Zydus
dedicated to life

# Zydus' multi-pronged approach to combat the pandemic of COVID-19



## JANUARY 2020

India's first coronavirus patient tests positive.

## FEBRUARY 2020

### 11 FEBRUARY

WHO announced that the new coronavirus disease will be known by the official name of COVID-19.

COVID-19

### 15 FEBRUARY

Zydus launches a fast tracked programme to develop a vaccine for COVID-19.

## MARCH 2020

### 08 MARCH

COVID-19 cases reported in 100 countries of the world, with more than 100,000 cases worldwide.

### 20 MARCH

One of the largest manufacturers of Hydroxychloroquine, Zydus ramps up the production from 3 metric tons to 30,000 metric tons to meet the global demand.

### 11 MARCH

**The World Health Organization declared that the "COVID-19 can be characterized as a pandemic".**

### 25 MARCH

A nation-wide lockdown was announced in India.

**APRIL 2020**

**02 APRIL** Cases reach **1 million**

The number of confirmed COVID-19 cases around the world hits 1 million.

**20 APRIL**

**Zydus explores the biologicals route to treat novel coronavirus with long acting Pegylated Interferon alpha-2b.**

# Long-acting Pegylated Interferon Alpha-2b being explored for the treatment of novel Coronavirus

Zydus has been at the forefront in exploring ways to combat COVID-19 in different ways.

**Besides the DNA plasmid vaccine, ZyCoV-D which is in Adaptive Phase I/II clinical trials, Zydus announced repurposing its biological therapy Pegylated Interferon alpha-2b. Clinical trials are now underway to see if it can be effective in treating COVID-19.**

While a research conducted in the US showed that Interferon alpha significantly reduced novel Coronavirus titers in vitro, a clinical study in China shows shortened duration of viral shedding in patients.

If the long-acting molecule like Pegylated Interferon alpha is given early on in the infection, the patient suffering from COVID-19 will have a significant benefit as the viral load is reduced, lesser IL-6 is produced and virus eliminating specific immune response is generated.

With trials underway in Mexico, Zydus is also working with USFDA to open an Investigational New Drug (IND) filing for Pegylated Interferon alpha-2b and exploring the possibility for “Compassionate Use Program”.

**MAY 2020**

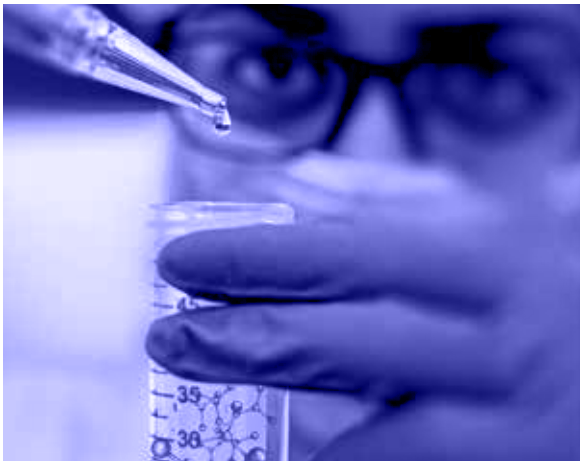
**21 MAY**

Zydus to manufacture “COVID KAVACH ELISA” - the first indigenously developed IgG test for antibody detection in collaboration with ICMR-NIV Pune.

Supplying the first batch of

# 30,000 COVID KAVACH

ELISA tests to ICMR, free of cost

Leaving no stone unturned in the effort to help the nation fight the healthcare challenge, the first batch of 30,000 COVID KAVACH ELISA tests were manufactured and supplied by Zydus Diagnostics, to Indian Council of Medical Research (ICMR), free of cost. These test kits have been manufactured in technology transfer with ICMR-NIV of Pune for surveillance purposes. Robust antibody tests are critical for surveillance and understanding the proportion of population exposed to SARSCOV-2 infection.

ICMR-NIV, Pune has successfully developed an indigenous IgG ELISA test for antibody detection for COVID-19.

The test was validated at two sites in Mumbai and has been found to have high sensitivity and specificity.

In addition, the test has the advantage of testing 90 samples together in a single run of 2.5 hours.

## 28 MAY

Zydus launches Immunity Booster CIMUNE, combination of Vitamin C (Ascorbic Acid) and Elemental Zinc in India.


**Range of sanitizers launched.**

Zydus launches a range of Alcohol based Sanitizing/ Cleansing Wipes and Sanitizers in India.


**Preponed the launch of sanitizer range under the Nycil brand** in India.

Launch originally planned for 2021. Launched in a record time and it has provided a great impetus to overall Zydus Wellness portfolio.

## JUNE 2020

## 12 JUNE

Zydus signs a non-exclusive licensing agreement with Gilead Sciences Inc., to manufacture and market Remdesivir.

## 16 JUNE

Oxford University trial indicates that Dexamethasone may reduce deaths by upto one third in hospitalised patients with severe respiratory complications of COVID-19.

Zydus is one of India's leading manufacturers of Dexamethasone.


## 28 JUNE

Zydus launches Supermune, an immuno-booster, comprising a unique combination of herbs multiminerals and multivitamins.

A one-of-its-kind product in India.

**JULY 2020**

**03 JULY - 24 DECEMBER**

Zydus' vaccine for COVID-19 (ZyCoV-D) successfully completes preclinical development and receives permission to initiate human clinical trials.

## Making progress with our vaccine ZyCoV-D

ZyCoV-D, our vaccine to combat COVID-19 has completed Adaptive Phase I/II Clinical Trials; has started Phase III clinical trials in 30,000 volunteers.

**ZyCoV- D, the plasmid DNA vaccine to combat COVID-19 completed its Adaptive Phase I/II clinical trials and entered into Phase III clinical trials.**

The seven day safety of the vaccine in all the subjects enrolled in the Phase I clinical trial has been endorsed by the independent Data Safety Monitoring Board (DSMB), which has been constituted to oversee the safety aspects of the clinical trial.

**The dosing for the Phase III clinical trials has started in 30,000 healthy adult volunteers as part of the multicentric, randomised, double-blind, placebo controlled, study.**

**In the Adaptive Phase I/ II study of the vaccine ZyCoV-D had been conducted in over 1000 healthy adult volunteers and the vaccine was found to be safe, well tolerated and immunogenic.**

A second vaccine which is a measles vectored vaccine is also in pre-clinical development.

**06 JULY**

**Zydus receives approval from COFEPRIS, Mexico to study Desidustat in the management of COVID-19.**

# Desidustat being studied for the management of COVID-19 in Mexico.

Patients infected with COVID-19 have been reported to display signs of 'Hypoxia' leading to organ failure and death despite the use of anti-virals, anti-inflammatory drugs or ventilators.

The attack with the novel coronavirus pneumonia (COVID-19) will cause less and less haemoglobin that can carry oxygen and carbon dioxide. The lung cells have been reported to develop extremely intense poisoning and inflammation due to the inability to exchange carbon dioxide and oxygen frequently, which eventually results in ground-glass-like lung images.

**Desidustat (a hypoxia inducible factor prolyl hydroxylase inhibitor, currently undergoing Phase 3 trials) mimics the physiologic effect of altitude on oxygen availability. At higher altitudes, the body responds to lower oxygen availability with stabilization of hypoxia-inducible factor, and this can lead to increased red blood cell production and improved oxygen delivery to tissues.**

To explore the effectiveness of Desidustat in the management of COVID-19, Zydus is conducting trials in Mexico. We received approval from the regulatory authority of Mexico, COFEPRIS, to conduct a Phase 2b, Multicenter, Open-label, Randomized, Comparator- Controlled Study to Evaluate the Efficacy and Safety of Desidustat Tablet for the Management of COVID-19 patients.

The novel mechanism of targeting 'hypoxia' through HIF-PH inhibitor will be studied for the first time in COVID-19. Clinical and regulatory development of Desidustat in COVID-19 is being executed in Mexico by Avant Santé Research Center S.A. de C.V., a leading Contract Research Organization (CRO) headquartered in Monterrey, Mexico.

### 11 JULY

Zydus launches ZyUV –UV sanitizer, which provides 99.9% surface disinfection. Ideal for home, small and big offices with built-in safety measures.

### 15 JULY

'ZyCoV-D vaccine' - Human dosing starts .

### 17 JULY

Zydus receives approval from COFEPRIS to conduct clinical trials in Mexico with Pegylated Interferon alpha-2b to treat novel Coronavirus.

### 23 JULY

Zydus launches ZyOxy – Portable oxygen cylinder with medical grade oxygen for home use.

**JULY 2020**

### 13 AUGUST

Zydus launches Remdac™ (Remdesivir) for the treatment of COVID-19 in India Priced at Rs. 2800 per 100 mg vial; Remdac™ the most economical Remdesivir brand in India.

In June 2020, Zydus had entered into a non-exclusive agreement with Gilead Sciences Inc., to manufacture and sell Remdesivir.

## Zydus launches the most economical Remdesivir brand, Remdac™ for the treatment of COVID-19 in India


Zydus launched Remdesivir under the brand name Remdac™ in the Indian market.

**Priced at ₹2800 for a 100 mg lyophilized injection, Remdac™ is the most economical Remdesivir brand in India.**

**It has impacted the lives of 7.5 Lac Indians.**

The drug has been made available across India through a strong distribution chain reaching out to Government and private hospitals treating COVID patients.

Speaking on the launch our Managing Director, Dr. Sharvil Patel, said, "RemdacTM is the most affordable drug as we would like to enable patients to have access to this critical drug in the treatment of COVID-19".

In June 2020, Zydus entered into a non-exclusive agreement with Gilead Sciences Inc., to manufacture and sell Remdesivir, the investigational drug, which has been issued an Emergency Use Authorization by the U.S. Food and Drug Administration (FDA) to treat patients suffering from severe symptoms of COVID-19.

It is an investigational nucleotide analog with broad-spectrum antiviral activity both in vitro and in vivo in animal models against multiple emerging viral pathogens, including Ebola, Marburg, MERS and SARS. In vitro testing conducted by Gilead has demonstrated that Remdesivir is active against the virus that causes COVID-19. The safety and efficacy of Remdesivir to treat COVID-19 are being evaluated in multiple ongoing Phase 3 clinical trials.

**SEPTEMBER 2020**

Launched new products to help people fortify themselves against COVID-19. Zincee, a Vitamin C tablet and Cimmune - SF, a sugarfree variant for diabetic patients were launched


**NOVEMBER 2020**

**03 NOVEMBER**

Zydus announces IND filing of ZYIL1, a novel oral small molecule NLRP3 inflammasome inhibitor NLRP3 inflammasome inhibitor can selectively modulate the inflammatory responses caused by the 'Cytokine Storm' in Acute Respiratory Distress Syndrome (ARDS), COVID19 and other inflammatory conditions.

In the cutting-edge, innovative research field of 'innate immunity', Zydus' development candidate 'ZYIL1' is efficacious in non-clinical animal models of inflammation, with acceptable ADME profile and high-safety margins.

Secured a Strong IP portfolio with multiple patents filed in all major countries.

## ZRC completes pre-clinical studies on a novel oral small molecule NLRP3 inflammasome inhibitor, ZYIL1, starts Phase I clinical trials

Following up on our initiatives to fight COVID-19 with diagnostics, vaccines and therapeutics, the focus is now on the cutting edge research to bring targeted therapies that can selectively modulate the inflammatory responses caused by the Cytokine Storm.

NLRP3 inflammasomes are involved in the inflammation process by production and release of pro-inflammatory cytokines IL-1β and IL-18. This harmful inflammation within the body leads to the onset and development of various kinds of diseases, including auto-immune diseases, inflammatory diseases, cardiovascular diseases, metabolic disorders, Gastro-intestinal diseases (inflammatory bowel disease), renal diseases, CNS diseases as well as Acute Respiratory Distress Syndrome (ARDS).

**Making further progress with our research efforts, our group filed the IND application of ZYIL1, a novel oral small molecule NLRP3 inhibitor candidate.**

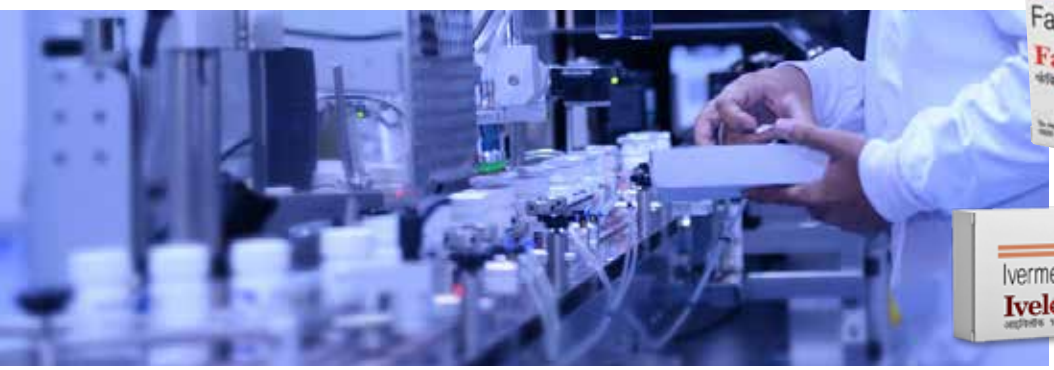
**SARS-CoV-2 has been reported to activate the innate immune signalling sensor NLRP3 inflammasome thereby leading to 'Cytokine Storm' in COVID-19 patients and causing Acute Respiratory Distress Syndrome (ARDS) complications like organ failures, and death in severe cases.**

**As an NLRP3 inflammasome inhibitor, ZYIL1 will bridge a critical unmet healthcare need in several inflammatory diseases including the current pandemic of COVID-19 and address complications caused by chronic, uncontrolled inflammation.**

ZYIL1, has demonstrated promising efficacy in a number of validated pre-clinical models of Inflammatory Bowel Disease (IBD), Multiple Sclerosis (MS), Sepsis and acute lung injury models of Acute Respiratory Distress Syndrome (ARDS). The studies have demonstrated that ZYIL1 can selectively supress inflammation caused by the NLRP3 inflammasome. The candidate, ZYIL1, has an acceptable ADME profile, with high safety margin. Our researchers at ZRC have completed all IND enabling pre-clinical studies. With the IND application being filed we have taken a kep step in advancing this drug candidate towards the clinic. We have also secured a Strong IP portfolio with multiple patents filed in all major countries.

## NOVEMBER

Launched Fabidac (Favipiravir) and Iveloc (Ivermectin) to further strengthen the COVID 19 portfolio.




The Hon'ble Prime Minister of India, **Shri Narendra Modiji** visited the Zydus Biotech Park and took a tour of the facilities. This was a historic moment when the Zydans committed themselves to the mission of Atma Nirbhar Bharat.

**DECEMBER 2020**

**04 DECEMBER**

## **Pegylated Interferon alpha-2b** is currently undergoing Phase III Clinical Trials

The biological therapy, Pegylated Interferon alpha-2b, 'PegiHep™ received an approval from the Drugs Controller General of India (DCGI) to start the Phase III clinical trials in COVID-19 patients.

**In the Phase II clinical trials study established the early safety, efficacy and tolerability of PegiHep™ and has indicated that Pegylated Interferon alpha-2b as having statistical clinical beneficial impact on the patient suffering from moderate COVID-19 disease by reducing their viral load, helping in better disease management such as reduced duration of oxygen support. Moreover, a single dose therapy will improve compliance and also make it highly affordable for patients. Pegylated Interferon alpha-2b, 'PegiHep™ is an approved drug and is being re-purposed for the treatment of COVID-19.**

**In the Phase II clinical trial which was open-label, randomized, comparator controlled study, involving 40 adult patients with moderate COVID-19 disease, 95% subjects in the test arm who received a single dose of PegiHepTM along with the Standard Of Care (SOC), became virus free as assessed by RT-PCR on day 14 and showed a statistically significant clinical improvement over the patients in the reference arm, who received only the standard of care and where only 68% patients showed an improvement in clinical symptoms and became RT-PCR negative.**

**JANUARY 2021**

**03 JANUARY**

## ZyCoV-D - fully indigenously developed vaccine is currently undergoing Phase III Clinical Trials

The dosing for the Phase III clinical trials has started in **30,000** healthy adult volunteers as part of the multicentric, randomised,double-blind, placebo controlled, study.

ZyCoV-D was found to be safe, well tolerated and immunogenic in the Adaptive Phase I/II clinical trials. The Phase II study of the vaccine ZyCoV-D had been conducted in over **1000** healthy adult volunteers as part of the adaptive Phase I/II dose escalation, multi-centric, randomized, double-blind placebo controlled study. The vaccine was found to be safe and elicit a strong immunogenic response. The trial was reviewed by an independent Data Safety Monitoring Board (DSMB) and reports were submitted to Central Drugs Standard Control Organisation (CDSCO) regularly for the update on safety outcome.

**It is being conducted in over 60 plus sites. The vaccine is very stable at 2 to 8 degrees as a result in a normal refrigeration temperature, the vaccine is also very thermostable at 25 degrees.**

**JANUARY 2021**

**25 JANUARY**

## Desidustat being studied for the management of COVID-19 has shown efficacy and safety in treating Hypoxia in hospitalized COVID-19 patients in Mexico

**Novel mechanism of targeting 'hypoxia' through HIF-PH inhibitor was studied for the first time in Hospitalised COVID-19 Patients in Mexico**

**Phase (2) b Trial data shows the potential of Desidustat in helping prevent acute respiratory distress syndrome (ARDS)**

**None of the hospitalised patients required mechanical ventilator in the Desidustat arm,** while 25% patients on the standard of care arm required mechanical ventilator

**Study trial indicates that the use of Desidustat for 14 days reduced CRP between baseline and day 14 among hospitalised patients with COVID-19**

**Level of IL-6 was stabilised in the Desidustat arm, while it increased in the Standard of Care arm**

**MARCH 2021**

## Remdac (Remdesivir) made more affordable at Rs. 899

Zydus makes Remdac, its brand of Remdesivir more affordable at Rs. 899 for a 100 mg lyophilized injection. The critical drug even at the time of its launch was the most economical brand of Remdesivir. The price cut made it further affordable for the patients.


**APRIL 2021**

## ZYDUS RECEIVES RESTRICTED EMERGENCY APPROVAL FROM DCGI FOR 'VIRAFIN' IN TREATING MODERATE COVID PATIENTS


**Zydus received Restricted Emergency Approval from DCGI for the use of Virafin (Pegylated Interferon alpha-2b) in treating moderate COVID infection in adults. The single dose subcutaneous injection of the antiviral helps in faster viral clearance and significantly reduces the hours of supplemental oxygen in the patients.**

**APRIL 2021**

## LAUNCHED VIROSHIELD MOUTH SPRAY

Zydus launched Viroshield mouth spray. Viroshield is a unique scientifically tested enzyme based formulation. It forms a protective layer in the throat which reduces the virus load by 99%.

**MAY 2021**

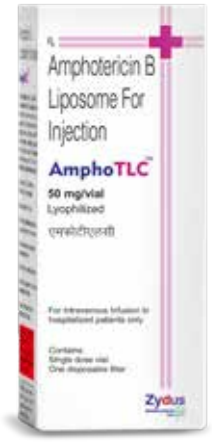
## Zydus explores monoclonal antibodies cocktail to neutralise COVID infection

Zydus seeks DCGI approval to undertake clinical trials for ZRC-3308 (Covimabs), a cocktail of two anti-SARS-CoV-2 monoclonal antibodies to combat COVID 19.v

**MAY 2021**

## ZYDUS AND TLC SIGN AGREEMENT TO MARKET LIPOSOMAL AMPHOTERICIN B, A CRITICAL DRUG TO TREAT BLACK FUNGUS OR MUCORMYCOSIS IN INDIA

**Zydus and TLC of Taiwan, signed a license supply and commercialization agreement to commercialize AmphoTLC™ (Amphotericin B Liposome for Injection 50mg) in India. AmphoTLC™ is a critical drug to treat Mucormycosis or Black Fungus in India**



**AUGUST 2021**

Zydus receives EUA from DCGI for **ZyCoV-D**, the **world's first Plasmid DNA vaccine** for human use.

- ZyCoV-D is the world's first needle free COVID vaccine.
- Apart from adults, it is the first vaccine to be approved for adolescents in the 12-18 age group in India.
- Safety, efficacy and immunogenicity of ZyCoV-D is well established in the largest clinical trials for a COVID vaccine in over 28000 volunteers in India.


**ZyCoV-D is a three dose vaccine which will be administered first on day zero, day 28th and then on the 56th day. With this approval, India now has its first COVID-19 vaccine for the adolescents in the 12-18 age group, besides the adult population. ZyCoV-D, is a needle-free vaccine administered using The PharmaJet® a needle free applicator, which ensures painless intradermal vaccine delivery.**

**This is for the first time that a technologically advanced vaccine has been successfully developed on the Plasmid DNA platform for human use. The platform because of its rapid plug and play technology can be easily adapted to deal with mutations in the virus, such as those already occurring. The company plans to manufacture 10-12 crore doses of ZyCoV-D annually.**

# Zydus Hospital Dahod in the fight against COVID-19

In the ongoing fight against Coronavirus, a 300+ bed quarantine facility was created at the Zydus Medical Hospital, Dahod. The hospital, located at a vantage point close to the Panchmahal and Chhota Udepur Districts in Gujarat, Jhabua District and Alirajpur district of Madhya Pradesh and Banswara of Rajasthan, Dahod has been serving as a healthcare hub for needy and underprivileged patients.

**Dr. Sanjay Kumar, COO, Zydus Hospital, Dahod is seen receiving a citation from the Hon'ble Governor of Gujarat, Shri Acharya Devvrat alongwith the Hon'ble Chief Minister of Gujarat, Shri Vijay Rupani.**

The hospital had treated several patients suffering from COVID-19.One amongst them was the 80 year old, Batulbibi Pathan of Dahod. Despite suffering from diabetes and blood pressure, she successfully fought off COVID-19 infection. She thanked the team of doctors led by Dr. Mohit Desai, who closely monitored her condition and provided intensive care treatment round the clock.

The Hospital was felicitated by the Governor of Gujarat, Shri Acharya Devvrat and honourable Chief Minister of Gujarat, Shri Vijay Rupani for offering humanitarian services to the patients suffering from COVID-19 and also for exhibiting immense commitment and dedication during the healthcare challenge under the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana(AB PM-JAY).

**Zydus Hospital Dahod**
750+ Bed Hospital | 300+ Doctors | 1.3 Lac OPD Patients
All treatments and medicines provided free of cost.
*January 2020 - January 2021*

**The recovery rate of the patients has been at**
**92.93%**

The **doubling time** of the case has been
**48 days**

The **fatality rate of case has been at**
**0.09%**

So far **7077 COVID patients have been diagnosed**

**6577 COVID patients have been treated**

Zydus dedicated to life

**Cadila Healthcare Ltd.**

Zydus Corporate Park, Scheme No. 63, Survey No. 536, Near Vaishnodevi Circle, Khoraj (Gandhinagar) S.G. Highway, Ahmedabad - 382481.Gujarat, India.

www.zyduscadila.com

CIN : L24230GJ1995PLC025878