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VISION

To emerge as one of the premier pharmacy colleges in the country and produce pharmacy professional of global standards.

MISSION

• To deliver quality academic programs in Pharmacy and empower the students to meet industrial standards.
• To build student community with high ethical standards to undertake R&D in thrust areas of national and international standards.
• To extend viable outreach programs for the health care need of the society.
• To develop industry institute interaction and foster entrepreneurial spirit among the graduates

2-DG THE NEW INDIAN WEAPON TO COVID

Dr Robin George

Background:

A deadly wave of COVID-19 is overwhelming India: New cases have hit 400,000+ per day, and more than 215,000 people have lost their lives. The health system is buckling under demand, but we're **helping families reach vaccinations** as we work in close contact with health workers who need **masks, COVID-19 test kits, and disinfectant** to save lives and stay safe.Our work in India and the 20+ countries we serve will not be over until these nations have resilient health systems that can serve their populations, in times of crisis and every day after.

In this middle stage of COVID 19 war, India had came up with the new weapon 2-DG, it has been developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), New Delhi, a lab of the Defence Research and Development Organisation (DRDO), in collaboration with Hyderabad-based pharma company Dr Reddy's Laboratories (DRL), the Ministry of Defence had said in a release earlier this month. Drugs Controller General of India (DGCI) has approved the oral drug for emergency use as an adjunct therapy in moderate to severe coronavirus patients. The approval of the drug has come at a time when India is grappling with a record-breaking wave of the coronavirus pandemic that has stretched the country's healthcare infrastructure to its limit.

The drug comes in powder form in a sachet, which is taken orally by dissolving it in water. Clinical trial results have shown that this drug helps in faster recovery of hospitalized patients and reduces supplemental oxygen dependence. Higher proportion of patients treated with 2-DG showed RT-PCR negative conversion in COVID-19 patients.

The 2-DG drug developed by DRDO is a big break-through and could be a game-changer in the battle against the pandemic as it helps in faster recovery of the hospitalised patients and reduces oxygen dependence.

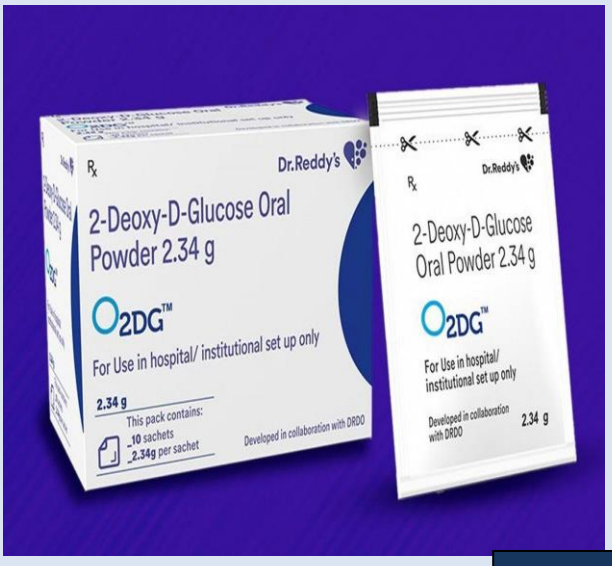
How it works?

According to the government release, clinical trial data show that the molecule helps in faster recovery of patients hospitalised with Covid-19, and reduces their dependence on supplemental oxygen.The drug accumulates in virus-infected cells, and prevents the growth of the virus by stopping viral synthesis and energy production. Its selective accumulation in virally-infected cells makes this drug unique, the release said.

2-Deoxy-d-glucose is a glucose molecule which has the 2-hydroxyl group replaced by hydrogen, so that it cannot undergo further glycolysis. As such; it acts to competitively inhibit the production of glucose-6-phosphate from glucose at the phosphoglucoisomerase level (step 2 of glycolysis). 2-Deoxyglucose labeled with tritium or carbon-14 has been a popular ligand for laboratory research in animal models

2-DG is up taken by the glucose transporters of the cell. Therefore, cells with higher glucose uptake, for example tumor cells, have also a higher uptake of 2-DG. Since 2-DG hampers cell growth, its use as a tumor therapeutic has been suggested, and in fact, 2-DG is in clinical trials. It is not completely clear how 2-DG inhibits cell growth. The fact that glycolysis is inhibited by 2-DG, seems not to be sufficient to explain why 2-DG treated cells stop growing.

Because of its structural similarity to mannose, 2DG has the potential to inhibit N-glycosylation in mammalian cells and other systems, and as such induces ER stress and the Unfolded Protein Response (UPR) pathway.



HISTORY THROUGH TRIALS

During the first wave of the pandemic in April 2020, laboratory experiments carried out by scientists of INMAS-DRDO in collaboration with the Centre for Cellular and Molecular Biology (CCMB), Hyderabad, found that this molecule works effectively against SARS-CoV-2, the coronavirus that causes the Covid-19 disease, and inhibits viral growth.

In May 2020, the Central Drugs Standard Control Organization (CDSCO) of the DCGI permitted phase 2 clinical trials of 2-DG in Covid-19 patients.

DRDO and its industry partner, DRL, conducted phase 2 trials on 110 patients between May and October last year, the government said. Phase 2a was conducted in six hospitals, and phase 2b (dose ranging) was conducted at 11 hospitals across the country.

On the basis of successful phase 2 clinical trials data, DCGI permitted phase 3 clinical trials in November 2020. Between December 2020 and March 2021, late stage trials were carried out on 220 patients admitted to 27 Covid hospitals in Delhi, Uttar Pradesh, West Bengal, Gujarat, Rajasthan, Maharashtra, Andhra Pradesh, Telangana, Karnataka and Tamil Nadu, the government said.

On May 1st DCGI approved the emergency use of this drug as adjuvant therapy in the management of COVID-19 patients who are hospitalized.

TRIAL RESULTS

The phase 2 clinical trials were carried out to test the safety and efficacy of the drug in Covid-19 patients. 2-DG was found to be safe in Covid-19 patients, and showed significant improvement in their recovery, the government release said. In efficacy trends, “the patients treated with 2-DG showed faster symptomatic cure than Standard of Care (SoC) on various endpoints”, the release said.

A significantly favourable trend (2.5 days difference) was seen in terms of the median time to achieving normalisation of specific vital signs parameters when compared to SoC. According to DRDO, the patients treated with 2-DG showed faster symptomatic cure than Standard of Care (SoC) on various endpoints in the efficacy trends.

Data from the phase 3 clinical trial showed that in the 2-DG arm, a “significantly higher proportion of patients improved symptomatically and became free from supplemental oxygen dependence (42% vs 31%) by Day 3 in comparison to SoC, indicating an early relief from oxygen therapy/dependence”, the government said. A similar trend was observed in patients aged more than 65 years.

POINT TO NOTE

Most advantage of this drug is, According to the government, 2-DG being a generic molecule and an analogue of glucose, it can be easily produced and made available in large quantities and the drug is available in powder form in a sachet, and can be taken orally after dissolving in water. In controversial many researchers points that, this approval was based on poor evidence; no journal publication (or preprint) concerning efficacy and safety are yet available