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WAMJ

World Asian Medical Journal

Inspirational
Asian Healthcare Leader

Karen E Kim, MD, MS

Dean-Designate of Penn State College of Medicine
Vice Provost for Research at the University of Chicago

SPECIAL REPORT I
Asia Rising at BIO International Convention 2023

BIOPHARMA REPORT I
Companies Making Automated Drug Discovery a Reality

BIOPHARMA REPORT II
Tech-First Companies Take the Lead in AI Drug Discovery

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From the Publisher

DoHyun Cho, PhD
Publisher
President & CEO of W Medical Strategy Group
Chairman of New York Health Forum

We are thrilled to unveil our latest edition of World Asian Medical Journal, featuring compelling articles on cutting-edge advancements, influential thought leaders, and significant developments reshaping the industry landscape.

As the cover story, we were honored to showcase the exceptional journey of an inspirational Asian American healthcare leader, Dr. Karen Kim, MD, MS. She is currently serving as the Vice Provost for Research at the University of Chicago and has been appointed as the Dean of Penn State College of Medicine. Dr. Kim's remarkable contributions and leadership have left an indelible mark on the field of medicine and contributed to continuous innovation of Gastroenterology.

Being a founder of the Center for Asian Health Equity at the University of Chicago, she eagerly addressed healthcare disparities and challenges which Asian American groups face in daily life. Being appointed as the first and only Korean American woman dean of Penn State College of Medicine, Dr. Kim emphasized that Asian American physicians need to step up to take more of significant positions in the field of medicine.

In this edition, we also featured the BIO International Convention 2023 in the Special Report I where Asia's prominence in the global healthcare arena has been accentuated. The region's innovation, research breakthroughs, and collaborative efforts have garnered attention, propelling it to the forefront of the industry.

In the Special Report II, we introduced the 'CDC Recommendations- U.S. 2023: Screening and Testing for Hepatitis B Virus Infection', which highlights the significance of proactive measures in curbing the prevalence of this health concern.

Advancements in technology have revolutionized drug discovery, and we present an exclusive reports in Biopharmaceutical Report I and II, introducing biopharmaceutical companies that are harnessing automation to accelerate drug development and bring innovative treatments to patients, and the role of Artificial Intelligence in drug discovery.

Conference Alerts featured invaluable opportunities for networking, learning, and staying ahead in an ever-evolving industry and Latest Healthcare Industry News, we covered the most recent developments, breakthroughs, and announcements of the health industry.

We hope this edition of WAMJ inspires our readers. Wishing all of your insightful reading and a prosperous journey in the world of healthcare and innovation.

From the Editor-in-Chief

Joseph P. McMenamin, MD, JD, FCLM
Editor in Chief
EVP of W Medical Strategy Group
Partner, Christian & Barton, LLP

Welcome to this, the 27th edition of the World Asian Medical Journal. We are happy to present here our interview with Karen E. Kim, MD, the newly-named dean of Penn State College of Medicine at Hershey, Pennsylvania. When she assumes her duties next month, Dr. Kim, a gastroenterologist, will be the first Asian-American, and the first woman, to hold this prestigious post.

In her interview, Dr. Kim tells us about her lifelong interest in medicine--beginning at age four(!)--when she decided she wanted to "save the world." Her decision required self-confidence, as she encountered some nay-sayers along the way, and she herself harbored doubts about her scientific capabilities. Notwithstanding those impediments, she excelled in medical school, graduating at the top of her class. Despite an interest in surgery, Dr. Kim decided on gastroenterology because it lent itself more readily to raising a family than surgery did, yet resembled surgery in that it addressed similar problems and allowed her to work with her hands; she also found that its path less littered with stereotype-derived obstacles.

During her fellowship. Dr. Kim studied epithelial transport, anticipating a career in research. Sadly, however, her mother was diagnosed with hepatitis B-related liver cancer and died from it. That experience led Dr. Kim to the realization that many serious gastroenterological and other diagnoses afflict Asians disproportionately, eventuating, in turn, in an interest that inspired her to found the Center for Asian Health Equity at the University of Chicago, where she has long practiced, taught, and conducted research.
Among the topics our interviewee discusses in this issue are self-propelled endoscopies, AI generative algorithms and predictive models, and the need to train AI with more Asian-inclusive studies. Relatedly, Dr. Kim points out that, to the extent Asians are trial subjects, too often the researchers fail to disaggregate them as Korean, Indian, Japanese, and so forth, lumping them all under the "Asian" category. Dr. Kim observes that relatively few healthcare professionals are bi- or tri-lingual, and although Asian-Americans are well-represented among providers and department chairs, few have become deans or otherwise joined the leadership ranks at academic centers. Phenomena such as these may have contributed to inadequate responses to problems such as delayed recognition of diabetes, and inadequate treatment for disorders ranging from cancers to suicide prevention.

Dr. Kim's agenda at Hershey is crowded. Among other ambitious goals, she hopes to further our progress in addressing issues such as those she has specifically studied, to enhance Hershey's prominence in pediatric oncology and other disciplines, and to expand the availability of care in rural parts of Pennsylvania. I am confident you will savor our interview with Dr. Kim as much as I did.
Be sure to check out our other offerings as well, in areas such as Asians' roles at the 2023 BIO International Convention, CDC's current hepatitis B screening and testing recommendations, automated and AI-assisted drug discovery, and, of course, all our standard features. Enjoy.

WAMJ

World Asian Medical Journal

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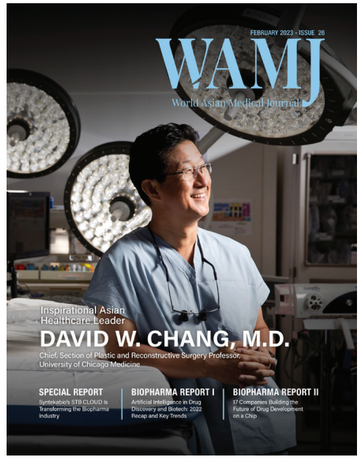
WAMJ Recap of the Last Issue



Cover Story

David W. Chang, M.D.
Chief, Section of Plastic and Reconstructive Surgery Professor, Univerity of Chicago Medicine

David W. Chang is a renowned plastic and reconstructive surgeon known for his expertise in complex microsurgical reconstructive surgery for cancer patients and lymphedema treatment. Dr. Chang has been a pioneer in developing innovative microsurgical procedures for lymphedema, aiming to improve patients' quality of life and reduce the severity of the condition. His career has witnessed significant advancements in microsurgery for cancer reconstruction, and he envisions an exciting future with technological innovations in the field. Dr. Chang has published more than 175 peer-reviewed research articles in high-impact journals as well as numerous book chapters. Personalized treatment plans, patient education, and research are fundamental aspects of Dr. Chang's patient-centered approach, and he advises aspiring medical professionals to have a genuine passion for their work. To learn more about Dr. Chang, please refer to issue 26 of WAMJ.

Special Report I

Synthekabio's STB CLOUD is Transforming the Biopharma Industry

Korean biotech company Syntekabio is revolutionizing the biopharma industry with its AI-based drug discovery platform, STB CLOUD. Utilizing deep learning algorithms and a proprietary technology called DeepMatcher®, the platform automates and streamlines the drug discovery process. As the only AI drug discovery biotech firm listed on KOSDAQ, Syntekabio aims to provide limited drug discovery capabilities and ideal solutions for fully automatic drug discovery to pharmaceutical companies in clinical-stages. To learn more about Syntekabio's STB CLOUD, please read issue 26 of WAMJ.

Biopharma Report I

Artificial Intelligence in Drug Discovery and Biotehc: 2022 Recap and Key Trends

Organ-on-a-chip technology aims to replicate human organs in lab settings. Organ-on-chip systems offer multi-parametric readouts of organ function, while artificial intelligence (AI) analyzes vast data, optimizing microfabrication and monitoring chip conditions. The NIH's Tissue Chip for Drug Screening Program accelerated its development and the FDA partnered with Wyss Institute, endorsing organ-on-a-chip for drug development. 17 companies in the US, Europe, and Israel are actively pioneering and engineering these innovative technologies. To learn more about organ-on-a-chip technology, please read issue 26 of WAMJ.

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Inspirational Asian Healthcare Leader

Karen E Kim, M.D., M.S.

Dean-Designate of Penn State College of Medicine
Vice Provost for Research at the University of Chicago

1. You are globally renowned for your accomplishments as a physician and a respected member of the medical community. What initially sparked your interest in pursuing a career as a physician, and how did you decide to specialize in your particular field of Gastroenterology?

Since the age of four, I decided that I wanted to be a doctor. I don't come from a family of physicians and it was a particularly hard decision because I didn't necessarily have a natural inclination towards being gifted in science. I was influenced by watching Marcus Welby, M.D. which aired in the 1970's and decided that I had to be a doctor with the mindset of saving the world.

It was an uphill battle to make it to where I am now but like I always tell young people, if you have a passion for it, go for it. Initially, there were people that questioned my decision but I knew in my heart that I could do it and I was going to believe in myself. If you think that you have a path for it, you have to believe in yourself and follow it.

Despite all my early challenges with my GPA and science curriculum, I found medical school to be extremely easy. I just took off from there and I graduated top of my class. I had so much fun with the people focused environment which was the main reason why I wanted to go into medical school, having the ability to connect with all different kinds of people in a diverse population.

Medical school is when I decided to become a surgeon but at that time, there were a lot of inequities in how men and women were treated in medicine. It was difficult for me to think about being both a surgeon and having a family, both of which are very important to me. Gastroenterology seemed like the right fit for me because the GI system stood out to me. I liked being in the abdomen and operating there. I enjoyed studying and doing luminal procedures, doing things with my hands, and just being able to solve a problem right then and there, so Gastroenterology became a natural pathway for me.

Even before going to medical school, I spent a lot of time doing basic science, bench research. During my residency, I never expected that I would work with patients.When I became a GI fellow, I was studying to become a gastroenterologist, doing epithelial transport, and understanding the pathogenesis of diarrhea in the GI system.

My mother was diagnosed with Hepatitis B related liver cancer and subsequently passed away from it. It was very shocking to me that I went through medical school, residency, and GI fellowship which treats Hep B and I was never told that 1 out of 10 people that have Hep B are Asian Americans, 50% Hep B burden in the U.S. are Asian Americans. I thought to myself, if I don't do something to help these communities while being Asian myself, who will do it?

From here, I did a 180 degree pivot and focused on Asian health even though I knew nothing about it. Growing up in a African-American neighborhood, I always thought about myself as a south side Chicago person. Having gone through their public schools and surrounded by African-American friends which I considered family, I never gave much thought about myself as an Asian person. So, my decision to focus on Asian health was a big rude awakening and I was angry.

Karen Kim, MD, speaks at an event to launch the Center for Asian Health Equity

2. What role do you see technology and innovation playing in the future of patient care in Gastroenterology?

I think there's a lot of exciting technology and innovations that will have a big impact in Gastrology. One area is how we can better visualize because treating the GI system is a very visual process having to identify abnormalities in the lining of the mucosa. Current technologies are pretty good at this but there is still a 10-20% miss rate. Self-propelled endoscopies is an exciting new technology in which the device can navigate and steer itself within the body.

Another area is the utilization of AI and different types of magnification processes to determine what the problem is, what needs to come out, what is missing, how are we getting a 360 degree visualization, and how we could improve the accuracy of the procedure itself. Generative AI is taking off in so many areas and we have also to be a part of it in healthcare. We need to ask ourselves, can we do better in AI generative algorithms and predictive models to determine who is at risk and who is not at risk?

I think that's what we're all grappling with now. How do we do the work that we do now, and can we do it in a more efficient way that will not only deliver a higher quality and timeliness of care, but also make it more cost effective.

Do you specifically see Asian Americans benefiting from the utilization of AI?

When I think about the application of AI, it is colorblind and algorithm based. They are only as good as the diversity in which these algorithms are created so we need to think about "fair" AI.

Asians are an extremely understudied population so most of these algorithms are created for the majority population and we can't use data from Asia because we know that social determinants of health and local environment may play a role in how you express your genes.

So I think that use of technology for special populations should include racial ethnic minority populations and other underserved populations. We

have to do better in making sure we create an inclusive framework so that these algorithms can actually generate data that are specific to populations that are often left out.

Here is an example: the American Diabetes Association a few years ago just determined that the BMI, body mass index, for Asians at risk for diabetes is significantly less than those of other Americans, almost to the tune of 15 pounds. We are called the "skinny fat" population because of all the skinny Asians with diabetes. You would never think that such a thin person would need testing for diabetes. There's something about fat metabolism in Asian Americans that makes us predetermined to have diabetes at a much lower BMI. A lot of central obesity is from the fat that collects around the abdomen which is the kind of fat that puts one at the highest risk of insulin resistance. Even though we knew this data 30 years ago, it was only several years ago that the American Diabetes Association announced they would begin screening Asians at a lower BMI threshold than other populations. These are the kinds of studies that need to be inputted into the AI algorithms so that we can benefit from the use of these new technologies.

Kim's research has focused on developing innovative technology-based solutions to address gaps in health care services among federally qualified community health centers.

3. You have long been interested in health equity and founded the Center for Asian Health Equity at the University of Chicago. Are there any particular healthcare disparities or challenges that you are particularly eager to address?

There's not a large Asian American population in Hershey, Pennsylvania, where I am going to work from this September, but I'm still very convinced that I can do this work on a regional and national platform.

One is inclusive research, how do we make sure that Asian Americans are disaggregated, meaning that Koreans are different from Chinese, Indians, and so on. Their ethnic populations have different health diseases and risks so how do we make sure that we promote a disaggregated approach for research data collection for Asian Americans. It's very important to me that we can create an inclusive recruitment and enrollment process for large clinical trials.

For instance, we have an All of Us Research Program. An amazing collective of a million people, an epidemiological cohort with greater than 50% of underrepresented populations in research which include Asian Americans. My team, through the Center for Asian Health Equity and our partner Asian Health Coalition, which is our non-profit arm, leads the national strategy in recruitment and enrollment for Asian American Native Hawaiian Pacific Islanders. We lead this program from the small non-profit arm in Chicago and we run this national program across the 50 states with dozens of community partners, hospitals, health systems. So, it is very important to me to make sure that we are at the table.

Hep B, without a doubt has the biggest health disparity compared to any other racial ethnic population. It's endemic in some parts of Asia and extremely common here in the United States. In a room full of 12 Asians in the United States, 1 will have Hep B without any knowledge of it, and a fourth of them will

die from cancer.

Mental Health in Asian American is also very prevalent with highest suicides rates for those between ages 18-24 and 65-80. One of the problems is that there are very few bilingual, bicultural providers who can understand the cultural nuances of Asian Americans, which is crucial for effectively treating their mental health, a huge stigma problem.

Another thing that other people probably don't think about but I am very passionate about, is cancer. Asians are the only population to die of cancer as the number 1 cause of death. This has been the case since 1980 which most people don't know about. I believe at this point, it should be more of a common knowledge and I keep thinking to myself, how many more Asian Americans have to die of preventable cancers before we realize that these populations need special studies and special outreach to make sure that they benefit from what should be normal healthcare.

These are some of the challenges that I wish to address and now there are increasing amounts of studies looking at how we can think about social determinants of health, dietary habits of these populations to decrease risks.

4. You have been appointed as the next dean of Penn State College of Medicine, effective September 2023. Could you share your thoughts and feelings about this new role and what it means to you?

It is unbelievably exciting and as you know, I do a lot of work on disparities. For me, I feel very proud to wear this position and I want to use this interview as an opportunity to promote Asians in Leadership.

One really glaring area of disparity that I would like to point out in the US, is that 1 out of 5 graduates of medical school are Asian Americans, about 20% of the physician workforce are Asian Americans, about 10% of our Chair of Medicine Roles are Asian Americans. Yet, if you look at how many deans there are out of the +150 medical schools, there's less than a handful of Asian American Deans and I am the only East Asian Dean in the US. I hope I will not fall flat and will try my best to make sure that other Asians are pulled up into these leadership positions because we deserve it and we are capable of being really outstanding leaders.

Mainly, I would like to see greater impacts and be able to lead in terms of students, staff, faculty. I want to make sure that the work that we do will maximize our ability to deliver better patient care, build research in a significant way, make sure that the education we are providing for the next generation is top notch, and impart in these students a sense of social justice and health disparity.

5. As the new incoming dean, what are your goals for advancing medical education, research, and patient care within Penn State? Could you discuss any innovative research areas or programs that you would like to develop or expand upon?

I try to think about what makes Penn State unique and there's so many. We are a state school and one of the only academic medical school centers that is located within a rural area. We fit within a sort of T shaped rural area of PA and it's a really underserved area.

I did a lot of research in Chicago, Illinois around colon cancer prevention and I ran our state run programs there. IL is 65% rural while PA is 75% rural, I did a lot of rural health work in IL, so bringing in that framework, it really seems to me an area of tremendous opportunity for Penn State College of Medicine to bring the rural pipeline — both in trainees who stay in PA to serve these underserved populations and in research on how we can better improve rural health.

How do we leverage the strength of the community health centers, federal qualified health centers, public health system, other commonwealth Penn State campuses, and nurses to deliver interdisciplinary health and improve the health of rural Pennsylvanians? That for me, is an area that I'm challenged by and feel excited about addressing.

The areas that are really strong in Penn State for college medicine is certainly pediatric oncology. We

Dr. Karen Kim announces new website www.ILColonCARES.org at the Midwest Health Equity Conference

have a very big foot print in this area and an incredible philanthropic arm called Four Diamonds. It's one of the largest student run philanthropic organizations that funds pediatric cancer, a huge opportunity in clinical research and education. Last year, one of their biggest events, an annual fundraiser, raised over 16 million dollars in less than 2 days. All of that goes into funding pediatric research, pediatric patients, clinical care, and out of pocket costs for anyone who needs it.

I also think we have a tremendous department in our basic science research as well, particularly how this basic science research interfaces with translational research. How do we take our bench research, to bedside, to innovation, then back to the bench and be able to leverage the patient population to better inform the science that is happening around our campus. In particular with the patient populations that we serve, I think we make a big mark on what that rural health will look like going forward.

In terms of students, my goal would be to continue to train the next generation of students that are interested in serving the area around Penn State, particular in the Hershey area. That's sort of my goal there, how can we approach our interdisciplinary health services and health science curriculum in this area, which we are really well known for.

6. As the founder and Board President of Asian Health Coalition, what are your primary responsibilities and duties? Could you provide an overview of AHC and its impact on the Asian community?

I am the Founder and Board President of AHC, Asian Health Coalition, which is a non profit organization that we founded in 1996. This was around the time my mother passed away from Hep B related liver cancer and I decided I had to do something. I knew nothing about being Asian and Asian health disparities so we formed this organization in order for us to become a passive building organization that works with direct serving Asian communities. We brought in millions of dollars in grants to be able to fund these organizations to do their work. It was a great model because these organizations are very ethnic specific and have

community health workers so they can be on the ground. It is a sort of a public health model.

In 2014, it was clear that AHC was doing really well but in some ways we were competing against the organizations that we were trying to fund because we were applying for the same grants. So, we ended up affiliating with Chicago University to create the Center for Asian Health Equity, which is AHC + Chicago University. Here, we were really able to focus on research and training the next generation, do a lot of policy advocacy, and still provide funding for our organizations but more from federal grants.

We have been making huge impacts and started working with Blue Cross and Blue Shield. We created a disaggregated Asian Cohort, understanding the health needs of Asian populations. We give back to the community based organizations and we were able to raise a lot of funds to support these specific health needs.

Most recently, we received a large grant from NIH, National Institutes of Health. After aggregating with them for about 3 years, they will start the first epidemiologic Asian cohort which is launching now across the country. We are one of the original grants out of the many grantees.

In your opinion, what are the most significant health challenges faced by the Asian community in the U.S., and how does the Asian Health Coalition address these challenges?

I think being invisible is the biggest problem as well as an absence of knowledge in health problems. We need to get seated at the table and make sure we are included in important studies.

We've done that really well in AHC and we run the national strategy with a tremendous amount of funding for disaggregated data. We have a very diverse portfolio of funding and we share it with our community. Every time we receive money, we add more branches and grow into a bigger tree with a very robust network, and we will continue to do so even after I go to Penn State.

7. Is there any additional information, vision, or message you would like to share with our readers in your roles as a dean, physician, and healthcare leader?

My parting message is to follow your passion and your dreams. Find those people who keep the doors open for you. As the only Korean American Dean and East Asian Dean, I hope people will knock on my door because I'm going to reach out and pull people up. I hope to use this position not only to promote the health and wellness of PA but also to engage the broader Asian community in leadership and education training in a way that's very meaningful and impactful.

Karen E Kim, M.D., M.S.
Dean-Designate of Penn State College of Medicine
Vice Provost for Research at the University of Chicago

Dr. Karen Kim is a prominent figure in medicine and cancer research, serving as Professor of Medicine and Dean for Faculty Affairs at the Division of Biological Sciences. As Associate Director of the University of Chicago Comprehensive Cancer Center and Director of the University of Chicago Medicine Comprehensive Cancer Center Office of Community Engagement and Cancer Disparities, Dr. Kim's dedication to addressing health disparities is evident. She established and leads the University of Chicago Center for Asian Health Equity, focusing on health disparities in Midwest Asian communities through community-engaged health and policy strategies. Her research spanning 15 years aims to reduce cancer health disparities among racial and ethnic minorities, particularly Asian American communities, advancing health equity nationally.

Asia Rising at BIO International Convention 2023

BY **SABINA LEE**

The 2023 BIO International Convention held in June welcomed more than 20,000 biotechnology and pharma leaders from 73 countries in Boston, the nexus of global biotech innovations.

SPECIAL REPORT I

Boston has emerged as "the most innovative square mile on the planet," according to Kendalle Burlin O'Connell, CEO of MassBIO, the world's first biotech trade organization that served as a genesis of the current BIO Convention. The Boston biotech boom was further accelerated by the creation of the Massachusetts Life Sciences Center in 2007. Since then the city has drawn nearly $9 billion in private venture capital and $3.2 billion in National Institutes of Health funding in 2022. It's estimated that nearly 1,000 biotech companies in Greater Boston today employ more than 100,000 people, leading the biotech innovation in Massachusetts. The state produces about 15% of the U.S. drug development pipeline, which translates to total 7% globally.

Technological advancement over the last few decades has spurred the growth of the biopharma ecosystem, which has become truly diverse and expansive. Encompassing everything from cloud platform technologies and manufacturing to biotech and venture capital investments and business advisory, there are more small laboratories and early biotech startups thriving today, with multinational pharmaceutical companies, healthcare advocacy groups, and consultants.

At this year's BIO International Convention, stakeholders from East Asia stood out for their notable presence. Led by the Convention's sponsor Samsung Biologics, Korean biotechnology was on full display at the K-Bio showcase. Boasting one of the largest delegations at the 2023 Convention, more than 500 Korean companies and organizations were in attendance, doubling the size from the previous year. Celltrion, Lotte Biologics and ST Pharm were among the participating industry leaders from Korea.

The Korean government has set the bioindustry competitiveness as the focus of its next national growth engine. It has allocated major resources to nurture Korean biotech companies, including export support and easing of regulatory measures. The government's strong commitment to increasing the biotech competitiveness in the global healthcare market and biosimilars was palpable at the Convention.


Boston Mayor Michelle Wu announced the training program

Small-to-mid-sized bio ventures like ABL Bio, Aptabio Therapeutics, CHA Biotech, Eubiologics, Prestige Biopharma, HLB and Syntekabio were onsite to actively pursue deals with multinational pharmaceutical giants, venture capital investors or new contract development and manufacturing organizations (CDMO).

Artificial intelligence (AI) and machine learning (ML) were prevailing conversation topics among the attendees. AI's potential impact for future therapies generated much optimism, though notwithstanding some concerns for misusing the technology, including its unregulated or irresponsible application to biopharma development.

Most agreed that the data—biomarkers, algorithms and physical molecules—hold enormous value. For developing new drug discovery and therapies urgently needed to save human lives and advancing patient care, the data serves as a foremost source for driving new innovations.

These recent developments together have signaled an inevitable shift in key biopharma value addition, moving the predominant emphasis from therapeutic efficacy to strategies leveraging big data. Regarding some of these aspects, Asia has become the place for fast deal-making, with advancing technologies impacting the scope and scale of deals and partnering opportunities.

Along with India and Korea, Mainland China has also grown exponentially for the last decade in size and

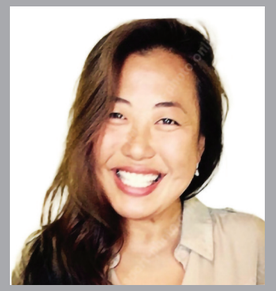
reputation. China's presence at the BIO Convention showed how the country has embraced a new wave of emerging global biotechs. Claiming its own place on the world stage as a source of innovative biotechnology, China is varying its tactics to include bioprocessing, global business development, marketing strategy and investment. These efforts are led by companies such as Wuxi Biologics, MyBio, Henlius, Novo Nordisk, Cubio, etc. With more than a billion people in its domestic market to serve in a region estimated to be four billion plus, China is rapidly expanding beyond its initial engagement of serving mostly nearby markets through joint venture projects with multinational corporations.

Generating more innovations today, AI and ML are making a significant impact by democratizing drug discovery. This pivotal transformation is shifting possibilities for developing new therapies, what was once limited to only well-funded global companies and institutions. The cost-cutting and time-efficient technologies have enhanced screening and optimization, changing the narratives and disrupting the norms within the industry. This trend has also allowed major pharma companies to increasingly seek collaboration with smaller, more agile biotech firms to fill their pipelines.

Trust-building has remained at the core of global biopharma relationships. The Convention networking workshops emphasized the importance of determining what the company's needs and wants are before setting targets and comparing deals.

Cultivating an international network of contacts and collaborators is fundamental for accessing new business opportunities beyond the company's own culture and language. Influential cross-border partnerships can lead to better products and services. The importance of well-defined communications and due diligence processes is paramount for effective transnational networking that can widen their pool of resources, talents and markets.

The takeaway from the Convention, especially for Asian companies, is to learn how to develop a compelling story that would help build relationships with investors and top pharma leaders worldwide. Knowing their valuation, setting an early target for partnering and understanding alternative financing options are also a key to improve their chances for success on the global biopharma stage.



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CDC Recommendations - U.S. 2023: Screening and Testing for Hepatitis B Virus Infection

BY **CENTERS FOR DIAEASE CONTROL AND PREVENTION**

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Chronic hepatitis B virus (HBV) infection can lead to substantial morbidity and mortality. Although treatment is not considered curative, antiviral treatment, monitoring, and liver cancer surveillance can reduce morbidity and mortality. Effective vaccines to prevent hepatitis B are available. This report updates and expands CDC's previously published Recommendations for Identification and Public Health Management of Persons with Chronic Hepatitis B Virus Infection (MMWR Recomm Rep 2008;57[No. RR-8]) regarding screening for HBV infection in the United States. New recommendations include hepatitis B screening using three laboratory tests at least once during a lifetime for adults aged ≥18 years. The report also expands risk-based testing recommendations to include the following populations, activities, exposures, or conditions associated with increased risk for HBV infection: persons incarcerated or formerly incarcerated in a jail, prison, or other detention setting; persons with a history of sexually transmitted infections or multiple sex partners; and persons with a history of hepatitis C virus infection. In addition, to provide increased access to testing, anyone who requests HBV testing should receive it, regardless of disclosure of risk, because many persons might be reluctant to disclose stigmatizing risks.

Interpretation of Screening Tests

The three main serologic markers used to determine HBV infection status are hepatitis B surface antigen (HBsAg), antibody to hepatitis B surface antigen (anti-HBs), and antibody to hepatitis B core antigen (anti-HBc). Serologic markers change over typical courses of resolved acute infection and progression to chronic infection.

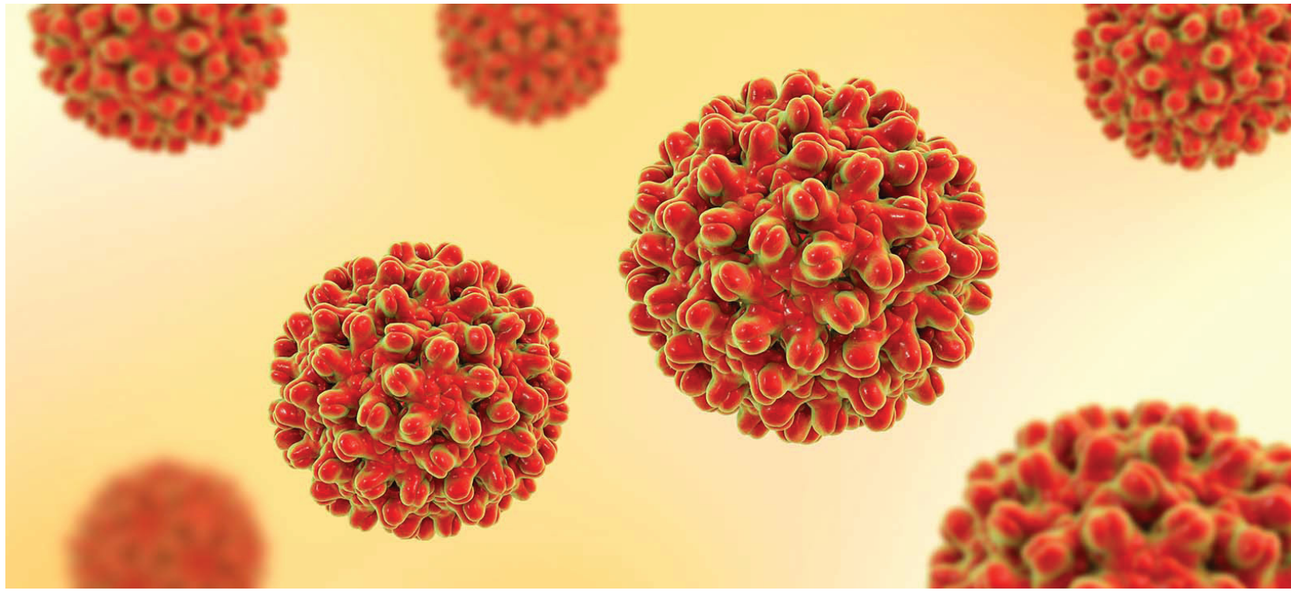
Persons with an Increased Risk for HBV Infection Recommended for Testing

- Persons with HCV Infection or a Past HCV Infection
- Persons Incarcerated or Formerly Incarcerated in a Jail, Prison, or Other Detention Setting
- Persons with Sexually Transmitted Infections or a History of Sexually Transmitted Infections or Multiple Sex Partners
- Infants Born to Pregnant Persons Who Are HBsAg Positive
- Persons Born in Regions with HBV Infection Prevalence of ≥2%
- Persons Born in the United States Not Vaccinated as Infants Whose Parents Were Born in Regions with HBV Infection Prevalence of ≥8%
- Persons Who Use Injection Drugs or Have a History of IDU
- Persons with HIV Infection
- MSM
- Household, Needle-Sharing, or Sexual Contacts of Persons with Known HBV Infection
- Persons on Dialysis, Hemodialysis, or Peritoneal Dialysis
- Persons with Elevated ALT or Aspartate Aminotransferase Levels of Unknown Origin

Rationale for New Recommendations

Chronic HBV infection can lead to substantial morbidity and mortality but is detectable before the development of severe liver disease using reliable and inexpensive screening tests. Routine monitoring and treatment for chronic HBV infection can reduce morbidity and mortality, supporting the importance of early detection of HBV infection. In addition, although not quantifiable, management of chronic infection through prevention efforts can prevent further transmission to others. These recommendations consider a simpler and less stigmatizing implementation strategy than previous risk-based HBV screening recommendations. The recommendations also provide guidance that is complementary to the 2022 ACIP recommendations to vaccinate all adults aged 19–59 years against HBV infection by providing a means to establish immunity or any history of infection or the need for vaccination to protect from future infection. Specific rationales for recommendations are as follows:

- Universal screening: Universal screening of adults is cost-effective compared with risk-based screening and averts liver disease and death. Although a curative treatment is not



yet available, early diagnosis and treatment of chronic HBV infections reduces the risk for cirrhosis, liver cancer, and death. Risk-based testing alone has not identified most persons living with chronic HBV infection and is considered inefficient for providers to implement.

- Triple panel screening: Using the triple panel (HBsAg, anti-HBs, and total anti-HBc) is recommended for initial screening because it can help identify persons who have an active HBV infection and could be linked to care, have resolved infection and might be susceptible to reactivation (e.g., immunosuppressed persons), are susceptible and need vaccination, or are vaccinated. When someone receives triple panel screening, any future periodic testing can use tests as appropriate (e.g., only HBsAg and anti-HBc if the patient is unvaccinated).
- Adults aged ≥18 years: An "all adults" recommendation was considered more feasible to implement (e.g., for integrating into electronic medical record alerts) than one among specific age groups. Considerations included the favorable economic analysis across adult age groups, similarly low vaccination rates among adult age groups, comparable epidemiology of acute and chronic infections from surveillance data among age groups, and harms of missed identification of chronic infections.
- Children and adolescents aged <18 years: Children and adolescents aged <18 years were not included in the universal screening recommendation because of the low prevalence of HBV infection in this age group and high levels of HepB vaccination. Children and adolescents aged <18 years who have risk factors and did not receive a complete vaccine series should be tested (Figure 1).
- New risk groups: The addition of three new risk groups was based on the HBV infection prevalence cutoff of ≥1%. The selection of the three groups for which to conduct systematic reviews was based on expert judgment, and the work group recognizes other populations might also be at increased risk.

HBV Screening and Testing Recommendations

In these guidelines, "screening" refers to conducting serologic testing of asymptomatic persons not known to be at increased risk for exposure to HBV. "Testing" refers to conducting serologic testing of persons with symptoms or who are identified to be at increased risk for exposure to HBV. The following evidence-based recommendations for HBV screening update and expand those issued by CDC in 2008.

Screening is recommended for the following persons:

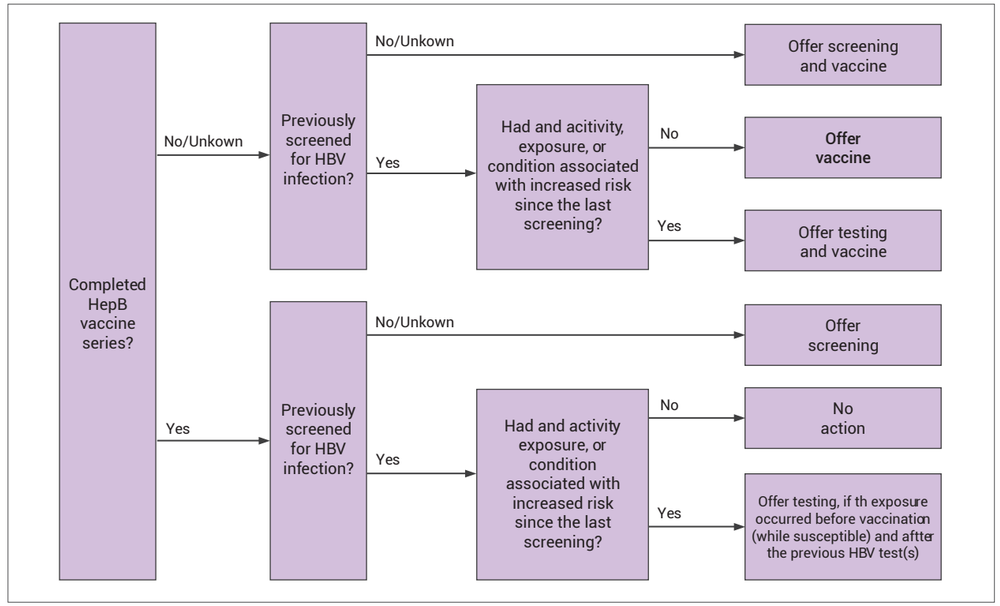
- All adults aged ≥18 years at least once during a lifetime (new recommendation).
- All pregnant persons* during each pregnancy, preferably in the first trimester, regardless of vaccination status or history of testing.

Testing is recommended for the following persons:

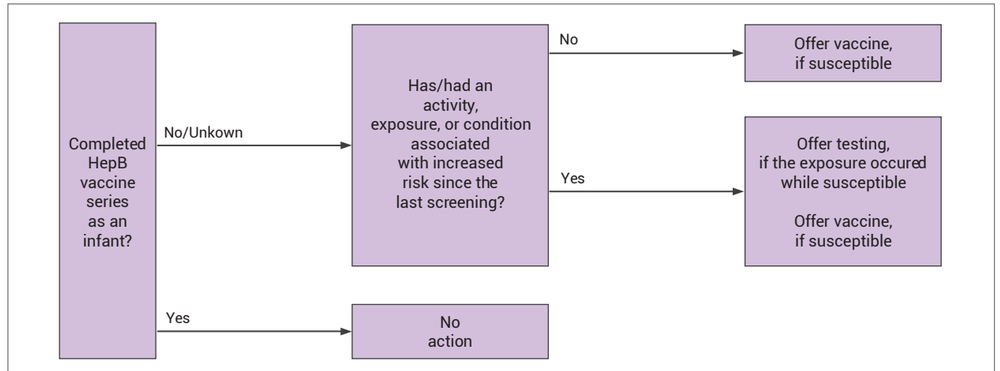
- Everyone with a history of risk for HBV infection, regardless of age, if they might have been susceptible during the period of risk (Figure 1). Susceptible persons include those who have never been infected with HBV (i.e., total anti-HBc negative) and either did not complete a HepB vaccine series per ACIP recommendations or who are known vaccine nonresponders.
- Susceptible persons, regardless of age, with ongoing risk should be tested periodically, while risk persists (Figure 1).
- Offer testing if the risk for exposure occurred after previous HBV serologic testing and while the person was susceptible.
- Anyone who requests HBV testing. These persons should receive testing, regardless of disclosure of risk, because many persons might be reluctant to disclose stigmatizing risks (new recommendation).

FIGURE 1. Incorporating hepatitis B virus screening and testing into a clinic workflow, by age

A. Nonpregnant adults aged ≥ 18 years without a known history of HBV infection



B. Children and adolescents aged 1-17 years without a known history of HBV infection



Per ACIP guideline, providers should only accept dadted records as evidence of HepB vaccination. Previous screening for HBV infection should include HBsAg, anti-HBc, and anti-HBs. After the collection of blood for serologic testing, persons who have not completed a vaccine series should be offered vaccination per ACIP guidelines at the same visit. Susceptible persons have never been infected with HBV(i.e., totla anti-HBc negative) and did not complete a HepB vaccine series per ACIP recommendations.

Abbreviations: ACIP = Advisory Committee on Immunization Practices; anti-HBc = antibody to hepatitis B core antigen; anti-HBs = antibody to hepatitis B surface antigen; HBV = hepatitis B virus; HBsAg = hepatitis B surface antigen; HepB = hepatitis B.

- Persons who have an increased risk for acquiring HBV infection, including the following:
  - Infants born to HBsAg-positive pregnant persons
  - Persons born in regions with HBV infection prevalence of ≥2%
  - U.S.-born persons not vaccinated as infants whose parents were born in regions with HBV infection prevalence of ≥8%
  - Persons who are injecting drug users or have a history of IDU
  - Persons incarcerated or formerly incarcerated in a jail, prison, or other detention setting (new recommendation)
  - Persons with HIV infection
  - Persons with HCV infection or a past HCV infection (new recommendation)
  - Men who have sex with men
  - Persons with STIs or past STIs or multiple sex partners (new recommendation)
  - Household contacts or former household contacts of persons with known HBV infection
  - Needle-sharing or sexual contacts of persons with known HBV infection
  - Persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis
  - Persons with elevated ALT or AST levels of unknown origin

Providers should follow these recommendations when offering screening and testing:

During the initial screening, test for HBsAg, anti-HBs, and total anti-HBc (new recommendation).

- Screening with the three tests (triple panel) can help identify persons who have an active HBV infection and could be linked to care, have resolved infection and might be susceptible to reactivation (e.g., immunosuppressed persons), are susceptible and need vaccination, or are vaccinated. Anti-HBs of ≥10 mIU/mL is a known correlate of protection only when testing follows a complete HepB vaccine series.

After the collection of blood for serologic testing, persons who have not completed a vaccine series should be offered vaccination per ACIP recommendations at the same visit or at an associated provider visit. Blood collection before vaccination is recommended because transient HBsAg positivity has been reported for up to 18 days after vaccination.

- Providers do not need to wait for the serologic testing results to administer the first or next dose of vaccine.
- Although screening can identify persons who are unvaccinated and susceptible to HBV infection, screening should not be a barrier to HepB vaccination, especially in populations that have decreased engagement with or access to health care. In settings where testing is not feasible or is refused by the patient, vaccination of persons should continue according to ACIP recommendations. Serologic testing should continue to be offered at future visits.

Additional screening might be recommended for certain populations, including blood donors, newly arrived refugees, and persons initiating cytotoxic or immunosuppressive therapy, and additional testing might be recommended for patients on hemodialysis, health care personnel, perinatally exposed infants, and persons involved in exposure events that might warrant postexposure prophylaxis and postvaccination serologic testing. Recommendations for these groups are described elsewhere. The new recommendation described in this report to include a total anti-HBc test during universal adult screening will support identification of persons with past HBV infection who should be aware of their risk for reactivation in the context of immunosuppression.

Follow-Up After HBV Testing

During the initial screening, test for HBsAg, anti-HBs, and total anti-HBc (new recommendation).

Persons with Active HBV Infection

Patients with acute infection should be counseled about their risk for developing chronic HBV infection, the risk for reactivation, and the risk for transmission to others. Treatment for acute HBV infection is not typically indicated except among patients with severe disease.

Persons who receive a diagnosis of chronic HBV infection can benefit from monitoring and counseling, including mental health support. CDC treatment guidelines have not been developed and are beyond the scope of these screening guidelines. However, AASLD has guidance for the monitoring and treatment of chronic HBV infection. Simplified guidance for primary care medical providers or other nonspecialists is available from the Hepatitis B Primary Care Workgroup (Table 1).

All patients who test positive for active HBV infection should be provided information on how to prevent transmission to others. Notification, testing, and vaccination of their household contacts or former household contacts, sex partners, and needle-sharing contacts are recommended, as appropriate. As resources allow, viral hepatitis or STI programs within local or state health departments might be available to support providers with contact tracing and notification.

Persons living with HBV infection have rights protected under the Americans with Disabilities Act. Persons should not be excluded from practicing in the healthcare field or from school, play, child care, work, or other settings because of their HBV infection.

Persons with Resolved (Past) HBV Infection

Patients should be counseled about their history of HBV infection and risk for reactivation. Therapies with the highest risk for reactivation include B-cell depleting agents (e.g., rituximab and ofatumumab). American Society of Clinical Oncology and AASLD guidelines have more information on therapies and conditions associated with increased risk for reactivation, as well as recommendations for treatment. Antiviral therapy for HBV infection, when initiated before immunosuppressive or cytotoxic therapy, can prevent reactivation of disease. The systematic review indicated the prevalence of resolved HBV infection (i.e., HBsAg negative and anti-HBc positive) in the general population ranges from 4.8% to 14.0% (median = 6.2%). Notification, testing, and vaccination of household, sex

TABLE 1.Initial medical evaluation of persons who are hepatitis B surface antigen positive

History/ Examination	Patient Education	Routine Laboratory Tests	Serology/ Virology	Imaging/ Staging Studies
• Symptoms/signs of cirrhosis • Alcohol screening and brief intervention • Metabolic risk factors • Family history of hepatocellular carcinoma • Hepatitis A vaccination status; offer vaccine if unvaccinated	• Educate patients on how to prevent transmission to others • Identify household contacts, sex partners, or needle-sharing contacts for screening and vaccination • Recommend abstinence or limited use of alcohol* • Recommend steps to reduce risk for metabolic syndrome and fatty liver • Refer to harm reduction counseling or drug treatment services, as needed	• CBC • Comprehensive metabolic panel, including AST/ALT, total bilirubin, alkaline phosphatase, albumin, creatinine, and INR	• HBeAg/anti-HBe • HBV DNA • Anti-HAV (total or IgG) to determine need for vaccination if none documented • Anti-HCV • Anti-HDV† • Anti-HIV • Other STIs (as indicated)	• Abdominal ultrasound with or without AFP§ • Elastography (e.g., FibroScan) or serum fibrosis assessment (e.g., APRI, FibroSure, FIB-4)

partners, and needle-sharing contacts of patients with HBV infection or a history of HBV infection are recommended, as appropriate.

Persons Who Are Susceptible to HBV Infection

Persons who are susceptible to HBV infection should be told that they have never been infected with HBV and are not protected from future infection. All persons who are susceptible to infection should be offered HepB vaccine per ACIP recommendations. Anti-HBs concentrations can wane over time among vaccine responders. For persons with a clearly documented vaccination series who test negative for anti-HBs, refer to Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. Vaccine should be offered to persons who have initiated, but not completed, the HepB vaccine series, regardless of anti-HBs status. HepB vaccine series completion is important for long-term immunogenicity.

Persons who are susceptible, refuse vaccination, and are at increased risk for HBV infection should be periodically tested. Frequency of periodic testing should be a shared decision between the patient and provider and be based on individual risk factors and immune status.

Persons Who Are Fully Vaccinated Against HBV Infection

Persons are considered fully vaccinated if they have completed a HepB vaccine series and can be reassured about protection against future illness. Vaccination status should be clearly documented in the medical record. Anti-HBs concentrations can wane over time among vaccine responders. For persons with a clearly documented vaccination series who test negative for anti-HBs, refer to Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices for specific populations for whom revaccination might be recommended (e.g., patients on hemodialysis). Revaccination or booster doses are not routinely recommended for persons who are immunocompetent.

Persons with Isolated Core Antibody

Persons with isolated anti-HBc should have their immune status and risk history considered before deciding next steps. Links to performance characteristics on all FDA-approved total anti-HBc assays are available. The specificity of total anti-HBc tests is 99.8%. However, if a person does not have risk factors, the result might be a false positive; repeat testing with the same assay is warranted to confirm the results. A false-positive isolated core antibody result means the person is susceptible and should be offered HepB vaccine per current ACIP recommendations.

A 2001–2018 national survey found the prevalence of isolated positive anti-HBc to be 0.8% (approximately 2.1 million persons). Among patients exposed to HBV, an isolated positive anti-HBc result might be the result of loss of anti-HBs after past resolved infection, occult infection (i.e., HBsAg is negative, but HBV DNA is positive), being in the window period before appearance of anti-HBs, or an HBsAg mutant infection (i.e., an infection that is not picked up by an HBsAg test unable to detect mutants). Patients who are immunosuppressed should be considered at risk for HBV reactivation, and HBV DNA testing is recommended to assess for occult infection. Among infants, an isolated anti-HBc result might be a consequence of passive placental transfer from an HBsAg-positive mother, which is why testing for anti-HBc is not indicated before age 24 months.

Patient Education

Patient education should be conducted in a culturally sensitive, nonstigmatizing manner in the patient's primary language (both written and oral whenever possible). Bilingual, bicultural, and medically trained interpreters should be used when indicated.

Reporting

Acute and chronic cases of HBV infection should be reported to the appropriate state or local health jurisdiction in accordance with requirements. The Council of State and Territorial Epidemiologists publishes case definitions for the classification of reportable cases of HBV infection. CDC has updated guidance for health departments on viral hepatitis surveillance and case management.

result will aid providers in correctly interpreting results. Finally, a better understanding of the prevalence of HDV in the United States is needed to inform recommendations for HDV screening among persons with HBV infection.

Future Directions

CDC will review these recommendations as new treatments, tests, epidemiology, HepB vaccination rates, and experience gained from implementation of these recommendations become available; recommendations will be revised as needed. The work group did not conduct a systematic review to reassess any of the groups at increased risk for HBV infection from the 2008 guidelines; future recommendations might modify the groups recommended for periodic testing. Additional data on the ideal frequency of periodic testing is needed. Continued collaboration with laboratories to bundle the three HBV tests (HBsAg, anti-HBs, and anti-HBc) would facilitate ordering the tests together as a triple panel. In addition, reporting a triple panel summary

Conclusion

Universal screening of adults for HBV infection is cost-effective compared with risk-based screening and averts liver disease and death. Although a curative treatment is not yet available, early diagnosis and treatment of chronic HBV infections reduces the risk for cirrhosis, liver cancer, and death. Risk-based testing alone has not identified most persons living with chronic HBV infection and is inefficient for providers to implement. Along with vaccination strategies, universal screening of adults and appropriate testing of persons at increased risk for HBV infection will improve health outcomes, reduce the prevalence of HBV infection in the United States, and advance viral hepatitis elimination goals.

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Biopharma Report

BIOPHARMA REPORT I

Companies Making Automated Drug Discovery a Reality

BIOPHARMA REPORT II

Tech-First Companies Take the Lead in AI Drug Discovery

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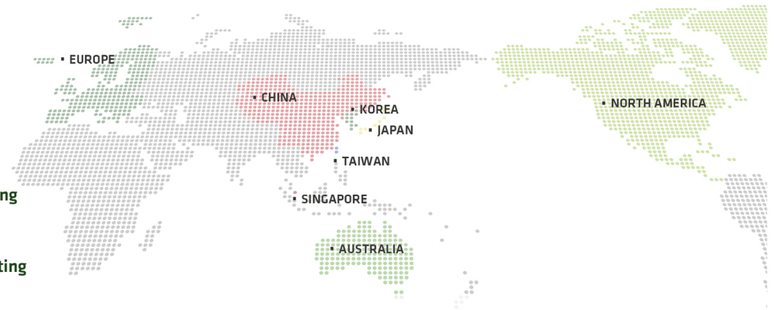

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Companies Making Automated Drug Dicovery A Reality

BY **ANDRII BUVAILO**

Data is king in modern biopharmaceutical research, and ability to generate massive amounts of quality biomedical data represents a tremendous research and business potential in the artificial intelligence (AI)-driven drug discovery realm. Challenges associated with big biological data, such as poor reproducibility, low accessibility, low standardization, etc, represent a considerable bottleneck for the advent of AI in drug discovery at scale, and the ambitions of the industry leaders to shift from drug discovery as a largely artisanship process to a so called "industrialized" drug discovery

AI-driven companeis demonstrate progress in drug discovery

There is a growing wave of companies building drug design platforms of new generation -- Recursion Pharmaceuticals (NASDAQ: RXRX), Insitro, Exscientia (NASDAQ: EXAI) , Insilico Medicine, Deep Genomics, Valo Health, Relay Therapeutics (NASDAQ: RLAY), you name it -- companies that create highly integrated and automated AI-driven and data-centric drug design processes from biology modeling and target discovery, all the way to lead generation and optimization (sometimes referred to as "end-to-end" platforms). These "digital biotechs" are trying to transform traditional drug discovery, a notoriously bespoke, artisan process, into a more streamlined, repeatable, data-driven process -- more resembling an industrial conveyor line for drug candidates. Announcements by Exscientia (NASDAQ: EXAI) (here), Deep Genomics (here), Insilico Medicine (here), and other companies point to a situation where the average time for an entire preclinical program -- from building disease hypothesis to official nomination of a preclinical drug candidate -- have shrunk down to timelines as short as 11-18 months, and at fraction of costs of a typical project of similar nature conducted "traditionally". Rapid timelines are achieved in drug repurposing programs with previously known drugs or drug candidates, for example, using AI-generated knowledge graphs, e.g. BenevolentAI (AMS: BAI) in their Baricitinib program, or advanced multiomics analysis and network biology to derive precision biomarkers for better patient stratification and matching novel indications -- as Lantern Pharm (NASDAQ: LTRN) does to rapidly expand their clinical pipeline.

However, a lot of those AI-driven "digital biotechs" are still relying on community-generated data to train machine learning models, and this may come as a limiting factor. While some of the leading players in the new wave, such as Recursion Pharmaceuticals and Insitro, are investing heavily into their own high-throughput lab facilities to get unique biology data at scale, other companies appear to be more focused on algorithms and building AI systems using data from elsewhere, and only having limited in-house capabilities to run experiments.

Data generation is a bottleneck in AI-driven drug discovery

A common practice is to use community-generated, publicly available data. But it comes with a caveat: an overwhelming majority of published data may be biased or even poorly reproducible. It also lacks standardization -- conditions of the experimentation may differ, leading to a substantial variation in data obtained by different research labs or companies. A lot has been written about it, and a decent summary of the topic was published in Nature: "The reproducibility crisis in the age of digital medicine". For instance, one company reported that their in-house target validation effort stumbled at their inability to reproduce published data in several research fields. The obtained in-house results were consistent with published results for only 20-25% of 67 target validation projects that were analyzed, according to the company's report. There are numerous other reports citing poor reproducibility of experimental biomedical data.

This brings us to a known bottleneck of "industrializing drug discovery": the necessity for large amounts of high quality data, highly contextualized, properly annotated biological data that would be representative of the underlying biological processes

and properties of cells and tissues.

In order for a wide-scale industrialization of drug discovery to occur, the crucial thing is the emergence of widely adopted global industrial standards for data generation and validation -- and the emergence of the ecosystem of organizations which would be "producing" vast amounts of novel data following such standards. Then, large drug makers and smaller companies would be able to adopt AI technologies to a much deeper extent. If we take the automotive industry as an example, a component of, say, an engine, developed in one part of the world would often fit into a technological process line in the other part of the world. So, highly integrated processes can be built across geographies and companies, as a "plug-and-play" paradigm.

Same approach is required in the preclinical research in drug discovery: every lab experiment, every data generation process, every dataset generated, all must be "compatible" with all other research processes, machine learning pipelines, etc. -- across the pharmaceutical and biotech communities globally. When this tectonic shift occurs, we will witness a truly exponential change in the performance of the pharmaceutical industry, something I would call "commoditization" of preclinical research.

These companies enable automated drug discovery

There is, luckily, a growing number of companies that are starting to bring about the required change in how preclinical research is done. Companies that build standardized, highly automated, scalable, and increasingly compatible laboratory facilities, guided by AI-based experiment control systems, and supplemented by AI-driven data mining and analytics capabilities. Such "next gen" lab facilities are often available remotely, making preclinical experimentation more accessible to various players in a wider scope of geographies.

In this post, let's review several such companies, which offer various options, including "plug-and-play" experimentation services to drug discovery and biotech organizations.

Strateos

Strateos is a California-based company, formerly known as Transcriptic and founded in 2012, provides cloud-based automation for daily routine operations of synthetic biology, medicinal chemistry, and a closed cycle of design-synthesis-testing for potential drug candidates. Having acquired 3Scan, it has expanded its spectrum of operations by robotic tissue slicing and analysis using computer vision technologies. In 2020 they started a collaboration with Eli Lilly where they are using Strateos Robotic Cloud platform at the client's facilities to increase biology capabilities and implement an automated chemical synthesis loop. The company raised a total of $101.8 million from a number of investors, including Lux Capital, DCVC, and Black Diamond Ventures.

Recently, Strateous annouced it is pivoting its focus to meet the rising demand for on-site, fully automated cloud labs for life science research and automated drug discovery. The company's LodeStar™ software platform allows companies to manage their on-premises research operations and instruments, enabling remote control, automated drug discovery data generation, and data analytics. Strateos recently completed multimillion-dollar design programs with two top biopharmaceutical companies to accelerate their digital transformation. The strategic shift also involves a reorganization of the company's staffing structure and the establishment of a Project Management Office. This move aims to support the growing demand for laboratory modernization and automated drug discovery solutions.

Emerald Cloud Lab

Another US-based company, the Emerald Cloud Lab founded in 2010, takes a different approach and instead of utilizing a set of predefined workflows provides a broad range of scientific instrumentations and therefore the ability to design fully customizable life science experiments. They are constantly adding new types of operations and machinery offering a wide and flexible set of services to their clients. One of the latest news is a collaboration with Carnegie Mellon University to be using Emerald Cloud Lab for educational and scientific purposes.

The company raised a total of $92.1 million from a number of investors, including Schooner Capital, Founders Fund, and Alumni Ventures.

The company is also active in democratizing academic research. For instance, Carnegie Mellon University is opening its Cloud Lab in early July, aiming to reshape the field of automated drug discovery. The facility, enabled by Emerald Cloud Labs, will provide students and faculty with remote access to over 200 lab instruments. Researchers can design AI-assisted experiments from any location, while technicians and robots carry out the work on-site.

Artificial intelligence could help scientists develop better medicines faster

The Cloud Lab democratizes academic science by allowing researchers from under-resourced institutions to conduct complex experiments with just an internet connection. Centralizing experiments in the cloud lab streamlines the process, reducing costs and the likelihood of errors during experiment replication. Carnegie Mellon is the first academic institution to implement cloud lab technology in collaboration with Emerald Cloud Labs.

Culture Biosciences

Founded in 2016, San-Francisco-based Culture Biosciences is a company that is involved in scaling up and optimizing bioreactor experiments which accounts for a substantial overhead for biopharma companies. Culture Biosciences has designed a set of bioreactors specifically suitable for fine-tuning the processes and remote real-time monitoring. Along with a wide range of strain screening and process development capabilities, this would allow a quick transfer from a lab-scale to commercial production both for small biotech companies as well as larger pharmaceutical organizations.

The company raised a total of $101.6 million from a number of investors, including Northpond Ventures, Verily, and Cultivian Sandbox Ventures.

In 2023, Culture Biosciences announced a shift of its focus towards upstream bioprocess development of new therapeutics in automated drug discovery. The company has appointed a new leadership team with expertise in the biotech and biopharma industries to enhance its capabilities. This change aims to address the bottleneck in developing scalable and optimized manufacturing processes for new biologic therapies. The new team members include Elena Cant as Chief Operating and Commercial Officer, Babu Sivaraman as Vice President of Engineering and Product, Sumeet Agrawal as Vice President of Strategy and Finance, and Wayne Evans as Vice President of People. The expanded offerings will help more companies in the sector succeed in accelerating the development of scalable, optimized manufacturing processes.

Synthace

In the growing field of automated drug discovery, a user-friendly solution is needed to integrate multiple robotic devices, data collection, and visualization routines from various vendors. UK-based Synthace, founded in 2011, tackles this challenge with its cloud-based "no-code" Synthace Life Sciences R&D Cloud for experiment automation. This software is suitable for simple sample liquid handling and complex multi-step protocols, using a graphical interface without requiring coding skills. The device-agnostic protocol builder enables users to create sophisticated experiment routines and transfer them between multiple devices. The in silico simulation feature helps identify potential errors in future workflows before actual experiment runs.

Synthace has raised $81 million from investors such as Horizons Ventures, Sofinnova Partners, and SOSV.

Tech-First Companies Takes The Lead in AI Drug Discovery

BY **ANDRII BUVAILO**

In recent news, Recursion (NASDAQ: RXRX), a prominent clinical stage TechBio firm, has announced the signing of agreements to acquire Cyclica and Valence, two companies with expertise in AI-enabled drug discovery. These acquisitions strengthen Recursion's position in computational chemistry, machine learning, and artificial intelligence, enhancing its technology-enabled drug discovery capabilities in the biopharma industry.

Cyclica, based in Toronto, has developed two innovative products in the computational chemistry domain, MatchMaker™ and POEM™ (Pareto Optimal Embedding Model), both of which will be integrated into the RecursionOS. MatchMaker™ is a deep learning engine that leverages AI to predict the polypharmacology of small molecules for drug discovery. POEM™ is a similarity-based property prediction model that provides a more accurate and comprehensive measure of molecular similarity, setting it apart from other AI prediction models.

Naheed Kurji, CEO and Co-Founder of Cyclica, stated that integrating Cyclica's proteome-wide prediction capabilities into Recursion's data ecosystem will result in one of the most extensive and purpose-built biological and chemical datasets in the drug discovery space.

Valence, a Montréal-based company located at Mila, the world's largest deep learning research institute, focuses on harnessing the power of deep learning for drug discovery. The firm has been a pioneer in applying low-data learning to drug design, enabling the development of differentiated small molecules with

improved properties and functionality from datasets unsuitable for traditional deep learning methods.

Daniel Cohen, CEO and Co-founder at Valence Discovery, expressed enthusiasm about integrating Valence's AI-based chemistry engine into Recursion's diverse and data-rich operating system, which he believes will help unlock the true potential of AI-first digital chemistry and drug discovery.

Upon acquisition, Valence will join forces with Recursion's Montréal deep learning research office, transforming into an artificial intelligence and machine learning research center led by Daniel Cohen, with continued advisory from Yoshua Bengio.

Recursion will acquire Cyclica for $40 million and Valence for $47.5 million, with both acquisitions expected to be completed in the second quarter of 2023, subject to closing conditions. The purchase price will be payable in the form of shares of Recursion Class A common stock, shares of a subsidiary of Recursion exchangeable for shares of Recursion's Class A common stock, and the assumption of certain outstanding Valence and Cyclica options.

AI-driven companeis demonstrate progress in drug discovery

Recursion is a vivid example of a new generation of "digital biotechs" -- companies which are built around AI-driven highly integrated and data-centric R&D workflows, often presented in a form of research platforms. Such companies are strikingly different, business model-wise, from traditional drug discovery and biotech companies, often centered around a particular therapeutic asset in development.

Conceptually, the term "platform" signifies a holistic and interconnected system that amalgamates an array of tools, technologies, and algorithms, ultimately expediting and refining the drug development pipeline. Various components of a platform work in concert to process copious amounts of biological, chemical, and clinical data, driving innovation in the pharmaceutical sector.

For instance, the Recursion Operating System (OS) offers a novel perspective on drug discovery by attempting to treat it as a search problem that can be methodically addressed. Central to the company's objectives, this integrated and multifaceted system is constructed to generate, analyze, and draw insights from large-scale biological and chemical datasets, with the aim of expediting the drug discovery process.

Three essential components form the backbone of the Recursion OS. Firstly, the Infrastructure Layer comprises both hardware and software, ensuring a stable foundation for the efficient operation of the system. Secondly, the Recursion Data Universe serves as a vast repository for diverse datasets, offering a wealth of information for researchers and data scientists to work with. Lastly, the Recursion Map is a collection of proprietary tools dedicated to discovery, design, and development in the drug discovery process.

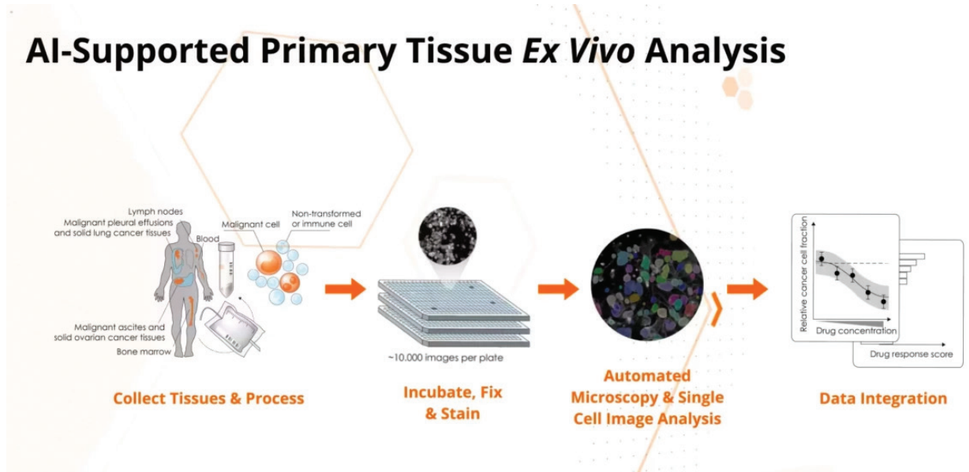
Other AI in drug discovery companies building R&D platforms

There are a plethora of other AI drug discovery companies which operate sophisticated R&D platforms.

Exscientia

For example, Exscientia, a leading UK-based AI drug discovery company, has developed the CentaurAI platform, a patient-first AI system aimed at creating medicines with an increased likelihood of success.

By integrating high-precision data from patient tissue with the CentaurAI platform, the company is able to streamline target selection, precision design and experimentation, as well as enhance clinical assessments. The AI-driven platform identifies emerging opportunities in target and disease space by combining global genetic data, literature, and primary patient tissue readouts. Exscientia's innovative approach includes phenotypic discovery, druggability, and precision design, among other elements, to optimize drug development processes while utilizing data-agnostic and generative design techniques. This advanced AI drug discovery platform is revolutionizing



One of the workflows in Exscientia's AI drug discovery platform

the pharmaceutical industry and setting new standards for precision medicine, as evidenced by the landmark EXALT-1 clinical study, which demonstrated improved patient outcomes using functional precision-oncology.

Over several years, Exscientia demonstrated an impressive performance of its AI drug discovery platform. In particular, its partnership with Celgene, which was later acquired by Bristol-Myers Squibb (BMS), led to the development of EXS4318, a selective Protein kinase C (PKC) theta inhibitor. The collaboration expanded to include immunology and oncology candidates, with BMS increasing its potential payments to Exscientia to over $1.3 billion.

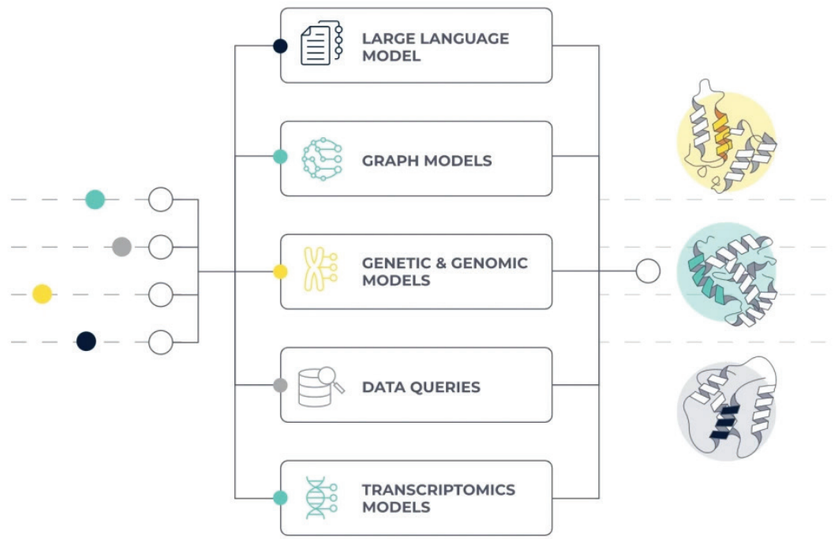
Another Exscientia AI-inspired drug candidate, EXS21546, is being co-developed with Evotec as an anti-cancer immunotherapy and is currently in Phase I/II trials. The company is also working on several early discovery oncology candidates in collaboration with Sanofi, GT Apeiron, EQRx, and Huandong. In addition, Exscientia's pipeline includes inflammation and immunology candidates, a hypophosphatasia candidate co-owned with Rallybio, a coronavirus candidate developed with the Bill and Melinda Gates Foundation, and a late discovery psychiatry candidate in partnership with Blue Oak Pharmaceuticals.

Exscientia has also used its AI drug discovery platform to co-develop a Phase I clinical candidate, DSP-0038, for Alzheimer's disease psychosis with Sumitomo Pharma.

BenevolentAI

One more UK-based company BenevolentAI developed The Benevolent Platform™, an AI drug discovery platform that offers a comprehensive view of disease biology by integrating over 85 data sources from various domains and data types. This platform helps scientists break down silos across therapeutic areas, connecting shared mechanisms across diseases.

The Benevolent Platform™ processes massive quantities of biomedical data using custom-engineered pipelines and machine learning



Components of The Benevolent Platform™

models, which extract biomedical entities and infer relationships. This information is stored in the Knowledge Graph, providing a proprietary integrated view of biomedical data that supports discovery and decision-making.

In early 2020, BenevolentAI scientists used the Knowledge Graph to discover a COVID-19 treatment, which is now approved by the US FDA. The platform's AI models mine the Knowledge Graph to identify novel insights and relationships, uncovering previously unconsidered drug targets.

The Benevolent Platform™ can also be applied to antibodies and other biologic agents, expanding the pool of possible drug targets. By integrating disease traits, genetics, and genomics into the Knowledge Graph, the platform generates endotype-specific target predictions that maximize the chances of clinical success. The AI tools provided by the platform enable scientists to make data-driven decisions and select only the most promising targets for wet lab experiments. Through the combined capabilities of the AI drug discovery platform, scientific expertise, and wet lab facilities, BenevolentAI has rapidly built a substantial portfolio of best-in-class and first-in-class drug candidates.

Insilico Medicine

Hong Kong-based Insilico Medicine strives to accelerate drug discovery and development in three key areas: disease target identification, generation of novel molecules data, and predicting clinical trial outcomes. Their PHARMA.AI suite includes PandaOmics, Chemistry42, and inClinico. PandaOmics allows users to access processed OMICs data for easier interpretation and uses a proprietary pathway analysis approach, iPanda, to provide comprehensive analysis. It also prioritizes and filters target hypotheses based on multiple scores derived from text and omics data. Chemistry42 assists in defining rules for molecule properties and optimizes compounds with physico-chemical parameters, binding scores, and drug-likeness features. Lastly, inClinico is a data-driven

platform for predicting the probability of success for individual clinical trials, utilizing vast amounts of data related to targets, diseases, trials, and scientists involved in the studies.

Insilico Medicine demonstrated a track record of successful validations of their AI drug discovery platform, including accelerated results for various indications, such as fibrosis, inflammation, and oncology, at a fraction of the typical R&D cost. Since 2021, the team has delivered 9 preclinical candidates discovered and designed using its AI drug discovery platform, including one for the QPCTL immuno-oncology target in partnership with Fosun Pharma.

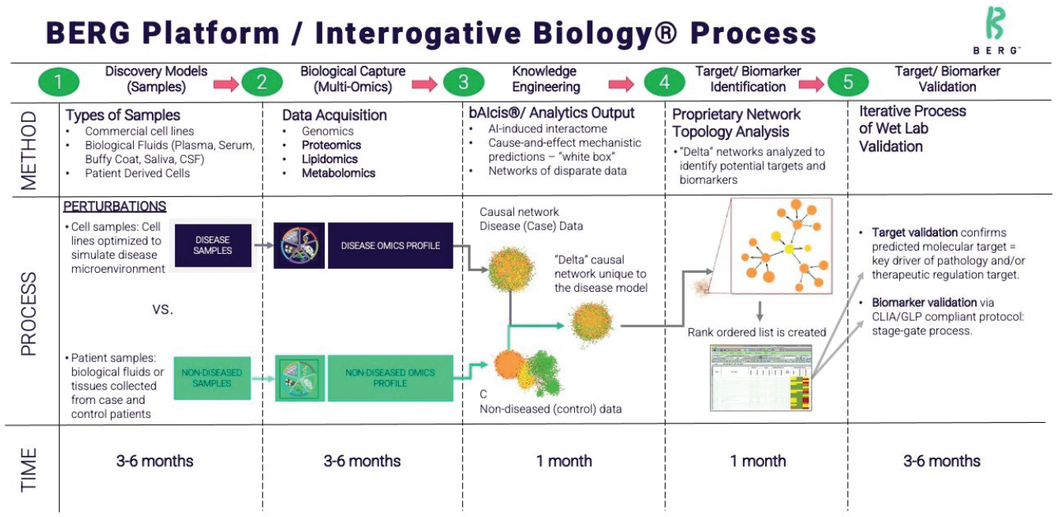
In early 2023, Insilico Medicine announced positive topline results for Phase 1 clinical trials of its AI-designed novel drug candidate INS018_055 for a novel target in idiopathic pulmonary fibrosis (IPF). The positive Phase I data paves the way for further evaluation of the drug's efficacy in IPF patients in a Phase II trial.

Notably, Insilico Medicine recently launched Life Star, a 6th generation Intelligent Robotics Drug Discovery Laboratory, in Suzhou BioBAY Industrial Park. The Intelligent Robotics Lab forms a closed loop by combining the company's AI drug discovery platform Pharma.AI with fully automated biological experiment modules.

BPGbio

BPGbio, a clinical-stage AI drug discovery company, has recently acquired assets from BERG, LLC, including their proprietary Interrogative Biology® Platform. This platform, developed by BERG since 2006, utilizes multi-omics data from over 100,000 samples, advanced AI software, and the powerful Frontier supercomputer at Oak Ridge National Laboratory.

With a focus on hypothesis-free, data-driven research, the platform delves deep into molecular phenotyping beyond traditional genomics, incorporating proteomics, lipidomics, and metabolomics. This approach has applications in various therapeutic areas, such as oncology, neurology, and metabolic diseases, and has been used for target discovery, mechanism of action discovery, drug repositioning, and biomarker discovery. BPGbio's diverse clinical pipeline, now bolstered by BERG's technology, is led by BPM 31510, a novel drug candidate targeting the metabolism of cancer cells



and showing potential in the treatment of pancreatic cancer. As an AI drug discovery company, BPGbio's acquisition of the Interrogative Biology® Platform signals a promising step forward in utilizing AI-driven solutions for drug discovery and development.

In 2018, the FDA awarded orphan drug designation to BPM 31510 for its potential in treating pancreatic cancer and epidermolysis bullosa (EB).

Deep Genomics

In 2019, Canadian-based Deep Genomics made headlines with discovering a novel target and a novel RNA therapeutics candidate for rare Wilson disease using their AI Workbench platform -- all within 18 months of initiating target discovery effort. In 2021, the company raised $180 million from a number of venture capital partners. There has not been much news from the company since then, though.

What do all these AI drug discovery companies and their recent successes have in common? A closer look at their development path, a track record of publications or announcements over the last several years reveal a quite notable distinction from a "traditional" drug discovery company -- they were all built as "AI-first" projects from the very beginning or adopted AI technologies in early stages of building organizational R&D workflows. Basically, they were growing as tech companies in the biomedical space, unlike many "wet-lab-born" drug discovery companies out there.

For example, Insilico Medicine started as a deep learning drug discovery company and was initially focused on generative models for drug design. Over the years, the company managed to gradually build an "end-to-end" drug discovery system, including everything from concept generation and target discovery to drug design and even clinical trial modeling. While the platform includes hundreds of components and models, working in an ensemble, a notable part of it is so-called generative adversarial

networks (GANs) -- an innovative class of machine learning frameworks designed by Ian Goodfellow and his colleagues in June 2014, and pioneered by Insilico Medicine for applications in drug design.

BenevolentAI early in the development built its integrated Benevolent platform with Knowledge Graph being at the heart of target discovery and drug repurposing. Exscientia developed its end-to-end AI platform Centaur Chemist which works in a combination with human expertise. Recursion Pharmaceuticals was built as a digital biology company in the first place, with all drug design successes revolving around its AI-driven biology analytics and cell image recognition capabilities. Deep Genomics developed AI Workbench as a cornerstone of its research process.

"AI-first" drug discovery companies reimagine pharmaceutical research

Moderna's success in AI drug discovery and vaccine development

Probably, the most well-known to the general public example of a company, which managed to realize the "AI-first strategy" at scale, comes from the area of mRNA-based vaccine development and therapeutics.

Moderna Therapeutics has demonstrated tremendous growth over just several years, and it had artificial intelligence and "tech-first" strategy in its business model from the very beginning. The company managed to come up with an mRNA vaccine within just months -- a hard task. The success came from a combination of basic biology breakthroughs, delivery technology, and carefully crafted digital systems and automation workflows to do it all efficiently at speed and scale.

As Marcello Damiani, Chief Digital Officer at Moderna wrote in 2017 white paper, "We rely on digitization to ensure seamless integration across the ecosystem, enable the ability to share and access data, permit the capability to scale, satisfy ever-increasing demands for research mRNA for preclinical and GLP toxicology studies, as well as GMP mRNA to supply an expanding number of clinical studies."

"Our platform comprises five key elements – Chemistry, Bioinformatics, mRNA Engineering, Process, Formulation"

"Digitization is the backbone upon which our platform is built. It is both an enabler of our science and core to our science"

"This enterprise-wide focus on digitization has positioned Moderna to execute against our strategy, while also yielding a distinct competitive advantage. Six years since commencing operations, Moderna has amassed a pipeline with a breadth, speed, and scale not common in our industry".

Drawing parallels among companies like Moderna, Recursion Pharmaceuticals, Exscientia, Insilico Medicine, and alike, it becomes apparent that a new type of organizations emerged in the pharma industry -- "tech-first" companies, with more flexible business models, faster R&D workflows, more optimal data management. This is the era of data-driven research and industrialized drug discovery.

AI in drug discovery: evolution, not a revolution

A recent report by BiopharmaTrend summarizes some of the leading clinical stage drug candidates, developed using artificial intelligence -- out of dozens of other such candidates currently in clinical development. The application of "AI-first" drug discovery strategy and technology integration allows a number of companies, such as Exscientia, BenevolentAI, Insilico Medicine and others, to demonstrate substantial acceleration of preclinical research timelines, down to 18 months and less, for the entire route from idea to preclinical candidate nominations.

However, the advent of artificial intelligence in the biomedical field is not as immediately disruptive as it is in other industries, such as text translation, video generation and ChatGPT.

Biology is much harder and it takes a lot of time to confirm or disprove AI model prediction outcomes, which are not always as expected. Already today it is clear that AI is extremely promising, but will not be able to disrupt pharmaceutical research in any instance. It will most likely be a gradual evolution of research practices and technological stacks, as well as business models of drug discovery companies.

For example, among various accomplishments, such as the swift discovery of baricitinib through AI-assisted drug repurposing and other recent achievements, BenevolentAI recently reported mixed topline results from its Phase IIa trial examining AI-derived drug candidate BEN-2293 in patients with mild-to-moderate atopic dermatitis (AD). BEN-2293 is a selective inhibitor of the three tropomyosin-related kinases (Trk) receptors (TrkA, TrkB, and TrkC), often referred to as a pan-Trk inhibitor, and is designed for topical application.

The study's primary endpoint assessed the safety and tolerability of BEN-2293, while secondary outcomes evaluated the percentage of patients achieving an improvement in the Eczema Area and Severity Index (EASI) and pruritus Numerical Rating Scale (NRS).

Although BEN-2293 was safe, well-tolerated, and met the trial's primary endpoint, it did not demonstrate a statistically significant effect on EASI or NRS endpoints among the participants in the treatment arm.

We will be able to assess the current impact of AI in drug discovery when more of the AI-inspired drug candidates currently in early clinical development advance to further stages (or fail). In the meantime, we at BiopharmaTrend created the BPT20: Artificial Intelligence in Drug Discovery Productivity Index, with the idea of tracking the progress in this exciting and rapidly evolving field.

Andri Buvailo, Ph.D.

Co-Founder, Director, BiopharmaTrend

Andrii Buvailo is a pharmaceutical industry analyst and writer, focusing on emerging companies (startups), technologies and trends in drug discovery, and R&D outsourcing. He received a master's degree in Inorganic Chemistry and a PhD in Physical Chemistry from Kyiv National Taras Shevchenko University. His articles were published on Forbes.com, and market research reports were referenced by some of the leading life science organizations. He also participated in numerous scientific projects in Ukraine, Belgium, Germany, and the United States (DAAD, Horizon 2020, NATO, CRDF grants), and published in high-impact research journals.

Conference Alert

North America

American Association for Cancer Research (AACR) - 16th Conference 2023

September 29-October 2, 2023 | Orlando, Florida, USA | Virtual & In-Person Conference

Website: https://www.aacr.org/meeting/16th-aacr-conference-on-the-science-of-cancer-health-disparities-in-racial-ethnic-minorities-and-the-medically-underserved/
Contact: WHSDC@gwu.edu

16th AACR Conference on The Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved advances the understanding of, and ultimately helps to eliminate, the disparities that represent a major public health problem. Reflecting this transdisciplinary field, professionals from academia, industry, government, and the community are brought together to promote the exchange of novel ideas, discuss the latest findings in the field, and stimulate the development of new research on cancer health disparities.

Biotechnology Innovation Organization (BIO) Investor Forum 2023

October 17-18, 2023 | San Francisco, California, USA

Website: https://www.bio.org/events/bio-investor-forum
Contact: register@bio.org

Focused on bringing together early-stage and established private biotech businesses with select investors, the BIO Investor Forum plays a vital role in propelling the industry forward.Gain deep insights on the business of biotech including deal trends and implications of policy and regulatory shifts from industry leaders committed to your success.

American Society of Clinical Oncology (ASCO) Quality Care Symposium 2023

October 27-28, 2023 | Boston, Massachusetts, USA | Virtual & In-Person Conference

Website: https://conferences.asco.org/quality/attend
Contact: qualityregistration@spargoinc.com

The ASCO Quality Care Symposium offers research and education for the entire clinical care team that encompasses the needs and viewpoints of multiple disciplines and various practice settings. An interactive in-person and online experience so you can stay at the forefront of this ever-expanding field by examining the most important science and topics in quality care today. The entire clinical care team can gain a better understanding of the latest advances in quality improvement and explore the science on quality improvement in oncology. This activity has been approved for AMA PRA Category 1 Credit™.

American Society of Human Genetics (ASHG) 75th Annual Meeting 2023

November 1-5, 2023 | Washington, DC, USA

Website: https://www.ashg.org/meetings/2023meeting/
Contact: meetings@ashg.org

The world's best and brightest in human genetics and genomics research convene once a year for ASHG's Annual Meeting! Join more than 8,000 scientists from around the globe at ASHG 2023 to take part in a 5-day program comprising the year's most significant new advances in the field. From invited sessions, to workshops, to the presidential symposium and the distinguished speaker symposium. Join for cross cutting issues, a celebration of ASHG's 75th anniversary and a demonstration of new products and innovations supporting research.

Society for Neuroscience (SfN) Annual Meeting 2023

November 11-15, 2023 | Washington, DC, USA | Virtual & In-Person Conference

Website: https://www.sfn.org/meetings/neuroscience-2023
Contact: meetings@sfn.org

Neuroscience 2023 will feature lectures, symposia, and events for scientists at all career stages. Sessions and events at the annual meeting are designed to provide attendees with a range of opportunities, including scientific enrichment, career development, and professional networking. Scientists from around the world will congregate at Neuroscience 2023 to discover new ideas, share their research, and experience the best the field has to offer.

Joint Meeting of the American Society for Cell Biology (ASCB) and European Molecular Biology Organization (EMBO) - Cell Bio 2023

December 2-6, 2023 | Boston, Massachusetts, USA

Website: https://www.ascb.org/cellbio2023/
Contact: ascbinfo@ascb.org

This unique meeting focuses on cell biology as the fundamental basis of biology as well as sessions on emerging interdisciplinary topics and showcases a diverse global community of the brightest minds in cell biology. Cell Bio focuses on the fundamental basis of biology, where attendees congregate in an inclusive environment to learn about the latest advances in cell science from peers, educators, and renowned experts from all over the world. As such, Cell Bio welcomes presenters, organizers, and attendees from every career-level, research area, institution, and demographic background.

Europe

European Society for Biomaterials (ESB) Annual Meeting 2023

September 4-8, 2023 | Davos, Switzerland, Europe

Website: https://esb2023.org/
Contact: esb.davos@aofoundation.org

As one of the prime biomaterials events of the year, ESB2023's goal is to promote interactions and collaborations between researchers, educators, clinicians and industry representatives who are interested in biomaterials. Therefore, ESB2023 will be held as a face-to-face event without a hybrid (online) component. ESB2023 will offer an exciting stage to share the latest solutions and discoveries to treat injured and aging tissues and organs. To do so, ESB2023 will offer a series of workshops and symposia on topics ranging from biomaterial basic science, applied biomaterials, clinical translation, additive manufacturing, biomaterials in education, healthcare accessibility, and regulatory affairs.

European Society for Medical Oncology (ESMO) Congress 2023

October 20-24, 2023 | Madrid, Spain | Virtual & In-Person Conference

Website: https://www.esmo.org/meeting-calendar/esmo-congress-2023
Contact: esmo@esmo.org

The ESMO Congress is the most influential oncology platform for clinicians, researchers, patient advocates, journalists and healthcare industry representatives from all over the world. ESMO 2023 will disseminate the latest cutting-edge data, provide high quality education and unparalleled networking opportunities for oncologists and other stakeholders from all around the world. Whilst invited faculty will be presenting live from Madrid, the innovative, LIVE Plus, congress format will offer participants the option to attend in person, in Madrid, or online, through a virtual platform, from 20 to 24 October 2023.

Health and Biological Sciences Research Association (HBSRA) - BioClina 2023 International Conference on Biological & Clinical Studies

November 24-25, 2023 | London, United Kingdom | Virtual & In-Person Conference

Website: https://hbsra.org/symposium/london-bioclina-24-25-nov-2023
Contact: convener@eurasiaresearch.info

Healthcare and Biological Sciences Research Association (HBSRA) is an international community of researchers, practitioners, students and professionals for the development and spread of ideas in the field of healthcare and life sciences. HBSRA aims to bring together worldwide researchers and professionals, encourage intellectual development and to create opportunities for networking and collaboration. BioClina 2023 Conference Series themes will cover the advances and trends in plant biology, microbiology, zoology & human biology and clinical research.

Asia

Korean Society of Medical Oncology (KSMO) & 2023 International Conference 16th Annual Meeting - Collaboration Beyond Borders, Cancer Research Beyond Limits

September 7-8, 2023 | Seoul, South Korea | Virtual & In-Person Conference

Website: https://www.ksmoconference.org/
Contact: info@ksmoconference.org

The Korean Society of Medical Oncology (KSMO) has been actively cultivating expertise in medical oncology since the foundation of the society in 2005. Under the theme of "Collaboration beyond borders, Cancer research beyond limits", this year's conference will cover a variety of scientific discoveries and innovative technologies in cancer research and multi-modality treatment. KSMO will expand our up-to-date knowledge about novel targeted therapy including antibody-drug-conjugates (ADC) and PROTAC, immunotherapy, optimizing T-cell redirection strategies for solid tumors, artificial intelligence-empowered precision medicine and organ preservation strategies.

2023 HBV International Meeting - Hepatitis B Foundation

September 19-23, 2023 | Kobe, Japan | | Virtual & In-Person Conference

Website: https://www.hbvmeeting.org/
Contact: info@hbvmeeting.org

This influential international conference, 2023 International HBV Meeting, will be held this year Sept. 19-23 at the Kobe International Conference Center, Kobe, Japan. This meeting promises to feature cutting-edge studies in hepatitis B and D viruses (HBV and HDV), development of new technologies and analytical methods for understanding HBV and HDV infection, joint discussion on the latest therapeutic development with patients and clinicians, opportunities to network with the HBV/HDV community for all career stages and a platform for trainees (graduate students and post-docs) to showcase their studies.

3rd International Congress of the Asian Oncology Society (AOS) in conjunction with the 61st Annual Meeting of Japan Society of Clinical Oncology (JSCO) - Diversity and Inclusion 2023

October 19-21, 2023 | Yokohama ,Japan

Website: https://congress.jsco.or.jp/aos2023/
Contact: aos2023@congre.co.jp

The 3rd International Congress of the Asian Oncology Society (AOS2023) in conjunction with the 61st Annual Meeting of the Japan Society of Clinical Oncology will be an excellent opportunity to share the latest knowledge and outcomes in the field of oncology under the integrated theme, "Diversity and Inclusion". This will be an ideal occasion for all oncologists in Asia to get together at the venue for the benefit of our patients. JSCO2023, together with AOS2023, aims to build a new platform to enable medical professionals involved in cancer care to unite across the boundaries of specialties.

European Society for Medical Oncology (ESMO) Asia Congress 2023

December 1-3, 2023 | Singapore, Singapore

Website: https://www.esmo.org/meeting-calendar/esmo-asia-congress-2023
Contact: esmo@esmo.org

The ESMO Asia Congress 2023 will welcome you in Singapore to present and discuss the latest scientific and clinical advances across the entire field of oncology, of relevance at a global level, and for the Asia-Pacific region. The outstanding scientific programme will cover the latest advances on the most prevalent cancer types in the region, offering high quality multidisciplinary educational sessions and special sessions in collaboration with illustrious international and Asia-Pacific oncology associations.

Latest Healthcare Indusry News

JUNE 2023 - AUGUST 2023

1. **Why Recent Regulatory Changes Require a Deeper Focus on Health Equity**

The 2023 EY Health Equity Outlook Report found that while there has been strong cross-sector momentum on health equity priorities across the health ecosystem, efforts remain nascent. Despite broad awareness of the challenges, health industry organizations have not universally developed strategies to address harmful social determinants of health, and many are not yet able to measure the impact of their interventions on vulnerable patient populations. In brief, the federal government strengthened its commitment to health equity advancement in its regulatory portfolio, new standards will require a transformation of organizational culture and operations, and organizations should focus on linking health equity data to actionable strategies.
https://www.ey.com/en_us/health/health-equity-implications-of-regulations

2. **HHS Invests $11 Million to Expand Medical Residencies in Rural Communities**

The U.S. Department of Health and Human Services (HHS), through the Health Resources and Services Administration (HRSA), awarded nearly $11 million to 15 awardees to strengthen the health workforce by establishing new residency programs in rural communities. Nearly 70 percent of areas designated as primary medical Health Professional Shortage Areas are in rural areas. Physician shortages, poverty, and geographic isolation contribute to lack of access to care and poorer health outcomes for rural Americans. More than half of rural U.S. counties lack hospital obstetric services. In response to the declining access to rural maternal health care, three of 15 awards will be used specifically to develop new family medicine residency programs with enhanced obstetrical training in rural communities.
https://www.hhs.gov/about/news/2023/07/26/hhs-invests-11-million-expand-medical-residencies-rural-communities.html

3. **Breakthrough Cures for Hepatitis C Still Fail to Reach the Vast Majority of Americans Who Need Them**

A new CDC report suggests the majority of people with hepatitis C still have not been cured nearly a decade after breakthrough treatments that clear the viral infection were first approved in the United States. The findings highlight the urgent need for a proposed national program that would end much of the suffering and death from hepatitis C by eliminating the disease in the United States. It's estimated more than 2 million people in the United States have hepatitis C, which if left untreated, often leads to serious and sometimes deadly outcomes such as liver cancer and liver failure. Despite the existence of a safe and highly effective oral cure for hepatitis C, the infection contributed to the deaths of more than 14,800 people in 2020.
https://www.cdc.gov/media/releases/2023/p0629-hepatitis-c.html

4. **FDA Approves First Oral Treatment for Postpartum Depression**

The U.S. Food and Drug Administration approved Zurzuvae (zuranolone), the first oral medication indicated to treat postpartum depression (PPD) in adults. PPD is a major depressive episode that typically occurs after childbirth but can also begin during the later stages of pregnancy. Until now, treatment for PPD was only available as an IV injection given by a health care provider in certain health care facilities.The efficacy of Zurzuvae for the treatment of PPD in adults was demonstrated in two randomized, double-blind, placebo-controlled, multicenter studies. Approval of Zurzuvae was granted to Sage Therapeutics, Inc.
https://www.fda.gov/news-events/press-announcements/fda-approves-first-oral-treatment-postpartum-depression

5. **FDA Approves First Cellular Therapy to Treat Patients with Type 1 Diabetes**

The U.S. Food and Drug Administration approved Lantidra, the first allogeneic (donor) pancreatic islet cellular therapy made from deceased donor pancreatic cells for the treatment of type 1 diabetes. Lantidra is approved for the treatment of adults with type 1 diabetes who are unable to approach target glycated hemoglobin (average blood glucose levels) because of current repeated episodes of severe hypoglycemia (low blood sugar) despite intensive diabetes management and education. The primary mechanism of action of Lantidra is believed to be the secretion of insulin by the infused allogeneic islet beta cells. In some patients with type 1 diabetes, these infused cells can produce enough insulin, so the patient no longer needs to take insulin (by injections or pump) to control their blood sugar levels.
https://www.fda.gov/news-events/press-announcements/fda-approves-first-cellular-therapy-treate-1-di-patients-typabetes

6. **As Part of President Biden's Unity Agenda, Cancer Moonshot Announces Launch of New ARPA-H Program to Develop Novel Technologies for More Precise and Accurate Cancer Tumor Removal**

The The Biden Cancer Moonshot announced a first-of-its-kind Advanced Research Projects Agency for Health (ARPA-H) program to develop novel technologies that will allow surgeons to remove cancerous tumors with more precision and accuracy, resulting in better health outcomes for Americans facing cancer. Program launch represents a major milestone for the new agency established and funded by President Biden and bipartisan members of Congress to revolutionize how we improve health outcomes for Americans facing cancer and other diseases.
https://www.whitehouse.gov/briefing-room/statements-releases/2023/07/27/as-part-of-president-bidens-unity-agenda-cancer-moonshot-announces-launch-of-new-arpa-h-program-to-develop-novel-technologies-for-more-precise-and-accurate-cancer-tumor-removal/

LATEST HEALTHCARE INDUSTRY NEWS

7. **Study: AI-Supported Mammogram Screening Helped Doctors Detect 20% More Breast Cancer Cases**

Artificial intelligence (AI) may be able to better detect breast cancer on mammogram images than trained doctors, a new study found. New research found that AI-supported mammogram screening was 20% more likely to detect breast cancer than trained doctors. Researchers emphasized that the technology needs to be used in tandem with a radiologist, but it could make the screening process more accurate and efficient. This is particularly important as the United States is facing both a shortage of radiologists and an aging population that requires more imaging as part of their health care.w
https://www.health.com/artificial-intelligence-mammogram-screening-7571176

8. **Fierce Pharma Asia - BMS, BeiGene strike settlement: Sumitomo Otsuka suffer Trial Failures: AstraZeneca CEO talks China**

Bristol Myers Squibb and BeiGene have decided to terminate their China licensing deal originally signed in 2017 by Celgene around the cancer drugs Revlimid, Abraxane and Vidaza. The settlement puts an end to a feud that stemmed from a Chinese import and sale ban on Abraxane. A pair of phase 3 studies for Sumitomo Pharma and Otsuka's schizophrenia candidate ulotaront missed their primary endpoints. In response to a question about a recent Financial Times report that AstraZeneca has crafted plans to spin out its China operations in case of rising geopolitical tensions, AstraZeneca CEO Pascal Soriot said the company studies many business scenarios.
https://www.fiercepharma.com/pharma/fierce-pharma-asia-bms-beigene-deal-end-sumitomo-otsuka-schizophrenia-flops-astrazeneca-ceo

9. **Biden-Harris Administration Launches National Dashboard to Track Heat-Related Illness**

The U.S. Department of Health and Human Services (HHS) Office of Climate Change and Health Equity (OCCHE), in partnership with the National Highway Traffic Safety Administration (NHTSA), launched a first-of-its-kind online information portal called the Heat-Related Illness EMS Activation Surveillance Dashboard ("EMS HeatTracker"), which maps emergency medical services responses to heat-related illness across the country. The tracker will help public health officials ensure that outreach and medical aid reach the people who need it most and help decision-makers prioritize community resilience investments. This tool is being published as the climate crisis makes heat waves more extreme and more frequent around the country. It is the latest step by the Biden-Harris Administration to provide communities with the support and resources they need to stay safe from the worsening effects of extreme heat.
https://www.hhs.gov/about/news/2023/08/09/biden-harris-administration-launches-national-dashboard-track-heat-related-illness.html

10. **Microplastics found in human heart tissues, both before and after surgical procedures**

Everywhere scientists look for microplastics, they've found them -- food, water, air and some parts of the human body. But examinations of our innermost organs that aren't directly exposed to the environment are still limited. Now, in a pilot study of people who underwent heart surgery, researchers in ACS' Environmental Science & Technology report that they have found microplastics in many heart tissues. Research has shown that they can enter the human body through mouths, noses and other body cavities with connections to the outside world. Yet many organs and tissues are fully enclosed inside a person's body, and scientists lack information on their potential exposure to, and effects from, microplastics.
https://www.sciencedaily.com/releases/2023/08/230809130639.htm

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