



  
**BHARAT**  
BIOTECH

[www.bharatbiotech.com](http://www.bharatbiotech.com)



**CORPORATE PRESENTATION**



*Lead Innovation*

## BHARAT BIOTECH - OVERVIEW



- Established : 1996
- Promoters : Dr. Krishna & Ms. Suchitra Ella
- Business Line : Vaccines and Bio-therapeutics
- First Project : Hepatitis B Vaccine - US \$ 3.5 Mn
- Investment : > US \$ ~500Mn
- Personnel : >1,500 resources including scientists
- Accreditations : WHO PQ. ANVISA, KFDA, PIC(S), other Countries

# BHARAT BIOTECH - OVERVIEW

## VISION



To offer affordable, safe and effective healthcare solutions to combat mankind's most dreaded illnesses, and to thus eradicate or at least control their occurrence in the years to come.

## MISSION



We seek to address the health care needs of the 8 billion people in the emerging markets by driving innovation and being a frontrunner in research and development of new vaccines and bio-therapeutics.



Product portfolio of **19 vaccines** and 4 Biotherapeutics



Intellectual property of more than **215 global patents**



**9 billion doses** of vaccines delivered & counting



Exports to over **125 countries**



**4 WHO** Pre-qualified vaccines



World's first WHO **PQ Typhoid Conjugate Vaccine**



World's first **PQ Rotavirus vaccine** from a naturally attenuated strain



Development of several novel vaccines.



First in the world to file **global patents** for Zika & Chikungunya



Global collaborations – **BMGF, PATH, WHO, GAVI, UMB, UWM, Oxford University, NIH, CDC & ICMR, DBT,** other reputed institutions.

5 cities / ~ 3000 Personnel / ~ \$ 300 million revenues



# FOUNDER'S PROFILE

**Dr. Krishna M. Ella**  
Co-Founder & Executive Chairman  
Bharat Biotech International Ltd.



Recipient of  
Rotary International  
Fellowship from Rotary  
Foundation - 1985

PhD from University of Wisconsin,  
Madison -1987-1992

Ex-Faculty,  
University of  
South Carolina

Developed innovative research-  
based company - Bharat Biotech  
International Limited

A recipient of more than  
100 National & International  
awards, including India's 3rd  
highest civilian award –  
PADMA BHUSHAN in 2022

Distinguished Alumni Award  
from the University of  
Wisconsin, 2022

Member - PM's Scientific  
Advisory Council, Govt. of India

# FOUNDER'S PROFILE

**Mrs. Suchitra Ella**  
Co-Founder & Managing Director  
Bharat Biotech International Ltd.

Graduate from  
University of Madras in  
Economics & Philosophy

Specialized in  
Business & Marketing  
Operations at  
UWCU, Wisconsin

Past Chairperson of CII  
Southern Region for 2022-23

Co-Founded Ella Foundation  
and Krishna & Suchitra Ella  
Foundation for Academic  
Research, Training, Culture,  
Social & Health Empowerment

Returned to  
India in 1998 to start  
Bharat Biotech  
International Ltd





**PADMA BHUSHAN  
2022**



**FOUNDERS OF  
BHARAT BIOTECH  
CONFERRED  
WITH THE  
THIRD-HIGHEST  
CIVILIAN AWARD**



**PADMA BHUSHAN  
ON 28<sup>TH</sup> MARCH 2022**

# FOUNDER'S PROFILE

## Meet the man behind India's Genome Valley

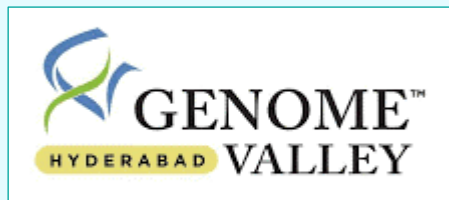
Last updated on: January 7, 2011 14:23 IST



Image: Dr Krishna M Ella, scientist-turned-entrepreneur and founder, Bharat Biotech.  
Photographs: Courtesy, Bharat Biotech

Shobha Warrior in Hyderabad

**Largest Cluster in India  
Proactive Approach  
from AP & Telangana  
State Governments**



**University of Wisconsin Madison**

**Honorary Doctorate – May 2022**





# OUR PRODUCTS

# VACCINES FOR ALL

## Children



S. No.	Vaccine	Brand
1	Hib	BioHib®
2	OPV Monovalent Type-1	BIOPOLIO M1™
3	OPV Monovalent Type-3	BIOPOLIO M3™
<b>4</b>	<b>OPV Bivalent</b>	<b>BIOPOLIO B1/3®</b>
5	DPT; TT, DT	Comvac 3™
6	DPT+ Hep B	Comvac 4-Hb®
7	DPT+ HiB	Comvac 4®
8	DPT+ Hep B + Hib	Comvac 5®
9	Influenza	HNVAC®
10	JE	Jenvac®
11	Hep B	Revac B+®
12	Hep B	Revac B mcf®
13	Rotavirus	<b>ROTAVAC®</b>
14	Rotavirus	<b>ROTAVAC 5D®</b>
15	Typhoid	Typbar®
16	Typhoid	<b>Typbar TCV®</b>
17	COVID-19	COVAXIN®
18	COVID-19	INCOVACC®
19	Rabies	INDIRAB®

## Children & Adults



S. No.	Vaccine	Brand
1	Influenza	HNVAC®
2	Rabies	INDIRAB®
3	JE	Jenvac®
4	Hep B	Revac B+®
5	Typhoid	Typbar®
<b>6</b>	<b>Typhoid</b>	<b>Typbar TCV®</b>
7	COVID-19	COVAXIN®
8	COVID-19	INCOVACC®

## Travelers

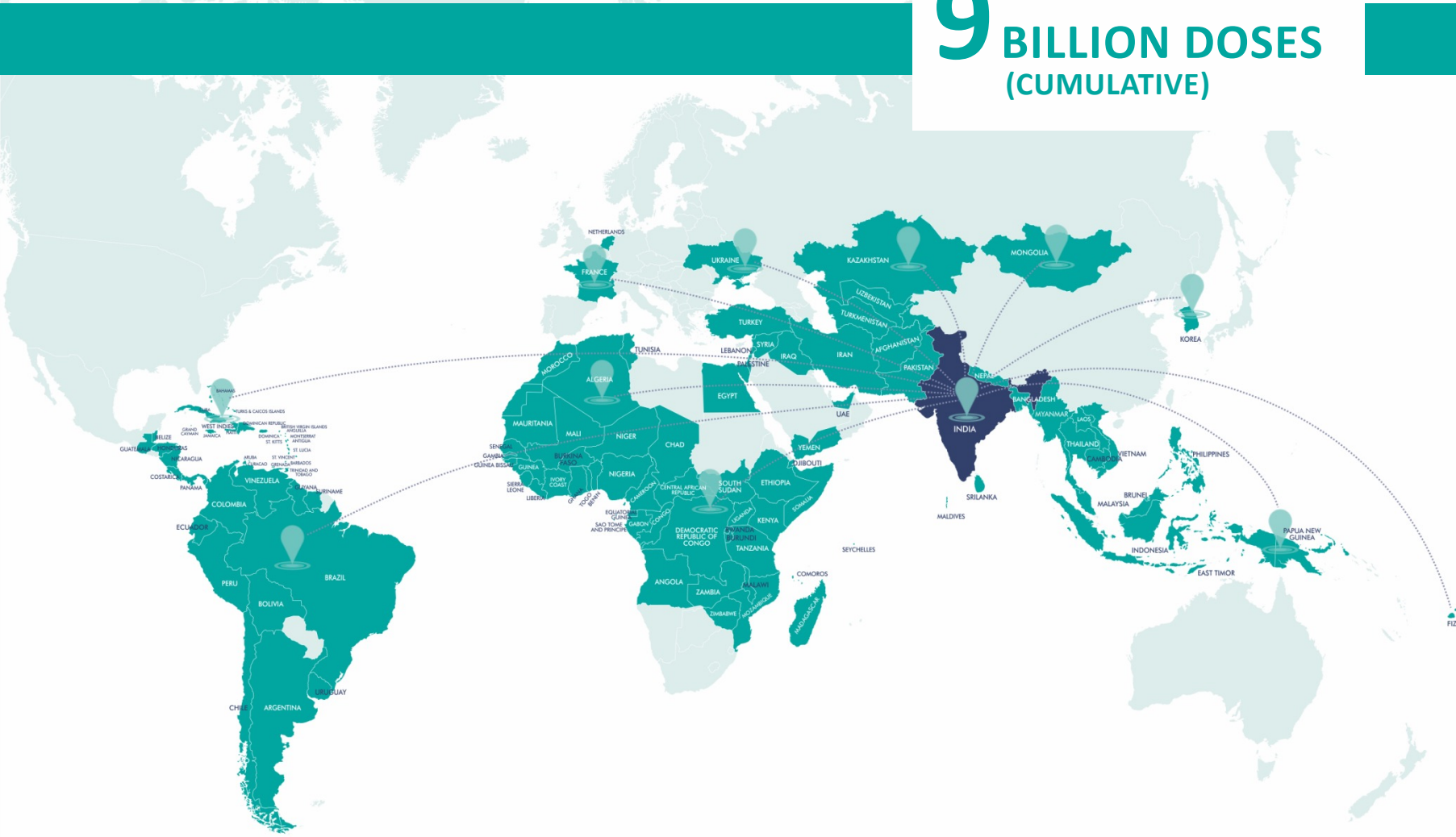


S. No.	Vaccine	Brand
1	Influenza	HN VAC®
2	JE	Jenvac®
3	Typhoid	Typbar®
4	Typhoid	<b>Typbar TCV®</b>
5	COVID-19	COVAXIN®
6	COVID-19	INCOVACC®

The WHO-Prequalified vaccines are highlighted

# GLOBAL PRODUCT REACH

**9** BILLION DOSES  
(CUMULATIVE)



# INDO – US – Vaccine Action Programme



**30**  
YEARS

**15**  
CLINICAL  
TRIALS

**~250,000**  
INFANTS



# ROTAVAC<sup>®</sup>

**6**  
PATENTS

**20**  
PUBLICATIONS

**6**  
COUNTRIES



**ROTAVIRUS VACCINE DEVELOPMENT PROJECT**  
A 16-Member Worldwide Public Private Partnership Collaboration

# Innovation – 5 drops

## 3 dose schedule : Superior Efficacy



5 lakh doses of ROTAVAC®  
1 Truck

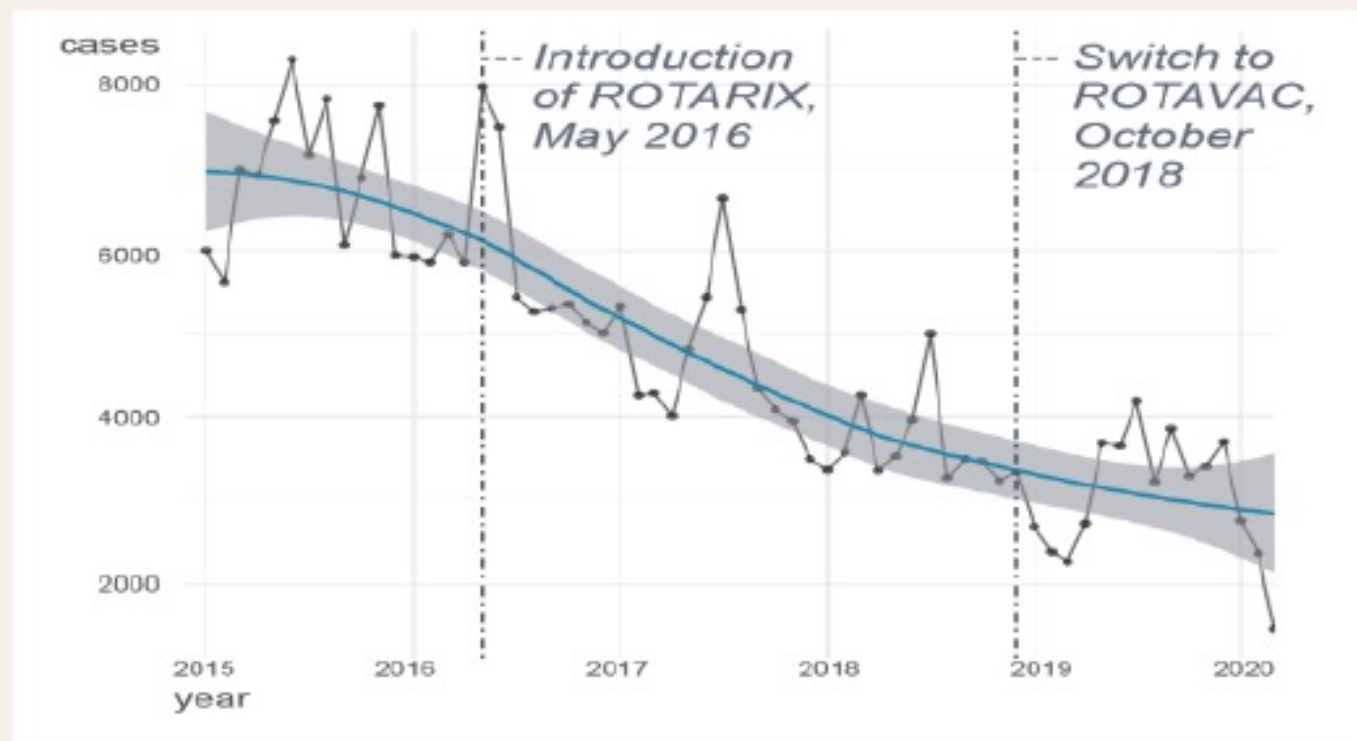


5 lakh doses of other Rotavirus vaccines  
5 Trucks

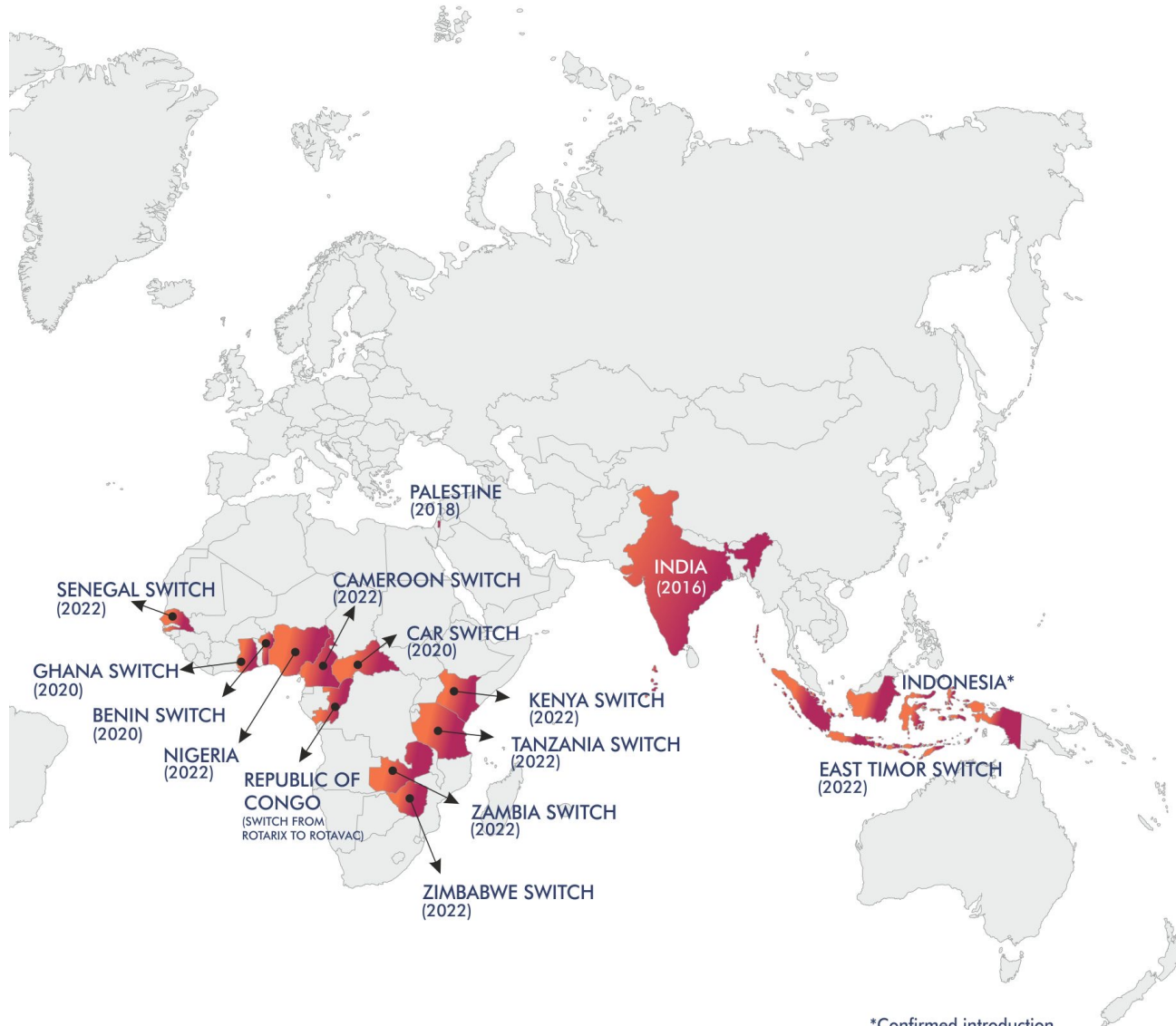


# ROTAVAC – Palestine Introduction

**Figure 1.** All-cause diarrhea cases by month and year in Gaza, January 2015 to March 2020.

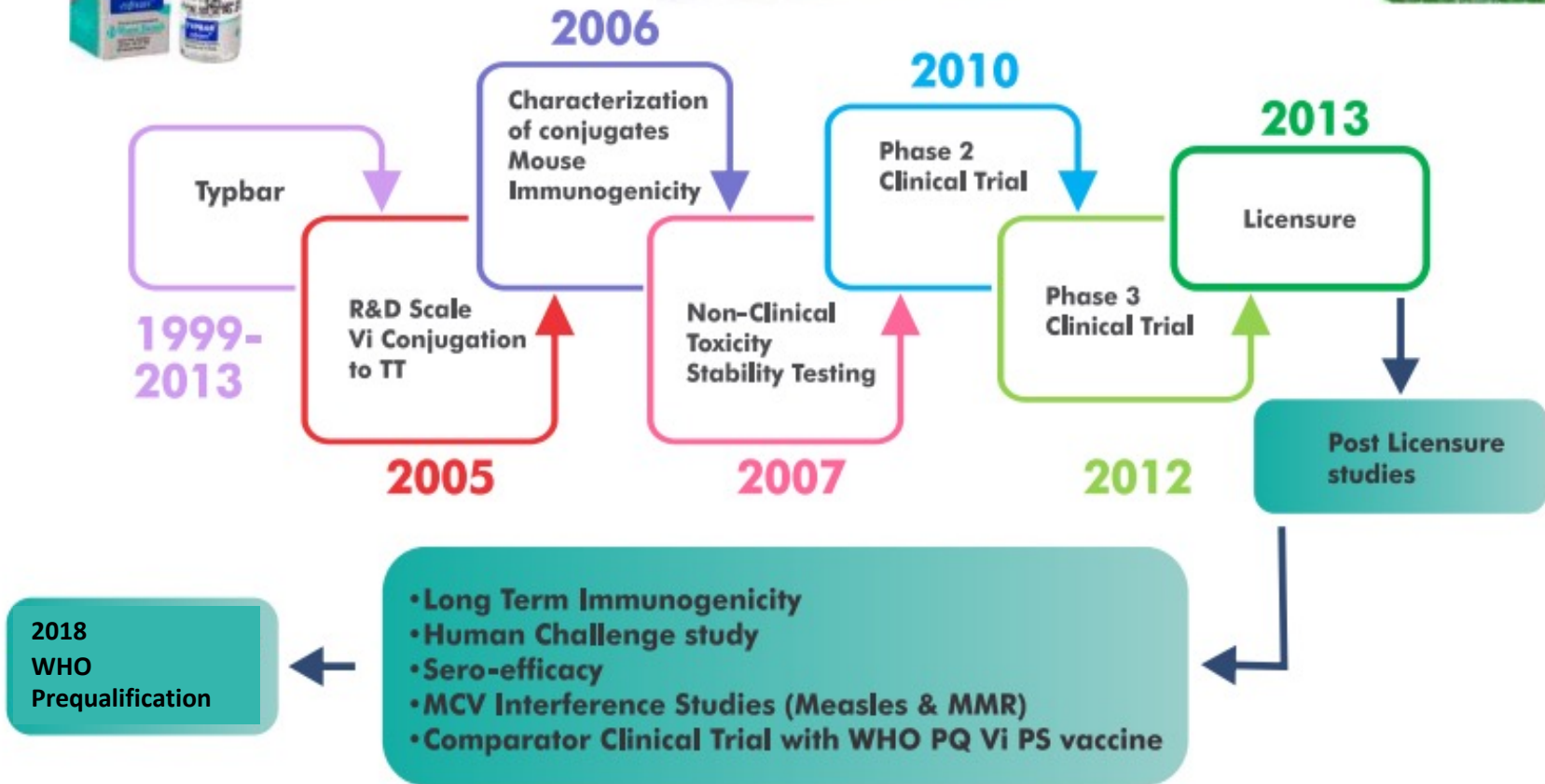


# ROTAVAC Switch Wave : > 300 million doses supplied



\*Confirmed introduction

• **DEVELOPMENTAL MILESTONES – TYPBAR TCV®**





**Recommended  
for 6 months of  
age and above**

**A single dose of  
Typbar TCV®  
(25µg/05mL) elicits a  
robust immune  
response of 97.7%,  
with four-fold  
seroconversion across  
all age groups beyond  
6 months of age**

**Co-administration  
of Typbar TCV®  
with MCV/MMR  
vaccine showed  
non-interference,  
proven in Indian  
and Malawian  
children**

## The New York Times

### THEY SWALLOWED TYPHOID BACTERIA - ON PURPOSE

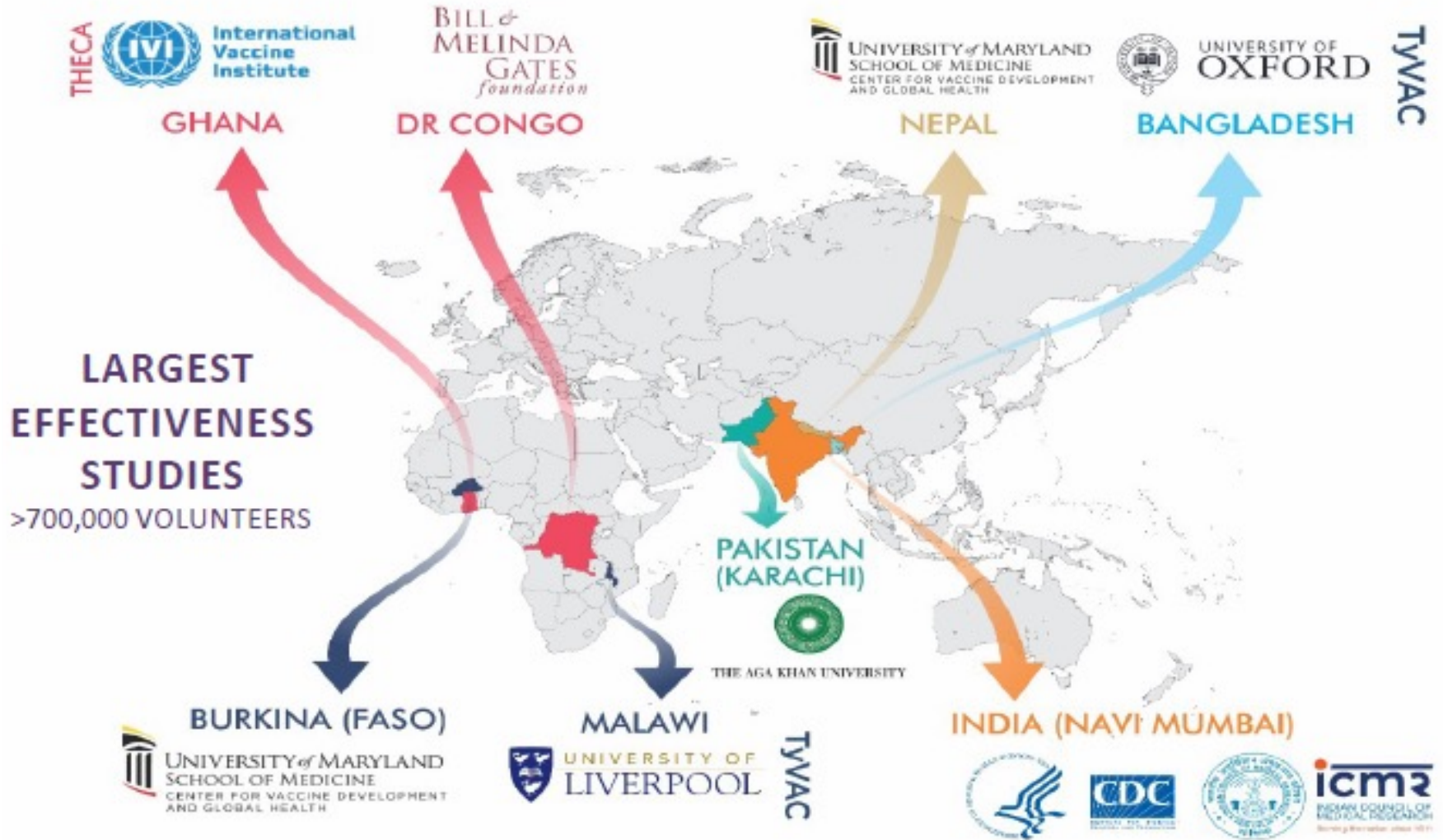
More than 100 residents of Oxford, England, took part in a trial of a new typhoid vaccine.

Typbar TCV® is the only effective vaccine that is also safe for infants, and is already used widely in India.































*A volunteer drinks a solution containing typhoid bacteria during the vaccine trial at Oxford University.  
Pic: Andrew Testa for New York Times*

# Typbar TCV® Effectiveness Clinical Trials Across the Globe



# COVAXIN<sup>®</sup>

## PUBLICATIONS

PRECLINICAL TRIALS	CLINICAL TRIALS	NEUTRALIZATION OF VARIANTS
 <p>Hamster Efficacy Study against Delta and Omicron</p> 	 <p>Paediatric Study 2 - 18 years</p> <p>THE LANCET Infectious Diseases</p>	 <p>Alpha, Beta and Delta (B.1.1.7, B.1.351 &amp; B.1.617.2 respectively)</p> 
 <p>Preclinical Safety and Immunogenicity</p> 	 <p>Booster Dose</p> 	 <p>D614G, Delta and Omicron (NIV-770-2020, B.1.617.2 &amp; B.1.1.529 respectively)</p> 
 <p>Non-Human Primate Efficacy Study</p> 	 <p>Phase 3</p> <p>THE LANCET</p>	 <p>T-cell Response</p> 
 <p>Hamster Efficacy Study (BBV152)</p> 	 <p>Phase 2</p> <p>THE LANCET Infectious Diseases</p>	 <p>Kappa (B.1.617.1)</p> 
	 <p>Phase 1</p> <p>THE LANCET Infectious Diseases</p>	 <p>Beta and Delta (B.1.351 and B.1.617.2 respectively)</p> 
		 <p>Gamma (P2-B.1.1.28)</p> 
		 <p>Alpha (B.1.1.7)</p> 

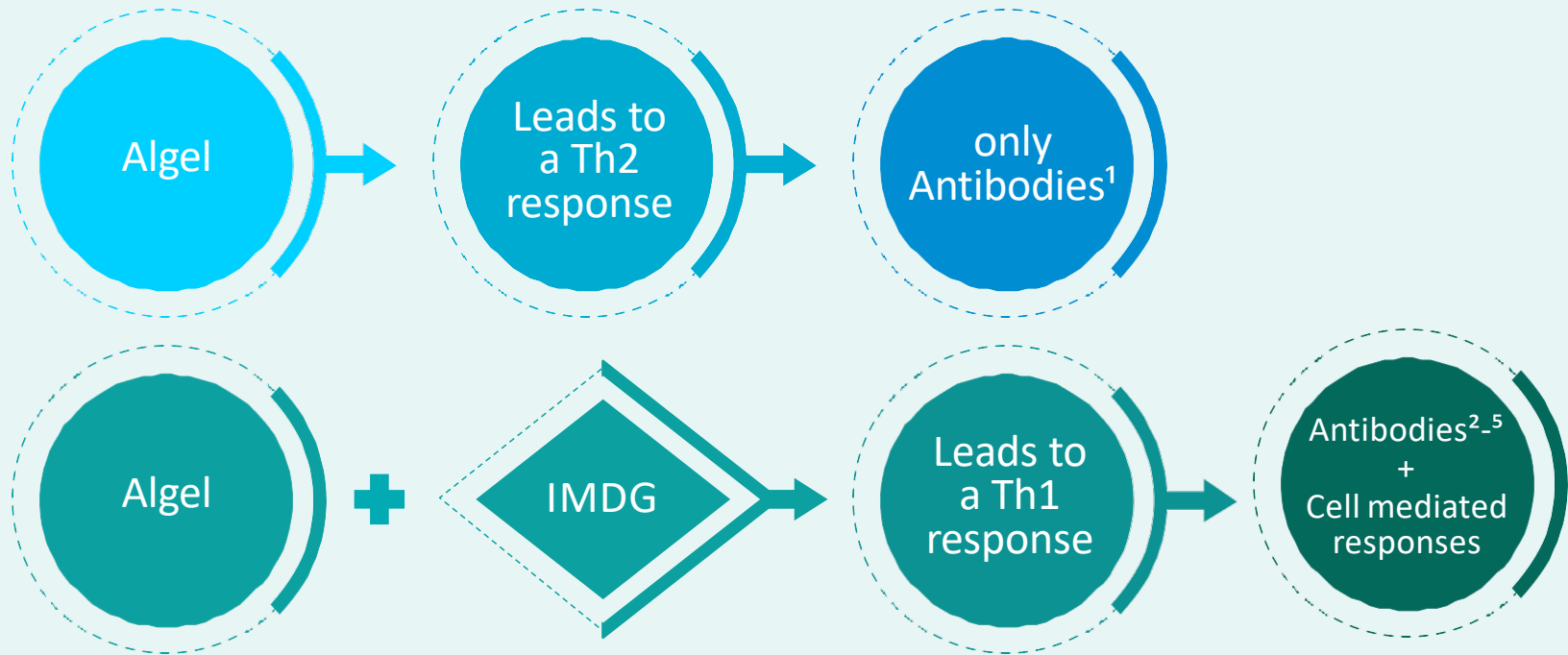


COMMITTED TO  
DATA TRANSPARENCY



# COVAXIN® DEVELOPED WITH A NOVEL ADJUVANT

## ALGEL Vs ALGEL-IMDG

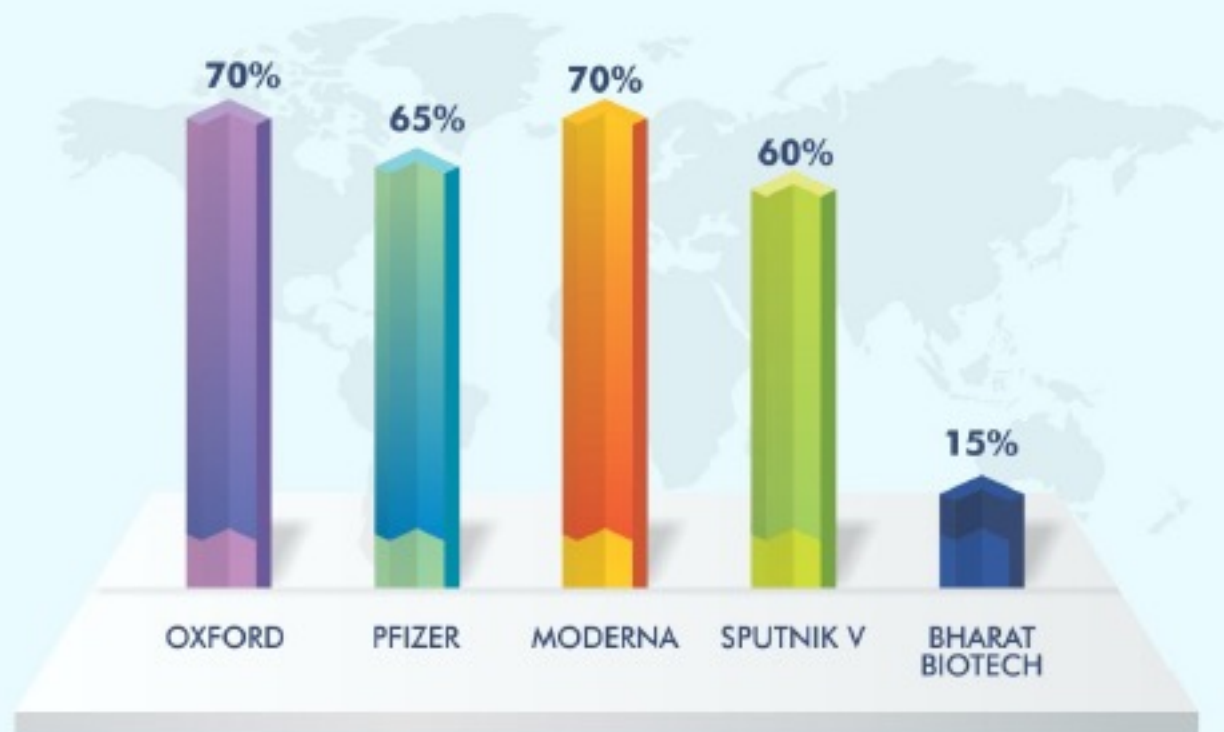


**COVAXIN : > 6 ug / Dose**

**Other inactivated vaccines : 3-4 ug / Dose**

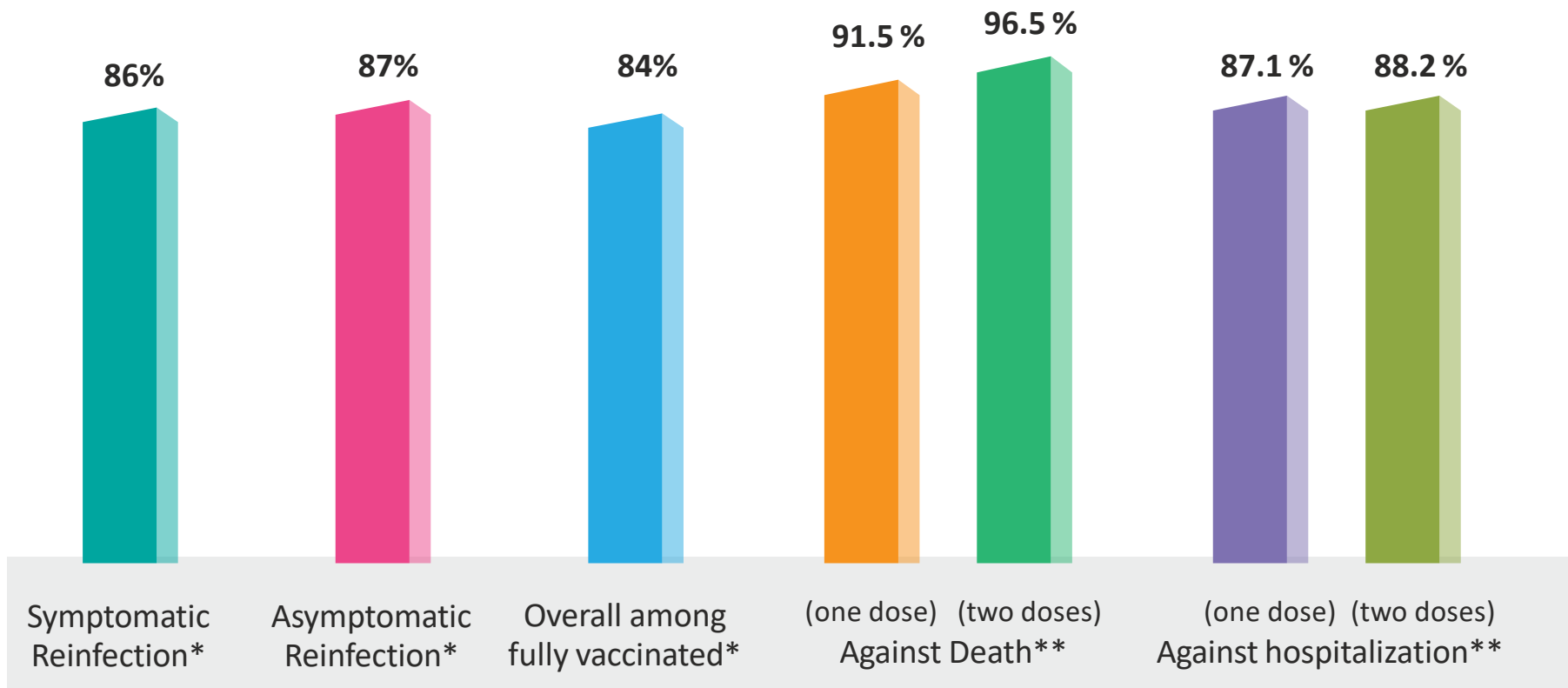
## COVID-19 Vaccines – Adverse Events

### SIDE-EFFECTS FROM COVID-19 VACCINE TRIALS



**COVAXIN**  
The best safety  
profile of  
COVID vaccines

# VACCINE EFFECTIVENESS



## References:

\* Malhotra S et al., SARS-CoV-2 Reinfection Rate and Estimated Effectiveness of the Inactivated Whole Virion Vaccine BBV152 Against Reinfection Among Health Care Workers in New Delhi, India. JAMA Netw Open. 2022 Jan 4;5(1): e2142210. doi: 10.1001/jamanetworkopen.2021.42210.

\*\* Desai D et al., Effectiveness of an inactivated virus-based SARS-CoV-2 vaccine, BBV152, in India: a test-negative, case-control study. Lancet Infect Dis. 2021 Nov 23:S1473-3099(21)00674-5. doi: 10.1016/S1473-3099(21)00674-5.

Bharat Biotech's

**iNCOVACC**<sup>®</sup>

world's first Intra Nasal vaccine  
receives approval for emergency use in India





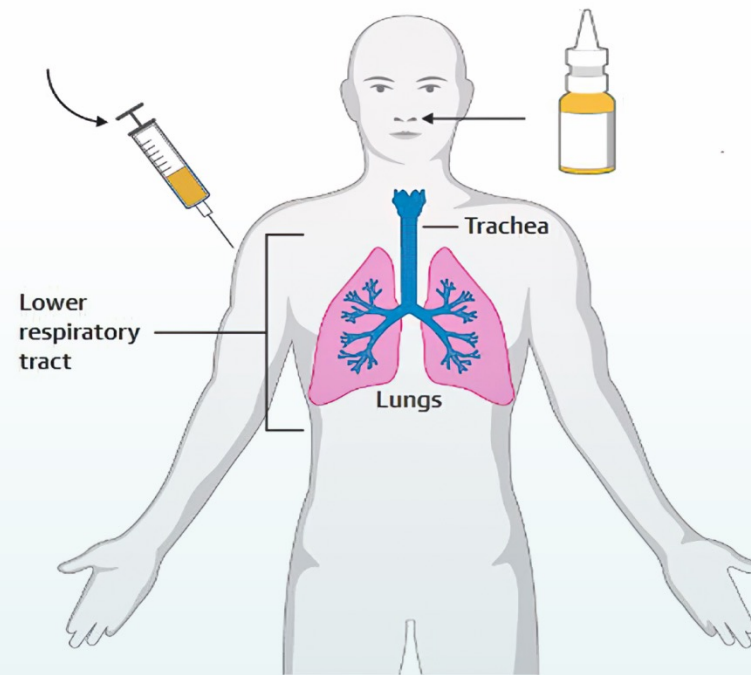
## INTRAMUSCULAR Vs INTRANASAL VACCINATION

### Intramuscular vaccination

Injected vaccines stimulate a response in the systemic immune system. They are effective at protecting against serious illness and death but do not stop people becoming infected.

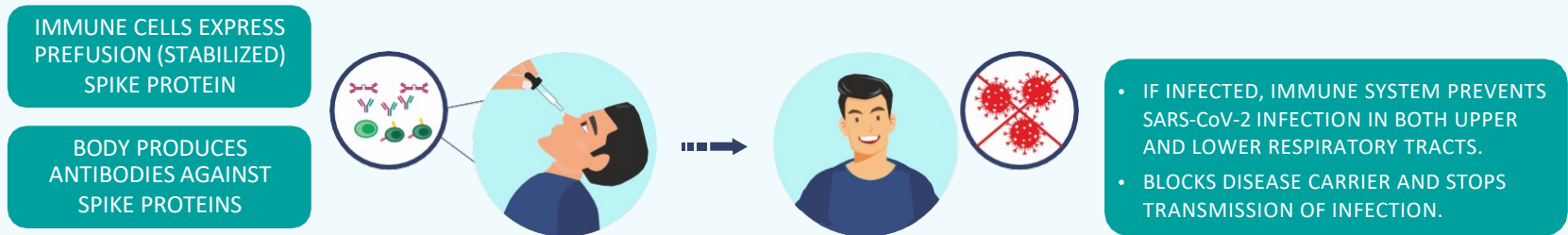
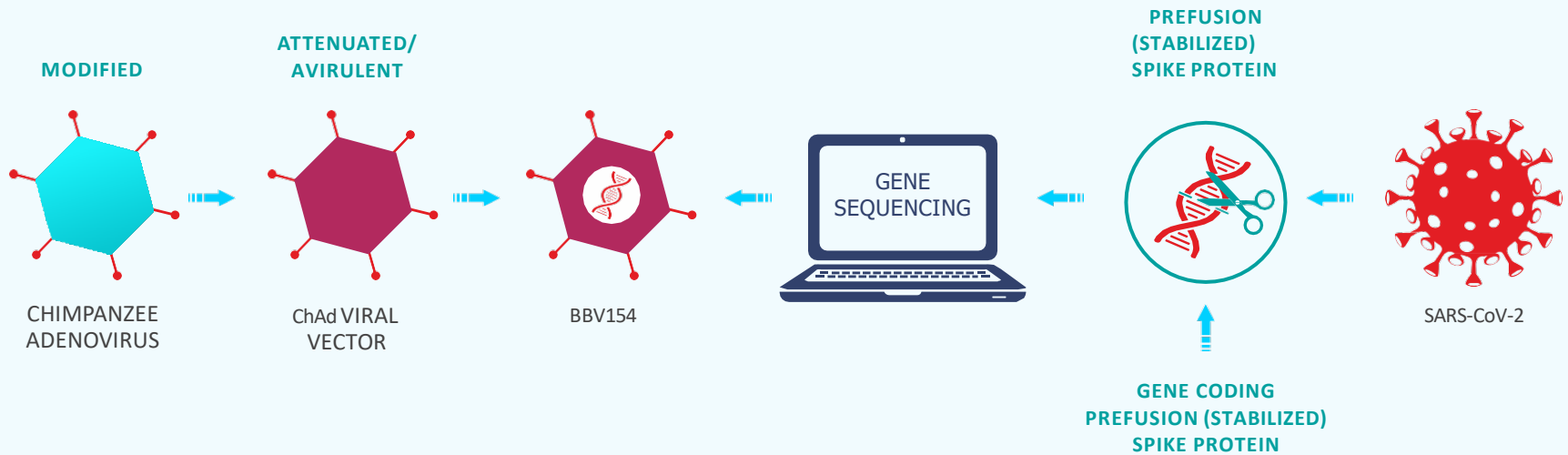
### Intranasal vaccination

Nasal vaccines primarily target mucosal immune cells, which are the first line of defence against respiratory infection. Scientists hope that these vaccines could prevent people from becoming infected with Covid in the first place.



<https://www.theguardian.com/world/2022/aug/20/covid-nasal-vaccines-scientists-hope-help-halt-transmission>

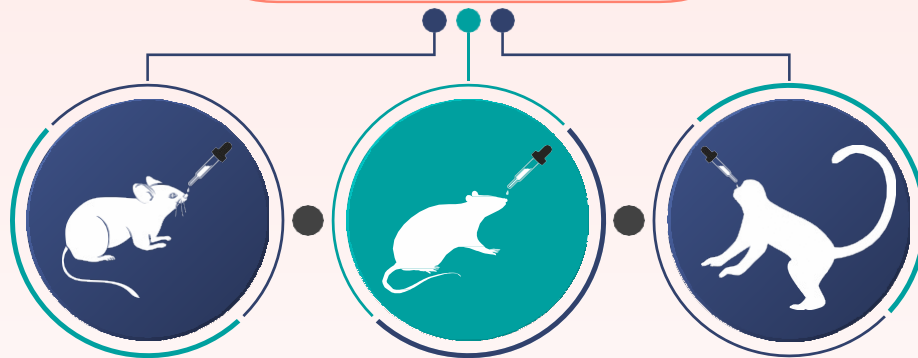
# BBV154 – PRODUCT DESIGN AND MECHANISM OF ACTION



# ONLY COVID VACCINE TO UNDERGO THREE ANIMAL CHALLENGE STUDIES

(Funded by NIH, conducted by Washington University)

## ANIMAL PROTECTIVE STUDIES



Mice

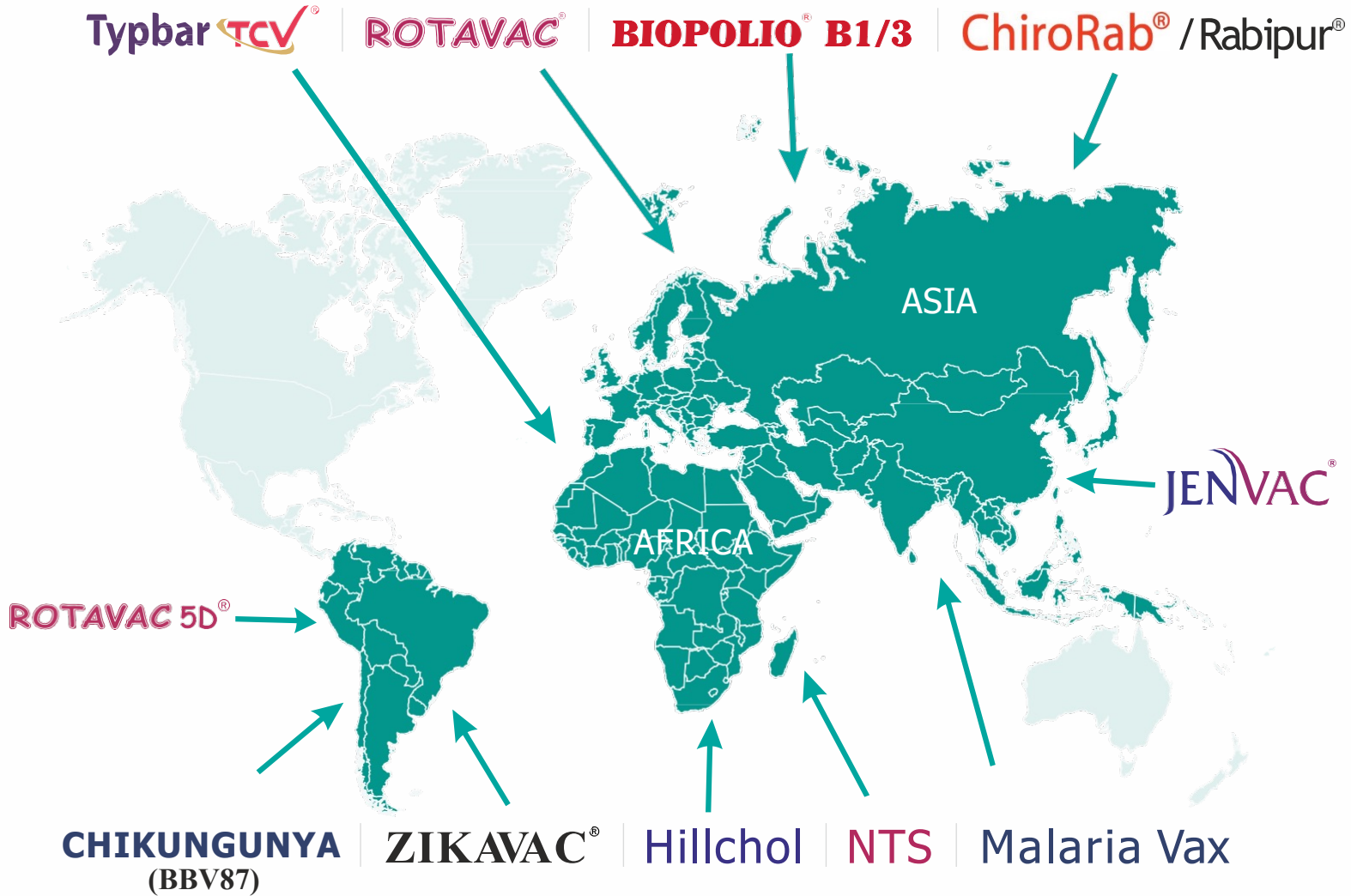
Hamsters

Rhesus Macaques



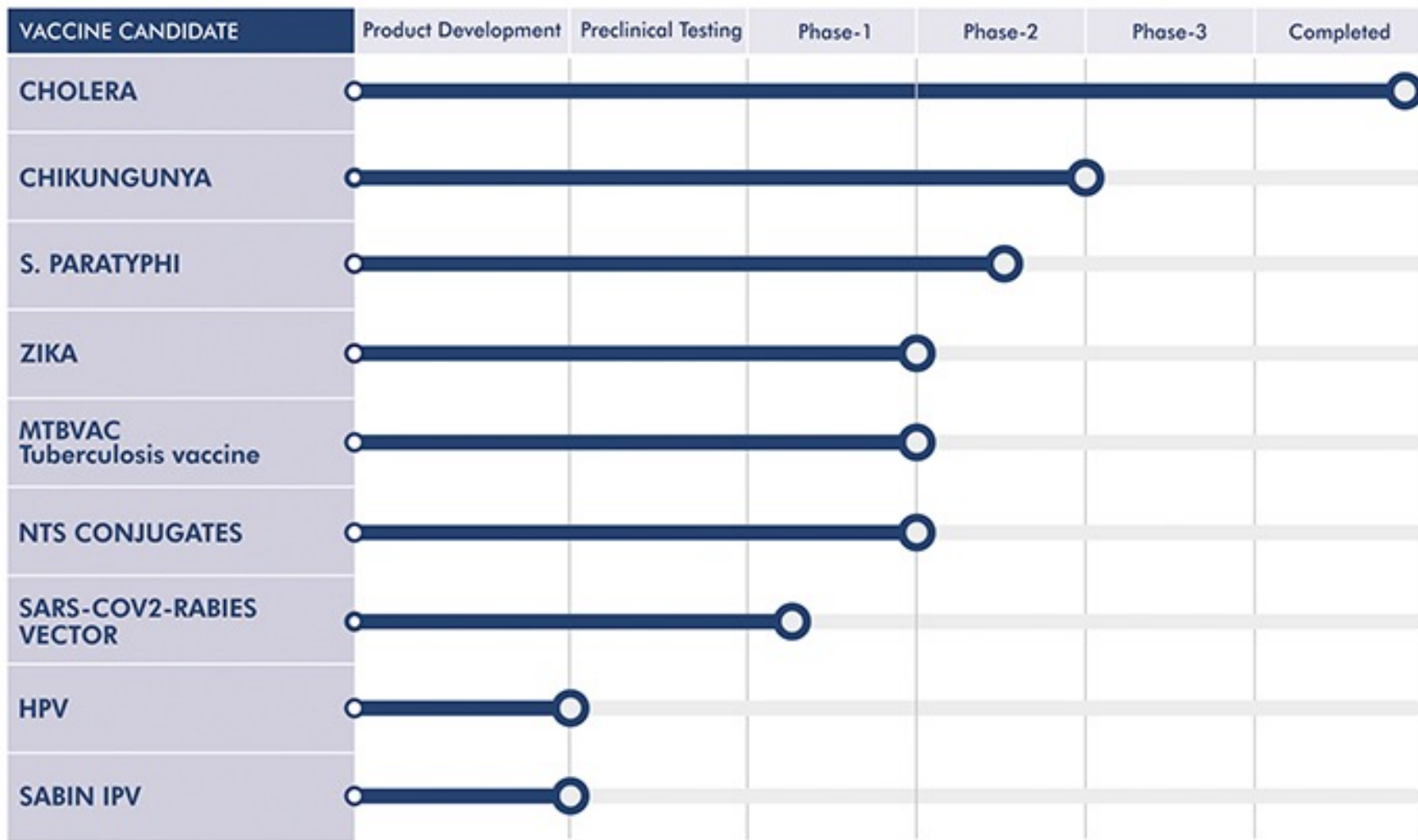
Vaccine induced antibodies  
decreased viral clearance in the  
upper & lower airway

# WORLD'S LARGEST MANUFACTURER



# R&D PIPELINE

# OUR PRODUCT PIPELINE





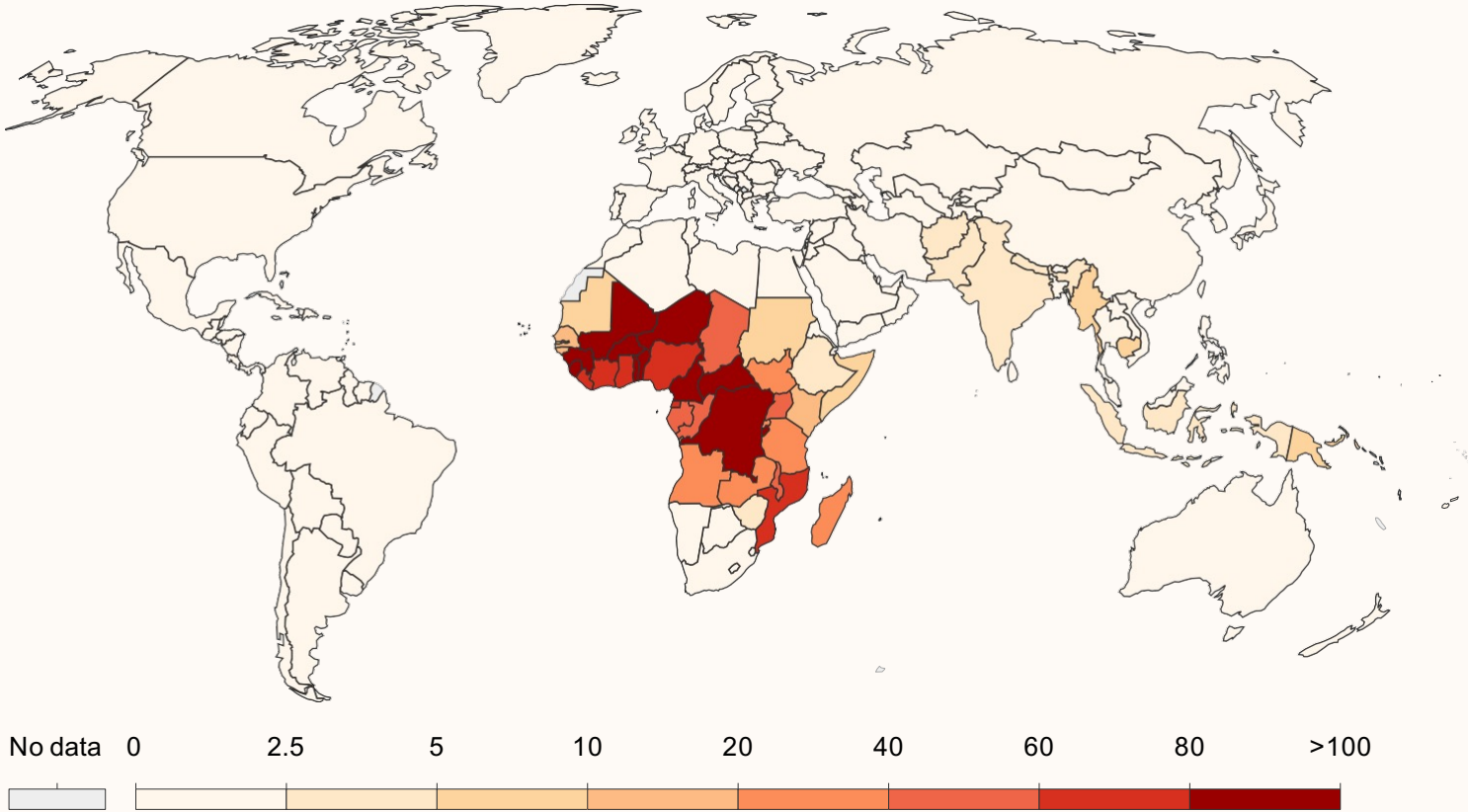
# Hillchol<sup>®</sup> Next-Gen Oral Cholera Vaccine

In collaboration with



# MALARIA VACCINE : GLOBAL DISEASE BURDEN

## RTSS – TECHNOLOGY TRANSFER TO BHARAT BIOTECH





# MTBVAC : LIVE RATIONALLY - ATTENUATED TB VACCINE



**Universidad**  
Zaragoza



TuBerculosis Vaccine Initiative



# NTS – NON-TYPABLE SALMONELLA

## A PUBLIC- PRIVATE PARTNERSHIP



**welcome**trust

 UNIVERSITY of MARYLAND  
MEDICAL CENTER

**\$ 4M Grant to University of  
Maryland & Bharat Biotech**

Completed Phase- 1 in **Baltimore,**  
Maryland, US

Mali phase 2 study

# BBV106 : Paratyphi A : Oral vaccine



- Partnership to develop ...
  - Oral vaccine
    - Human challenge studies @ Oxford University – 2022
- dsgfdsg

# BBV 87 : Chikungunya Virus Vaccine



- First in the world to develop a Chikungunya Virus Vaccine
- First to get global patent
- Clinical Trials in process in India, Columbia, Panama, Cost Rica, Guatemala, Thailand



~ \$14 Million Funding

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
6 March 2008 (06.03.2008)

PCT

(10) International Publication Number  
**WO 2008/026225 A2**

(51) International Patent Classification  
A61K 29/09 (2006.01)

Bharat Biotech International Limited, Genome Valley, Turkapally, Shamserpet, Hyderabad 500 078 (IN).

(22) International Application Number  
PCT/IN2007/000343

(74) Agents: BALASUBRAHMANYAM, Lakshmi et al., Corporate Law Group, 1306, 13th Floor, Kailash Building 25, R. G. Marg, 110 001 New Delhi (IN).

(23) International Filing Date: 31 August 2007 (31.08.2007)

(20) Priority Date: 1 September 2006 (01.09.2006) IN

(24) Filing Language: English

(26) Publication Language: English

(54) Title: A VACCINE FOR CHIKUNGUNYA VIRUS INFECTION

(71) Applicant (for all designated States except US): BHARAT BIOTECH INTERNATIONAL LIMITED (IN); Genome Valley, Turkapally Shamserpet, Hyderabad 500 078 (IN).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 December 2012 (20.12.2012)

WIPO | PCT

(10) International Publication Number  
**WO 2012/172574 A1**

(51) International Patent Classification:  
A61K 29/72 (2006.01) C07K 14/08 (2006.01)

(25) Filing Language: English

(22) International Application Number:  
PCT/IN2012/000432

(26) Publication Language: English

(23) International Filing Date:  
18 June 2012 (18.06.2012)

(30) Priority Date:  
2007/CH/2011 17 June 2011 (17.06.2011) IN

(54) Title: VACCINE COMPOSITION COMPRISING AN INACTIVATED CHIKUNGUNYA VIRUS STRAIN

(71) Applicant (for all designated States except US): BHARAT BIOTECH INTERNATIONAL LIMITED (IN); Genome Valley, Turkapally, Shamserpet, Hyderabad 500078 (IN).

# BBV 121 : Zika Virus Vaccine

Phase I completed

## (12) International Application Status Report

Report generated on: 15 July 2016 (15.07.2016)

**(10) Publication number:**

**(43) Publication date:**

**(26) Publication language:**

English (EN)

**(21) Application Number:**

DCT/IN2016/050241

**(22) Filing Date:**

15 July 2016 (15.07.2016)

**(25) Filing language:**

English (EN)

**(31) Priority number(s):**

3652/CHE/2015 (IN)

**(31) Priority date(s):**

16 July 2015 (16.07.2015)

**(31) Priority status:**

**(51) International Patent Classification:**

**(71) Applicant(s):**

BHARAT BIOTECH INTERNATIONAL LIMITED [IN/IN]; Genome Valley, Turkapally, Shameerpet, Hyderabad 500078 (IN)  
*(for all designated states)*

**(72) Inventor(s):**

SUMATHY, Kandaswamy; Bharat Biotech International Limited, Genome Valley, Turkapally, Shameerpet, Hyderabad 500078 (IN)

ELLA, Krishna Murthy; Bharat Biotech International Limited, Genome Valley, Turkapally, Shameerpet, Hyderabad 500078 (IN)

# CLINICAL TRIALS CONDUCTED BY BHARAT BIOTECH ACROSS THE WORLD

  
**~100**  
CLINICAL  
TRIALS

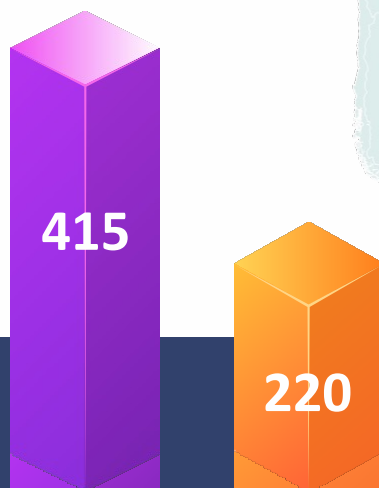
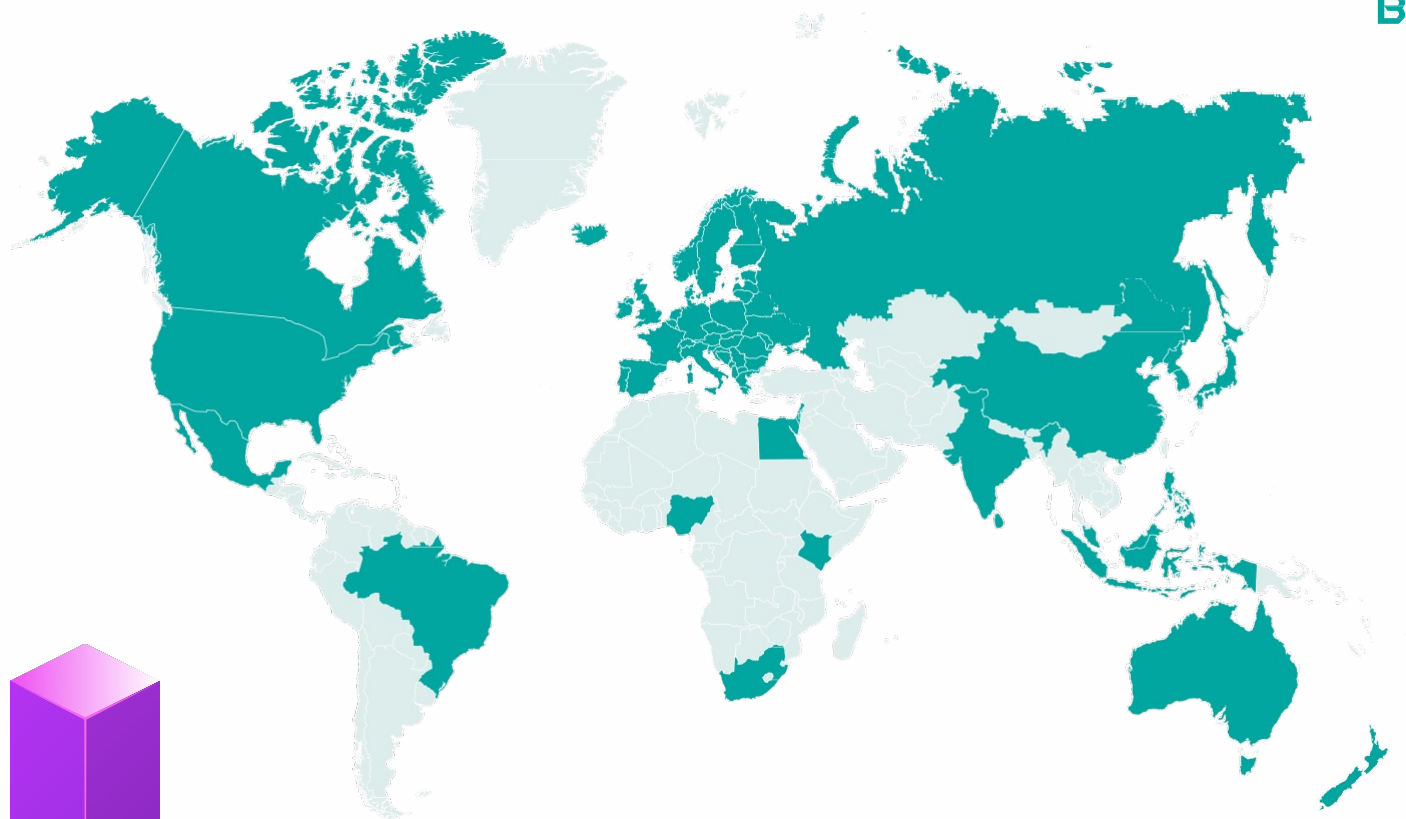
  
ACROSS  
**20**  
COUNTRIES



  
**~150,000**  
ADULTS

  
**~700,000**  
VOLUNTEERS

  
**~550,000**  
INFANTS



## PATENTS WORLDWIDE

PATENTS  
FILED

ACTIVE  
PATENTS

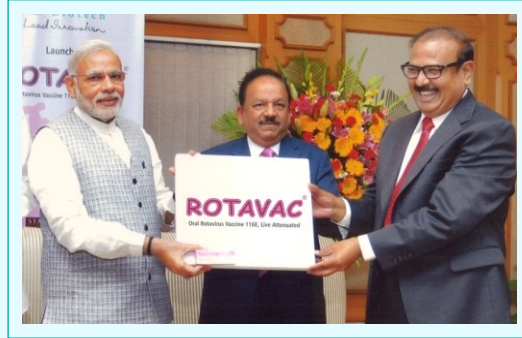
# EVENTS





**HON'BLE PRIME MINISTER'S VISIT  
TO BHARAT BIOTECH**

# EVENTS



**Shri Narendra Modi**  
Hon'ble Prime Minister of India



**Bill & Melinda Gates**  
Founders, BMGF



**Dr. Christian Loucq**  
Director-General  
International Vaccine Institute



**Michael O Levit**  
Secretary, U.S. Dept. of Health  
& Human Services



**John Kerry**  
Former Senator, USA

## EVENTS



**His Excellency Thabo Mbeki**  
Former President of South Africa



**Dr. A. P. J. Abdul Kalam**  
Former President of India, during the launch of REVAC B

Publications : > 100

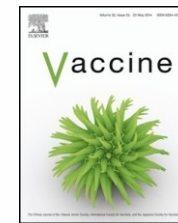
THE LANCET



THE LANCET  
Infectious Diseases



*vaccines*



GASTROENTEROLOGY  
RESEARCH



human **VACCINES**  
& IMMUNOTHERAPEUTICS



*microorganisms*



JTM JOURNAL  
of TRAVEL  
MEDICINE

# OUR PARTNERS WORLDWIDE



**BILL & MELINDA**  
*GATES foundation*



**Centre for Health Research  
and Development**  
Society for Applied Studies



**Department  
for International  
Development**



THANK YOU