



Cross-continent Vaccine Collaboration against COVID-19

CoronaVac™

November 05, 2020

科兴控股生物技术有限公司
SINOVAC BIOTECH LTD.

Company Introduction

CONFIDENTIAL

Our History & Products

We focus on the Research, Development, Manufacture and Commercialization of vaccines for infectious diseases with significant unmet medical need.

2001

SINOVAC

Sinovac Beijing
Established

2004

Inactivated SARS Vaccine
(Phase 1)

2006



Split Infl uenza Vaccine

2009



Infl uenza A (H1N1) Vaccine

SINOVAC

Sinovac LifeSciences
Established

2012



2020...



Varicella Vaccine, Live(大连)
Quadrivalent Infl uenza Vaccine
COVID-19 Vaccine
PPV23
Sabin-IPV

Provide Chinese Children with Top Quality Vaccines, Provide Children around the World with Vaccines Made in China

Inactivated Hepatitis
A Vaccine
(WHO PQ, 2017)



2002

Combined Inactivated
Hepatitis A and B Vaccine



2005

Inactivated H5N1
infl uenza (avian fl u)
Vaccine



2008

Sinovac Dalian Established
SINOVAC

2010

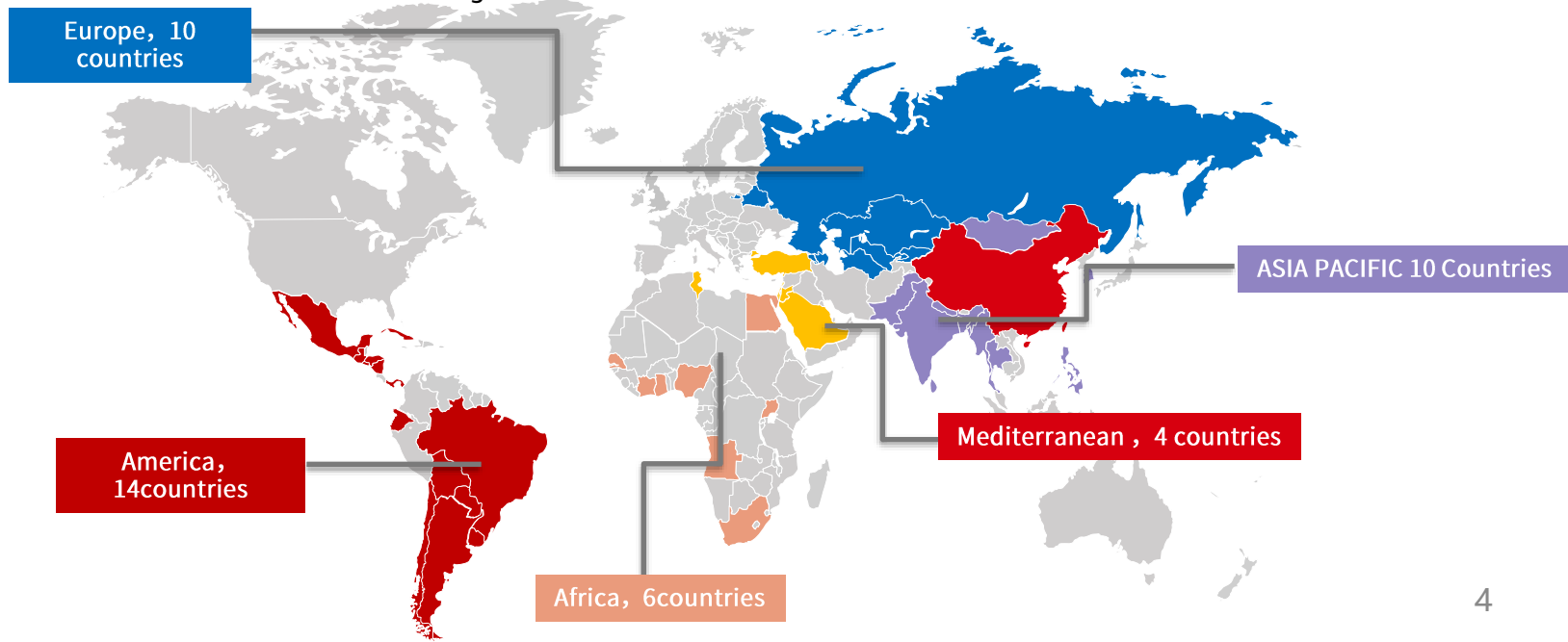
Vaccine for Hand foot and mouth
disease caused by EV71



2016

Worldwide Market & Footprint

- › The cumulative global sales are nearly 160 million doses. In 2019, an average of 112 people per minute were vaccinated with Sinovac's vaccines to obtain immune protection.
- › Sinovac's vaccine has been sold in 22 countries around the world, has been registered in 17 countries, and is being registered in 26 countries, covering 3.25 billion people 68 million newborns
- › The hepatitis A vaccine Healive® is the first HepA vaccine in China to pass WHO-PQ, and is being exported to more than 10 "Belt and Road" countries and international organizations such as UNICEF and PAHO.



Production Sites

Shang Di



Area: 22264.21 m²
Floorage: 14200.38 m²

HepA

Influenza

HepA&B combo

PPV23

Da Lian

克尔来福™
CoronaVac™
新型冠状病毒灭活疫苗



Area: 95685.6m²
Floorage: 20000m²

Mumps

Varicella

Area: 29021m²
Floorage: 32322m²

EV71

Sabin-IPV



Chang Ping



Da Xing

Area: 45523 m²
Floorage: 69124.5 m²

SARS-CoV-2

Influenza

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- › Beijing(Shang Di, Chang Ping, Da Xing sites), and Dalian site. 4 sites in total.
- › Total Capacity: More than 400 million doses per year for more than 10 vaccines
- › SARS-CoV-2 Vaccine Capacity: more than 300 million doses per year

Development of SARS-CoV-2 Vaccine (Vero Cell), Inactivated

Development Process

Science

REPORTS

Cite as: Q. Gao et al., *Science*
10.1126/science.abc1932 (2020).

Rapid development of an inactivated vaccine candidate for SARS-CoV-2

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The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) has resulted in an unprecedented public health crisis. There are currently no SARS-CoV-2-specific treatments or vaccines available due to the novelty of the virus. Hence, rapid development of effective vaccines against SARS-CoV-2 are urgently needed. Here we developed a pilot-scale production of a purified inactivated SARS-CoV-2 virus vaccine candidate (PiCoVacc), which induced SARS-CoV-2-specific neutralizing antibodies in mice, rats and non-human primates. These antibodies neutralized 10 representative SARS-CoV-2 strains, suggesting a possible broader neutralizing ability against SARS-CoV-2 strains. Three immunizations using two different doses (3 µg or 6 µg per dose) provided partial or complete protection in macaques against SARS-CoV-2 challenge, respectively, without observable antibody-dependent enhancement of infection. These data support clinical development of SARS-CoV-2 vaccines for humans.

The World Health Organization declared the outbreak of coronavirus disease in 2019 (COVID-19) to be a Public Health Emergency of International Concern on 30 January 2020, and a pandemic on 11 March 2020. It is reported that ~40% of COVID-19 patients have mild-to-moderate symptoms, while ~20% develop serious manifestations such as severe pneumonia, acute respiratory distress syndrome (ARDS), sepsis and even death (2). The number of COVID-19 cases has increased at a staggering rate globally. Severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2), the causative virus of the ongoing pandemic, belongs to the genus *Betacoronavirus* (*β-CoV*) of the family *Coronaviridae* (2). SARS-CoV-2 along with the severe acute respiratory syndrome coronavirus (SARS-CoV) and the Middle Eastern respiratory syndrome-related coronavirus (MERS-CoV), constitute the three most life-threatening viruses among all

elicits highly potent neutralizing antibodies (NAbs), 16 non-structural proteins (nsp1-nsp10) and several accessory proteins (3). No specific antiviral drugs or vaccines against the newly emerged SARS-CoV-2 are currently available. Therefore, urgency in the development of vaccines is of vital importance to curb the pandemic and prevent new viral outbreaks.

Multiple SARS-CoV-2 vaccine types, such as DNA-based formulations, recombinant-subunit/containing epitopes, adenovirus-based vectors and purified virus under development (4-6). Purified viruses have been traditionally used for vaccination and such vaccines have been found to be effective for the prevention of diseases caused by virus and poliovirus (7, 8). To develop

Initial R&D of COVID-19 vaccine on Jan 28, 2020

Phase I/II trials were approved by NMPA on April 13, 2020

Phase I and II commenced on April 16, and May 3, 2020

Efficacy result on rhesus model published in *Science* on May 6, 2020

Phase III was approved by Brazil authority on July 3, and has started on July 21, 2020.

Started in Indonesia on August 11, 2020.

Also started in Turkey and Chile.

Phase I clinical trial in Healthy Adults Aged 18-59

Schedule (Day)	Medium dose	High dose	Placebo	Total	Blood collection (Day)	Antibody detection/ T cell response (Day)	Lab index/ Inflammatory factors (Day)
0,14	24		12	36	0(-14),7,14,21,28,194	0(-14),7,14*,21,28*,194	0(-14),7,14,21
		24	12	36	0(-14),7,14,21,28,194	0(-14),7,14*,21,28*,194	0(-14),7,14,21
0,28	24		12	36	0(-14),7,28,35,42,56,208	0(-14),28*,35,42*,56,208	0(-14),7,28,35
		24	12	36	0(-14),7,28,35,42,56,208	0(-14),28,35,42*,56,208	0(-14),7,28,35
Total	48	48	48	144			

Phase II clinical trial in Healthy Adults Aged 18-59

Vaccination schedule (Day)	Medium Dose	High Dose	Placebo	Total	Antibody detection (Day)
0,14	120	120	60	300	0,14,28,194
0,28	120	120	60	300	0,28,56,208
Total	240	240	120	600	

Phase I/II Clinical Study Results - Safety & Immunogenicity

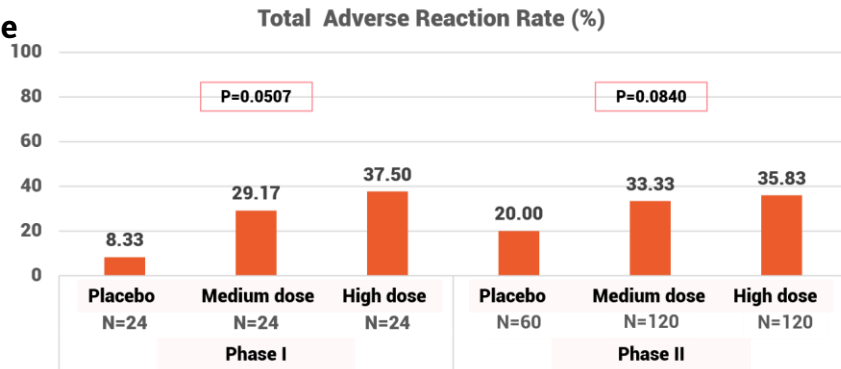
Safety

0, 14 Days Schedule

ADR with highest incidence:

Pain at the injection site (19.35%)

Second highest:
Fatigue (5.91%)

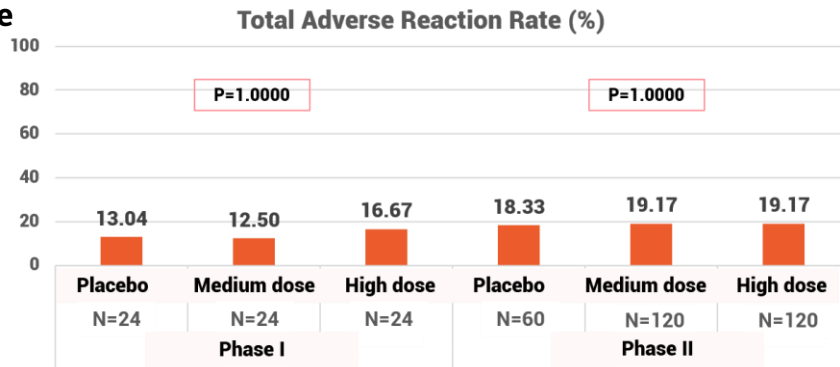


0, 28 Days Schedule

ADR with highest incidence:

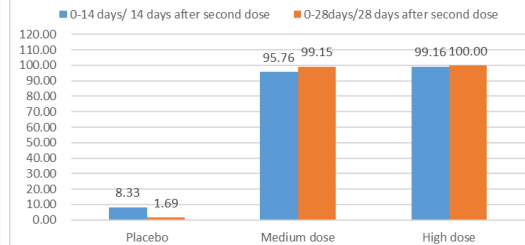
Pain at the injection site (10.78%)

Second highest:
Fatigue (4.31%)

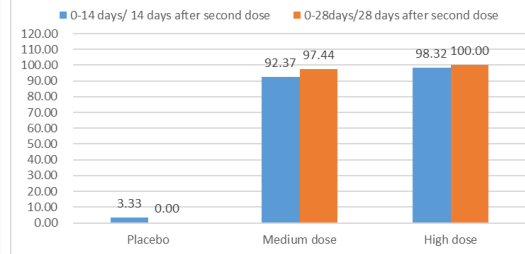


Immunogenicity

Sero-postive rate($\geq 1:4$)

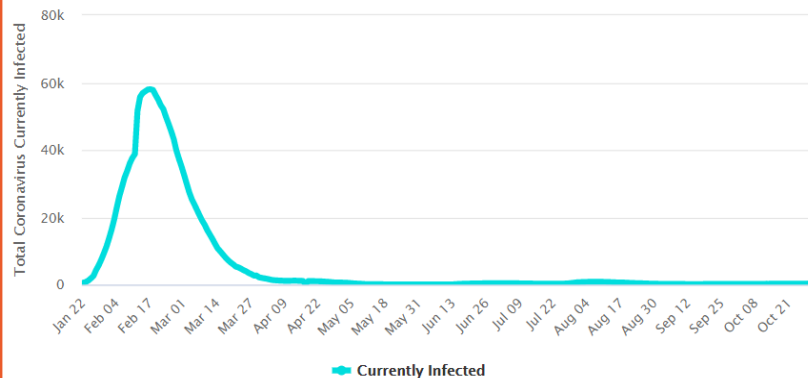


Sero-postive rate($\geq 1:8$)



Difficulties in Further Development

Active COVID-19 Cases in China



Few COVID-19 Cases in China



Limited Production Capacity

Collaboration

Collaboration on SARS-CoV-2 Vaccine (Vero Cell), Inactivated

How to choose our partners?

Considerations in choosing a partner

COVID-19 cases

The country must have enough active COVID-19 cases.

Population

The country should have a huge population.

Experience

The company should have experience on vaccines.

Our partners



In Brazil



In Indonesia

- Instituto Butantan is located in São Paulo, Brazil.
- It supplies the Brazilian public health system with 90% of the sera and 65% of all vaccines distributed in the country.
- Instituto Butantan manufactures 100% of the influenza vaccine doses used by the Brazilian Ministry of Health.
- It is set to be a global player in the development and manufacturing of the most advanced and needed biological products.

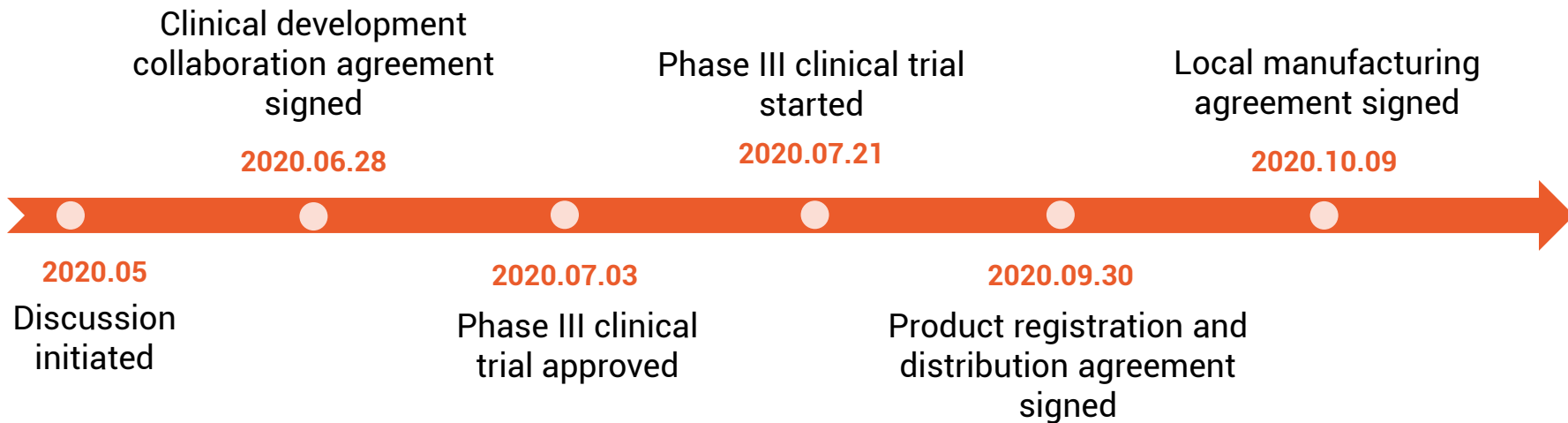


- Bio Farma is a state-owned company based in Bandung and the only local vaccine manufacturer in Indonesia.
- Bio Farma provides a wide of range of vaccines, including virus vaccines (against measles, polio, Hepatitis B) and bacterial vaccines (DTP, DT, TT, BCG vaccine).



Strategic collaboration between Sinovac and Butantan

Timeline for collaboration



Clinical trial

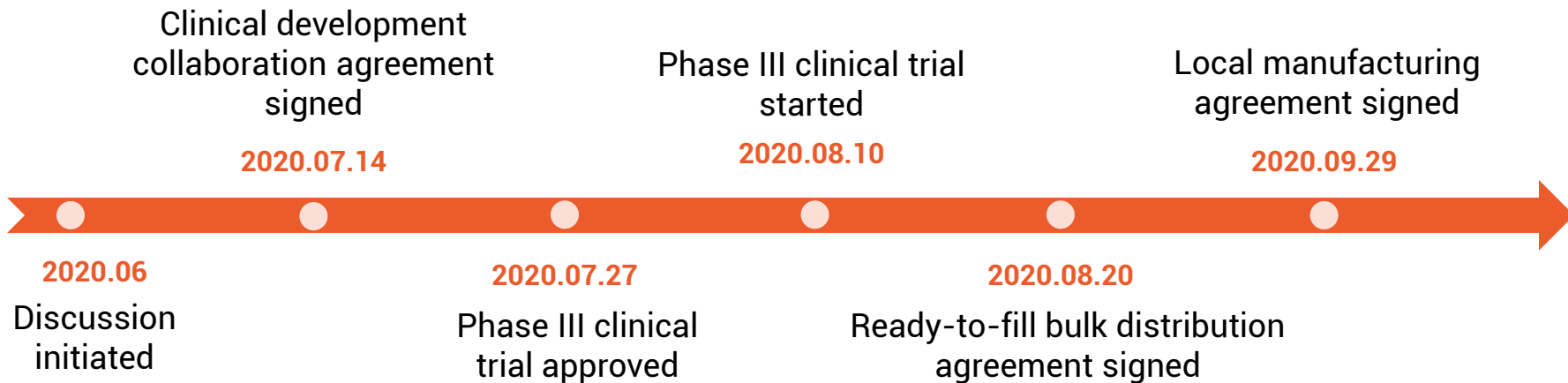
- A phase III double-blind, randomized, placebo-controlled clinical trial for the evaluation of efficacy and safety in health professionals
- 13,000 subjects in 22 sites, 0, 14 days schedule

Vaccine supply and technology transfer

- Sinovac will supply to Butantan 46 million doses of ready-to-fill bulk and finished product

Strategic collaboration between Sinovac and Bio Farma

Timeline for collaboration



Clinical trial

- Observer-blind, randomized, placebo-controlled two arms parallel groups, prospective intervention study
- 1,620 subjects, 0, 14 days schedule.

Technology transfer

- Sinovac will supply to Bio Farma 50 million doses of ready-to-fill bulk and finished product



Collaboration within dcvmn

The collaboration is between dcvmn members.



Complementary advantages

Butantan: strong clinical study experience and production capacity.

Bio Farma: the only vaccine company in Indonesia.



Pandemic control

China, Brazil and Indonesia constitute 24% of world population.

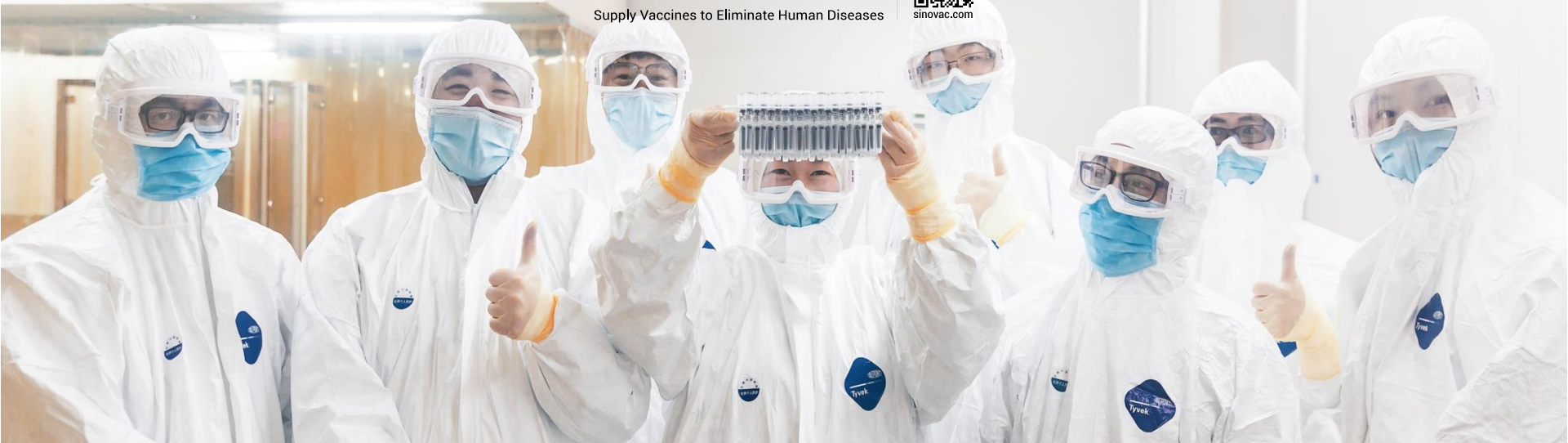
The collaboration serves to control the pandemic around the world.

SINOVAC

Supply Vaccines to Eliminate Human Diseases



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SINOVAC : Supply Vaccines to Eliminate Human Diseases



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