Pharma Sources Insight

AUGUST 2021

New Medtechs Shaping the Industry

Science of Epidemiology: Digital Technologies Shaping Our Lives

A Brief Introduction about FDA Next Step Inspections

SUBSCRIBE NOW

sinoexpo
informa markets

CPhI china®

P-mec

iCSE bioLIVE nex natural extracts FDF InnoPack LAB WORLD CHINA EP & Clean Tech

16 - 18 December 2021 | SNIEC, Shanghai, China

Exhibit at Asia's premier pharmaceutical event

Pharma trends in China*

1. The 'Made in China 2025' initiative identifies biopharma and advanced medicinal products as one of 10 key sectors that the country will focus on.
2. Multinational companies continue to expand R&D operations in China. China's relatively lower cost base compared to developed markets globally is one of the attractions for these companies.
3. China's large pharmaceutical market and its strong growth potential provide an impetus for international pharmaceutical firms to develop medicines specifically for the country's domestic market.

*Fitch Solutions China Pharmaceuticals & Healthcare Report - Q1 2021

The Chinese Pharma Market is forecasted to grow at CAGR of

4.4%

between 2020 & 2024

reaching

CNY 1,3 trn

(USD176.1bn) by 2024

50,000+
pharmaceutical professionals

200,000 sqm
exhibition space

3,000+
exhibiting companies

100+
conferences & activities

Book your stand at: gotocphi.com/china21

For more information contact:
salesoperations@informa.com
gotocphi.com/china21

informa markets

CCCM HPIE

sinoexpo informa markets

Dear Readers,

No one knows what the future will be like while COVID-19 keeps challenging world health. Well, the endpoint is what Pharma endeavors to achieve.

The scenario of the pharma industry in H1 of 2021:

Vaccine and Vaccination: Up to July 2021, 17 COVID-19 vaccines have been marketed worldwide; a number of 336940 million doses of COVID-19 vaccines have been administered worldwide, around 926 million people are fully dosed, covering about 611.9% of the world's population in bout 170 countries and regions, of which Israel, China, India and United States enjoy a leading vaccination coverage globally. **View More**

M&A: While pharma and Medtech R&D has been profoundly disrupted since the pandemic, in the first 6 months of 2021, the pharmaceutical and life sciences (PLS) sector has seen robust volume return to reach $123.3 Billion, with M&A activities related to innovation and maximization the potential of portfolios of the companies continues, based on PWC's analyst.

Lisence In/Out: In China, On June 30, Allist announced that it intends to enter into an agreement with ArriVent Biopharma to authorize the latter the right to exclusively develop Furmonertinib outside Greater China. Earlier before, another two third-generation EGFR-TKIs have been authorized to be marketed outside China, which are Avitinib and Almonertinib. And more drugs have been subject to overseas authorization in the first half of 2021, click to **View more**.

Pharma Trade: In the first half of 2021, solid global demand in response to lockdowns and vaccinations has quickened the export growth of China. According to the data provided by Trading Economics and Daxue Consulting, China's exports of Pharmaceutical Products increased to $4853258 thousand in May of 2021, reaching an all-time high since its record low of 77631 USD THO in January of 1996, and the volume is forecasted to rise to $10.2 billion by 2023.

Meanwhile, new drugs are finding their way to shaping the industry:

- On June 07, 2021, the US FDA approved Biogen's aducanumab (Aduhelm) for the treatment of AD, which makes it the first therapy to target the underlying disease process. **View More**
- It is expected that a new kind of vaccine, inhaled COVID-19 vaccine will be a more user-friendly and cost-effective way to get vaccinated quickly.**View More**

Also, there are some updates from PharmaSources.com too, with a new feature to be launched soon, followers of Pharma Sources Insight will be able to browse all the previous issues in just one page, even more, you will be able to separately download each issue to secure the reading without internet.

In this issue, thank you for the strong support from the PharmaSources.com supplier: **Nanjing Foreign Economic & Trade Development Co., Ltd.** Thanks for all our contributors. We will keep striving for providing quality pharma content and helping build connections in the pharma society, thank you for keeping staying with us.

Sincerely,
Editor in Chief
Pharma Sources Insight

References:

https://tradingeconomics.com/china/exports-of-pharmaceutical-products

https://daxueconsulting.com/pharmaceutical-industry-china/#:~:text=China's%20dynamic%20pharmaceutical%20trade%20environment&text=In%202018%2C%20China's%20pharmaceutical%20imports,to%20%2410.2%20billion%20by%202023.

https://www.reuters.com/world/china/chinas-june-exports-growth-beats-fcast-easing-global-lockdowns-boost-demand-2021-07-13/

https://www.pwc.com/us/en/industries/health-industries/library/pharma-life-sciences-deals-insights.html

CONTENTS

BRAND STORY

FIGHTING AGAINST COVID-19

GLOBAL MARKET REVIEW

PHARMA IN CHINA

INDUSTRY INSIGHT

BRAND STORY AUGUST 2021

Honesty and Credibility as the Foundation of Reputation,

Nanjing Foreign Economic & Trade is to meet the internal and external needsand abide by the contracts with quality, equality and mutual benefit.

Nanjing Foreign Economic & Trade Development Co., Ltd. Established in 1988. Specializing in international business, overpass ISO9001:2000 certified system in sept.2001. During more than 10 years. We have accumulated a wealthy product knowledge and trading experience, established our own specialized selling network, have set up 8 joint-ventrues and quite a few closed cooperated enterprises and manufacturers, have trained a lot of high educated trading talented persons.Our business scope cover pharmaceutical raw materials & intermediates, food additives, inorganic chemicals, dyestuffs, medical equipment, etc. Our products have been exported to more than 30 countries, such as USA, Europe, Japan, Taiwan, HK, South East Asia, South American and Africa, etc. The annual turnover is more than USD70mollion.

The company provides the following API and Finished Products:

APIs List

No.	Product Name	Standard	Certificate
1.	Allopurinol	BP/USP	DMF
2.	Amiodarone Hcl	EP	DMF
3.	Amikacine Sulphate	USP/EP sterile/non-sterile	DMF
4.	Cefepime HCL with L-Arginine	USP sterile	
5.	Ceftazidime buffered	USP sterile	DMF
6.	Ceftriaxone Sodium	USP sterile	DMF
7.	Chitosan VHD	DCA 95%	
8.	Chondroitin Sulfate (shark/bovine/pork/poultry)	USP	
9.	Clindamycin Phosphate & HCl	BP/USP	DMF
10.	Dexketoprofen Tromethamol	In-house	DMF
11.	Dipyridamole	EP	DMF
12.	Diosmin	EP	EDMF
13.	Doramectin	In-house	
14.	Doripenem	In-house	DMF
15.	Fenofibrate	EP/BP	
16.	Folic acid	USP	
17.	Gabapentin	USP	DMF
18.	Gemifbrozil	USP	DMF
19.	D-Glucosamine Hcl/Sulphate	USP	DMF
20.	Ertapenem sodium	In-house	DMF
21.	Ketoprofen	BP/EP/USP	DMF
22.	Ibuprofen /DC65 /DC90	USP/In-house	DMF
23.	L-a-Glycerylphosphorylcholine	In-house	
24.	L-Carnitine base/tartrate	EP/USP	EDMF
25.	Meloxicam	EP	DMF
26.	Meropenem with sodium carbonate	USP sterile	
27.	Moxidectin	EP	
28.	Naproxen base / Sodium	USP	DMF
29.	Naproxen Base/Sodium/ DC80/DC90	USP/In-house	DMF
30.	Oxaliplatin	EP	DMF
31.	Oxacilline sodium sterile	USP	DMF
32.	※Piperacilline Sodium + Tazobactam Sodium	8:1 sterile	DMF
33.	Rutine	NF	DMF
34.	Silymarine	DAB	DMF
35.	Sucralfate	USP	DMF
36.	Tulathromycin	In-house	
37.	Toloperisone hcl	JP	DMF
38.	Tropisetron HCl	In-house	DMF
39.	Vitamin B1 Mono & HCl	EP/USP/BP/FCC	DMF
40.	Vitamin B6	EP/USP/BP/FCC	DMF

Amino Acids list

No.	Product Name	Standard	Certificate
1	D-/L-Aspartic Acid	AJI	
2	L- Argenine base	USP	
3	D-Cycloserine	USP	
4	L-Ornithine HCL	USP	
5	L-Valine	USP	
6	L-leucine/ Isoleucine	USP	
7	BCAA	2:1:1；1:1:1	
8	L-Tryptophan	USP	
9	Beta- Alanine	AJI	
10	Citrulline malate	1:1/2:1	
11	L-Cystine	AJI	
12	L-Lysine Base/Hcl	USP	

TABLETS

Name of product	Standard	Specification	packing
Azithromycin	CP	500mg	100t×10bottle×24box
Ranitidin	USP	150mg	100t×10bottle×24box
Carvedilol	CP	6.25mg 12.5mg	100t×10bottle×24box
Levonorgenestrel 0.15mg + Ethinyl Estradiol 0.03mg (sugar/film coated)	USP	0.15mg+0.03mg	21tabe/blister

POWER INJECTION

Name of product	Standard	Specification	packing
Cefalothin Sodium	USP	.1g/7ml	50vials×20boxes
Penicillin G Sodium	USP	1mega/7ml	50vials×20boxes
Oxacillin sodium	USP	1g/7ml	50vials×20boxes
Cefoperazone sodium+Sulbactam sodium	CP	1.5g/10ml	50vials×20boxes
Omeprazole lyoph	USP	40mg/10ml	50vials×20boxes
Acyclovir	CP	250mg/10ml	50vials×20boxes

Which One of the New Dosage Forms of Nasal Spray Vaccine for COVID-19 Will Be Successful?

By Big Cat of Medical Field

Keywords: Nasal Spray Vaccine, Inhaled COVID-19 Vaccine, NMPA

According to the reports on March 24, 2021, CanSino (688185.SH, 06185.HK) inhaled COVID-19 vaccine was approved by the National Medical Products Administration. The announcement of the company's Hong Kong Stocks research shows that the inhaled recombinant COVID-19 vaccine, also called adenovirus type 5 vector, jointly developed by the company and the Research Institute of Academy of Military Medical Sciences, has obtained the clinical trial approval from National Medical Products Administration. The previous 14-day prevention success rate of this vaccine have reached 68%, while the success rate of preventing serious diseases is as high as 95%, showing good effectiveness.

Such nasal spray can quickly achieve immune protection, shorten the vaccination period, achieve herd immunity in a short term. In addition, the virus can be kept in the temperature of 2℃-8℃, which is favorable for nasal spray preparations. It arouses a very enthusiastic response in the market. However, looking back, its stock price falls after rise. It can be seen that the capital market raises questions about the new nasal spray preparations. So, which one will ultimately succeed among various new dosage forms of COVID-19 vaccine? To this end, I will make an analysis in this paper.

Is subcutaneous injection the only way to vaccinate?

Normally, many of us believe that the feeling of immunization is just like getting influenza vaccine: going straight to the hospitals, rolling up our sleeves and feeling a quick stabbing pain in our arms. Then we finish the vaccination of new vaccine. This is what is happening in the current vaccination. Most of the current vaccination is directly injected into the arm, because the arm muscle has a certain slow-release dose effect, which can slowly release the effective ingredients of the vaccine. This means that human body has enough time to make reaction and the immune system can produce antibodies against the virus.

However, it is known to us all that SARS-CoV-2 is spread through the respiratory tract. So, if possible, we can develop a

nasal spray vaccine for the respiratory tract. This vaccine, as a nasal spray, will be delivered directly to the human respiratory tract. It can directly stimulate an immune response in places (such as the lungs and upper respiratory tract) where SARS-CoV-2 may invade and proliferate. A paper published in Science showed that the new nasal-peptide may be an ideal choice to prevent the spread of SARS-CoV-2 in the world. This method of administration is stable in transportation and it is convenient for wide usage.

In addition to nasal sprays, the production of drugs related to the oral mucosa is also a new kind of vaccine.

In theory, this site-specific strategy may provide stronger protection against COVID-19 compared to injecting vaccination, because it is closer to natural COVID-19 infection and can produce antibodies and immune cells at key positions where viruses enter.

In addition, vaccine components with bacteria as carriers can deliver antigens directly to the mucosal tissues of the nose and oral cavity. Antigen is a vaccine component that can trigger immune response. Mucosal vaccine should be effective, because it can induce immunity when viruses enter, and control initial infection before it becomes a definite systemic infection. It capitalizes the unique and powerful components of human immune system located in mucosal tissue. B cells in mucosa produce immunoglobulin A, interferon and other elements, which is a powerful first-line defense against intestinal and respiratory pathogens. Mucosal tissue is also retentive. T cells can "remember" specific antigens after crossing with mucosal tissue for the first time, which can make quicker and stronger immune response in the next crossing.

COVID-19 vaccine is administrated through mucosa, which has clear benefits.

If COVID-19 vaccine is administrated through mucosa, virus or bacteria as carrier shall be needed. For example, the adenovirus vector is used in R&D of the nasal spray by CanSino this time. This vector is generally active. There are at least 4 advantages of using active viral or bacterial vectors. Firstly, as a live virus or active bacterium that can be used in human body, it is normally safe and acceptable for human body. Secondly, it can also be transplanted to mucosal slices, which means that it can live and proliferate harmoniously with other bacteria in the airway. It will prolong the protective effect of the new vaccine, which can reduce the number of vaccinations needed by individuals. In the end, it may take only one nasal spray to be effective for 3 months. Thirdly, thanks to the modern genetic engineering production technology, the production cost of bacteria or live viruses is relatively low, and it is feasible to produce SARS-CoV-2 antigen by genetic engineering of bacteria. Finally, compared with other vaccines, the equipment cost of mucosal vaccine is relatively low. On the one hand, the expensive and difficult antigen purification process can be omitted; on the other hand, needles and trained medical staff are not needed for spray vaccine, which will greatly save social and human capital.

Summary

In brief, due to the wide spread of COVID-19 in the world, we know that there will not be only one manufacturer of COVID-19 vaccine in the future, but more competitors or manufacturers in stead. Since a manufacturer's products can't cover the whole world, the global coverage can only be ensured by adopting the integrated vaccine (nasal mucosa, intramuscular injection, intravenous injection, etc.). As far as the current situation is concerned, COVID-19 pandemic is not expected to fade in a short time. At the same time, as the SARS-CoV-2 mutates constantly, people in different countries also need different vaccines for continuous replacement and cross immunization.

Overview of COVID-19 Vaccination in Progress in China

By Xiaoyaowan

Keywords: COVID-19 Vaccine, Vaccination, China

Up to July 2021, 17 COVID-19 vaccines which have been marketed worldwide are listed on the right:

Vaccines that Have Been Marketed Worldwide		
No.	**Vaccine Products**	**Country**
1	ASTRAZENECA/UNIVERSITY OF OXFORD	UK
2	PFIZER/BIONTECH	GERMANY
3	MODERNA	USA
4	JANSSEN/JOHNSON&JOHNSON	USA
5	GAMALEYA	RUSSIA
6	FEDERAL BUDGETARY RESEARCH INSTITUTION STATE RESEARCH CENTER OF VIROLOGY AND BIOTECHNOLOGY/VECTOR INSTITUTE	RUSSIA
7	CHUMAKOV FEDERAL SCIENTIFIC CENTER FOR RESEARCH AND DEVELOPMENT OF IMMUNE AND BIOLOGICAL PRODUCTS	RUSSIA
8	BHARAT BIOTECH	INDIA
9	SINOVAC	CHINA
10	CANSINO BIOLOGICS INC.	CHINA
11	BEIJING INSTITUTE OF BIOLOGICAL PRODUCTS	CHINA
12	WUHAN INSTITUTE OF BIOLOGICAL PRODUCTS	CHINA
13	SHENZHEN KANGTAI BIOLOGICAL PRODUCTS/ BEIJING MINHAI BIOTECHNOLOGY CO., LTD.	CHINA
14	CHINESE ACADEMY OF MEDICAL SCIENCES, INSTITUTE OF MEDICAL BIOLOGY	CHINA
15	ANHUI ZHIFEI LONGCOM BIOPHARMACEUTICAL, INSTITUTE OF MICROBIOLOGY OF THE CHINESE ACADEMY OF SCIENCES	CHINA/UZBEKHISTAN
16	RESEARCH INSTITUTE FOR BIOLOGICAL SAFETY PROBLEMS	KAZAKHSTAN
17	SHIFA PHARMED INDUSTRIAL GROUP	IRAN

Source: gavi.org

Calculation based on publicly displayed capacity reveals the capacity of the above COVID-19 vaccines is expected to over 12 billion doses in 2021.

Current vaccination status of COVID-19

3360 million or so doses of COVID-19 vaccines have been administered worldwide, around 926 million people are fully dosed, covering about 11.9% of the world's population in bout 170 countries and regions, of which China, India and United States enjoy a leading vaccination coverage globally.

So far, the cumulative number of doses of COVID-19 vaccine in China hit about 1350 million, with 223 million people are fully dosed. It is expected that the COVID-19 vaccination rate will arrive at about 60% at the end of 2021, and at 70% to 80% at the beginning of 2022, extending to 1.1 billion people in China.

Three groups for vaccination in China

In China, the vaccination is rolled out following the order of key populations, high-risk populations and other populations to steadily increase the coverage rate of COVID-19 vaccination.

Key populations consist chiefly of those with higher occupational exposure risk, those with overseas infection risk and those in key posts to maintain basic social operation, those over 18 years old in border areas, and those with higher transmission risk of diseases in service industries and labor-intensive industries, which amounts to a size of about 210 million people; high-risk populations mainly refer to the elderly, patients with

underlying diseases and so on, with a size of about 460 million people; and the size of other populations reaches about 440 million. The vaccination rate target of about 80% will be achieved after all the above three types are vaccinated.

Three groups for vaccination in China		
Type		Number of population
Those with higher occupational exposure risk	Key populations	210 million
Those in key posts to maintain social operation and essential facilities		
Those in labor-intensive industries		
Those at high risk of severe diseases and mortality	High-risk populations	460 million
18 years and older	Other populations	440 million

Source: National Bureau of Statistics

Capacity of four domestic COVID-19 vaccine firms

In terms of China's COVID-19 vaccines under study, inactivated virus vaccine of CNBG and SINOVAC BIOTECH, and adenovirus vectored vaccine of CanSino have been approved and conditionally available on the market as of now. The recombinant subunit vaccine of Zhifei Biology has been certified for emergency use.

Current publicly available information provides an insight that the annual vaccine output of the above four domestic manufacturers is estimated to be approximately 2.9 billion doses in 2021, which can cater to 1.3 billion people's vaccination requirements with 2 injections per person. The market scale of the inland vaccine is expected to come near RMB 18 billion.

Four domestic COVID-19 vaccines approved for application					
Vaccine manufacturer	Marketing status	Time of being approved for use	Vaccine type	Clinical stage	Annual capacity
CNBG	Conditionally available on the market	Dec-20	Inactivated viral vaccine	Phase III	1 billion doses
SINOVAC BIOTECH	Conditionally available on the market	Feb-21	Inactivated viral vaccine	Phase III	1 billion doses
CanSino	Conditionally available on the market	Feb-21	Adenoviral vector vaccine	Phase III	600 million doses
Zhifei Biology	Emergency use	Mar-21	Recombinant subunit vaccine	Phase III	300 million doses

Source: Public data

On the top of meeting vaccination needs at home, inactivated virus vaccines of CNBG and SINOVAC BIOTECH have been exported to address vaccination needs in overseas markets. It is primarily put to use in more than 40 developing countries and regions worldwide.

References:

1、 *https://www.gavi.org/vaccineswork/covid-19-vaccine-race?gclid=Cj0KCQjwiqWHBhD2ARIsAPCDzaINHafZ4c0SImcjUoOOQ5ctPy3BUStJ5SjcDWk5j3FQD6XFgSQEPwaAqObEALw_wcB*

2、 *https://ourworldindata.org/covid-vaccinations?country=OWID_WRL*

About the Author:

Xiaoyaowan

Xiaoyaowan, a pharmaceutical industry practitioner, a word carrier in the We-media era focusing on changes of the pharma industry.

Worth Reading:

Vaccine Rollout Across the World - Does That Fix the Problem?

Read More

Having Applied for IPO to HKEX, What to Expect on Advaccine R&D Pipelines Beyond COVID-19 DNA Vaccine

By Yefenghong

Keywords: Advaccine, IPO, R&D Pipeline

An army of enterprises sought for IPO at Hong Kong in the almost first half of 2021. Not long ago, a prospectus submitted by Beijing Advaccine Biotechnology (hereinafter, "Advaccine") for listing caused a sensation, and the launch of its coronavirus DNA vaccine also drew wide attention. Not to mention this DNA vaccine, let's find out what else R&D lines of Advaccine to expect.

Advaccine is known to be an international leading platform for vaccine development and production, and an innovative biotech that is absorbed in the development and application of innovative vaccine technologies such as DNA nucleic acid vaccines, recombinant protein vaccines, and novel vaccine adjuvants. Its currently in research COVID-19 DNA vaccine, new respiratory syncytial virus (RSV) pneumonia vaccine, hepatitis B therapeutic vaccine, etc., have been reported to be associated with excellent clinical and preclinical data, and appears to usher in a wide market space.

R&D pipelines

Advaccine runs a comprehensive and innovative portfolio of technology platforms, i.e., DNA vaccine platform, recombinant protein subunit vaccine platform and novel adjuvant platform, based on which, a series of high-value vaccine products under research have been developed. It currently is engaged in developing six vaccine candidates for six disease areas, including potential pioneering vaccines developed against diseases caused by SARS-CoV-2, RSV, and HBV.

Products	Vaccine type	Target	Commercial right	Findings	Pre-clinical	Phase I	Phase II	Phase III
Pgx9501	DNA vaccine	COVID-19 prophylactic vaccine	Greater China	China United States: Phase II/III (Inovio)				
ADV110	Subunit vaccine	RSV prophylactic vaccine	Global	Australia				
ADV311	Subunit vaccine	HBV therapeutic vaccine	Global					
ADV510	Subunit vaccine	MCV therapeutic vaccine	Global					
ADV520	DNA vaccine	TAA cancer vaccine	Global					
ADV610	DNA vaccine	Personalized cancer vaccine	Global					

Advaccine's R&D pipeline (Figure source: Reference 1)

Core products

1. COVID-19 DNA vaccine: INO-4800

INO-4800 is recognized as a candidate DNA (deoxyribonucleic acid) vaccine developed by INOVIO for the coronavirus SARS-CoV-2 that causes COVID-19 pneumonia. DNA vaccine, also known as nucleic acid vaccine or genetic vaccine, introduces a DNA sequence encoding a certain protein antigen into a host through a vector to induce the body to produce an immune response. DNA vaccines feature high clinical safety, and are easier to produce and have an edge in R&D cost and cycle compared with live attenuated vaccines and recombinant protein vaccines. These features of DNA vaccine make it one of the strategies for researchers to develop against the COVID-19.

Advaccine and INOVIO, a US vaccine manufacturer, jointly declared that they have entered into a cooperation and licensing agreement on the COVID-19 candidate DNA vaccine INO-4800 in January of this year. The agreement states that Advaccine will have the exclusive rights to develop, manufacture and commercialize INO-4800 in the Greater China region (including China, Hong Kong, Macau and Taiwan).

INO-4800 currently seems to be the world's first and only COVID-19 candidate DNA vaccine under clinical development, and also the first COVID-19 candidate DNA vaccine worldwide that has been put to clinical trials in China and the United States. The clinical data of the Phase 1 study of INOVIO officially published in The Lancet reported that in a study of 38 vaccinated volunteers, the INO-4800 COVID-19 vaccine candidate presented 100% safety and resistance, receptivity and immunogenicity, as well as the ability to stimulate humoral immunity and cellular immunity simultaneously. INO-4800 is undergoing Phase 3 clinical trials and Phase 2 clinical trials in the United States and China respectively, including main subjects of 18 years old and older. Phase 3 clinical trials of INO-4800 have been reported to be carried out across several countries in June, and a marketing application will be made to NMPA as scheduled in the second half of 2021.

On top of that, INO-4800 provides many benefits, including: stability for more than one year at room temperature, storage for more than one month at 37°C, and a shelf life of five years at normal refrigeration temperature (2-8°C); no need to freeze during transportation or storage, meeting all the key conditions for timely distribution of COVID-19 vaccines.

2. RSV vaccine: ADV110

ADV110 is established as a vaccine candidate against respiratory syncytial virus (RSV) and the only RSV vaccine candidate designed and developed by a Chinese company. It has been put to the clinical stage and is currently leading the way clinically around the globe. ADV110 comprises two active components, the purified RSV G protein subunit as the immunogenic component, and the adjuvant AE011 formed in an optimized ratio. This vaccine candidate can induce high levels of anti-G protein specific antibodies and neutralizing antibodies against RSV infection, resulting in reduced the lung viral load.

The vaccine aims to guard children from 6 months to 5 years old and the elderly over 65 from acute viral lower respiratory tract infections. It moved to Phase 2 clinical trial in Australia in April this year, and such phase is expected to end in 2023.

3. Hepatitis B therapeutic vaccine: ADV311

ADV311 is identified as a candidate vaccine for hepatitis B virus, which can be applied to treat chronic hepatitis B by inducing a strong immune response and breaking the immune tolerance induced by hepatitis B virus. This combination therapy is comprised of PreS1/S recombinant protein derived from LargeHBsAg and CA02. The adjuvant system may be chosen from GM-CSF, IFN-α and aluminum adjuvant. Fusing the preS1

sequence with the S protein enables the pre-S1/S antigen to achieve broad-spectrum immunity.

The mechanism equivalent test initiated by the researchers revealed the functional cure index of ADV311 was up to 15.4%, obviously outperforming other similar vaccines under development. A new drug clinical trial (IND) application for the vaccine expects to be filed to CDE in 2022.

Furthermore, Advaccine also has 3 pre-clinical vaccine candidates, among which, ADV510 is a therapeutic one based on tumor virus antigens for the prevention and treatment of Merkel cell carcinoma; Adv520 is a therapeutic one based on tumor related antigen for tumor treatment; and ADV610 is also a therapeutic one based on novel antigen for mutant tumor treatment.

Advaccine's financing history

Advaccine is recorded with a total of five rounds of investment in history, and one acquisition (obtained 100% equity of Suzhou Siao Biotech). Its post-investment valuation is as high as RMB 3.672 billion or so after the latest capital increase. The shareholders included a number of senior investors ranging from Matrix Partners, Fortune Capital, China SME Development Fund, to Hony Capital, etc.

	Round 1 investment	Round 2 investment	Round 3 investment	Round 4 investment	Round 5 investment
Registered capital increase	RMB 2.5 million	RMB 2.5 million	RMB 1.8 million	RMB 3.52 million	RMB 3.456 million
Number of subscribed shares	2,500,000	2,500,000	1,800,000	3,520,000	3,456,000
Consideration paid	RMB 20 million	RMB 40 million	RMB 42 million	RMB 220 million	RMB 432 million
Post-investment valuation of the company	RMB 100 million	RMB 240 million	RMB 392 million	RMB 1.62 billion	RMB 3.672 billion
Date of investment agreement	December 23, 2016	December 30, 2019	March 9, 2020 July 6, 2020	September 18, 2020 September 21, 2020 September 24, 2020 September 25, 2020 September 29, 2020 November 18, 2020 November 19, 2020	March 1, 2021 March 2, 2021 March 3, 2021 March 5, 2021
Payment date of full consideration	April 27, 2017	April 1, 2020	July 24, 2020	November 24, 2020	March 16, 2021
[Compiled] Cost per share paid under the previous investment	RMB 8	RMB 16	RMB 23.33	RMB 62.50	RMB 125

Advaccine's financing situation in history (Figure source: Reference 1)

Positioned as a high-tech enterprise focusing on innovative vaccines, Advaccine comes with an innovative technology platform, a broad market space, and product pipelines with leading R&D progress. The recent round of financing will boost the clinical research and industrialization of its DNA vaccines to make further progress. It is hoped that the capital will aid Advaccine to launch the products under research as soon as possible to benefit patients.

References:

1、 *Advaccine's Prospectus;*

2、 *Advaccine's official website.*

Worth Reading:

With Diversified CAR-T Products in Hand, CARSGEN Applied for IPO in Hong Kong to Challenge the Treatment of Solid Tumor

Read More

Science of Epidemiology: Digital Technologies Shaping Our Lives

By Sarah Harding

Keywords: Digital Technologies, Epidemiology, COVID Pandemic

> Epidemiology has been greatly enhanced by the development of digital technologies.

The past couple of years has been a roller coaster of shock, despair, hope and marvel, as the COVID pandemic has ravaged the world and changed the way we live – in some ways, forever. Throughout the pandemic, most governments have done their best to "follow the science". Teams of scientists have worked not just to discover treatments and vaccines for this new global enemy, but also to develop public health plans and strategies that might help to slow its spread.

The science of epidemiology has become increasingly prominent in running our countries and our lives, but where do those data come from?

What is Epidemiology?

The science of epidemiology has come a long way since the term was first used around 200 years ago. Known as the father of modern epidemiology, John Snow is most famous for his investigations into 19th-century cholera outbreaks in London (England), where his identification of a dirty water pump, and subsequent chlorination of the water, ended an epidemic. Although Snow's methods were not widely applied until after his death, this was the first clear example of applying epidemiology to a public health situation, to avoid further outbreaks of disease.

The methods used in these historical times are not difficult to imagine – they would have involved mapping the outbreaks, looking for common causative factors, evaluating them, and finding a suitable intervention to correct them. To a certain extent, the same approach applies today, but now we are aided by a range of technologies that make our epidemiological studies faster, better and more reliable.

Most markedly, the need to achieve independent samples large enough to provide adequate statistical power led to the development of large research teams, collaborative studies and the introduction of analytical tools. By the end of the 20th century, new technologies had already transformed the science of epidemiology, which was particularly affected by advances in data technology, modelling and genetics.

Data Technology

While multicentre biobanks and collaborative databases are greatly impressive, perhaps one of the most fascinating development of our century has been the use of smart devices to collect data from individuals in real time. Smartphones, wearables and such other mobile connected devices already provide powerful real-time epidemiology tools at scale [1].

As well as providing a multitude of data for continuous measurement of critical biomarkers for medical diagnostics, physiological health monitoring and evaluation, these technologies have been implemented during the COVID pandemic in various 'track and trace' programmes intended to remove infected individuals (or those at risk of infection) from the general population to reduce spread. If used correctly and routinely, these tools have the potential to dramatically reduce the spread of disease.

Modelling

Epidemiological modelling can be a powerful tool to assist in health policy development, and disease prevention and control. Models can vary from simple deterministic mathematical models through to complex spatially-explicit simulations and decision support systems.

Throughout the COVID pandemic, mathematical models have been instrumental in understanding how the virus might impact populations, helping to inform government policies around the world [2]. Some of these models were freely available on-line, and I can't be the only person who was utterly smitten with many of these, explaining with little red and white dots how changes in behaviour or viral transmission rates might affect spread of the disease.

Genetic Epidemiology

Another important development is the use of genetic epidemiology, which brings together genetics, epidemiology and biostatistics to identify genes controlling risk for complex and heterogeneous diseases [3].

In the past two decades, the available tools for genetic epidemiology have expanded from a genetic focus (considering one gene at a time) to a genomic focus (considering the entire genome of an organism). The use of isoenzymes as genetic markers, the direct analysis of DNAs, and the production of highly specific monoclonal antibodies, are all widely used to enable the rapid identification of different strains that might have different distributions, transmission rates or cycles, or might be linked to different forms or severities of disease.

Big Data Analytics

Of course, all of the above developments – data technology, modelling and genetics – depend on the management and interpretation of Big Data. As with many other disciplines, therefore, big data analytics is core to modern epidemiology. Big Data holds the promise of identifying population health intervention targets through the analysis of high volume, highly variable data. It also offers the potential of targeting causative factors, and refining behaviours and interventions, using rapid feedback mechanisms [4].

Nevertheless, the mass of data generated by genomic, molecular, clinical, epidemiological, environmental, and digital information is a challenging reality of 21st century epidemiology. These data need to be processed, analyzed and interpreted in a systematic and efficient manner if scientists are to find relevant signals. Multistep analytical approaches have been used to estimate health risks associated with different types or combinations of exposures, but pathway analytical approaches are increasingly used for integrating and interpreting high-dimensional data generated by multiple techniques.

Epidemiology and COVID

Modern technologies such as those described above have supported the public-health response to COVID-19 worldwide [5]. Techniques employed during the COVID pandemic have included:

- Digital epidemiological surveillance
- Rapid case identification
- Digital contact tracing
- Tracking the spread of different genetic strains of the virus worldwide
- Modelling data to predict outcomes and evaluate potential interventions

- Evaluating the impact of actual interventions through the use of mobility data
- Public communication to keep populations informed.

These techniques leveraged billions of mobile phones, large online datasets, connected devices, computing resources and significant advances in machine learning and natural language processing. They have helped to reduce the human and economic impact of COVID, guiding governments and public health providers in the management of the crisis, through an ocean of uncertainty and doubt.

I don't think it is unfair to suggest that our epidemiologists have been the unspoken champions of the COVID pandemic.

What Next?

Epidemiology has been greatly enhanced by the development and application of new technologies. In particular, the COVID pandemic has confirmed the need for epidemiological science to evolve alongside the emerging fields of mobile and digital healthcare. That pattern of co-development – of the science of epidemiology and other disciplines – will certainly continue, while the future of public health will inevitably become increasingly digital.

In conclusion, digital technologies have an important role in our response to outbreaks and pandemics. As we continue to develop those technologies, our response to COVID should continue to strengthen and, with these tools in place, our response to any other pandemics in the future should be faster and more resilient.

References:

1、 *Guk K et al. Evolution of Wearable Devices with Real-Time Disease Monitoring for Personalized Healthcare. Nanomaterials (Basel). 2019;9: 813 https://www.mdpi.com/2079-4991/9/6/813*

2、 *Czyzewski A. Modelling an unprecedented pandemic, https://www.imperial.ac.uk/stories/coronavirus-modelling/*

3、 *Duggal P et al. The Evolving Field of Genetic Epidemiology: From Familial Aggregation to Genomic Sequencing. American Journal of Epidemiology 2019;188: 2069–77 https://doi.org/10.1093/aje/kwz193*

4、 *Mooney SJ et al. Epidemiology in the Era of Big Data. Epidemiology 2015;26:390–4 https://journals.lww.com/epidem/Fulltext/2015/05000/Commentary__Epidemiology_in_the_Era_of_Big_Data.14.aspx*

About the Author:

Sarah Harding, PhD

Sarah Harding worked as a medical writer and consultant in the pharmaceutical industry for 15 years, for the last 10 years of which she owned and ran her own medical communications agency that provided a range of services to blue-chip Pharma companies. She subsequently began a new career in publishing as Editor of Speciality Chemicals Magazine, and then Editorial Director at Chemicals Knowledge. She now focusses on providing independent writing and consultancy services to the pharmaceutical and speciality chemicals industry.

GLOBAL MARKET REVIEW AUGUST 2021

Alzheimer's Disease – Recent Advances in Treatment

By Neeta Ratanghayra

Keywords: Alzheimer's Disease, AD Drugs, Unmet Need Treatments

Alzheimer's disease (AD) is a neurodegenerative disease affecting millions of people globally. AD is a chronic, progressive disease and with time, the patient's cognition always deteriorates.

Apart from the typical symptoms of memory loss and cognitive impairment, AD is associated with a long prodromal period of 20 to 30 years during which no symptoms are seen. By the time the disease is diagnosed, significant, irreparable damages may have occurred.

The current treatment options offer symptomatic relief, but there is a huge unmet need for treatment with disease-modifying activity. The recent approval of Biogen's aducanumab marks the beginning of a pipeline of therapies meant to target the underlying disease mechanism - but "one size may not fit all". Hence, finding alternative treatment options especially those which target the disease pathophysiology is the need of the hour.

Alzheimer's disease drug pipeline

A distinct pathological feature of AD is the accumulation of amyloid β plaques in the brain which triggers neurodegenerative processes leading to memory loss and cognitive impairment. Another hallmark is the presence of tau protein tangles. Treatments targeting amyloid β plaques and phosphorylated tau protein have been investigated in several clinical trials albeit with limited success. This has compelled research towards targeting other targets such as inflammation, oxidative stress, infection, metabolism/bioenergetics, vascular factors, synaptic plasticity/neuroprotection, and gut-brain axis.

Currently, there are around 126 drug candidates for AD at various phases of clinical development. Of these, 28 agents are being tested in phase 3 trials – these include symptomatic agents as well as disease-modifying treatments. The list also includes 10 repurposed agents.

Some of the promising AD pipeline disease-modifying treatments in phase III clinical trials

Drug candidate	Company/Sponsor	Mechanism of action	Comments
Gantenerumab	Roche	Monoclonal antibody	Designed to bind with subnanomolar affinity to aggregated forms of beta-amyloid. It is administered subcutaneously over five minutes, making it quicker and easier to deliver than intravenous therapies.
Solanezumab	Eli Lilly, ATRI	Monoclonal antibody	Targets Aβ monomers. Solanezumab failed in people with mild Alzheimer's, but it is still being evaluated in people with amyloid buildup but no signs of cognitive impairment.
Atuzaginstat (COR388)	Cortexyme	Inflammation/Infection	Atuzaginstat targets the toxic proteases, or gingipains, produced by P. gingivalis, which have been discovered in greater than 90% of AD patients and shown to produce Alzheimer's pathology and neurodegeneration in infected animals.
Azeliragon	vTv Therapeutics	Amyloid, inflammation	Azeliragon is an orally active small-molecule antagonist of advanced glycation endproducts (RAGE). RAGE is an immunoglobulin supergene family member that is expressed on multiple brain cell types, specifically on endothelial cells and microglia, which is upregulated in Alzheimer's disease.
Blarcamesine (ANAVEX2-73)	Anavex Life Sciences	Synaptic plasticity/neuroprotection	ANAVEX®2-73 activates the sigma-1 receptor (SIGMAR1). SIGMAR1activation results in the restoration of complete housekeeping function within the body and is pivotal to restoring neural cell homeostasis and promoting neuroplasticity.
TRx0237	TauRx Therapeutics	Tau protein aggregation inhibitor	Purified form of methylene blue. Prevent tau aggregation or dissolve existing aggregates to interfere with downstream pathological consequences of aberrant tau in tauopathies including Alzheimer's.
AGB101 (low dose levetiracetam)	AgeneBio	Synaptic Plasticity/ Neuroprotection	AGB101 is being evaluated for mild cognitive impairment due to AD as a once-daily dose that is given to patients at approximately one-twelfth of the dose most commonly prescribed for epilepsy.
Icosapent ethyl (IPE)	VA Office of Research and Development, University of Wisconsin, Madison	Oxidative stress	May improve arterial function and cerebral blood flow, attenuating adverse brain changes related to β-amyloid protein, and improving cognition.
Troriluzole (BHV4157)	Biohaven Pharma, ADCS	Glutamate modulator; prodrug of riluzole; to improve synaptic function	Troriluzole requires only once-daily dosing and is unaffected by food unlike riluzole which needs to be taken twice a day on empty stomach.
Lecanemab (BAN2401)	Eisai, Biogen	Monoclonal antibody	Targets Aβ protofibrils. FDA granted breakthrough designation based on positive data from the Phase IIb Study 201 trial in Alzheimer's patients.
Tricaprilin	Cerecin	Caprylic triglyceride	Designed to induce ketosis and thereby improve mitochondrial metabolism.

Alzheimer's disease clinical trials

In the past few years, several treatments targeting various AD mechanisms especially amyloid β have been designed and tested, however, most have a disappointing track record.

Several reasons have been postulated for clinical trial failure. Some experts suggest that the dose used in the trials could be inadequate to achieve the therapeutic effect. Due to the differences in the blood-brain barrier between humans and animals, the dose used on animal models to predict human blood-brain barrier drug permeability may be insufficient to elicit a response in humans. Also, the

doses used may result in unacceptable adverse effects. Several trials were stopped early due to inflammatory changes or microhemorrhages in the brain.

Another debate lingering AD trials is targeting the disease stage at which it is reversible. Most trials that failed target mild to moderate disease. A preclinical phase that precedes the onset of symptoms by a couple of decades is seen as a potentially reversible stage.

Though amyloid and tau are seen as potential targets, the stream of failed clinical trials indicates that other potential targets need to be explored. Also, research shows that amyloid β and tau protein act together synergistically in AD, thus, a possible approach would be to target both amyloid β and tau simultaneously.

Biogen's aducanumab – The first therapy to target the underlying disease process

On June 07, 2021, the US FDA approved Biogen's aducanumab (Aduhelm) for the treatment of AD.

Aducanumab is a monoclonal antibody that targets the amyloid-β and reduces amyloid plaques in the brain. Aducanumab is the first AD therapy approved to target an underlying disease mechanism.

The FDA approved aducanumab using the accelerated approval pathway based on the surrogate endpoint of reduction of amyloid-beta plaque in the brain. Aducanumab was evaluated in three different studies including a total of 3,482 patients with AD. Compared to placebo, in patients receiving aducanumab, a significant reduction of amyloid-beta plaque was observed.

FDA's accelerated approval pathway allows the earlier approval of drugs that treat serious conditions, and that fill an unmet medical need based on a surrogate endpoint. The use of a surrogate endpoint significantly shortens the time required before receiving approval. Under the accelerated approval pathway, Biogen is required to verify the aducanumab's clinical benefit in a new randomized, controlled clinical trial.

Alzheimer's disease - Scenario in China

Around 50 million people worldwide are afflicted with AD, of this at least 10 million patients are in China. The numbers are expected to touch 40 million in China by 2050. The prevalence of AD is higher in older age groups, among females, and in the rural areas of China. The growing prevalence and high burden call for an increased demand for new drugs for this devastating disease.

In November 2019, the National Medical Products Administration (NMPA) approved GV-971 (sodium oligomannate), the first AD drug to be marketed since 2003.

GV-971 is a mixture of acidic linear oligosaccharides derived from brown algae. The drug is reported to work by modifying gut bacteria. When administered orally, GV-971 is retained in the gut where it reduces bacterial metabolite-driven peripheral infiltration of immune cells into the brain, inhibits Aβ aggregation, and inhibits neuroinflammation in the brain. The drug penetrates the blood-brain barrier through transporters including the glucose transporter GLUT1.

GV-971 completed a nine-month phase III trial in 2018 in China including 818 patients across 34 public hospitals. The drug was found to demonstrate a safe and effective improvement in cognition. In October 2020, a global phase III trial of GV-971 was initiated in around 2,000 patients at 200 medical centers worldwide. The trial is expected to be completed by 2025.

Desperate need for treatment

AD accounts for 60–70% of dementia cases, which contributes to increased disability and social dependency. Due to these devastating consequences, more effective therapies are urgently required.

Experts feel that approvals of the first drug in a new category can revive the field, leading to greater innovation and increased investments. Developing new ideas and targeting those in large-scale clinical trials can help in better understanding the treatment effectiveness.

References:

1、 *Shi J, Sabbagh MN, Vellas B. Alzheimer's disease beyond a myloid: strategies for future therapeutic interventions. BM J. 2020;371:m3684.*

2、 *FDA Grants Accelerated Approval for Alzheimer's Drug. Ava ilable at: https://www.fda.gov/news-events/press-announc ements/fda-grants-accelerated-approval-alzheimers-drug*

3、 *Cummings J, Lee G, Zhong K, Fonseca J, Taghva K. Alzhei mer's disease drug development pipeline: 2021. Alzheimer s Dement (N Y). 2021;7(1):e12179.*

4、 *Huang LK, Chao SP, Hu CJ. Clinical trials of new drugs for Alzheimer disease. J Biomed Sci. 2020;27(1):18.*

5、 *Wang X, Sun G, Feng T, et al. Sodium oligomannate therap eutically remodels gut microbiota and suppresses gut bac terial amino acids-shaped neuroinflammation to inhibit Alz heimer's disease progression. Cell Res. 2019;29(10):787-8 03.*

6、 *Sodium Oligomannate (GV-971). Alzheimer's Drug Discover y Foundation. Available at: https://www.alzdiscovery.org/u ploads/cognitive_vitality_media/Sodium_Oligomannate_(G V-971).pdf*

About the Author:

Neeta Ratanghayra
Freelance Medical Writer

Neeta Ratanghayra is a freelance medical writer, who creates quality medical content for Pharma and health-care industries. A Master's degree in Pharmacy and a strong passion for writing made her venture into the world of medical writing. She believes that effective content forms the media through which innovations and developments in pharma/healthcare can be communi-cated to the world.

Worth Reading:

Pharmaceutical Companies Back to the Blue Ocean of AD in the Wake of Aduhelm's Approval

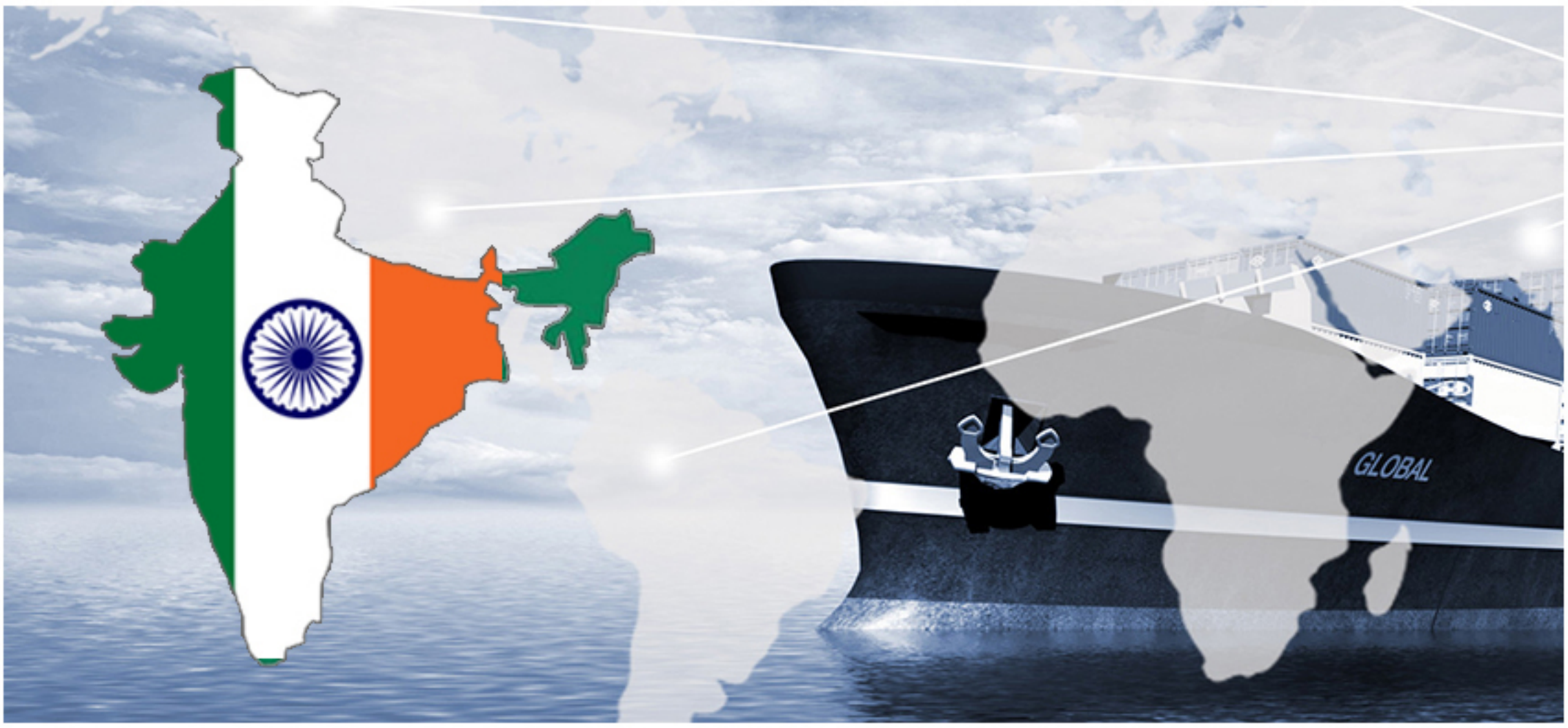
Read More

GLOBAL MARKET REVIEW AUGUST 2021

India's Pharmaceutical Industry Disruption Impacts Africa and the World

By SHEM OIRERE

Keywords: API, Exportation, Pandemic



India is one of the top global pharmaceutical producing markets that a large share of the global healthcare systems relies on for supply of drug formulations and biologicals at least until COVID-19 pandemic struck.

The pandemic disrupted India's pharmaceutical export supply chain with the Directorate General of Foreign Trade (DGFT) halting, albeit momentarily, the exportation of some pharmaceutical products that may have had an impact on provision of health services especially in low and middle income countries such as those in Africa. (1)

For example, in March 2020, India announced a total ban of hdyroxychloroquine and formulations from hydroxychloroquine except in circumstances where the export is in fulfilment of an earlier obligation under advance contract preceding the ban date or where an irrevocable letter of credit had been issued before the export ban notice.

The Indian government also restricted the hydroxychloroquine exports except in a situation where full advance payment had been received by Indian exporters or where the product was destined to other countries on humanitarian grounds but subject to recommendation of the Ministry of External Affairs.

The restrictions on exportation of hdyroxychloroquine and 24 other products was later eased under subsequent notices by DGFT. (2)

Previously, India had placed export restrictions on at least 26 other products including paracetamol and several antibiotics. (3)

The ban was largely to mitigate an unprecedented disruption in production of APIs in Chinese manufacturing plants, which account for nearly 70% of India's APIs import requirements.

However, the ban by India of Chloroquine and hydroxychloroquine, which had been touted as possible treatment option for COVID-19, was significant to a region such as Africa, where the two products are previous generation anti-malaria treatment

drugs, with the region accounting for up to 94% of the global malaria cases and deaths in 2019. (4)

Moreover, Africa remains one of the destination export markets for India's bulk drugs with the export value in the continent reaching US$ 372.2 million by 2017 according to the Export/Import Bank of India. (5)

Egypt, South Africa are some of the top importers of bulk drugs from India. Egypt's value of imports by 2017 was valued at US$ 95.9 million, which South Africa had a share of 23.1% of the total bulk imports by African countries.

Meanwhile, South Africa comes third in ranking of importers of India drug formulations, valued at US$ 389 million, with the total imports by the Africa region reaching US$ 2.8 billion at the end of 2017. (5)

Other big Africa importers of drug formulations from India include Nigeria, the second largest importers with 12.4% share, Kenya (10.4%), Tanzania (6.8%), Uganda (5.0%), Ethiopia (4.9%), Ghana (4.7%), Mozambique (4.3%), Congo D. Republic (3.0%) and Zambia (3.0%), according to the Indian Exim Bank. (5)

Other Indian pharmaceutical products' export destinations include the US, accounting for share of 86.4% of the Americas market and Brazil with imports valued at US$ 196.5 million by 2017.

But with the raging COVID-19 pandemic, some of India's top pharmaceutical export destinations in Africa may have been weakened hence unable to mobilize adequate resources for additional medicines as funds are channeled in combating the killer virus.

"Over one third of African countries have reported disruptions to essential health and immunization services throughout the pandemic and the onset of COVID-19 vaccinations," according to the World Health Organization. (6)

"Two-thirds of these countries reported the reallocation of staff to provide COVID-19 relief as the main driver for the disruptions, but fear of contracting COVID-19 has also led to lower numbers of patients seeking care for other conditions," said the UN health agency. (6)

Africa is also one of the regions that expected to benefit from the partnership of India's Serum Institute of India with Gavi, a public–private global health partnership and the Vaccine Alliance and the Bill & Melinda Gates Foundation. The partnership focused on acceleration of the manufacture of an additional 100 million doses of future vaccines, "if proven to be safe and effective, for low- and middle-income countries in 2021." (7)

But when COVID-19 hit India hard, with nearly 30.8 million cases and 408,000 deaths by the first week of July 2021, the partnership's scheduled vaccine production and supply was delayed as the anticipated SII deliveries were caught up in the rush by India to contain the pandemic with additional vaccines required to meet demand in the local market. (8)

However, India is likely to scale up its pharmaceutical products' export trade levels especially with the recent approval of four domestic companies- Solara Active Pharma Science Ltd, Rajasthan Antibiotics Ltd, Dhatri Lab Pvt Ltd and Vital Laboratories Pvt Ltd- to manufacture Key Starting Materials (KSMs)/ Drug Intermediates and Active Pharmaceutical Ingredients (APIs) under the government-driven Production Linked Incentive (PLI) scheme. (9)

India, with an estimated US$41.7 billion worth of pharmaceutical industry, proposes to set up greenfield plants in four different target segments under the PLI scheme at an estimated cost of Rs 6,940 (US$93.0482) by 2030 for the manufacture of 1,1-Cyclohexanediacetic Acid, Meropenem, Ritonavir and Levofloxacin.

More low and middle income countries, including those in African region are also likely to benefit from the recent partnership between Merck & Co Inc with five pharmaceutical product makers in India for the manufacture and distribution of the company's molnupiravir. (10)

As more lessons emerge from the disruption that has been inflicted by COVID-19 in the global healthcare system, it may as well be true to say when India & China pharmaceutical markets sneeze, the entire world catches the cold.

References:

1、 *https://www.dgft.gov.in/CP/*

2、 *https://www.reedsmith.com/en/perspectives/2020/04/india-reverses-pharmaceutical-export-restrictions-shortly-after-imposing*

3、 *https://timesofindia.indiatimes.com/business/india-business/government-bans-export-of-26-pharma-ingredients/articleshow/74467687.cms*

4、 *https://www.who.int/news-room/fact-sheets/detail/malaria*

5、 *https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj7scLg6tvxAhXSyYUKHUpUAG0QFnoECAIQAA&url=https%3A%2F%2Fwww.eximbankindia.in%2FAssets%2FDynamic%2FPDF%2FPublication-Resources%2FResearchPapers%2F92file.pdf&usg=AOvVaw2EMMJWKgkq6TRcYAfSsL-b*

6、 *https://www.afro.who.int/news/risks-and-challenges-africas-covid-19-vaccine-rollout*

7、 *https://www.who.int/news/item/25-03-2021-covax-updates-participants-on-delivery-delays-for-vaccines-from-serum-institute-of-india-(sii)-and-astrazeneca*

8、 *https://www.gavi.org/news/media-room/new-collaboration-makes-further-100-million-doses-covid-19-vaccine-available-low*

9、 *https://www.pib.gov.in/PressReleasePage.aspx?PRID=1700790*

10、 *https://www.merck.com/news/amid-humanitarian-crisis-in-india-merck-announces-voluntary-licensing-agreements-with-five-indian-generics-manufacturers-to-accelerate-and-expand-global-access-to-molnupiravir-an-investigational-ora/*

About the Author:

Shem Oirere

Shem Oirere graduated from the University of South Africa with a bachelor's degree in International Relations and Diplomacy, and also holds a Diploma in Journalism from the London School of Journalism. He previously worked for the Kenya Times, Nation Media Group and The People Daily over a twenty-year span as a business writer and Sub-editor. He wishes to share a view of the scenes behind Africa's latest pharma market trends with the rest of the world.

Worth Reading:

Boost for Africa's APIs Production Plan

Read More

Popular Products and Suppliers

at PharmaSources.com

TOP 10 HOT PRODUCTS OF PHARMASOURCES.COM		
No.	Product Name	CAS No.
1	Vitamin K3-MSB	6147-37-1
2	Vitamin K3-MNB	73581-79-0
3	Film Coatings	/
4	Aloe Vera Extract	/
5	Zhejiang Huahai Pharmaceutical Co., Ltd.	713516-99-5
6	Shaanxi Honghao Bio-Tech Co.,Ltd.	/
7	Inner Mongolia Yuhangren Hi-tech Industrial Co.,Ltd.	/
8	Guangdong jinzong Pharmaceutical Equipment Technology Co., Ltd.	/
9	Zhejiang Xianfeng Technologies Co., Ltd.	65-46-3
10	Zibo Pioneer Import & Export Co.,Ltd/Shandong Charming Chemical Equipment Co.,LTD	/

TOP 10 VISITED PHARMA MANUFACTURERS OF PHARMASOURCES.COM	
No.	Company Name
1	North China Pharmaceutical Co.,Ltd.
2	Zhejiang Huahai Pharmaceutical Co., Ltd.
3	Zhejiang Langhua Pharmaceutical Co., Ltd.
4	Sunwin Biotech Shandong Co., Ltd.
5	ANHUI PROVINCE YIFAN SPICE CO.LTD
6	Arshine Pharmaceutical Co., Ltd.
7	Hangzhou Celor Chemical Co., Ltd.
8	Zhejiang Medicines & Health Products Imp. & Exp. Co., Ltd.
9	Heilongjiang Weikaier Biotechnology Co., Ltd.
10	Shandong Fengcang Chemical Co., Ltd.

Pharma Sources

CPhI china

P-mec

PharmaSources.com

The One-Stop Online Trade Platform
for the Pharmaceutical Industry

Easy Sourcing
Easy Trade
in China

8,000 +

Chinese Pharma-related Suppliers

3.6 Million +

Quality Products

WhatsApp

Scan and Chat Now

Linkedin
PharmaSources.com

Facebook
@Pharmasources

Twitter
@pharmachina365

Contact Us: PharmaSources@imsinoexpo.com

Overseas Marketing of Furmonertinib Following Avitinib and Almonertinib

By Dopine

Keywords: Overseas Authorization, Furmonertinib, Avitinib, Almonertinib

According to Allist Pharmaceuticals' announcement on June 30, Allist intends to enter into an agreement with ArriVent Biopharma (hereinafter referred to as "ArriVent") to authorize ArriVent the right to exclusively develop (including R&D, production, import, export, use, sales, etc.) Furmonertinib outside Greater China, and Allist will receive a down payment of 40 million US dollars, and an accumulative amount of no more than 765 million US dollars, including R&D and sales milestone payments (after reaching the agreed R&D or sales milestone event), sales commission fees, and some shares of ArriVent.

Furmonertinib is a highly selective and irreversible third-generation EGFR-TKI independently developed by Allist. In March 2021, it was approved for the treatment of locally advanced or metastatic non-small cell lung cancer (NSCLC) in adults with disease progression during or after treatment with EGFR-TKI and positive EGFR T790M mutation confirmed by detection. Furmonertinib's trade name is Ivesa.

Furmonertinib marks the third 3G EGFR-TKI and the second domestic EGFR-TKI approved in China. The Phase 2b clinical data published in The Lancet Respiratory Medicine revealed that Furmonertinib came with an ORR of 74%, mPFS of 9.6 months, and DCR of 94% in the treatment of patients with EGFR T790M mutation-positive locally advanced or advanced NSCLC; In terms of patients with brain metastases, according to the data disclosed in the WCLC 2020, the 160 mg subgroup of the Phase 2a dose extension study suggested Furmonertinib proved central nervous system (CNS) ORR of 84.6 %, CNS mPFS of 19.3 months, and CNS DCR of up to 100%.

Moreover, the production application of Furmonertinib for the first-line treatment of NSCLC (i.e. the treatment of locally advanced or metastatic NSCLC adult patients with EGFR exon 19 deletion or exon 21 (L858R) substitution mutation) are expected to be filed this year. Meanwhile, this drug for adjuvant therapy of the indication (of patients with EGFR mutation-positive stage II-IIIA NSCLC after radical resection with or without adjuvant chemotherapy) is currently subject to Phase 3 clinical

trials. Furmonertinib for indications for insertion mutation of exon 20 (of locally advanced or metastatic NSCLC adult patients with EGFR 20 exon insertion mutations) is reported to be in Phase 1b clinical trials.

Avitinib and Furmonertinib being marketed overseas one after another

So far, three 3G EGFR-TKI inhibitors have been permitted in China, details of which are listed in the following table. Therein, AstraZeneca's Osimertinib has been authorized for second-line treatment, first-line treatment, and postoperative adjuvant therapy for patients with EGFR mutation-positive NSCLC, and yet Almonertinib and Alflutinib are only allowed for second-line treatment. Simultaneously, marketing application of Almonertinib for the first-line treatment of new indications of adult EGFR exon 19 deletion or exon 21 (L858R) substitution mutations of locally advanced or metastatic NSCLC (the relevant acceptance number is CXHS2101017) has been brought into the priority review by CDE.

Drug name	Trade name	Company name	NMPA approval time and indications
Alflutinib Mesylate	Ivesa	Allist Pharmaceuticals	2021-03-02: adult patients with locally advanced or metastatic NSCLC who have been treated with EGFR-TKI and have a T790M mutation
Almonertinib Mesilate Tablets	Ameitini	Hansoh Pharma	2020-03-17: adult patients with locally advanced or metastatic NSCLC who have been treated with EGFR-TKI and have a T790M mutation
Osimertinib Mesylate Tablets	Tagrisso	AstraZeneca	2017-03-22: adult patients with locally advanced or metastatic NSCLC treated with EGFR-TKI and with positive T790M mutation
			2019-09-01: first-line treatment for adult patients with locally advanced or metastatic NSCLC with EGFR exon 19 deletion or exon 21 (L858R) substitution mutation
			2021-04-07: adjuvant therapy for adult NSCLC patients with EGFR-sensitive mutations after tumor resection

Furthermore, the production application of 4 another third-generation EGFR-TKIs have been submitted, including 4 domestic new drugs and 1 generic drug.

Acceptance number	Component words	Company name	Type of declaration	CDE acceptance time
CYHS2101144 CYHS2101145	Osimertinib	Jiangsu Fosun Pharma	Generic drugs Class 4	May 12, 2021
CXHS2101009	Rezivertinib	Beta Pharma	New drug Class 1	May 7, 2021
CXHS2100008 CXHS2100009	Bevotinib	Betta Pharmaceuticals	New drug Class 1	March 4, 2021
CXHS1800009 CXHS1800010	Avitinib	ACEA Biosciences	New drug Class 1	June 25, 2018

It can be perceived from the approval and production applications of the third-generation EGFR-TKIs that the R&D strength of Chinese pharmaceutical companies shouldn't be belittled, and they have been accredited and favored by overseas pharmaceutical companies. thereinto, Avitinib and Almonertinib have gone global. In May 2020, ACEA Biosciences issued exclusive authorization to Sorrento Therapeutics for all indications of Avitinib in all parts outside China. In August 2020, Hansoh Pharma authorized the overseas development and commercialization rights of Almonertinib (outside Chinese Mainland, Hong Kong, Macau and Taiwan) to EQRx.

A plurality of drugs were subject to overseas authorization in the first half of 2021

Besides the third-generation EGFR-TKIs, incomplete statistics have disclosed a number of drugs of China have been made available overseas in H1 of this year, including two homemade PD-1 monoclonal antibodies (i.e. Tislelizumab and Toripalimab) and 2 biosimilars (i.e. Bevacizumab biosimilar and Tocilizumab biosimilar).

- In January 2021, Innovent Biologics licensed the commercialization rights of Bevacizumab biosimilars in the United States and Canada to Coherus, and then exclusively authorized Etana the rights and interests of such biosimilar in Indonesia.
- In January 2021, BeiGene granted the development, production and commercial rights and interests of Tislelizumab in the United States, Canada, Mexico, EU member states, the United Kingdom, Norway, Switzerland, Iceland, Liechtenstein, Russia and Japan to Novartis.

- In February 2021, Tide Pharmaceutical, a subsidiary of CNBG, concluded an overseas licensing cooperation agreement with Graviton to jointly develop and commercialize its self-developed innovative drug TDI01 for the treatment of fibrosis beyond Greater China. TDI01 is known to be a highly selective inhibitor of the new target Rho/Rho-related coiled-coil forming protein kinase 2 (ROCK2), which is able to inhibit the progression of fibrosis, anti-inflammatory and immune regulation by inhibiting the ROCK2 signaling pathway based on high selectivity.

- In February 2021, Luye Pharma and Towa Pharmaceutical reached an agreement, which licensed the latter the exclusive right to develop and commercialize Rivastigmine Transdermal Patch in the Japanese market. In March 2021, Luye Pharma arrived to an agreement with Italfarmaco Group, which licensed the latter the exclusive right to commercialize its Rivastigmine Transdermal Patch in the following European countries: Germany, Italy, Portugal and Greece. Based on this agreement, Italfarmaco also has the preferred right to commercialize the product in Chile and Vietnam.

- In February 2021, Junshi Bioscience and Coherus Corporation came to a cooperation on the development and commercialization of Toripalimab in the United States and Canada, which allowed Coherus to obtain the license of Junshi Bioscience's Toripalimab and two optional projects (in case of implementation) in the United States and Canada.

- In March 2021, I-MAB Biopharma and Kalbe Genexine Biologics (hereinafter referred to as "KG Bio") reached a strategic partnership. The agreement licenses KG Bio the preferred negotiation right for the exclusive authorization of commercialization of two drug candidates independently developed by I-MAB Biopharma, including: TJD5, a highly differentiated anti-CD73 antibody for advanced solid tumors, which has been in the Phase 1 clinical trial; and another drug candidate of I-MAB Biopharma to be agreed between the two parties.

- In March 2021, Kelun-Biotech, a subsidiary of Kelun Pharmaceutical, and Ellipses Pharma entered into a regional licensing cooperation agreement, in which Kelun-Biotech authorized the exclusive license of its small-molecule tumor-targeted RET kinase inhibitor project (A400 project) in Europe and the United States and other regions to Ellipses Pharma at a certain price.

- In April 2021, Denovo Biopharma delegated the global clinical development and commercialization rights of DB102 to treat rare genetic diseases such as vEDS to Rumpus Therapeutics/Aytu Biopharma. DB102 is regarded as a "first-in-class" small-molecule serine/threonine kinase inhibitor and acts on key tumor targets such as PKCβ, PI3K and AKT. It shows direct effects of inducing tumor cell death and hindering tumor cell proliferation, and the indirect effect of inhibiting tumor-induced angiogenesis. It was originally developed by Eli Lilly for the first-line treatment of high-risk DLBCL and GBM, and Denovo Biopharma currently owns the global rights of such drug.

- In April 2021, Bio-Thera licensed BAT1806's product rights in the global market beyond China (including Chinese Mainland, Hong Kong Special Administrative Region, Macau Special Administrative Region and Taiwan) to Biogen. BAT1806 is reported to be a Tocilizumab injection developed by Bio-Thera in accordance with the relevant guidelines of China's NMPA, US FDA, and EU EMA biosimilars. It is established as a recombinant humanized monomer cloned antibody targeting interleukin-6 receptor (IL-6R), and it is in the process of a global Phase III clinical study for the treatment of rheumatoid arthritis.

- In May 2021, PREGENE exclusively authorized the clinical development and commercialization rights of its self-developed Nanobody-based CAR-T cell injection product in India to Dr. Reddy's Laboratories.

Worth Reading:

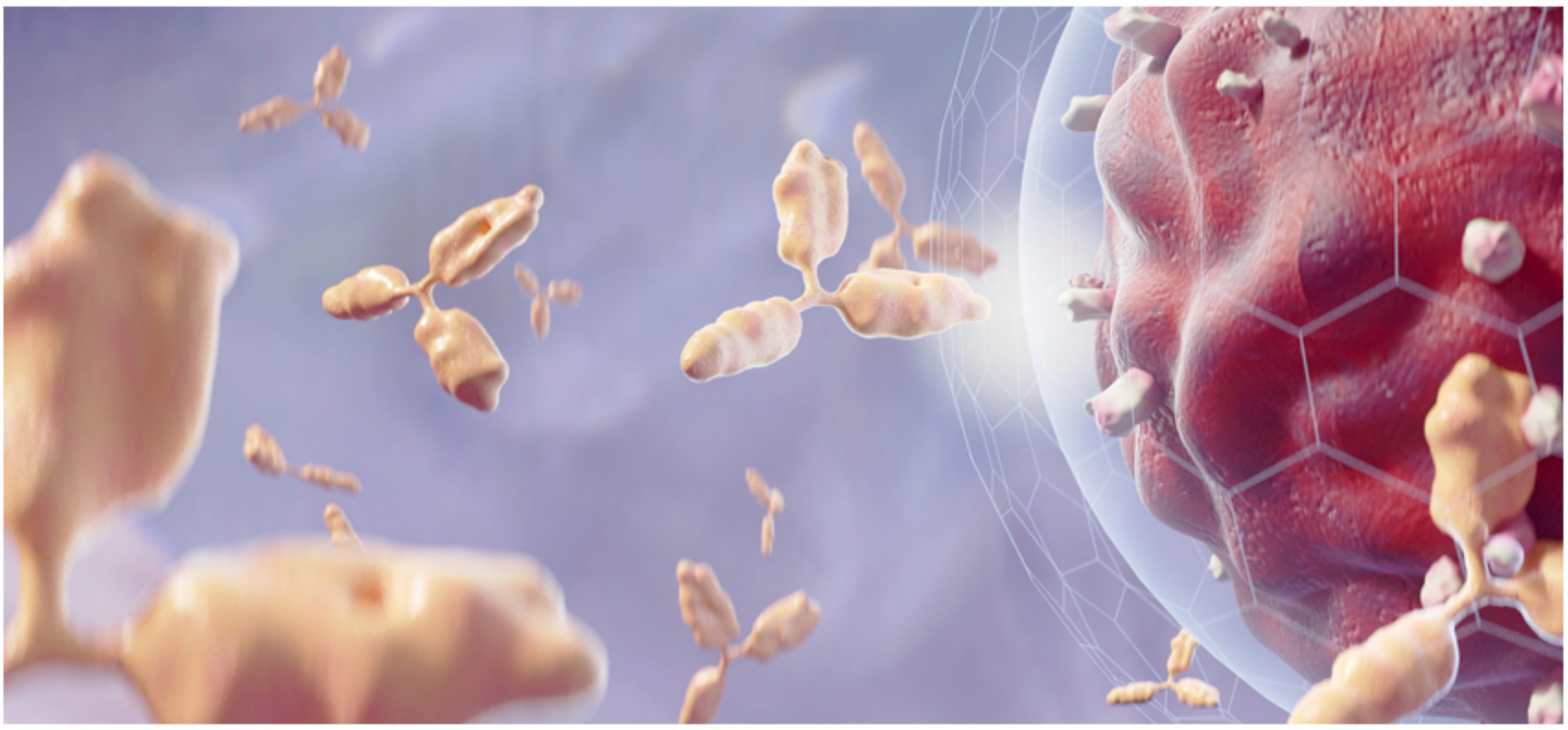
Release of a Novel Chinese-developed Class 1 Anti-HIV Drug May Reshape the Market

Read More

Bispecific Antibodies – Key Developments in China

By Neeta Ratanghayra

Keywords: Bispecific Antibody Candidates, BsAbs Platform Technologies, Biotheraputics



Bispecific antibodies (BsAbs) are artificially designed antibodies with dual binding sites. The binding sites may be directed at two different antigens or two different antigens or two different epitopes on the same antigen. The dual binding ability makes bsAbs an attractive therapeutic option for a range of conditions including cancer, autoimmune diseases, and infectious diseases.

This article covers the basics of bsAbs and gives an overview of the bsAbs landscape in China.

Bispecific antibodies - The next generation of biotherapeutics

Bispecific antibodies, with their novel functionalities, are seen as the next generation of cancer biotherapeutics. With bsAbs, it's possible to combine more than one target which can ultimately help improve the efficacy and safety of biological drugs with single targets. BsAbs can also help combat drug resistance commonly observed with a single target antibody.

Bispecific antibodies - Mechanisms of action

BsAbs are available in multiple formats ranging from small protein fragments to large immunoglobulin G (IgG)-like molecules and its dual binding ability enables a flexible functioning pathway.

The specificity of bsAbs can be leveraged to redirect T cells to cancer cells or block two different signal transduction pathways simultaneously. BsAbs can also be used for simultaneous targeting of multiple disease mediators and targeted delivery of payloads into tumor cells. Several bsAbs are designed to act as connectors of immune cells and work by connecting immune cells to cancer cells, thereby allowing immune cells to exert their killing action.

Most BsAbs are designed to target immune cells CD3, CD16, and CD47, while some are designed to enable dual immunomodulation and targets dual-targeted immune checkpoints pathways such as PD-1, PD-L1, LAG-3, and TIM-3.

In addition to targeting immune cells, BsAbs can target dual tumor targets such as HER2, EGFR, DLL1and block dual signaling pathways. They can also target inflammatory factors in the tumor microenvironment and reduce inflammation and cytokine release syndrome.

Bispecific antibody – Current market scenario

Catumaxomab (Removab®) - The first bispecific antibody approved

Catumaxomab, a murine anti-EpCAM × anti-CD3 bsAb was the first bsAb drug approved in the world. Catumaxomab (Removab®) was approved in the EU for the intraperitoneal treatment of malignant ascites in patients with EpCAM-positive epithelial tumors. However, catumaxomab was voluntarily withdrawn by its manufacturer in 2017 due to commercial reasons.

Chinese biotech Lintonpharm is reinitiating the clinical development of catumaxomab. Lintonpharm has received authorization from China's National Medical Products Administration (NMPA) to conduct a global phase III trial of catumaxomab in advanced gastric cancer. The NMPA has also authorized Lintonpharm to proceed with a Phase 1/2 clinical trial evaluating the safety and efficacy of catumaxomab in patients with non-muscle-invasive bladder cancer (NMIBC) whose tumors have recurred due to Bacillus Calmette-Guerin (BCG) vaccine failure.

Blinatumomab (Blincyto®)

Blinatumomab (Blincyto®) developed by Amgen, is the second bsAb to be introduced in the market. Blinatumomab is an anti-CD19 × anti-CD3 antibody indicated for the treatment of acute lymphoblastic leukemia.

Emicizumab (Hemlibra®)

The third bsAb to be approved is Roche's Emicizumab (Hemlibra®). Emicizumab is an anti-FIXa × anti-FX antibody that mimics activated factor FVIII (FVIIIa), a clotting protein reduced in patients with hemophilia A.

110 bsAbs under clinical trials, 21 of these clinical trials are in China

The attractive features of bsAb have led to significant efforts towards their development as the next generation of biotherapeutics, especially in cancer. In addition to the two bsAbs currently approved, around 110 bsAbs are currently at various phases of clinical development. Of this, 21 clinical trials are being carried out in China. Most of the bsAbs being evaluated in China target solid tumors while few target hematological tumors including lymphoma and cancer-caused malignant ascites.

Bispecific antibody platform technologies in China

Several platforms for designing bsAb have been developed in China, of which many have been received patent from the US Patent Office.

Major bsAb platforms developed in China include:

- *YBODY® (Wuhan YZY Biopharma)*
- *CRIB™ (Alphamab)*
- *Tab™ (Shanghai Generon)*
- *FIT-Ig™ (EpimAb Biotherapeutics)*
- *WuXiBody™ (WuXi Biologics)*
- *SMAB™ (Genscript Biotech)*

Bispecific antibody development - Challenges

Though poised to be the next-generation biologics, development and manufacturing challenges hamper the wider use and clinical acceptance of bsAb.

Some of the key technical challenges while developing bsAb include:

- *The requirement of high expression level and production yield makes it difficult to develop productive processes*
- *Requirement of strategies to prevent toxicity and immunogenicity caused by novel epitopes*
- *Meeting thresholds for activating multiple molecular pathways*
- *Ensuring the product quantity, quality, and stability during manufacturing*

Below is a list of selected bsAb candidates developed in China:

A List of Selected bsAb Candidates Developed in China

Company	Drug candidate	Targets	Condition/Disease	Technology	Stage of development
Wuhan YZY Biopharma	M802	HER2 x CD3	HER2+ advanced solid tumors	YBODY® technology platform	Phase I
Wuhan YZY Biopharma	M701	EpCAM x CD3	Malignant ascites	YBODY® technology platform	Phase I
Alphamab Co., Ltd.	KN026	HER2 x HER2	Solid malignancies (breast and gastriccancer)	Charge Repulsion Improved Bispecific (CRIB™) platform	Phase I
Evivebiotech (Formerly, Shanghai Generon Co., Ltd. (Generon)	A-319	CD3 x CD19	Lymphoid leukaemia	Immune-therapy antibody (ITab™)	Phase I
EpimAb Biotherapeutics, Inc.	EMB-01	EGFR x MET	Neoplasms, Neoplasm Metastasis, Non-Small-Cell Lung Cancer	Tetravalent Fabs-In-Tandem immunoglobulins(FIT-Ig™) technology	Phase I/II
EpimAb Biotherapeutics, Inc.	EMB-02	PD-1/LAG-3	Advanced solid tumors	Tetravalent Fabs-In-Tandem immunoglobulins(FIT-Ig™) technology	Phase I/II
EpimAb Biotherapeutics, Inc.	EMB-06	BCMA/CD3	Relapsed or Refractory Multiple Myeloma	Tetravalent Fabs-In-Tandem immunoglobulins(FIT-Ig™) technology	Phase I/II
Innovent Biologics	IBI-322	PD-L1/CD47	Advanced malignancies	NR	Phase I
Innovent Biologics	IBI-318	PD-1/PD-L1	Advanced tumors	NR	Phase I
Innovent Biologics	IBI-315	PD-1/HER2	HER2-expressing advanced solid malignancies	NR	Phase I
Innovent Biologics	IBI-323	LAG-3/PD-L1	Solid tumours	NR	Phase I

What does the future look like?

Currently, there are only two commercially available bsAbs, but the way the approved bsAbs have revolutionized the treatment landscape reflects its great market potential. As per recent reports, the estimated market opportunity for bsAbs is set to reach $8 billion by 2025.

Also, the growing number of bsAbs candidates authorized for clinical trials by NMPA and the continuous financial investments reflect the advancing innovation and competitiveness of Chinese biotech companies.

References:

1、 *Zhang J, Yi J, Zhou P. Development of bispecific antibodies in China: overview and prospects. Antib Ther. 2020;3(2): 126-145.*

2、 *Labrijn AF, Janmaat ML, Reichert JM, Parren PWHI. Bispecific antibodies: a mechanistic review of the pipeline. Nat Rev Drug Discov. 2019;18(8):585-608.*

3、 *Global Bispecific Antibody Market, Drug Sales & Clinical Pipeline Insight 2025. Available at: https://www.researchandmarkets.com/research/xhhw54/global_bispecific?w=5. Accessed on: 29 Jun 2021.*

About the Author:

Neeta Ratanghayra

Freelance Medical Writer

Neeta Ratanghayra is a freelance medical writer, who creates quality medical content for Pharma and health-care industries. A Master's degree in Pharmacy and a strong passion for writing made her venture into the world of medical writing. She believes that effective content forms the media through which innovations and developments in pharma/healthcare can be communi-cated to the world.

INDUSTRY INSIGHT AUGUST 2021

A Brief Introduction About FDA Next Step Inspections

By Lin Zhang

Keywords: FDA Inspections, COVID-19 Pandemic, Resiliency Roadmap

The COVID-19 pandemic is one of the largest public health challenges in human history. It led to the U.S. Food and Drug Administration (FDA) choosing to pause most inspections and adapt for mission-critical work on a case-to-case basis.

According to the FDA, the agency inspects a variety of fields and sectors, in particular, those related to food and medical materials. There are three types of inspections: (1) for-cause (investigate a problem or complaint or the belief that there is a serious issue); pre-approval/pre-market/pre-license (part of the review of the process to market a new product); and routine surveillance (monitor ongoing compliance with the existing requirements). Out of these, the routine surveillance is being given a lower priority unless something critical and threatening to public health occurs. For example, tobacco is currently considered a low priority, while food and medications are given a higher significance.

In March 2020, the inspections were halted with the exception of mission-critical inspectional work. The mission-critical inspections that continued involved the following: products received breakthrough therapy or regenerative medicine advanced therapy, product requires follow-up because of recall, serious adverse events or outbreaks due to foodborne illness; product is used to treat a serious condition and has not substitute; product is related to the response to COVID-19.

FDA has published a guidance of the use of remote interactive evaluation last April. (2) The main strategies for the pandemic have been adapting and prioritizing, which has involved the use of existing authorities and tools for remote oversight and developing new tools to extend the organization reach. Prioritizing has involved establishing prioritization plans by type of commodity and also an overall approach that would guide the decision-making process at an organizational level.

In July 2020, the FDA resumed domestic inspections, though

setting strict priorities with the use of the COVID-19 Advisory Level (3) that tracks real-time data and assess state levels.

Notably, on May 5, 2021, the FDA has issued a new report: "Resiliency Roadmap for FDA Inspectional Oversight". (4) The Resiliency Roadmap details the inspection and assessment of the COVID-19 pandemic and the plan for priorities and operations going forward, taking into account the continued uncertainty of the pandemic and the different possibilities concerning how it will develop in the next months.

Specifically, the FDA plans three realistic options to prioritize inspections based on the current and future state of the COVID-19 pandemic:

1、 **Base-Case** as a gradual return to standard operations,
2、 **Best-Case** as an immediate return to standard operations, and
3、 **Worst-Case** as a maintenance of an emergency-operations status.

Since March 2020 to March 2021, FDA has conducted 440 application-based inspections. 68 applications were delayed and are to be completed in 2021. There were 90% of for-cause inspections in 2020. FDA also carried out 821 mission-critical inspections. 29 were done outside the U.S. There were 777 prioritized domestic inspections.

The organization has taken other steps to ensure compliance and safety, including:

- *Reviewing records and information;*
- *Doing remote assessments for individual program areas (around 1,183 remote assessments conducted since March 2020 to March 2021);*
- *Using information shared by regulatory partners across state, local, tribal, and territorial lines (4,273 human food and 1,295 animal food inspections on the behalf of the FDA were conducted in 2020-2021);*
- *Using information shared by trusted foreign regulatory partners;*
- *Sampling and analytical testing of regulated products domestically and at the international borders (65 foreign establishments placed on import alert);*
- *Refusing entry of unsafe imported products.*

Due to the ongoing and uncertain nature of the pandemic, FDA continues to prioritize the mission-critical inspections and has outlined plans that depend on how the situation with COVID-19 develops, considering the best and worse case scenarios. They will continue to carry out other types of inspections. Postponed inspections will be conducted over a longer period of time and based on risk assessment. The biggest challenge is managing the large volume of inspections that fall into the lower priority tiers that the FDA will try to resolve going forward.

FDA's fiscal year ends in September 2021, and this is taken as a benchmark date to achieve the plans and objectives that the agency is currently facing. According to the report, there are 12,285 human and animal food inspections remaining for the fiscal year 2021, with 1,272 (10%) of these inspections achievable under the base-case scenario and 2,579 (21%) achievable under the best-case scenario. The agency will focus on mission-critical inspections under the worst-case scenario.

In regards to surveillance inspections, there were plans to complete 21 thousand establishments in 2020. 8 thousand were postponed due to the pandemic. 2021 involves a plan for 26,250 inspections, including those that were delayed. However, the rate at which the inspections will take place depending on how the pandemic situation will continue to develop and whether the situation will continue according to a best-case or worst-case scenario.

However, for future inspections, the institution intends to continue to use the remote tools (2) and authorities they relied on during the pandemic to improve operations and strengthen overall compliance. In the worst-case scenario, these tools would be prioritized, but they are considered in regards to all three options.

However, for future inspections, the institution intends to continue to use the remote tools and authorities they relied on during the pandemic to improve operations and strengthen overall compliance.

FDA is currently expanding its workforce and will begin a modernization effort that will transform infrastructure and data enterprise, integrating next-generation technology and tools and overall improvements. FDA is also working to increase the speed of the evaluations and integrate the new tools to help build a more flexible, data-driven, and risk-based oversight modeling system. FDA intends to maximize every approach and resource to accomplish its mission.

While the pandemic continues, the efforts will be focused on mission-critical and prioritized inspections. Lower risk inspections and routine inspections will be delayed and given a lower priority until normal operations are resumed, and this is a decision based on risk assessment. The safety and well-being of FDA staff who have been having difficulties accessing administrative leave are also considered a priority. FDA expresses and reinforces its commitment to protecting public health and regulating products that can represent a risk within the U.S. which may help guide the new and next step inspections.

References:

1、 *https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-classification-database*

2、 *https://www.fda.gov/media/147582/download*

3、 *https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-prepares-resumption-domestic-inspections-new-risk-assessment-system*

4、 *https://www.fda.gov/media/148197/download*

About the Author:

Lin Zhang

Lin Zhang, Ph.D., senior director of a health care industry company in the United States. With the experience in clinical medicine, biotechnology, health industry and other fields, he is responsible for the research and development of plant medicine, functional food and health products. He was a clinician and worked for the National Cancer Institute, FDA and the National Cancer Center of Japan for many years.

Pharma Sources Insight

APRIL 2021

Breakthroughs & Trends: Chinese Biopharmaceutical Overview

A Glimpse of the Oncology Drug Treatment Market in China

Industrial Adoption of Continuous Pharmaceutical Manufacturing

SUBSCRIBE NOW

sinoexpo
informa markets

Review

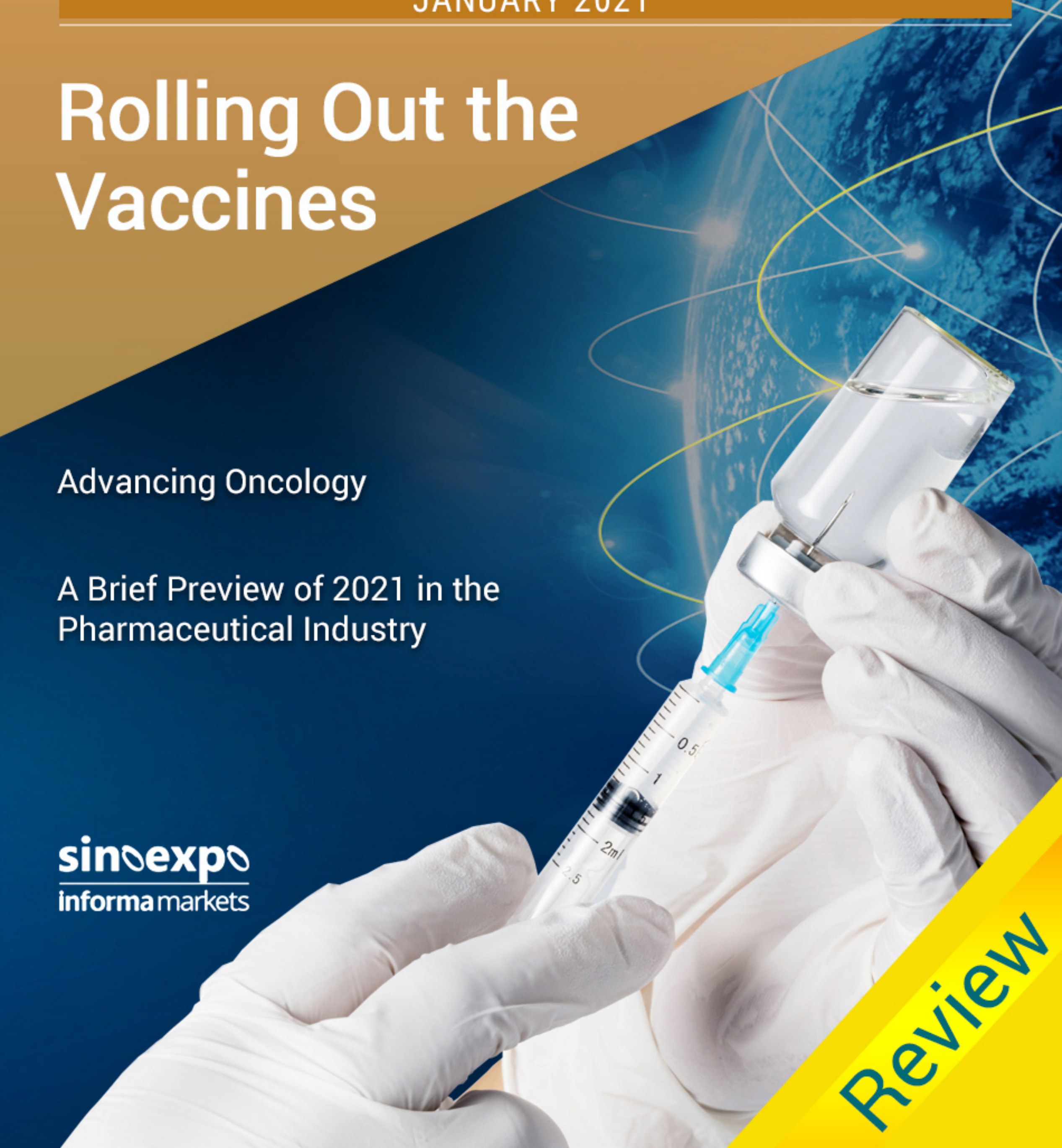
Pharma Sources Insight

JANUARY 2021

Rolling Out the Vaccines

Advancing Oncology

A Brief Preview of 2021 in the Pharmaceutical Industry



sinoexpo
informa markets

Review

Pharma Sources Insight

Your FREE Source of News and Insights into China Pharmaceutical Industry.

Subscribe to get FREE alerts for the new issues now!

sinoexpo informamarkets

Subscribe >

Pharma Sources

www.PharmaSources.com