treat the disease. To do so, Cerenis needs to build personal relationships with physicians. Part of that effort involves attending and speaking at conferences and getting on the radar of key opinion leaders to make them aware of study results.

The current Phase 3 study, named Tango, is ongoing and has 30 patients participating. Dasseux says there is a story behind each one getting involved with the trial. At one point he was contacted by a physician who had a potential subject who was an electrician and didn't seem to be the typical low-HDL patient. The patient was interested in participating in the trial, and additional tests found his brother was also affected. "We were always adding one or two patients at a time,

WORLDWIDE ORPHAN DRUG SALES & SHARE OF PRESCRIPTION DRUG MARKET (2000-2022)



SOURCE: EvaluatePharma, February 2017

and it was always a very emotional experience," notes Dasseux. "Tango is now a global study with patients in the U.S., Canada, Europe, and Israel."

RELY ON LOGISTICS PARTNERS

Administering a protein-based biologic to patients spread across multiple countries and continents does complicate the logistics of a trial. To remedy the situation, an in-house team at Cerenis works with CROs to ensure the supply of medicines to patients is not interrupted.

"Having just 30 patients allows us to handle shipments on a case-by-case basis," says Dasseux. "Much of the logistics effort is handled through CROs in the various countries, but in some cases our internal team is also involved."

Getting patients to the clinic is an additional challenge. For example, the patients in Quebec are in the region of Chicoutimi, where the population is quite dispersed, and travel time to the clinic could take 2 to 6 hours. Clearly this is not an ideal situation, especially during the first two months when weekly IVs are mandated. In fact, some patients ended up not being able to participate in the trial because of the lengthy travel time. In some locations nurses traveled to the patient to administer the drug locally.

"This is an emerging technique, and it's important to make sure everything is well validated," explains Dasseux. "We need every patient to come to the clinic at the beginning of the study to have tests performed. If they cannot do that, they cannot participate in the study. We are doing our best to accommodate them. Although we do not pay the patients, we are also doing our best to make sure the trial is not costing patients anything out of pocket."

KEEP EVERYONE IN THE LOOP

It's very important to properly communicate with patients when running a rare-disease trial. In many cases, they do not know much about clinical trials and neither does their physician. For that reason, Cerenis has lengthy discussions with the treating physicians.

"These are general practitioners," says Dasseux. "They do not have expertise in rare diseases or clinical trials, so we need to make them feel comfortable with the referral process. So, we discuss trials with them and have our internal experts, as well as independent industry experts, explain the process."

Once the physician has a good understanding of the process, individuals from Cerenis will visit them to discuss the trial face-to-face. Later the CRO is brought into the process as well. The main goal of all these interactions is to preemptively identify potential challenges and discuss solutions. Dasseux stresses there are no one-size-fits-all activities when it comes to dealing with rare-disease physicians and patients.

Normally the physician visits will incorporate training such as good clinical practices. A video will explain how to properly prepare the IV solution. Refrigerators, water baths, and infusion pumps are required and are often provided by Cerenis to clinics that do not have the proper equipment on hand. Generally, the in-person visits take three days. If anyone is still uncomfortable with the process, a return visit is scheduled. A hotline is provided for sites to quickly connect with Cerenis or the CRO if there are questions.

"With any rare disease trial, we often have to go above and beyond what is typically required of a Phase 3 trial," adds Dasseux. "We want to make sure every patient entering the trial understands if they do not complete the study, it could put the whole trial in danger. Each patient is a major contributor, and losing even one patient will have a big impact on the results." L

Breakthroughs in treatment have given hope to many patients with rare diseases. Yet, barriers to accessing these life-changing treatments remain. Specialized commercialization strategies designed with the patient's treatment experience in mind optimize product access while ensuring cost and logistical efficiencies. Working with a greater purpose takes understanding that every patient matters. It takes AmerisourceBergen.

AmerisourceBergen®

ItTakesAmerisourceBergen.com

CLINICAL TRIAL LOGISTICS \ MARKET ACCESS CONSULTING \ PATIENT ACCESS & ADHERENCE \ SPECIALTY RX, 3PL, GPOS \ DISTRIBUTION

Janssen Turns Clinical Data **Over To Patients**

ED MISETA Chief Editor, Clinical Leader @EdClinical

A common complaint I hear from patient advocacy groups has to do with the lack of follow-up with patients after the conclusion of a trial. Patients often never hear back from the company conducting the study or learn of the results. Some companies have struggled to find a solution, while others have started providing data to patients at the end of the study. Janssen has taken that notion to the next level: It is attempting to make patient data available to participants while the trial is underway.

When first considering this change, Andreas Koester, MD, Ph.D., global head, R&D operations innovation at Janssen, notes his team had a lot of questions. First, they wondered why no one else was doing it. That got them wondering about the rationale behind doing it, and if the action would be valuable to patients.

"When you look at clinical trials today, you know that they are less than ideal. Costs are high, timelines are too long, and patients often feel their voices are not heard in the planning process. Of course, there are a million things sponsors could do to address the situation," Koester says.

To improve the process, one of the first things Janssen did was help create the Investigator Databank (along with Merck and Lilly) to share data among pharma companies in a way that met all legal and regulatory requirements. The databank shares investigator information that companies have on file in an effort to reduce the administrative burden for investigators and increase the visibility of qualified investigators to sponsors.

The next step was determining how to help patients. Koester explains, "Inspired by what Pfizer did a couple of years ago with the Blue Button project, we also wanted to give patients access to their data once the trial is over. But then we decided to take it a step further and define ways to give patients access to some of their data during the clinical trial."

"Even if only some data – like lab values – can be shared during the ongoing trial, this will give patients actionable healthcare information and make them the partners they want to be."

ANDREAS KOESTER, MD, PH.D.
Global Head, R&D Operations Innovation, Janssen

PATIENTS ARE DRIVING INNOVATION

One concern is that offering patients a look at their data at the conclusion of the trial may be too late. Many patients have multiple health issues for which they see other providers in addition to the trial investigator. Trials have to be kept blind, which means not everything can be shared, and this concern has kept many sponsors from sharing any information with patients. But Koester notes this approach would not work for much longer. Healthcare is changing, and patients expect more information to become active participants and decision-makers in their own healthcare.

One event, however, convinced Koester that the pendulum was swinging in the direction of patient rights and greater data transparency. In 2014, the FDA amended the Clinical Laboratory Improvement Amendment (CLI) of 1988, thereafter giving patients the direct access they desired. Patients just needed to request the data. Prior to that, information had to go through physicians, as it was felt patients could not properly interpret the data.

"That was a watershed moment symbolizing the direction of where clinical care was going," says Koester. "Patient empowerment was a real thing. HealthIT.gov, in that same year, proposed the notion that in the future, patients would be the owners of their data. Providers could no longer keep it in silos and inaccessible."

A few other events also helped usher in this paradigm change. First, the VA developed the Blue Button standard, enabling all patients in their care to have access to data when visiting other hospitals, clinics, or caregivers. Then the Society for Participatory Medicine noted patients would be less of a passenger in their healthcare and more firmly planted in the driver's seat. Finally, Eric Topol released his book, *The Patient Will See You Now* (2015), another indication that healthcare trends were moving toward increased patient empowerment.

IT'S MY DATA, NOT YOURS

At that point, Koester was wondering what all of this would mean to the clinical trial industry. "It was clear

to me that something would have to change," he says. "Suddenly, a patient could go to their doctor, know what is going on, and have an open discussion. But when participating in a trial, pharma is telling them that here, everything is different and we can't tell you anything. There is no way that model could continue to work. It would clearly have a huge negative impact on future trial participation."

With those insights, Janssen went to a number of patients who had participated in a trial and asked if they would be interested in seeing their data and having access to it during and after the trial. The response was overwhelmingly positive. Not only did patients want their data, they noted the information came from their bodies, they owned it, and they felt they had a right to it. They also made it clear they did not want to wait a year after the trial to find out if they were on the drug or to find out the results of the trial by reading a medical journal.

But one problem remained: How do you give patients their data yet still ensure the clinical trial remains blinded? Would the data sharing risk unblinding the trial or adding bias to the study outcome? If so, what could Janssen do about it?

Ultimately, the approach the company decided on was simple: You will never be able to give patients all of the data collected, but don't let that keep you from sharing any of it. The company would consider, at the outset of the trial, what data can be shared with patients. Then, by sharing that information, pharma can better engage with patients and allow them to feel more like a partner than a subject.

"We believe this is simply a first step," notes Koester. "I envision a future where we start defining which data can safely be shared when we are in the process of designing the protocol. Even if only some data — like lab values – can be shared during the ongoing trial, this will give patients actionable healthcare information and make them the partners they want to be."

WILL REGRET ENSUE?

Pharma has always been, and still remains, a conservative industry. And any company contemplating this type of change will have concerns about repercussions. Still, Koester remains positive and seems to have effectively mitigated the risks in cooperation with experts in legal, privacy, and regulatory departments.

"Right now, I do not see anything that would make me regret this decision," he states, rather confidently. "I am convinced this [sharing of information] is the direction in which healthcare is moving. Clinical research either has to evolve in the same direction or risk having studies become even more difficult to perform in the future. That is a risk we cannot afford to take."

Although confident, Koester notes there will be many challenges; figuring out how to operationalize the decision will be difficult, considering no one has done it before.

Even though Janssen now has a logistical framework hammered out, it took two years to figure out the specifics of patient privacy, informed consent, and the mechanics of online data access. It was also a challenge to get everyone in the company on board, from the executive management team down to the chief medical officer. They all had to believe that, in the long run, the effort would be a good investment for the company.

> *"When you look at clinical trials today, you know that they are less than ideal."*
>
> **ANDREAS KOESTER, MD, PH.D.**
> Global Head, R&D Operations Innovation, Janssen

Janssen is now in the first pilot program rolling out patient data access in a large-scale, multinational Phase 3 trial. Thus far the reaction to the effort has been varied. Last year when the idea was presented at The Conference Forum's Patients as Partners conference, representatives from the FDA applauded it, patients embraced it, and pharma attendees asked, "How is that even possible?" and said it couldn't be done. But Janssen believes that once every company incorporates a similar approach, all patients will benefit. Koester predicts patients will continue to talk about their trial participation and will even measure lab values on their own. No one wants to be kept in the dark. Pharma can put its head in the sand and pretend these things are not happening, or engage patients and ask what can be done for them.

"The dream is to have a system in place where every patient in a trial can access their data without unblinding or inserting bias into the trial and directly access information at the close of the study to determine if they were on the drug or the placebo," Koester explains. "The government is mandating a layman's summary of the results by the beginning of 2018. We want to go a step further. We want patients to get that summary, but also see where in the dose-response curve they fit and how they improved or deteriorated while being on the drug or placebo. This is all just a small first step toward more patient participation and empowerment." L

CLINICAL LEADER
FORUM

BRINGING TOGETHER A COMMUNITY COMMITTED TO BETTER TRIAL OUTSOURCING

PHILADELPHIA
MAY 10-11, 2017
ClinicalLeaderForum.com

SPEAKERS INCLUDE

ABEONA THERAPEUTICS
Michelle Berg | *VP, Patient Advocacy*

ADARE PHARMACEUTICALS
Karen Brooks | *Sr. Dir., Clinical Operations*

AGILE THERAPEUTICS
Elizabeth Garner | *CMO, SVP, Clinical Development*

ALEXION PHARMACEUTICALS
Mike Collins | *Head, Global R&D Vendor Mgmt.*

BEYONDSPRING PHARMACEUTICALS
Ramon Mohanlal | *Chief Medical Officer*

BOEHRINGER INGELHEIM
Theresa Devins | *Sr. Assoc. Dir., Site Ops.*

CELERITAS SOLUTIONS
David Kim | *Executive Consultant*

CLINICAL PERFORMANCE PARTNERS
Beth Harper | *President*

EMD SERONO
Paulo Moreira | *VP, Global Clin. Ops. & Ext. Innovation*

EMERSON CLINICAL RESEARCH INSTITUTE
Fabian Sandoval | *CEO & Research Director*

FDA
John Whyte | *Dir., Prof. Affairs & Stakeholder Engagement*

FERRING PHARMACEUTICALS
Guy Bolton | *Associate VP, Head of U.S. Clinical Ops.*

GSK
David Slade | *US Asthma & Biologics Lead*

HALLORAN CONSULTING GROUP, INC.
Laurie Halloran | *President & CEO*

THE HARTE GROUP
Michael Harte | *President*

INDUSTRY STANDARD RESEARCH
Kevin Olson | *CEO*

INFORMATION SERVICES GROUP
Frances Grote | *Dir., Clinical Sourcing Advisory Svs.*

JANSSEN
Elise Felicione | *Sr. Director, R&D Ops. Innovation*

JAZZ PHARMACEUTICALS
Sean Gharpurey | *Exec. Dir., R&D Strat. Bus. Improv.*

JOHNSON & JOHNSON
Katie Mazuk | *Sr. Dir., Global Head Investigator*

LAURELTON HEART SPECIALISTS PC
Ola Akinboboye | *Medical Director*

NEKTAR THERAPEUTICS
Deirdre BeVard | *VP, Development Operations*

NIMBUS THERAPEUTICS
Kathryn Stiede | *Head, Clinical Operations*

NOVEOME BIOTHERAPEUTICS, INC.
John Hall | *Director, Clinical Operations*

REGENERON
Bari Kowal | *Head, Clinical Trial Mgmt.*

SOCIETY FOR CLINICAL RESEARCH SITES
Christine Pierre | *Founder & President*

SUPERNUS PHARMACEUTICALS
Stefan Schwabe | *EVP, Head of R&D*

SYNEDGEN
Greg Fiore | *Chief Medical Officer*

State Funding Fuels Michigan's Life Sciences Industry

CAMILLE MOJICA REY Contributing Writer

Following the Great Recession of 2007-09, leaders in Michigan came up with a plan for diversifying its industries. The state's dependence on the automobile industry, the country's largest, had threatened to cripple its entire economy until the federal government intervened. The state — and the companies — might not be so lucky next time. So, the plan for a more diversified Michigan of the future includes looking to one of its core industries of the past: the life sciences.

Few people know that the first pharmaceutical companies in the U.S. were founded in Michigan (see sidebar). In the past 100-plus years, the biopharma industry has become bicoastal, with most large companies headquartered in Massachusetts, New Jersey, and California. It has also become an industry dominated by large multinational corporations that began buying up Michigan's larger companies in the early 2000s.

"We've largely recovered from that consolidation and have been growing at a nice clip," says Stephen Rapundalo, Ph.D., a former pharmaceutical researcher who now heads the Michigan Biosciences Industry Association, known as MichBio.

The current growth in Michigan's life sciences industry is largely due to efforts at the state level to fund innovation, provide affordable wet-lab space for fledgling companies, and offer incentives for established ones that are looking for a business-friendly place to relocate.

According to a 2016 Bio/TEConomy report, a total of 44,277 people are employed in the life sciences industries in Michigan, with an employment multiplier bringing that number to 248,348. Of those, 8,813 were employed in biopharma, ranking Michigan 11th in the country in terms of biopharma employment. The state is home to 105 life sciences companies, ranking it 13th in the U.S. with respect to such establishments. About 85 percent of the state's companies are located in the southern part of the state. The Michigan Economic Development Corporation (MEDC), a quasi-government agency that is responsible for economic growth and attraction across the state, has made it a priority to make Michigan one of the top 10 states for biotech in the country.

"About half of our funded companies are making exits now in one way or another, either through licensing of products or startups."

KEVIN WARD, M.D.
Executive Director, Fast Forward Medical Innovation (FFMI)

Published in 2016, MichBio's *Roadmap for Success* will be updated every year to reflect any changes, challenges, or successes the state experiences. The current plan calls for the state to focus on "agri-biosciences, medical devices, biopharma, R&D/testing, and biologistics." The document is essentially a "to-do" list that helps people like Rapundalo guide discussions with lawmakers and decision makers. He says MichBio looked at the list of other comparable-sized states and saw that top states all had published strategic plans.

MICHIGAN'S PHARMA LEGACY

By the time the first automotive companies were setting up shop in the early 1900s, Michigan was already home to Parke-Davis (1871) and Upjohn (1886); both eventually were bought by Pfizer. Another company, Perrigo, was founded in 1887 and for many years was the world's largest manufacturer of OTC drugs in the country. Its CEO is still based in the town in which it was founded, Allegan – a city of just under 5,000 residents.

That prominence continued into more recent times. The world's largest-selling drug, Lipitor, was invented and developed by the Ann Arbor facilities owned and operated by Warner Lambert/Parke-Davis. Pfizer, which was co-marketing and distributing Lipitor when it was launched in 1997, bought Warner Lambert/Parke-Davis in 2000. Zantac, Motrin, and the anthrax vaccine – to name a few – were also developed in the state. Consolidation of companies in the 2000s, however, led to economic chaos in the state. The state was left without a large pharmaceutical company headquartered there. Upjohn and Parke-Davis were lost. Then, in January 2007, Pfizer announced it would be closing down R&D facilities in Kalamazoo and Ann Arbor, costing Michigan 30 percent of its biopharma jobs at the time. A part of that loss was later turned into a gain when a former Pfizer research facility in Plymouth Township was purchased by a public-private partnership and turned into the Michigan Life Sciences and Innovation Center (see main story).

"We now have our own guide that lets us say, 'This is what we need to compete with other regions, domestically and globally.'"

EXPANDING FUNDING

MichBio's road map calls for technology transfer and entrepreneurial activities between academic research centers and the bio-industry to be better integrated. To that end, state leaders decided recently to build upon the success of a five-year-old program at the University of Michigan's Medical School called Fast Forward Medical Innovation (FFMI). Using funds from the Michigan Translational Research and Commercialization (MTRAC) statewide program, FFMI has awarded funding to 34 projects over four years, resulting in 10 new startups.

"About half of our funded companies are making exits now in one way or another, either through licensing of products or startups," says Kevin Ward, M.D., FFMI's executive director. The success of the program lies in mentorship. The program provides specialized education that includes mentorship and a team of venture capitalists, medical industry partners, and commercialization experts. "No matter where a research team is at on the innovation road map, we have something to offer," Ward says.

In July 2016, the Michigan Strategic Fund extended FFMI by creating the Life Sciences Innovation Hub, focusing on innovation in four areas: devices, diagnostics, therapeutics, and healthcare IT. The statewide hub is co-managed by the FFMI program and the university's Office of Tech Transfer. The hub opens up $3.5 million in MTRAC grants to researchers on and off-campus at any nonprofit, university, or health system that can apply for either early-stage Mi-Kickstart awards ($25,000 to $30,000) or midstage Mi-TRAC awards ($100,000 to $200,000).

The hub just completed its first round of funding and is working toward helping investigators reach their next milestones. "This is a partnership between the university and the state to get researchers that extra bit of money, and, most importantly, mentorship to turn ideas into products. This is something you see being implemented across the country," Ward says. "What makes us unique is that we are integrating mentorship, business development, education on project funding, and commercialization."

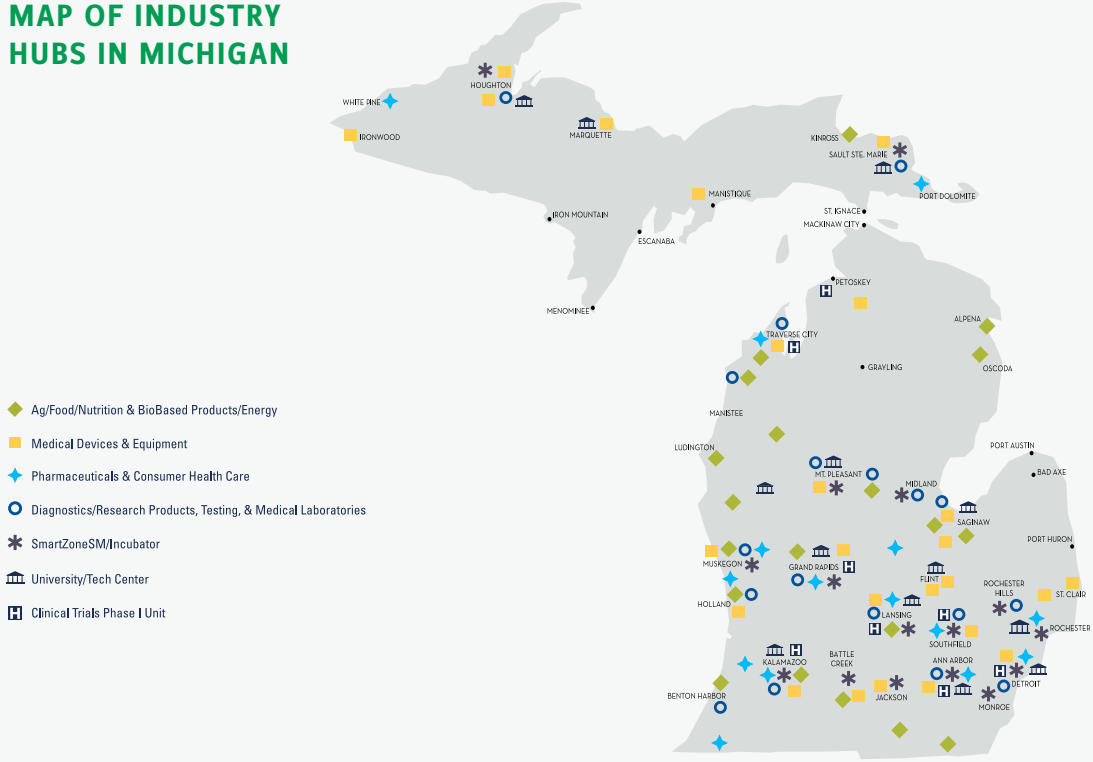
PROVIDING CRITICAL WET-LAB SPACE

Fostering the next generation of biopharma companies, as MichBio's plan calls for, is not easy when buildings that contain wet-lab space are the most expensive per square foot in any real estate market. For those fledgling companies, Michigan offers several innovation centers across the state that include wet-lab space. One of the most successful innovation centers with wet-lab space is the 57,000-square-foot Michigan Life Sciences and Innovation Center (MLSIC) in Plymouth Township.

"This facility is developing many exciting and innovative products," says Fredrick Molnar, MLSIC's executive director and VP of entrepreneurism for MEDC. "We have some great ideas and some excellent companies here. It's our job to support them and see that they make it past the idea stage and into the expansion phase where they can go out on their own and help diversify the Michigan economy."

MLSIC is the fortunate result of one of the state's pharmaceutical industry's most dramatic job losses. In 2007, Pfizer closed R&D operations in Ann Arbor and Kalamazoo, leaving 2,400 people without jobs and cutting the biopharma workforce by 30 percent overnight. While the University of Michigan bought Pfizer's main campus in Ann Arbor, a newly remodeled R&D facility in nearby Plymouth Township was eventually purchased from the company by a public-private partnership between MEDC and several private foundations.

MAP OF INDUSTRY HUBS IN MICHIGAN



"We needed a space for those talented people who were thinking about leaving the state," says Roger Newton, Ph.D., founder of Esperion Therapeutics. Newton is codiscoverer and product champion of Lipitor, the best-selling pharmaceutical ever. To help keep people in the state, Newton joined forces with Mike Finney, who was then the executive director of Ann Arbor SPARK, an entrepreneurial support group started in 2005. Together, they negotiated with Pfizer for the purchase of the Plymouth Township facility.

One of MLSIC's first tenants was Newton's Esperion. Newton sold Esperion to Pfizer in 2004 and, when Pfizer shut down R&D in Michigan, Newton bought back the Esperion name, also bringing with him senior talent and two patents from the original Esperion portfolio. Today, "Esperion 2.0" has a drug candidate, bempedoic acid (ETC-1002), in Phase 3 clinical trials that reduces LDL, the bad cholesterol, without an increased risk of muscle pain/weakness associated with statin use.

MLSIC is now home to a diverse group of startup companies run by new and serial entrepreneurs. These companies have a wide range of products in development. These include Tissue Regeneration Systems, which is developing skeletal reconstruction and bone regeneration technology; Celsee Diagnostics, a company making products in the emerging field of liquid biopsy; and Tespo, which has developed a Keurig-like countertop machine for dispensing vitamins that does away with excipients.

ATTRACTION & FUTURE OUTLOOK

In addition to fostering the growth of new companies, MichBio's road map calls for establishing a business-friendly environment. "We have eliminated over 2,100 industry regulations for businesses over the past six years," says Tino Breithaupt, MEDC's senior vice president for national and global business development. Breithaupt is responsible for attracting existing companies to the state.

In order to simplify the tax code, Breithaupt explains, the state has implemented a flat 6 percent corporate tax. The state also passed legislation eliminating the personal property tax for manufacturing and technology businesses. "From a community perspective and a state perspective, this puts us in a better position to attract business." Breithaupt also says MEDC supports companies once they have relocated. "We meet with these companies on a regular basis to see how things are going for them and see if there is anything we can do to assist in their growth short- and long-term." L

BIO International Convention

The Global Event for Biotechnology

BIO PARTNERING OPENS APRIL 2017

ONE ON ONE PARTNERING™ Powered by BIO

Meet thousands of executives and leaders from these companies with **BIO One-on-One Partnering™**:

DOUBLE HELIX

abbvie · AMGEN · Bristol-Myers Squibb · Genentech A Member of the Roche Group · Johnson & Johnson · MERCK

HELIX

Lilly · Pfizer · SANOFI

JUNE 19-22, 2017 • SAN DIEGO, CA • CONVENTION.BIO.ORG • #BIO2017

The Worldwide War On Counterfeit Medicines

CAMILLE MOJICA REY Contributing Writer

This is the third article in a five-part Life Science Leader *series examining the current state of the counterfeit medicines problem.*

It's a sobering trend for the pharmaceutical industry. The counterfeit medicines market is growing at twice the rate of the market for legitimate prescription drugs. That's according to the Center for Medicine in the Public Interest, a New York-based research group partially funded by the pharmaceutical industry. The organization estimates that the sale of fake pharmaceuticals generated $75 billion in 2010. The group estimates that the figure for 2016 will rise to $95 billion.

"It has been a real growth industry," says Travis Johnson, the primary lobbyist in Washington, D.C. for the International AntiCounterfeiting Coalition (IACC). Johnson oversees all aspects of the IACC's government relations and policy development in North America.

The potential for harm due to fake drugs has made fighting this problem a top priority for the IACC, an organization founded in 1979 that originally focused on stopping the sale of counterfeit apparel and luxury goods. Today, it aims to stop all product counterfeiting, including fake pharmaceuticals. "A knock-off designer purse is not going to kill anyone. A fake drug that is manufactured in unsanitary conditions or contains contaminates just might," Johnson says.

Counterfeit drugmakers are not just unscrupulous; they are creative. They are always looking for new ways to get their products out on the market. Over the years, everything from antifreeze to yellow highway paint has been found in counterfeit drugs. "The whole point is to make as much money as they possibly can. So, if they can use cheap ingredients, they will," Johnson says.

Winning the fight against counterfeit drugs requires global cooperation, Johnson says. The IACC is made up of 250 members from a cross section of business and industry. It also includes law firms, investigative and product security firms, government agencies, and intellectual property associations. Coming together, these players have allowed the IACC to put a dent in pharmaceutical crime, especially when it comes to fake drugs being sold via the internet.

The web did not even exist when the IACC was created. Today, fighting the sale of counterfeit products online is one of the organization's most effective strategies. It has developed two programs — the RogueBlock Program and the IACC MarketSafe Program. RogueBlock is used to track down the sources of illicit products and take away criminals' ability to receive payment for their illicit goods, while MarketSafe is used to take down fake product listings on Chinese online marketplaces Taobao and Tmall.

TAKING DOWN PHONY ONLINE PHARMACIES

RogueBlock was the IACC's first program for tracking down counterfeiters online. The program has led to the termination of 5,100 merchant accounts representing an estimated 200,000 websites selling a wide variety of goods, from the traditionally counterfeited items, such as electronics and automotive parts, to the more recent emergence of entertainment software and movies. The IACC does not keep track of how many of those merchants were trafficking in fake pharmaceuticals, but Johnson says the number is substantial.

Thousands of rogue online pharmacies exist, Johnson says. "These are entirely unlicensed and unregulated sites," he says. Many advertise that they sell drugs approved by foreign regulatory agencies. It is still, however, illegal to import those goods. "The vast majority of online pharmacies are trafficking in nothing but fake medicines," Johnson says.

The statistics back up this claim. A 2013 survey of

10,000 websites by the National Association of Boards of Pharmacy showed that 97 percent of these sites did not meet industry standards. The increase in rogue pharmacies is part of a shift from manufacturers of fake drugs shipping counterfeit medicines in large shipping containers to distributors to the manufacturers filling the orders themselves. "It appears the counterfeiters have cut out the middleman. They don't need an operation based on two continents," Johnson says. Instead, they rely on express delivery and courier services to get their products around the globe quickly.

BLOCKING SALES

RogueBlock was created to find those manufacturers. It is a vast improvement over the traditional system in which illegal online pharmacies were taken down one at a time through civil litigation over trademark infringement. "The processes that were available were rather slow and not effective in the long term because it is so easy to register a new domain," Johnson says. In addition, there were jurisdictional issues because a website could be operated overseas and, due to the use of privacy and proxy services, it was nearly impossible to find out who was operating the website.

"It appears the counterfeiters have cut out the middleman. They don't need an operation based on two continents."

TRAVIS JOHNSON
Lobbyist For The International AntiCounterfeiting Coalition

RogueBlock uses computer algorithms to track credit card payments and pinpoint the sources behind online pharmacies. "Most people think there is a 1:1 correlation, one person one website," Johnson explains. In reality, there is usually a fairly large, sophisticated organization running hundreds or thousands of websites. "They are saturating the market, so, if a site goes down or gets blocked, there are many other sites still in operation," Johnson says.

Credit card companies' rules state that merchant accounts cannot be used to traffic in illegal or stolen goods. These are global policies, so there are no jurisdictional issues. "The criminals are in violation, and it is justified for the banks to terminate their credit card accounts," Johnson says. Still, criminals might find someone else to take the responsibility for opening bank and credit card accounts, but at least RogueBlock makes it harder for them to do business. "One of our goals was to contract the online market. We have done that. We have also increased awareness and educated our partners in the financial sector," Johnson says.

IACC MarketSafe is a similar program that targets storefront listings on Taobao and Tmall, the Chinese-language version of eBay or Amazon. The IACC worked with the platforms' owner, the Alibaba Group, to streamline its process for submitting and processing complaints. Nearly 5,000 seller storefronts have been removed and the sellers permanently banned from the site using this initiative. According to Pfizer's chief of security, John Clark, his company used both programs as models for creating its own. *(See the second article in this series in our March issue.)*

INCREASING LATIN AMERICAN COOPERATION

In addition to fighting online pharmaceutical crimes, the IACC looks for trends and ways of addressing them. The organization held a meeting in June 2016 in Miami attended by 250 representatives from 15 Latin American countries. Economic growth in the region is leading to greater consumer powers. Latin America, therefore, is widely viewed as a growth market for both authentic and counterfeit products. IACC is focusing on improving public awareness and training customs officials to recognize counterfeits.

Raising the awareness of Latin American lawmakers is also important because the distribution models for counterfeit medicines have gotten quite sophisticated. Counterfeiters have taken to shipping products from the country of origin, usually China, through ports in Central America on their way to other countries, like the United States. "If products enter a port in one country destined for another, there is not the same level of scrutiny," Johnson explains.

Currently, the U.S. is one of few countries that will take action against illicit goods in transit to other countries. IACC's job at the Miami conference was to encourage collaboration and advocate for new laws. Johnson says he is hopeful that kind of change will come to the region because most countries, in addition to sending agents who work in the field, also sent high-ranking customs officials to the meeting.

According to Johnson, the pharmaceutical industry is doing all the right things, including moving the world toward employing universal unique identifiers or bar codes. He expects more progress to be made against counterfeit medicines in the coming years. L

Diversity In The Biopharma Boardroom: **Moving Past Good Intentions**

CHRISTOS RICHARDS

After years of being relegated down the governance agenda, diversity in the boardroom is now an acute optic and has become a priority for many biopharma companies. The focus on increasing the number of female and non-Caucasian directors continues even as biopharma boards are grappling with a tougher investor environment, unresolved pricing issues, and the uncertainty brought by the new Trump administration.

Though concerns such as these tend to push social responsibility initiatives to the back burner, the issue of boardroom diversity is now more than a societal imperative — it is an integral part of a best practices approach to corporate governance. It has been well established that diversity provides a hedge against groupthink, enriches debate, and helps lead to a more rigorous evaluation of risk.

With the board at the top of the organizational chart, diversity in the boardroom also has become a highly visible proxy for a company's culture, increasing the company's desirability as an employer. Smaller or earlier-stage companies once got a pass on this issue, but that exemption is evaporating given the competition for boardroom talent that all companies now face. A recent analysis by Catalyst Advisors and Atlas Ventures' Bruce Booth suggested that biopharma firms, from startup to post-IPO, will need more than 600 new directors in the next several years — after having depleted the director candidate pool by adding 250 new directors in the past two years. The cold reality is that no biopharma company, large or small, can hope to succeed if it excludes, even inadvertently, any of the market's executive talent from the candidate pool.

While it is only one aspect of the overall diversity landscape, gender diversity provides an easily quantifiable measure of equality of opportunity. Examining the board composition of the 164 publicly traded companies in the NASDAQ Biotechnology Index shows how much work remains to be done: As of the beginning of this year, only 15 percent of board members are women, and 26 percent of the companies in the index are still without a female director. In comparison, among S&P 500 companies, women hold 20 percent of board seats and 2 percent of those boards remain all-male; among the traditional Big Pharma companies, 26 percent of board seats are held by women and every board has at least one female director.

Organizations like Women in Bio and MassBio help keep a spotlight on gender diversity. Last year, Women in Bio announced a program to identify and provide boardroom training for female board-ready biopharma executives. While this year's JP Morgan conference was taking place, MassBio released a letter signed by more than 100 biopharma leaders committed to implementing gender-diversity best practices, including asking current board members to act as active sponsors of women ready for their first board seat. But these initiatives beg the question of how it is that the industry's good intentions on gender diversity have such difficulty being translated into reality.

HOW GOOD INTENTIONS FALL BY THE WAYSIDE

To answer that question, it is necessary to closely examine how the director search process typically unfolds. When looking to fill a board vacancy, nominating committees often start out eager to add a woman to the board's roster. Once the recruiting process begins in earnest, however, many committees can fall back

PERCENTAGES OF TOP EXEC POSITIONS FILLED BY WOMEN

	BANKING & INSURANCE 48 Companies	CONSUMER 92 Companies	HEALTHCARE (NON-PHARMA/ BIOPHARMA) 16 Companies	TECHNOLOGY 74 Companies
Percentage of CEOs who are women	4.0%	7.4%	0%	6.7%
Percentage of other CXOs and business unit leaders who are women	15.9%	19.0%	13.6%	11.5%

Table 1

on default behaviors that prevent them from fully considering the complete talent pool available to them. Understanding how this happens will make it easier for nominating committees to fulfill their intentions for a more diverse boardroom.

In the heat of a search, it is not uncommon for nominating committees to become focused on pursuing a "name" director, such as the CEO who commands a well-known multibillion-dollar market-cap company. The common belief is that such an appointment will bring the board instant credibility with investors, a powerful professional network and the insight of knowing what it takes for an organization to reach the upper tiers of its industry.

The "name" director is, of course, the extreme case of the more general impulse to recruit a sitting CEO. But with only nine female CEOs in the NASDAQ Biotechnology Index, there simply aren't enough female biopharma CEOs to go around. Of course, we need to increase the number of women who move into the CEO role — but that alone won't appreciably improve the percentage of women biopharma directors. In addition, one must remember that regardless of the number of talented women who do move to the corner office, boards often restrict the number of outside board commitments their CEO may accept — a practice reinforced by recently issued ISS (Institutional Shareholder Services) guidelines.

SIDESTEPPING SELF-IMPOSED BOUNDARIES

Though the situation seems intractable, nominating committees can broaden their pool of female director candidates without compromising their standards if they are willing to rethink two long-held assumptions. The first is that only current or former CEOs — whether "names" or not — can make stellar directors. As Women in Bio and others have pointed out, the fact is that a great many executive committee members and business unit leaders have experience and judgment that would benefit the boards of biopharma companies preparing to scale operations and commercialize products. The business unit head who oversees a company revenue of half of a $20 billion market cap can certainly provide useful counsel to the CEO of a $1 billion company looking to lead that company into the next bracket. Non-CEO directors also tend to have less demanding travel schedules than CEOs, as well as fewer other obligations which might diminish outside boardroom bandwidth and availability. Indeed, the board that accepts a highly qualified regional president will be getting a director hungry to prove herself at the highest echelons of the industry. (It's important to note that the due diligence on these candidates needs to include a thorough examination of potential conflicts of interest.)

The second assumption is that the technical nature of the industry largely limits the pool of directors to biopharma and traditional pharma. Even though board work is much more demanding and complex than it once was, it is still ultimately about advice and oversight rather than running the business. More impor-

tantly, purposely cross-pollinating and recruiting director candidates from among seasoned C-level executives in other industries may bring perspectives and experience that could greatly benefit a biopharma CEO while also increasing the pool of women under consideration. This strategy, however, is typically reserved for the more mature (and often commercial-stage) company, and is most fruitful if leveraged in specific disciplines such as finance, legal, and human resources.

> *"Greater diversity in the boardroom will ensure that a company is better equipped to respond to its evolving challenges and opportunities."*

If we combine these two strategies — looking both deeper and wider — the pool of highly qualified female director candidates significantly expands. Table 1 shows how, across S&P 500 companies in four major industries, the percentage of women jumps when looking one level below the CEO. In absolute terms, these women represent an additional 610 potential director candidates.

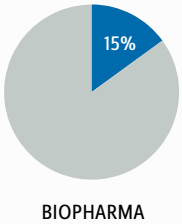
In a recent engagement, for example, we were able to offer one biopharma client a gender-diverse slate of director finalists when we turned to executives from the reimbursement/managed care sector. In a current engagement, we are looking to the luxury goods sector to fill a board seat for a company developing an aesthetic therapy ultimately paid for by the consumer. Whomever the nominating committee ends up selecting, that choice will be all the stronger because it comes from a finalist slate that is diverse in both gender and experience.

GETTING TO YES

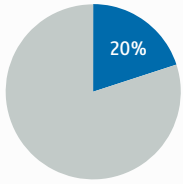
Updating the selection criteria is critical, but that is only half of what must be done for boards to successfully diversify. Boards must also position themselves to be attractive to female director candidates who are aggressively pursued by other boards, which will offer them competitive options. In addition to all the regular due diligence on the company's leadership, finances, and science, boards should expect that female candidates will closely scrutinize the company's track record on diversity in both the boardroom and within management. Companies currently operating without any female directors will find themselves in a challenging position on this score and will need to make a compelling argument regarding their commitment to diversity going forward, assuring female director candidates that the company isn't simply putting a bandage on a deeper deficiency. The situation is similar to that of a board composed of investors and founders looking to bring on its first non-investor independent director. The most desirable candidates will want to ensure that though they may be "the first," they won't be "the only" indefinitely. And with good reason: Only after an underrepresented group reaches a critical mass — thought to be between 20 and 30 percent — can they begin to fully integrate into the larger group.

Table 2

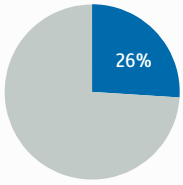
PERCENTAGE OF BOARD SEATS HELD BY WOMEN



BIOPHARMA



S&P 500



BIG PHARMA

That more and more biopharma boards are making diversity a priority is another sign of the sector's ongoing maturation. However, to make that priority a reality, biopharma nominating committees will have to broaden their approach to recruiting and be able to demonstrate their commitment to the diverse director candidates they hope to elect. Forward-thinking nominating committees will do these things even while the company is private so that a diversity orientation is hard-wired in from the start. Regardless of where a biopharma firm is in its trajectory, greater diversity in the boardroom will ensure that a company is better equipped to respond to its evolving challenges and opportunities. L

CHRISTOS RICHARDS is a partner at Catalyst Advisors, a global recruiting firm specializing in finding board members, CEOs, and senior leaders for biopharma companies across all stages of growth.

2017 HBA Woman of the Year event

Join over 2,000 attendees

11 May 2017 | NYC Hilton Midtown

Woman of the Year
Bahija Jallal, PhD
executive vice president, AstraZeneca and head of MedImmune

Honorable Mentor
Joaquin Duato
worldwide chairman, pharmaceuticals, Johnson & Johnson

STAR
Ceci Zak
principal and COO at Batten & Co (a strategic consulting firm within the Omnicom Group)

HBA Healthcare Businesswomen's Association
Connect Share Grow

Register today
HBAnet.org | #HBAimpact

How To Diagnose And Treat Team Conflict

SYLVIA LAFAIR, PH.D.

SYLVIA LAFAIR, PH.D., author of *Don't Bring It to Work* is a business relationship expert, named One of the World's Top 30 Leadership Professionals for 2016 by *Global Gurus* Top 30 Leaders, and creator of the award winning Total Leadership Connections Program.

When many highly educated people work together in a culture heavily focused on logic and science, the relationship realm, with its underbelly of subtle emotions, is often brushed aside. This can lead to systemic difficulties that derail productivity and limit success.

When tempers flare and issues are handled quickly, that's excellent. You have resolved a problem. However, if the same concerns show up over and over, including disappointments, disapproval, and discounting, you are staring at a pattern. Situations that constantly repeat need a different type of understanding to be resolved.

TYPES OF BEHAVIOR PATTERNS THAT CREATE HAVOC

- **THE PERSECUTOR:** embarrasses associates with finger-pointing and blaming. No resolutions occur because everyone is afraid to take them on. This leads to gossip, rumors, and disconnection.
- **THE AVOIDER:** leaves the scene, either physically or emotionally, when the going gets rough. Meetings are short-circuited, projects are delayed, and excuses are superficial.
- **THE DENIER:** pretends everything is perfect, with a desire to maintain the status quo. Facts and statistics are distorted to keep from changing course.
- **THE VICTIM:** cannot speak up for himself and will take all the blame yet is unable to offer options for making positive change.
- **THE SPLITTER:** talks out of both sides of the mouth telling individuals what they want to hear rather than being consistent, thus causing misunderstandings that fuel the fire.
- **THE DRAMA QUEEN/KING:** takes center stage with over-the-top concerns that lead nowhere and waste time rather than lead to a helpful solution.

ETIOLOGY OF RELATIONAL PATTERNS AND WAY OUT

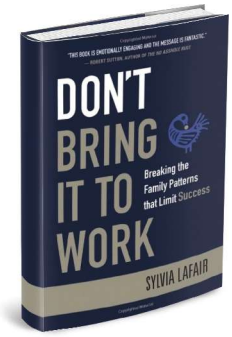
In his book, *Blink*, Malcolm Gladwell reports on studies that indicate our overwhelming predisposition for "instant knowing." People make snap decisions about whether they like each other without realizing it. When bosses or colleagues don't match our expectations, we realize this in a matter of seconds, and just like that the seeds of conflict are sown.

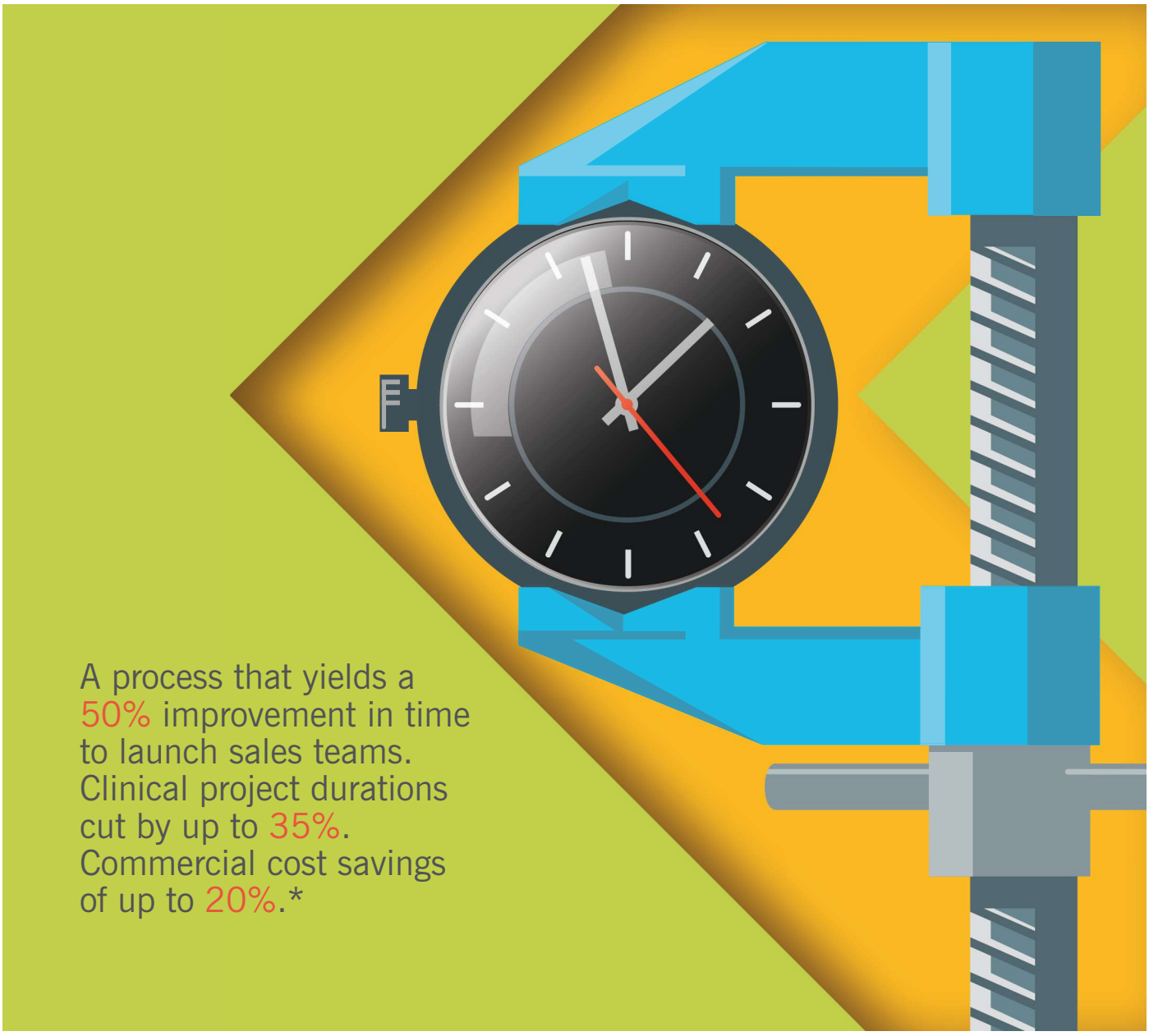
The "blinks" of remembrance come from early in life, from our original organization, the family. We have created work to resemble the family structure. There are bosses, like parents, and colleagues, like siblings. Just as there is a protocol to take a family history for physical illness, the same is needed for conflict resolution.

Handling underlying conflict is always a two-step process: Understand what triggers your own behavior and then help direct reports explore their reaction patterns.

Power is diminished by observing the ingrained, outdated patterns of reacting that create conflict. Next, understand this is more than just a reaction to the present situation, and the intensity is diffused. Then it is possible to transform the pattern to one that is positive; seeds of honesty and trust are planted.

There is room for discussion and change once you and your direct reports can see through those automatic, knee-jerk tendencies to respond. It is only when you stay in the rut of ingrained, outdated responses that no new movement is possible nor real dialogue can happen. L





In a business of numbers, these are the kind that can have human impact.

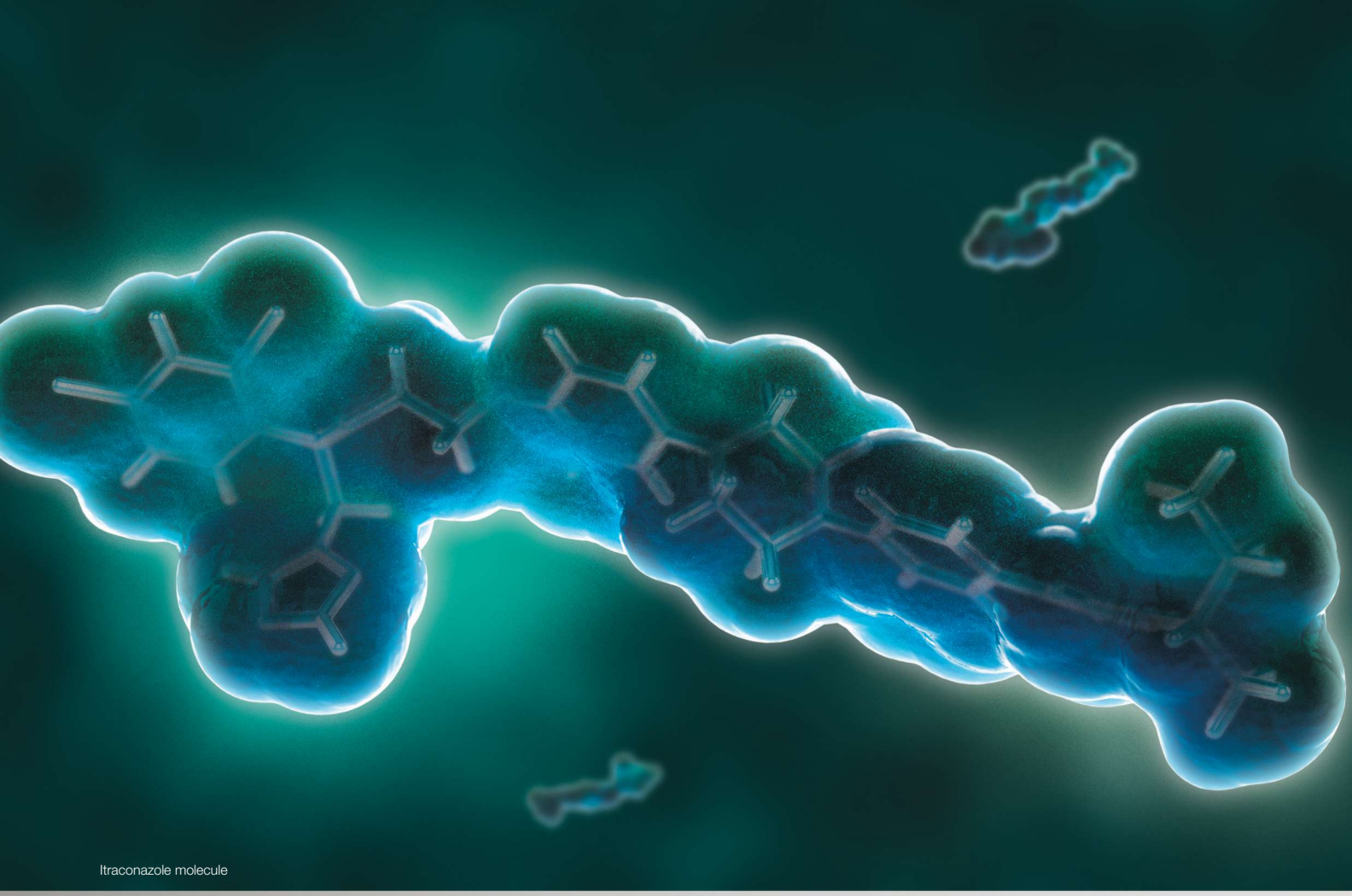
At inVentiv Health we believe the best way to help patients is by doing our jobs better, smoother and faster. That's why we purpose-built our organization in a unique way — commercial and clinical disciplines working together under one roof as teammates and colleagues, not distant relatives. At inVentiv, the consistent sharing of knowledge capital, data and insights helps each phase of the process go smoother and more successfully. Which can result in savings of both time and money. And while this may sound like just good business practice (which it certainly is), it's actually driven by a singular desire to help you help people. Sooner rather than later.

*We have achieved the results described above with some clients. As you know, every situation is different and results may vary. Our goal is constant improvement on costs and time.

inVentiv Health

Learn more at inVentivHealth.com/faster

Shortening the distance from lab to life.™



Itraconazole molecule

Formula to finished dose. Delivered.

Our clients bring us their one-of-a-kind breakthroughs. Our experience gives them a reliable and efficient journey into viable products. We offer complete drug substance and drug product services for small molecules. Plus, a comprehensive range of dosage forms. Let us apply our expertise to help you overcome your toughest solubility challenges and accelerate your path from concept to proof of concept to commercial launch.

Patheon®

A HEALTHIER WORLD. DELIVERED.