

Double Helical

March-April - 2021

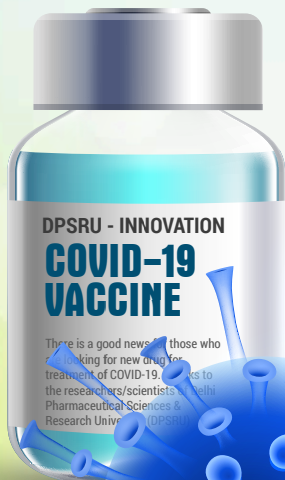
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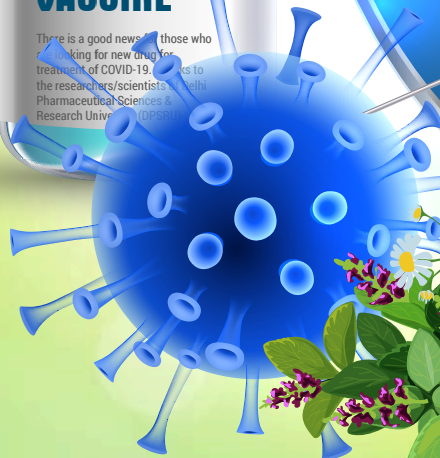
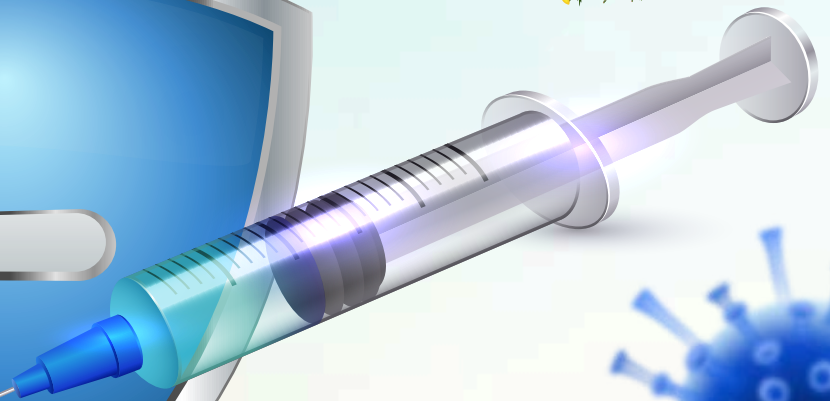
AN EXCLUSIVE

DOCKING TO DWELLING

A DEFINITE DRUG FOR THE TREATMENT OF COVID-19



There is a good news for those who
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Editorial Team
Abhigyan, Abhinav,
Dr. Manisha Yadav

Advertisements & Marketing
Abhinav Kumar, Vikas
Email: sales@doublehelical.com

Designer
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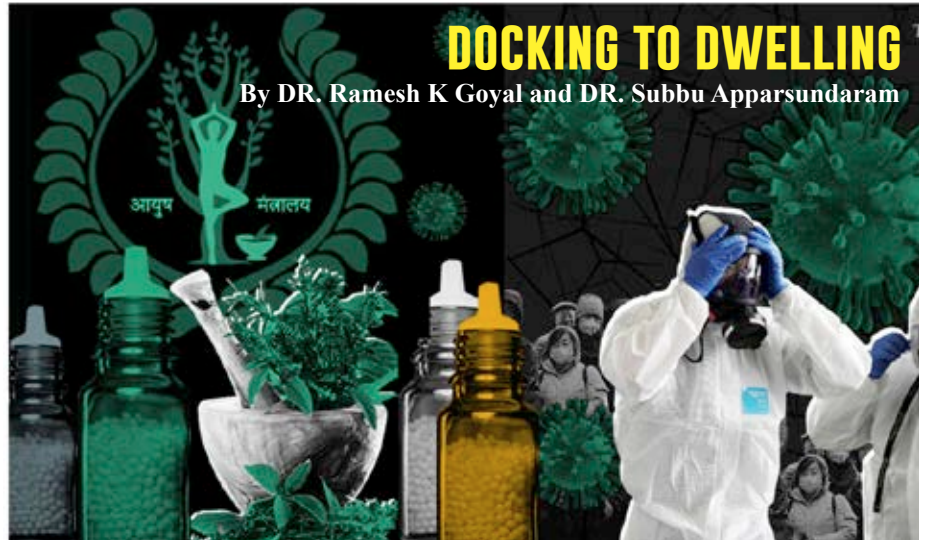
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Contact us :
contact@doublehelical.com
doublehelicaldesign@gmail.com,
editorial@doublehelical.com
Website: www.doublehelical.com,
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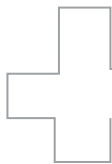
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Second wave of Covid-19 spreads faster than last year.....

Dear Readers,

Thanks a lot for your kind support. We are humbled to place on record our infinite gratitude for your uninterrupted, unwavering support to us in bringing out edition after edition on pertinent health issues.

When we thought that the worst was over, second Covid-19 wave has hit India hard. We are again seeing the doctors and the healthcare workers getting sick in large numbers. Even fully vaccinated doctors are testing positive for Covid-19.

With very disappointing we have to say that today the second wave of coronavirus (COVID-19) is increasing rapidly and has once again shaken the whole world with unprecedented ferocity, sending shivers down the spine of millions of people. India has so far done well to contain the spread of coronavirus but the country needs to keep up its vigil to defeat the dreaded virus that has emerged as the biggest threat to mankind.

Till the time of going to press, Ministry of Health and Family Welfare, Govt of India, reported over 1.40 lakh fresh cases. This is the third consecutive day of adding more than 1 lakh infections. Daily additions have been exceeding single-day recoveries since March 11, causing the active cases to bounce back to close to 10 lakh, a tally last touched in September last year. The night curfew has already been imposed in Delhi/ NCR region, Mumbai and more regions where the cases are rapidly increasing. The Delhi government recently announced new restrictions to contain the spread of the disease which includes allowing restaurants, cinema halls and buses within Delhi to operate with 50 percent capacity.

There is good news for those who are looking for new drug for treatment of Covid-19. Thanks to the researchers/scientists of Delhi Pharmaceutical Sciences & Research University (DPSRU) who have achieved a milestone by inventing new Corona drug. DPSRU is one of premier Pharmaceutical Sciences & Research University of India. Double Helical feels pride to break such mind blowing, research oriented and very informative story titled "Docking to Dwelling".

With the first case of corona reported from Wuhan, China on 31st December, there has been unprecedented outbreak of coronavirus disease (COVID-19). After over one year, the cases world-wide have not given satisfactory relief to be called as 'Control over the Disease'. Still when this article is written, a total of about 128 million cases have appeared with over 21 million active cases and 2 million deaths world-wide (216

countries affected). Daily even today half a million new cases appear from 155 countries and out of them daily over 1000 deaths reported from 56 countries. Even new deaths are reported from over 100 countries. In the beginning the case fatality ratio was 5-10%, it is a bit consolation that it has been reduced to about 1-3 %. One of the major breakthroughs has been the availability of vaccines. Lockdown, curfews, usage of masks and social distancing has given some rescue for the spread of the disease.

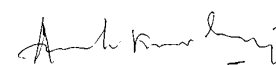
With vaccines it was hoped that herd immunity will come and appearance of cases will go down. However, the appearance of the second wave all across the world in different countries across the world puts a question of early success of the vaccination.

Keeping increasing cases of Covid-19, we should make us wonder if most of us have let down our guard. When the first wave struck we were ill prepared to tackle it and we lost many budding and promising doctors/intellectuals/politicians/filmmakers/ world fame actors and actresses while they were in the line of duty. This time around we are better prepared with PPE kits, proper safety equipment and guidelines. We don't want to lose anymore.

Everyone should be safe and take all possible precautions while attending to your patients. The situation is grim and the infectivity much higher than the last time. All must be vaccinated, if they still have not. In this grave pandemic situation we have to take precaution and maintain social distancing. A disease free doctor can serve thousands of patients. So your safety is in your hands.

Let's know about current issue of Double Helical there is more such interesting and thought-provoking stuff to savour. So, happy reading!

Thanks and regards



**Amresh K Tiwary,
Editor-in-Chief**



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During the MOU signing ceremony, S. N. Pradhan, IPS, Director General, NDRF; Dr. Prakash Chauhan, Director, IIRS, ISRO; Prof. Rajib Shaw, Director, IJL, Keio University; Sh. Atul Garg, Director, Delhi Fire Services, A. K. Sengar, IPS, IG, NDRF, B. C. Nayak, Retd. IPS, Former Special Director Intelligence, MHA, Anil Sinha, IAS retd. Founder Vice Chairman, Bihar Disaster Management Authority were present along with officers from Delhi Fire Services, NDMA, Indian Army and Deans/ Directors of the University. MoU, with IIRS will help in the training & education and high quality research in Remote Sensing and GIS applications for the students of University. MOU with IJL, Keio University Japan, will help in climate change and disaster risk reduction by use of emerging technologies like artificial intelligence, robotics, geo -spatial technologies with scope of further joint research in the field of Disaster Management.

Dr Mahesh Verma, vice Chancellor, Guru Gobind Singh Indraprastha University, said that the MoU with NDRF will help in exchange of resource persons, training and joint case studies for the students of CDMS, GGSIPU on various aspects of Disaster Management. All the parties of MoUs shown keen interest to work jointly on emerging areas of disaster risk reduction and mitigation.

During the MoU, DG, NDRF said that the students of

GGSIU can be involved during the real time situations tackled by NDRF for the disaster management which will provide practical knowledge to students and also joint case studies can be developed with the academic inputs of the CDMS. Director, IIRS emphasized on developing joint short term/PG courses on advance remote sensing and Geo-spatial technologies and exchange of resource persons and availability of infrastructure. Director, IJL, Keio University asserted that the experience of Japan in handling disaster management and use of advance technology can be shared with CDMS for the academic and research purposes that will help in management and planning in the risk reduction of various natural & man -made disasters.

The Vice Chancellor of the University Padam Shri Prof Mahesh Verma said that these kinds of academic linkages through various academic collaborations are the need of the hour, where we can share technologies and manpower resources with each other. Such academic collaborations will definitely help in building synergy to achieve higher goals in research and academic excellence and best practices, matching with international standards.

Registrar of the University Ravi Dadhich proposed the vote of thanks to all the dignitaries of MoUs ceremony and said that University is achieving new heights under the dynamic leadership of Vice Chancellor, GGSIPU. 



Second wave of Covid-19 hits India

India is witnessing the second wave of Coronavirus. As per experts, the current wave is spreading faster than last year as it was mostly the elderly....

BY TEAM DOUBLE HELICAL

The pace of Covid-19 infection is rapidly increasing. As per statistics, more than one lakh new cases are coming up every day. The Govt of India, may have denied the possibility of complete lockdown, but the worsening situation has also raised the concerns of the BJP led government. Covid-19 has severely affected the health system of the country and the number of patients reaching the hospital is increasing every day.

India is witnessing the second wave of Coronavirus. As per experts, the current wave is spreading faster than last year as it was mostly the elderly who were infected with the Covid-19 virus last year. However, this time around, the patients are mostly children and pregnant women.

Till now, Ministry of Health and Family Welfare, Govt of India, reported over 1.40 lakh fresh cases. This is the third consecutive day of adding more than 1 lakh infections. Daily additions have been exceeding single-day recoveries since March 11, causing the active cases to bounce back to close to 10 lakh, a tally last touched in September last year. The night curfew has already been imposed in Delhi/ NCR region, Mumbai and more regions where the cases are rapidly increasing. The Delhi government recently announced new restrictions to contain the spread of the disease which includes allowing restaurants, cinema halls and buses within Delhi to operate with 50 percent capacity.

Maharashtra has once again emerged as the epicentre of the outbreak, with the wealthiest state accounting for more than half of the daily additions. Of the 10 districts with most number of cases, seven are in Maharashtra. This has forced the state government to stop all non-essential services, shut malls and restaurants, and urge companies to resort to work from home for the ongoing month.

Punjab and Chhattisgarh are witnessing a surge, too. They have added most Covid-19 cases after Maharashtra over the last couple of weeks. The average daily cases in a week in Punjab have gone up from 240 in February to more than 2,700 in April, while in Chhattisgarh, it has gone up from 250 to more than 2,400 during the period. Chhattisgarh accounts for 6% of the total cases and 3% of total death.

The experts claim that these cases are emerging in areas that


previously had low infection rate. Wherever there is high density of people with previously uninfected groups, they are susceptible to these massive outbreaks, and are leading to a surge in cases as people have dropped their guards.

Dr Suneela Garg, Advisor, Indian Council of Medical Research and Director Professor, Department of Community Medicine, Maulana Azad Medical College, New Delhi, said, "The second wave of corona virus is said to have brought new symptoms of the infection. While the usual symptoms of Covid-19 include fever, body ache, loss of smell and taste, chills, breathlessness, several studies are

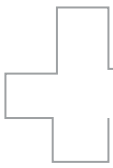
suggesting that red eyes, gastronomical conditions, and hearing impairment should not be taken lightly as they might also be a result of contracting the virus.

According to Dr. Vinay Aggarwal, Past National President IMA, Recipient of Dr BC Roy National Award, just when we thought that the worst was over, second Covid-19 wave has hit India hard. According to IMA, more than 700 modern medicine doctors lost their lives in the first wave of Corona virus. We are again seeing the doctors and the healthcare workers getting sick in large numbers. Even fully vaccinated doctors are testing positive for Covid-19. This should make us wonder if most of us have let down our guard. When the first wave struck we were ill prepared to tackle it and we lost many budding and promising doctors while they were in the line of duty. This time around we are better prepared with PPE kits, proper safety equipment and guidelines.

Dr A K Agarwal, Professor of Excellence, Ex Additional Director General of Health Services, Ministry of Health and Family Welfare and presently, Medical Advisor, Innovation, Apollo Group of Hospitals, New Delhi, said, "Keeping increasing case of Covid-19 in mind, vaccination should be made available at more sites, especially at community centres, as near to residential area as

possible. Residents Welfare Associations can be persuaded to coordinate it, because, for some elderly people, it may be difficult to travel to distant locations. Busting of myths related to side effects and choice of vaccines, (based on latest scientific data) by knowledgeable persons with more patience and helping attitude." 





CHANGING TREND WITH COVID-19 AND IT'S IMPACT ON IMPLANTS PLACEMENT

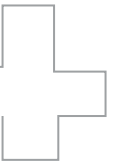


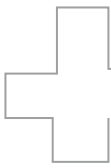
The outbreak of coronavirus disease 2019 (COVID-19) rapidly escalated into a worldwide pandemic, creating a global health and economic crisis....
BY DR DEEPTI SHARMA

It is a novel virus which is distinct from SARS-CoV and MERS-CoV, with Chinese horseshoe bats being the most probable origin. Transmission occurs primarily through droplet spread or contact routes. Due to the characteristics of dental settings, the risk of cross infection between dental

health care personnel (DHCP) and patients can be very high. This article provides a brief overview of the Coronavirus Disease 2019 which May Affect Dental Implant Integration to explain this observation it has been studied that COVID-19 alters the ACE2 pathway, the inflammatory cytokine “storm,” and/or







microvascular dysfunction. The aim of this article is to highlight the current changes and manage patients with covid 19 infection while taking necessary precautionary measures before placing /planning implants.

Implant failure has been observed during the integration period in patients who had coronavirus disease 2019 from March through November 2020. The failures occurred during the period of implant integration. One patient had COVID-19 infection 6 weeks before implant placement and developed intense progressive pain within 6 days of implant placement, resulting in removal of the implant and immediate relief of pain. A second patient was COVID positive 4 weeks after implant placement and developed severe bone loss around the implant resulting in its removal. Both had uneventful implant placement with excellent primary stability. Mechanisms to explain these observations are COVID-19 alterations in the ACE2 pathway, the inflammatory cytokine “storm,” and/or microvascular dysfunction.

THE ACE2 PATHWAY

ACE2 is a receptor for the spike glycoprotein of the coronavirus. ACE2 promotes cleavage of angiotensin into Ang-(1-7) and targets MasR. Both ACE2 and MasR are expressed by osteoblasts and osteoclasts. In vivo, Ang-(1-7) decreases alveolar bone loss through optimization the osteoblast/osteoclast ratio. ACE2/Ang-(1-7)/ MasR is an active player in alveolar bone remodelling. One mechanism for inhibition of osteogenesis may occur when coronavirus-19 combines on the receptor for ACE2, resulting in down regulation of the ACE2/ Ang-(1-7)/ MasR pathway. This would change the balance of osteoclast/ osteoblast action. When the coronavirus interferes with the ACE2 receptor, the aforementioned actions are inhibited,



and bone resorption and lack of bone apposition may occur. The role of inflammatory factors and the cytokine storm IL-1b, IL-6, TNF-a, G-CSF, IP-10, MCP-1, MIP-1a have been detected in patients with COVID-19, especially those who required ICU admission. These factors may enhance bone resorption through the RANKL signalling pathway. If not under control, the elevated levels of these cytokines may result in osteoclast recruitment, bone loss, and decreased bone formation. Immunosuppression may be important to consider for our implant patients whose implants have exposure to oral bacteria.

MICROVASCULAR DYSFUNCTION


Evidence exists that the microvasculature is effected by COVID-19. In the study by Rovas et al,⁴ 23 moderate to severely ill patients with COVID-19 were compared with healthy volunteers. Intravital microscopy, red cell velocity, and glycocalyx dimensions were used to evaluate perfusion

boundaries. Patients with COVID-19 showed up to 90% reduction in vascular density. This was almost exclusively small capillaries with diameters ranging from 4 to 6 micrometers. Vascular velocity was also decreased. Their data clearly showed alterations of the microcirculation and the endothelial glycocalyx in patients with COVID-19. SARS-CoV-2, the causative virus of COVID-19, binds to ACE2 in vascular endothelial cells and arterial smooth muscle cells. It is believed that COVID-19 can cause endothelial glycocalyx damage. Fragmented vascular endothelial glycocalyx is elevated in patients with COVID-19 and may be useful as an indicator of the COVID-19 state.

Lowenstein and Solomon propose that severe COVID-19 is a microvascular disease resulting in microvascular inflammation and thrombosis. They claim that patients with COVID-19 are in a hyper inflammatory state with elevated cytokines and microvascular



thromboses are prominent. They propose a pathway of pathogenesis that is triggered by microvascular inflammation with exocytosis caused by endothelial cell damage. The aforementioned 3 pathways may result in decreased healing and decreased osteogenesis around dental implants. The following case reports illustrate unique implant failures. The first case may represent microcirculatory dysfunction and the second generalized alteration in bone remodelling, bone formation and infection during the integration period. The surgeon will need to identify patients with COVID-19 experience – either previous positive testing with subsequent negative testing before implant placement or a positive COVID-19 test after the implant is placed within the early time period of integration. A patient who has had recent positive testing for COVID-19 should be counselled as to possible risks that can adversely affect implant treatment, until the systemic effects of COVID-19 have passed.

One problem that clinicians have is that minimal information is available concerning the long-term effects of COVID-19, regarding the alterations in the ACE2 pathway, the inflammatory state, and microvascular dysfunction. If a patient tests positive during the period of integration soon after implant placement, they may be at an increased risk for implant failure and the patient must be informed of the possible risk. Obviously, a larger patient sample is needed to confirm this observation. 

The Author is Fellow Forensic Odontology, Cert (WMD), Cert (Implants) General Secretary For Council Of Accredited Forensic Odontologist approved by Govt Of India Owner / Director Dr Sharma Dental Care.

COVID-19'S IMPACT ON DENTAL ECONOMICS

Covid-19 Had A Devastating Effect On Dentistry In India. Dentistry Has Been Considered As The Riskiest Of All Professions In Relation To Covid-19...

**BY PROF. (DR.) MAHESH VERMA /
DR. ASWINI Y BALAPPAVAR**

On 31st December 2019, China reported to the World Health Organization (WHO) about the cases of pneumonia of unknown etiology detected in Wuhan City, Hubei Province of China. Since then we have seen a lot of changes in the country. With complete lockdown to partial lockdown to lifting up of the lockdowns and again back to curfews now. India has the largest number of

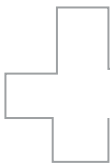
confirmed cases in Asia, and has the second-highest number of confirmed cases in the world after the United States with more than 10.3 million reported cases of COVID-19 infection and more than 154,000 deaths as of February 2, 2021.

COVID-19 had a devastating effect on Dentistry in India. Dentistry has been considered as the riskiest of all professions in relation to COVID-19. Extraordinary situations demand extraordinary measures and aptly

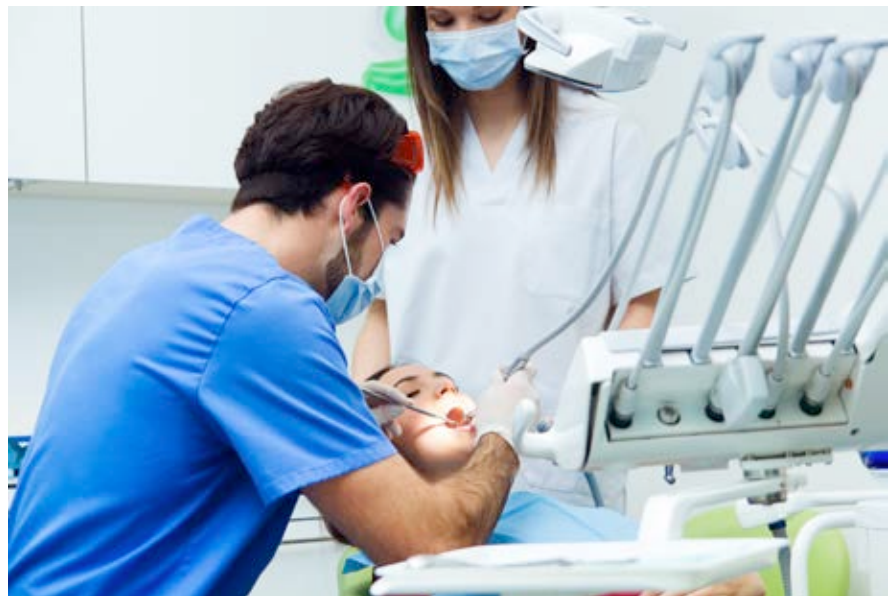
dentistry started adapting to the demands of the situation. Guidelines were laid out by Ministry of health and family welfare, IDA, CDC, for emergency dental procedures and infection control during COVID-19.

As the number of cases of COVID-19 started declining and various vaccination trials have been started, most of the countries have removed lockdown. The private as well as government dental set ups have started their full-fledged practices.





Dr. Aswini Y Balappanavar



But refurbishing dental practices to normal needs a complete structural as well as functional revision for the safety of dentist, their staff as well as for patients. Many of the practices inculcated during this period will continue for long time and for good.

1. PATIENT CARE: Considering every patient as a potential asymptomatic COVID-19 carrier, preliminary thermal screening will be continued. Use of hand sanitizers, social distancing, mouth masks and shoe covers will be encouraged. Management of time space between patients with minimum number of patients per day may become choice of dentists. The structural changes in dental clinics done during COVID-19 will be sustained for hygienic practices. All unnecessary and frequently touched objects is removed, adequate ventilation in waiting/operating area are maintained, Surface disinfection with 0.5%–1% sodium hypochlorite and daily fumigation will be a norm. For the Clinical Procedures, the essential use of personal protective equipment (PPE) with preferably N-95 mask, rubber dams, anti-retraction hand pieces and pre-procedural mouth rinse preferably with Povidine Iodine

will become a routine as they reduce the contamination by 70%.⁴Dental materials that requires minimal clinical time like bulk fill composites has been recommended which adds additional monetary investment with no visible returns.³The consumer demand also may be affected due to hesitancy to visit a dentist post COVID.

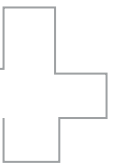
Biomedical waste management and infection control will be carried out without negligence and strictly be disposed of in accordance with the official instructions using double-layer yellow medical waste package bags and “gooseneck” ligation. Training and education of all dental care personnel team regarding hand hygiene, donning and doffing of PPE suits and all infection control measures should be performed on regular basis with reinforcements.

2. EDUCATION AND TRAINING: Due to this pandemic all the class education, clinical trainings and continuing dental education had moved to an online format. Now, the students, faculty and dental professionals have become congenial with the use of technology and online

platforms we would see a hybrid mode of education and training of dental professionals. Dental education through e-learning activities will continue to be pursued in the form of integrating virtual patients (VP), a computer simulation of real-life clinical scenarios, webinars etc.

3. DENTAL ECONOMICS: The COVID-19 pandemic has devastating impact on high-contact industries, including dentistry and their manpower. The pandemic has negatively impacted the dental market as well.³Globally a sharp, steep economic contraction has been seen in the dental care sector.⁴Due to the deferral of elective procedures and visits to dentist, the demand of dental products had decreased. The factories engaged in dental products are operating with reduced workforce which results decrease dental products supply.


According to the ADA, the US dental care spending has declined from 66% in 2020 to 32% in 2021. Due to the increase in the time period between the patients and the time required for the treatment, will subsequently



Prof. (Dr.) Mahesh Verma



reduce the number of patients as well as interventions per day. Also, there is an increase in fixed costs (e.g., HEPA filters, the adapting of air-conditioning plants) and variable costs (e.g., personal protective equipment, N-95 mask) which will escalate the total treatment cost but decreases total profit. The loss will be even greater for smaller dental practice owners who have single treatment room. Post lockdown the dental practices may open full-fledged and demand for the products bringing in some relief for the manufactures and hopefully bring balance in dental economics.

4. DENTAL MANPOWER- This pandemic resulted in closure of most dental private practices due to the increased input cost and reduced output. Most dental practices would respond by reducing their staff and other expenses and borrowing money for paying rent and salaries. 

(The authors are Vice Chancellor, Guru Gobind Singh Indraprastha University, New Delhi / Associate Professor, Department of Public Health Dentistry, Maulana Azad Institute of Dental Sciences, New Delhi)



A MAN BEHIND HAPPY SMILE

India has achieved significant public health gains and improvements in health care access and quality over the last three decades. The health sector is amongst the largest and fastest growing sectors.....

BY ABHIGYAN/ABHINAV





Meeting Dr Suresh Ahlawat at his Sushant Lok, Gurgaon based MUSKAAN Dentals Global was an uplifting experience that filled the Double Helical Team with positive vibes and immensely feel-good factor. During our hours-long conversation, Dr. Ahlawat dwelt at length the complementary benefits of Dental Care during Covid-19 phase which by harmonizing our inherent natural life-force helps to impart health, eliminate sickness and restore total wellness Thereby, it minimises dependence on external medication and surgical interventions.

He also explained about Ayushman Bharat Pradhan Mantri Jan Arogya Yojana is also known as Ayushman Bharat National Health Protection Scheme which main objective is to provide free access to healthcare for 50 crore people in the country. People using the program access their own primary care services from a family doctor. When anyone needs additional care, then PM- Jan Arogya Yojana provides free secondary health care for those needing specialist treatments and tertiary health care for those requiring hospitalization.

Dr Suresh Ahlawat, BDS, MDS, DNB (USA) Oral/Maxillofacial Surgery and Implantology, has been practicing in this field for more than two and half decades. In his long career, he went on bringing sparkling smiles over his patients' faces by his manoeuvred skills along with the latent reservoir of his dental knowledge. Presently he is associated with multiple centres of MUSKAAN Dental Global and Shanti mission Hospital run by Chaudhary Sher Singh Memorial Shanti Devi Charitable Trust.

According to Dr Ahlawat, India has achieved significant public health gains and

improvements in health care access and quality over the last three decades. The health sector is amongst the largest and fastest growing sectors, expected to reach US\$ 280 billion by 2020. At the same time, India's health sector faces immense challenges. It continues to be characterized by high out-of-pocket expenditure, low financial protection, low health insurance coverage amongst both rural and urban population. It is a matter of grave concern that we incur a high out-of-pocket expenditure on account of health and medical costs. 62.58% of our population has to pay for their own health and hospitalization expenses and are not covered through any form of health protection.

Besides using their income and savings, people borrow money or sell their assets to meet their healthcare needs, thereby pushing 4.6% of the population below the poverty line. The Government of India is committed to ensuring that its population has universal access to good quality health care services without anyone having to face financial hardship as a consequence. Under the ambit of Ayushman Bharat Yojana, a Pradhan Mantri Jan Arogya Yojana to reduce the financial burden on poor and vulnerable groups arising out of catastrophic hospital episodes and ensure their access to quality health services was conceived.

Ayushman Bharat Yojana/ Pradhan Mantri Jan Arogya Yojana or National Health Protection Scheme has two goals, one, creating a network of health and wellness infrastructure across the nation to deliver comprehensive primary healthcare services, and another is to provide insurance cover to at least 40 per cent of India's population which is majorly deprived of secondary and tertiary care services.

Says Dr Ahlawat, "Ayushman Bharat Yojana/ Pradhan Mantri Jan Arogya



Yojana (PMJAY) consists of two major elements like National Health Protection Scheme and Wellness centres. National Health Protection Scheme will provide cashless treatment to patients. And wellness centres will provide primary care to the patients. In fact, the government will upgrade existing Public Health Centres to Wellness Centres."

Healthcare of late has come in to greater focus by the government. NDA-1 right in the beginning mentioned about National Health assurance Mission, which is synonymous with universal health coverage. This was followed up with National Health Policy in the year 2017 and year later government launched world's largest healthcare scheme under the name AYUSHMAN BHARAT (AB). The two components of the AB scheme i.e. 1.5 lakh Health

& Wellness Centers and Prime Minister Jan Ayog Yojana (PMJAY), providing insurance cover up to 5-lakh per family under designated underprivileged sections of society. These schemes are by all standards very ambitious/ path breaking and once get implemented will usher; New India: Healthy India.

Hon Prime Minister in his first interaction with new ministers, has directed them to come out with 100-days plan, which will specify road map for coming years to take India to newer heights. Association of Healthcare Providers (India) is fully committed to support government's healthcare initiatives in line with its motto; 'Educating and Advocating for Well Being of Common Man'. The 100-day blue print as we understand, will develop framework for coming years. In our considered opinion, we have



outlined 5-priority areas, which could be part of framework to make AYUSHMAN BHARAT as India's great success story, which has potential to be role model scheme for other developing nations.

Preventive dental care is all the things should do to take care of teeth and gums: brushing, flossing, eating a healthy diet, and seeing your dentist regularly to help avoid dental disease. When it comes to the health of teeth and gums, preventive dental care is smart. Brushing and flossing help to remove plaque from the surfaces and in between teeth, keeping teeth looking and feeling clean.

A healthy diet, one low in sugar and other refined carbohydrates, helps keep whole body, including teeth and gums, in good shape. And routine dental exams and regular cleanings may help prevent the incidence of higher-cost treatments such as

recommend the frequency of visits that's right for everyone.

Says Dr Ahlawat, "The dental filling is a treatment modality administered to restore missing tooth structure which could have been a result of decay or trauma. Decay makes the tooth hollow. Dental Filling helps in filling this gap and protect it from further decay. A filling is also used to repair broken or cracked tooth and the teeth which wear off due to dental habits like teeth grinding, nail biting etc.

Says Dr Ahlawat, "We have to outline certain priority areas, which could be part of framework to make AYUSHMAN BHARAT as India's great success story, which has potential to be role model scheme for other developing nations.

Undoubtedly India has currently half of recommended figure of 23-healthcare workforce per 10,000

& Surgeons in various specialties. Government may consider recognizing Fellowships by various specialty associations. There is great imbalance in geographical distribution of medical colleges, which need to be urgently arrested. The plan for allowing some of selected 300+ bed private hospitals in deficient districts to have attached academic blocks for 100-MBBS seats can be quickly put in place. Government can open 10-institutes, like PGI Chandigarh to operate only PG courses. It needs to be stressed that any amount of increase in healthcare expenditure will not achieve desired outcomes, unless we address the manpower issue.


Nursing profession is in dire state. Parents today do not favor their children to go for nursing career. The nurses have hardly any career progression. The salary for GNM/



periodontal surgery, root canals, extractions and fillings. After all, early detection and prevention are key to minimizing your need for more serious dental treatment.

There are no clear guidelines stating how often a person should see the dentist. Some studies suggest once a year, others say every three or six months. Depending on current dental health, dental history, risk factors for dental disease, and personal preference, we will

population. We have about 1-doctor per 1600 population against WHO norm of 1-doctor per 1000. We have huge shortage of specialists. To cite government figure, there is 80% shortage of specialists in 5500 Community Health Centers. Government need to come out with innovative models to make up this shortage i.e. increase of PG seats in medical colleges, increase of DNB seats, recognizing of diploma program run by College of Physicians

B.Sc. nurse in many states is below 10,000/, while the salary to driver in these states is above 15000/. The nurses have huge potential to support doctor in clinical work, but they cannot even prescribe a basic pain killer. Indian Nursing Council need to be revamped on priority the way is being done with MCI. Same is the case with Allied & Healthcare Workforce Council, which has huge potential in providing employment to young population. 



THE RISE IN THE COVID-19 CASES

The resurgence in COVID-19 cases tally: A result of negligence Anniversary of Lockdown in India: Second wave grips several states...

**BY N. K. PRASANNA &
S. K. VARSHNEY**



N. K. Prasanna



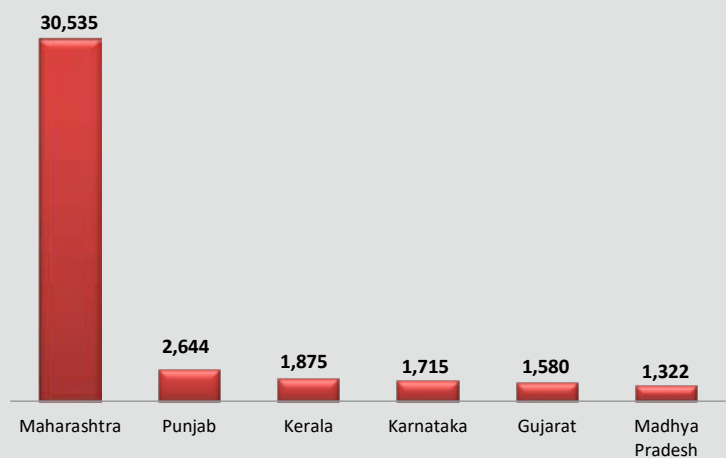
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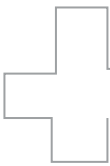
On 31st December 2019, China reported to the World Health Organization (WHO) about the cases of pneumonia of unknown etiology detected in Wuhan City, Hubei Province of China. Since then we have seen a lot of changes in the country. With complete lock down to partial lockdown to lifting up of the lockdowns and again back to curfews now. India has the largest number of confirmed cases in Asia, and has the second-highest number of confirmed cases in the world after the United States with more than 10.3 million reported cases of COVID-19 infection and more than 154,000 deaths as of February 2, 2021.

The rise in the Covid cases in several states are the concerning matters which is continuously catching the attention of the people. The backbone of India's economy, Maharashtra is the worst-hit country by the overall coronavirus cases. The situation of COVID-19 cases in India is once again in danger and in some states, cases are increasing like wildfire which itself is an alarming situation for densely populated countries like India. Apart from Maharashtra, the other three states including Punjab, Haryana, and Madhya Pradesh are facing the heat of increasing cases and probably are on the path to becoming the next hot spots or we can say are emerging hot spots of India. Whereas Maharashtra has reported 30,535 cases in the last 24 hours followed by Punjab, Kerala, Karnataka, Gujarat, and Madhya Pradesh.

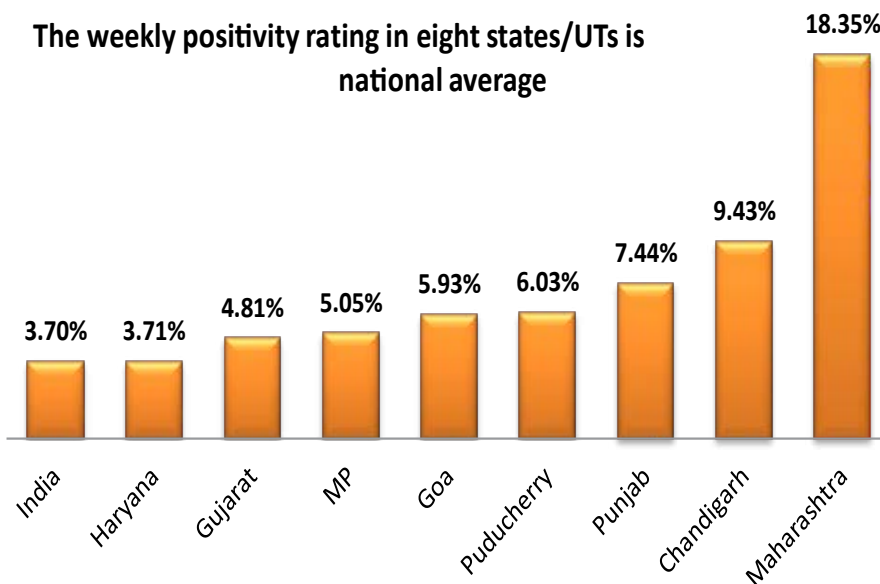
Several states are taking mandatory precautions and imposing guidelines to fall off the cases toll-like night

Six states registered 84 percent of new cases





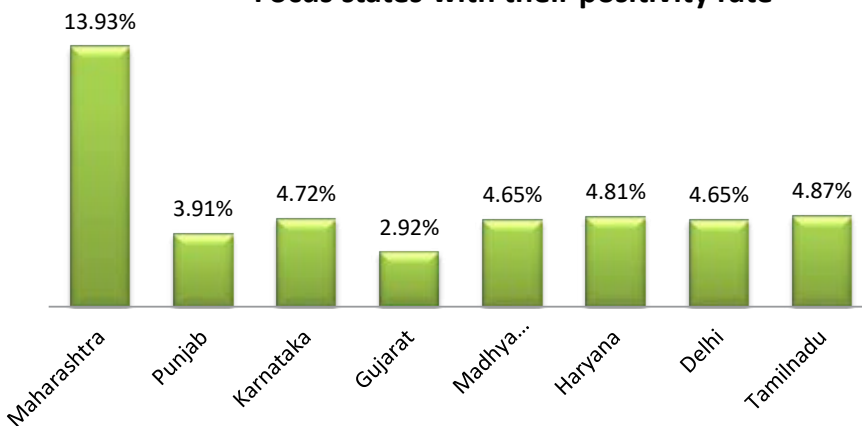
The weekly positivity rating in eight states/UTs is national average



curfew from 9 pm to 5 am in various districts of Punjab including Mohali, Amritsar, Patiala, Ludhiana, Jalandhar, Hoshiarpur, Kapurthala, Moga, Ropar, SBS Nagar, and Fatehgarh Sahib. Not only in Punjab, From 22nd March, Rajasthan government will also enforce a night curfew in eight cities and will require visitors to the state to bear a Covid-19 negative test report. The night curfew will be in place from 11 p.m. to 5 a.m. in Ajmer, Bhilwara, Jaipur, Jodhpur, Kota, Udaipur, Sagwada (Dungarpur), and Kushalgarh (Banswara), according to officials. Its been a year of the historical lockdown in India and the situation is still facing the second wave of infection. Though



Focus states with their positivity rate




some of the states are still combating the virus more appropriately and Kerala is a great example for the other states where the cases are rising at a very high level.

Total numbers of daily cases are increasing day by day but no such increase in the death rate has been observed so far. The majority of districts saw a rise, with 77 out of 363 showing an increase from zero average daily cases a month earlier. Today, India's total Active Caseload is 3,34,646. India's successful caseload now accounts for 2.87 percent of the country's overall Positive Cases. In the last 24 hours, a net incline of 25,559 cases has been added to the overall active caseload.

Today, India's total recoveries total 1,11,51,468. The overall recovery rate in the country is 95.75 percent. In the last 24 hours, there were 21,180 recoveries however, there have been 212 deaths has been reported.

Increasing cases are also growing concerns among citizens and officials. It's high time for us not to negotiate

with the precautionary measures and should be our duty to strictly follow all the guidelines of COVID-19 to ensure safety. Somewhere the rise in cases is the result of our carelessness and ignorance.

Though the vaccination drive has been started in India that doesn't mean we are 100% safe from the virus, we have to ensure the appropriate behaviour against COVID-19 which includes the maintenance of hand and respiratory hygiene, avoid social gatherings, and indoor clustering, restrict unnecessary travel to other states for upcoming Indian festivals like Holi, Ugadi, etc. Enjoy festivals in a new normal way and say no to crowded places. 

(The authors are Scientist at CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR), New Delhi / Head, International Cooperation, Department of Science and Technology, New Delhi)



HOW DO YOU ANALYSE THE RISE IN COVID CASES IN THE COUNTRY?

**By Dr Vijay Agarwal,
President, CAHO**

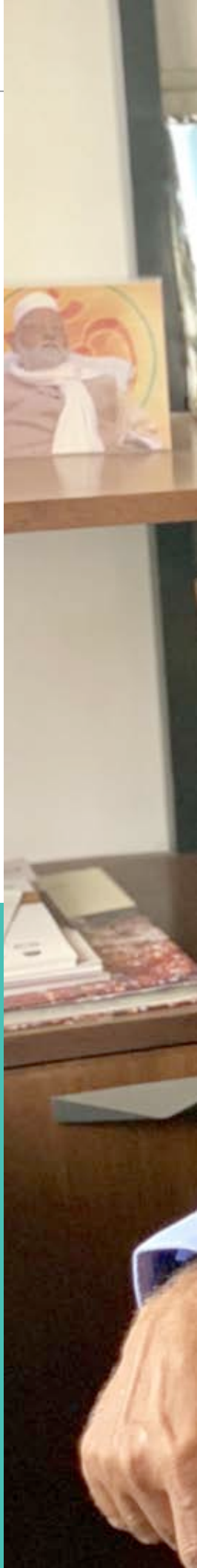
Increase in Covid new active cases from 18000 cases on March 7 to 40000 cases on March 20 is the rather exponential. This is the highest percentage increase in cases since July 2020. Deaths have also increased by 30 percent during this period.

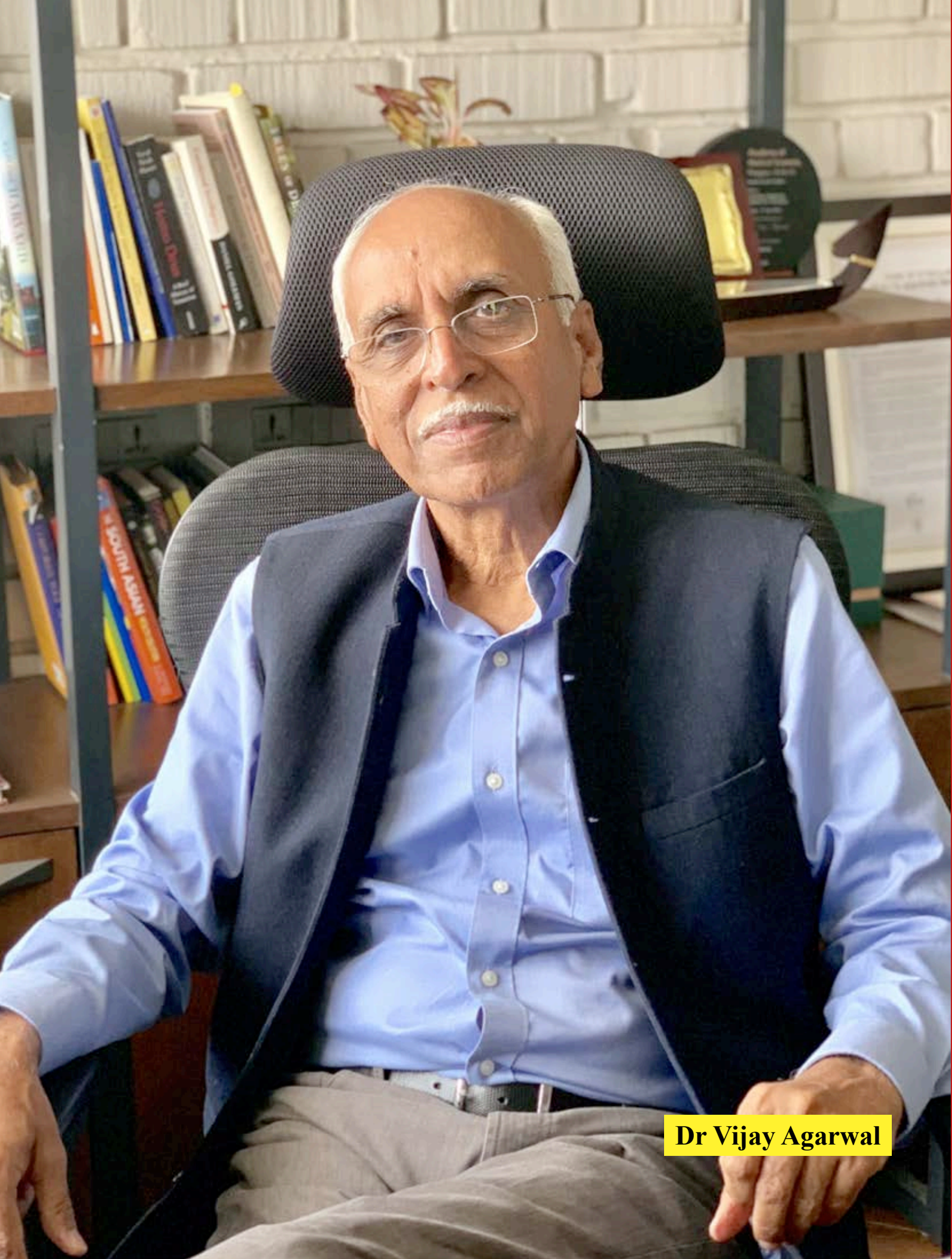
In my view, the increase in cases is throwing up some interesting facts:

1. The state of Maharashtra with 8% population of the country is contributing 60 % of total cases.
2. Kerala was also a partner in crime with Maharashtra but has done well in reversing the trend during this period.
3. Other high prevalence states include Karnataka, Andhra Pradesh, Tamil Nadu, Delhi, UP, West Bengal, Odisha, Rajasthan, Chhattisgarh and Telangana in that order.

WHAT IS THE CASE FATALITY RATE?

If hundred people are diagnosed with Covid-19 then how many die will determine the case fatality rate. National average is quite impressive at 1.39 percent. Over a period of time the case fatality rate all over the world has also decreased because of better understanding of the virus and the disease treatment protocols. However the State like Punjab has a very high fatality rate in India at 3.15%. It is indeed disturbing and that needs to be probed. Kerala on the other hand as case fatality rate 0.4 percent which is





Dr Vijay Agarwal

much lower than the national average.

WHAT SHOULD BE THE APPROACH TO TACKLE THIS “SECOND WAVE”?

Dr Vijay Agarwal, said, “We should concentrate and study the variations in various states especially Maharashtra, Kerala and Punjab. The role of mutant strains needs to be established. Vaccination is covering presently a very small percentage of our country’s population. This needs to be accelerated and the interval between the two doses can be even 8 to 12 weeks based on supply logistics. Vaccination will remain the mainstay for controlling the second wave besides people wearing masks appropriately and observing hygiene. There should be uniform rules regarding social gatherings across a state or whole country. We should discourage imposing “lockdowns”.

Dr D K Gupta, CMD, Felix Hospital, Noida (UP), said, “The poor adherence to safety protocols is driving the surge. India’s Covid-19 cases are rising because people are no longer following Covid-appropriate behaviour. Many people feel that Covid 19 is over. They attend social gatherings, social events and do not follow physical distancing. These huge crowds become super spreading events of Covid cases. We still have 75 percent susceptible populations. They don’t have antibodies. Virus is still around. Any social gathering can lead to spurt in the population.

Emergence of more infectious variants of corona virus could be another reason. Samples are being taken from clusters to look for variants and so far, there is no data to suggest the variants are more dangerous or that vaccines won’t work against them. There are 10 centers in India looking for genome sequencing. At present, 3 variants have been found from Brazil, UK and South Africa. These centers are looking for variants from random sampling and cluster study. Since this virus will continue to mutate, our main concern is - Is this variant of clinical significance? Is it more virulent? Will it have an immune escape mechanism against the vaccine efficiency?

Dr D K Gupta says that as of now, there is no data for more severe infection caused by mutant virus or vaccine not working. The poor levels/protocol for testing so far; this has allowed those with infections to remain undetected and go around spreading the disease. India need to increase the pace of vaccination



























centers in urban and rural areas. Supply of vaccine is also a key point here. Bharat Biotech Interim data shows 81 % efficacy. Vaccine will help in combating number of cases.

The emergences of new variants of the novel corona virus (SARS-CoV-2) have set off alarm bells across the world, including India. The researchers stress the importance of genome sequencing to gauge the impact of the new mutant variants. Genome sequencing is an exercise that studies changes in the structure of the virus over time. A combination of changes (mutations) in the ribonucleic acid of the virus can give birth to a new variant. The exercise is carried out only on samples that have tested positive for the virus.

Other countries kicked off the exercise right at the beginning of the pandemic. Given India’s significant caseload, it should have jumped on to the bandwagon quickly as well. A simple calculation, however, shows India registered 1,022,335 new Covid-19-positive cases during December, 2020-March 2021. At five per cent, the total number of sampled cases collected for sequencing should be 51,117 for the period.




How some of the Covid-19 vaccines compare

Company	Type	Doses	Storage
 Oxford Uni-AstraZeneca	Viral vector (genetically modified virus)	x2 	 2 to 8°C (6 months)
 Moderna	RNA (part of virus genetic code)	x2 	 -25 to -15°C (7 months)
 Pfizer-BioNTech	RNA	x2 	 -80 to -60°C (6 months)
 Gamaleya (Sputnik V)	Viral vector	x2 	 -18.5°C (liquid form) 2 to 8°C (dry form)
 Sinovac (CoronaVac)	Inactivated virus (weakened virus)	x2 	 2 to 8°C
 Sinopharm	Inactivated virus (weakened virus)	x2 	 2 to 8°C
 Novavax	Protein-based	x2 	 2 to 8°C
 Janssen Johnson & Johnson	Viral vector	x1 	 2 to 8°C (3 months)



INCREASE SPEED OF VACCINATION.

According to **Dr Ravi Wankhedkar , Past National President, Indian Medical Association**, we need to urgently rework the vaccination strategy & encourage “vaccination on demand” to eligible people, high risk people, frontline workers in all fields & those interacting with large numbers everyday & exposed to risk of infection.

Fortunately India is having more than adequate vaccine production capacity. Involve private health sector to increase reach of vaccination and decrease vaccine hesitancy. Allow companies, organizations, firms etc to vaccinate their workforce. Seven percent of districts in India have nearly 60% cases. Massive vaccination drive should be undertaken in these districts in a mission mode. Instead of generalised lockdowns speedy massive vaccination along with effective disease surveillance should be urgently implemented. . 



DOCKING TO



DPSRU - INNOVATION
**COVID-19
VACCINE**

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DWELLING

A DEFINITE DRUG FOR THE TREATMENT OF COVID-19

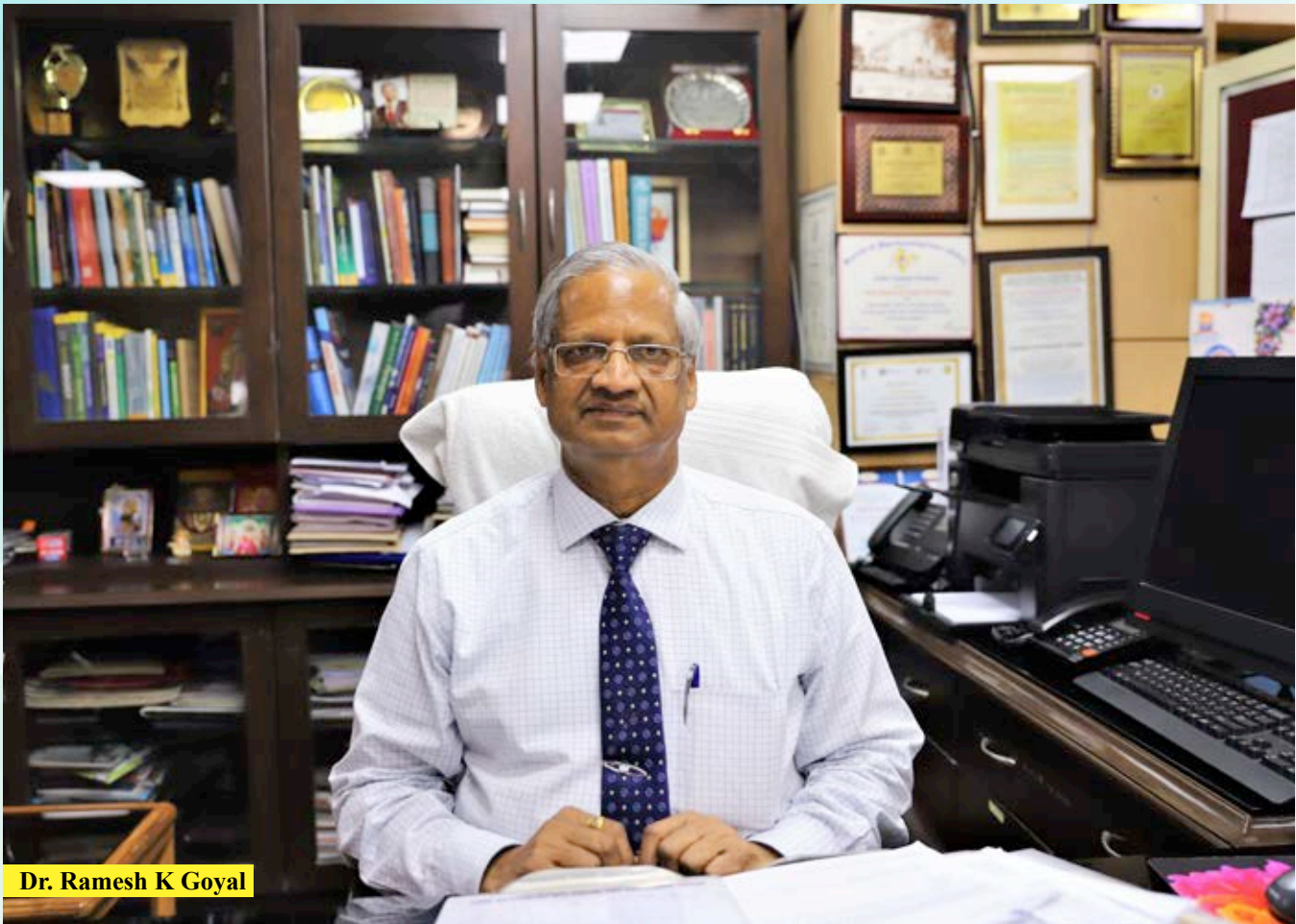
There is a good news for those who are looking for new drug for treatment of COVID-19. Thanks to the researchers/scientists of Delhi Pharmaceutical Sciences & Research University (DPSRU) who have achieved a milestone by inventing new Corona drug. DPSRU is one of premier Pharmaceutical Sciences & Research University of India. Double Helical feels pride to break such mind blowing and very informative story...

BY DR. RAMESH K GOYAL AND DR. SUBBU APPARSUNDARAM

With the first case of corona reported from Wuhan, China on 31st December, there has been unprecedented outbreak of coronavirus disease (COVID-19). After over one year, the cases world-wide have not given satisfactory relief to be called as 'Control over the Disease'.

Still when this article is written, a total of about 128 million cases have appeared with over 21 million active cases and 2 million deaths world-wide (216 countries affected). Daily even today half a million new cases appear from 155 countries and out of them daily over 1000 deaths reported from 56 countries. Even new deaths are reported from over 100 countries.

In the beginning the case fatality ratio was 5-10%, it is a bit consolation that it has been reduced to about 1-3%. One of the major breakthrough has been the availability of vaccines. Lockdown, curfews, usage of masks and social distancing has given some rescue for the spread of the disease. With vaccines it was hoped that herd immunity will come and appearance of



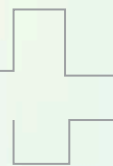
Dr. Ramesh K Goyal

cases will go down. However, the appearance of the second wave all across the world in different countries across the world puts a question of early success of the vaccination. From all these facts and figures, the only answer is that “Development of effective medicine is the only answer. The following comparison speaks then same.

EARLIER STRATEGIES FOR DRUG DISCOVERY

In the beginning there was no WHO and FDA approved Drugs or vaccine available for COVID -19 which to a great extent hold today the same. There has been an impatient bustling need to have a drug for the treatment. With the announcement of possibility





of 4hydroxyquinoline last year, being effective in COVID-19, the is sudden upsurge of ‘repurposing of drugs’ as one of the strategies for the discovery of drug in COVID-19. It was noticed that as on 05 April 2020 for COVID-19 there are 282 clinical trials going on with the ‘drug repurposing’ as the strategy. We reviewed various clinical trials from www.clinicaltrials.gov. It was noticed that apart from chloroquine and hydroxychloroquine, various the monoclonal antibody, corticosteroids, antibiotics, and many of the known antiviral drugs like arbidol, remdesivir, favipiravir, lopinavir, ritonavir, oseltamivir have been taken for the clinical trials in various countries. WHO also came up with an initiative known as Multi-country ‘Solidarity Trial’ for developing a potential drug or therapy against COVID-19. With drug

repurposing as one of the strategies with guidelines and strategies framed by the WHO formed an IPC (Infection Prevention and Control) for monitoring the widespread of this COVID-19 across the world.

Considering previous viral infections

Middle East Respiratory Syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV) and the epidemics have occurred in the past decade, the first set of trials for the discovery of new drugs was to repurpose of antiviral drugs, used in various retroviruses i.e. for MERS, SARS, dengue, AIDS etc. In addition to antiviral drugs, anti-retrovirals, antimalarial drugs, antibiotics and antiparasitic, nonspecific anti-inflammatory and immunosuppressive drugs, kinase inhibitors, monoclonal antibodies and other miscellaneous drugs utilized for the design of new drug and vaccines against coronavirus disease. **Remdesivir**, a nucleotide analog is a broad-spectrum antiviral prodrug with effective in vitro antiviral activity against different RNA viruses such as SARS-CoV, MERS-CoV, Hendra virus, Nipah virus (NiV), Marburg,



Drugs Vs Vaccines

Drugs



- Treats the infection or lessen symptoms
- Infected patients
- Targets germ/host
- Preventing spread of disease (example reduces viral load)
- Improve outcomes of the disease
- May have prophylactic action
- Easily distributed
- Existing pharma manufacturing and pharmacy distribution infrastructure
- New variants/mutations?

Vaccines



- Prepares body's immune system
- Healthy subjects
- Targets germs in general
- Prevention of disease
- Large population
- Herd immunity
- Goal is disease eradication
- Maintenance of the cold chain
- Distribution logistics and long-distance transport
- New variants/mutations?



Repurposed Drugs Used in COVID 19 Treatment

Anti Viral Agents

Darunavir
Favipiravir
Fingolimod
Immune Globulin
Interferon
Ivermectin
Lopinavir and Ritonavir
Oseltamivir
Ribavirin
Niclosamide
Azithromycin
Remdesivir
Chloroquine

Acetylcysteine	Anti-oxidant ; Prevent COVID-19-associated Cytokine Storm and ARDS
Ascorbic Acid/ Vitamin C	Antioxidant properties High dose of oral liposomal vitamin C help coronavirus patients recover faster
Colchicine	Analgesic and Anti-inflammatory Inhibits the chemotaxis of monocytes and neutrophils (cells in the lungs)
Dexamethasone Methylprednisolone	Corticosteroid
Dipyridamole	Anti-coagulant; Increase in lymphocyte and platelet recovery
Hydroxychloroquine	Found to be benefit for Covid-19
Ibuprofen	Anti-inflammatory property
Ifenprodil	Prevents glutamate signalling (NMDA receptor in lung cells & T-cells, neutrophils)
Indomethacin	An NSAID
Pirfenidone	Antifibrotic, Slows the rate of lung function decline

Ebola virus (EBOV), respiratory syncytial virus (RSV) provided success to a great extent. But it was again not a clear drug. Similar was the case with **Favipiravir**, chemically known as 6-fluoro-3-hydroxy-2-pyrazine carboxamide, a pyrazine derivative that is used as an anti-viral agent for the treatment of influenza in Japan. Other drugs like **Ribavirin**, **Arbidol**, (**Umifenovir**), **Oseltamivir**, **Bromhexine** a transmembrane protease serine (TMPRSS2) inhibitor, **Fingolimod** (Gilenya) is a sphingosine-1-phosphate receptor (S1P receptor) could not come up as real as efficacious and safe drug for COVID-19.

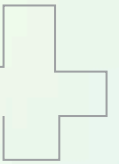
Chloroquine and Hydroxychloroquine are well known antimalarial drugs with some immunosuppressant effect on increasing immune factors. However, some reports have shown their antiviral action which occurs at ACE 2 cell entry-level by inhibiting glycosylation of host receptors, proteolytic processing, and endosomal acidification. When



Hydroxychloroquinewas reported to be potent against SARS-CoV-2, other antimalarial drugs like mefloquine and amodiaquine were tried and were not found effective against SARS-COV-2. Later, Emodin, was reported to block SARS CoV spike protein with ACE2 in

a dose-dependent manner and ACE-2 became a target focus..

Soon excessive immune mechanism involvement COVID surfaced. This brought many immunomodulators for repurposing. Baricitiniban approved for rheumatoid arthritis



having inhibitory action on Janus kinase (JAK)1/JAK2, Imatinibmesylate and dasatinib, inhibitors of the kinase signaling pathway, Trametinib, Selumetinib, a potent inhibitor of MEK, and many other came into the race. Tocilizumab however, got a greater success among these. Surprisingly, simple Dexamethasone proved highly useful as per the reports from Italy

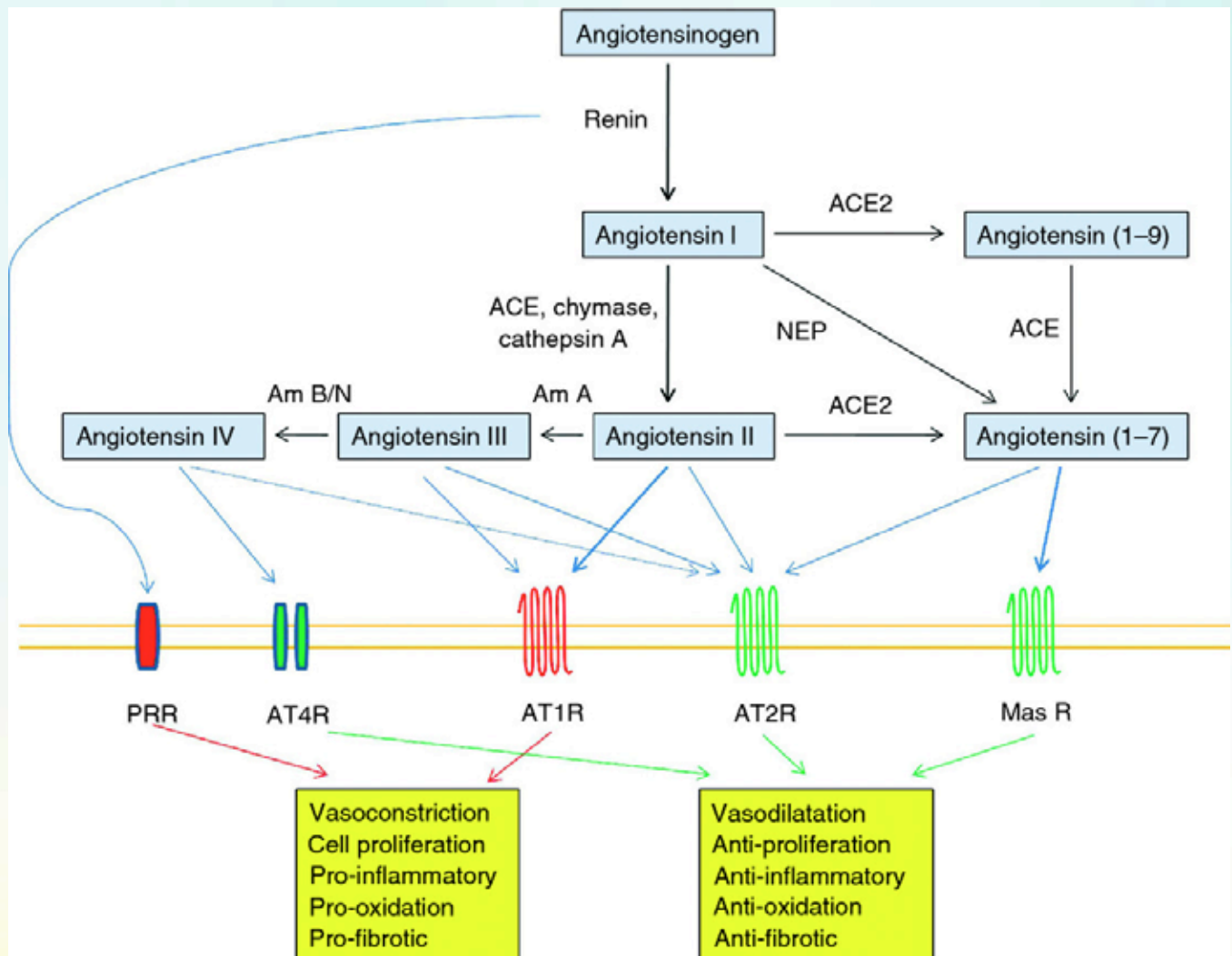
Apart from respiratory failure and immune or cytokine surges another clinical reports showed that in COVID-19 patients which are critically ill, the patients have high incidences of Thromboembolism Haemostatic abnormalities include mild thrombocytopenia and increased

D-dimer levels leading to death. The use of anti-coagulant drugs in COVID-19 patient became yet another strategy but only to the patients having higher D-dimer levels.

Having understood, the pathophysiology coming into the forefront several scientists all across the world tried to manage the COVID-19. Development of the vaccine and the development of antiviral drugs with drug repurposing strategy have been on the top. Based on the clinical symptoms reported from time to time and then clarify the pathophysiological consequences of COVID-19, the use of non-conventional antibiotics like azithromycin, steroids

like dexamethasone & monoclonal antibodies for immunomodulation, anti-thrombotics or thrombolytics and certain food supplements were recommended by the statutory bodies in different countries.

Considering the rampant deaths reported worldwide due to novel corona virus (COVID-19) on one side, hypertension, diabetes and renal failure emerging as comorbidities with mortality risk due to respiratory failure on the other side. The link of these morbidities with renin angiotensin system (RAS) and angiotensin converting enzyme-2 (ACE-2) as the site of the multiplication of COVID-19 has widely been accepted.



Based on the clinical reports out of the deaths and the prognosis of COVID-19, from several parts of the world, following are the major pathophysiological and molecular derangements that have drawn the attention of the scientists for the discovery of the medicine that can be used for the treatment of COVID 19.

1. 1. Binding of the virus with ACE-2 receptors leading to Viral multiplication, Over expression of ACE2 and thereby a total derangement of RAS; i m m u n o s t i m u l a t i o n , inflammation, Cytokine surge (increase in TNFa, IL1, IL6,IL10etc).
2. Inflammation in the alveoli and cell death in alveoli of lungs and causing Acute Respiratory

In the light of clinical picture of the COVID-19, we described it as the “Virus induced Cardiovascular Pulmonary Disease”. Delhi Pharmaceutical Sciences and Research University (DPSRU), is the first Pharmacy University of India, has been working for last one year with team members from Pharmacognosy and Pharmaceutical Chemistry Departments. In addition, we partnered with Remedium Therapeutics for development of a formulation with ACE-2 as the Target and then to have the clinical Trials. The formulation was expected to be innovative therapies from herbal resources treatment of COVID-19.

It is now well known that membrane-anchored ACE2, is well expressed in the epithelial cells of the lung,



action by hydrolyzing Ang II to Ang1-7. Ang1-7 exerts anti-inflammatory, antithrombotic, antihypertensive, antiarrhythmic, and cardioprotective action through G-protein-coupled Mas receptors (MasR). On the other hand, Ang II acting via AT1 receptors causes vasoconstriction, inflammation, cytokine secretion, thrombosis, endothelial and myocardial dysfunction, it also acts on AT2 receptors to reduce inflammation and oxidative stress. Thus, ACE and ACE2 arms of RAS counterbalance their actions fine-tuning many physiological function. Angiotensin receptor blockers (ARBs) and ACE inhibitors were investigated for the treatment of COVID-19, but it was a failure.

Various parts of the world have revealed that cardiovascular disturbances, including hypertension and thrombotic events, diabetes, and acute respiratory distress, are

3. Distress or syndrome
3. Thrombotic events and embolism
4. Binding with ORF8 proteins, leading to dissociation of iron from the 1-beta chain of hemoglobin getting attached to the surface glycoprotein porphyrin.

intestine, kidney, heart, and blood vessels express ACE2 and is also present in the oral and nasal mucosa, skin, lymph nodes, thymus, bone marrow, spleen, liver, and brain Due to its expression in a wide range of tissues and organs, ACE2 regulates the vasculature and inflammation, oxidative stress, fibrosis, and proliferation. ACE2 regulates Ang II



Solanum nigrum



Croton bonplandianum



Euphorbia prostrata



Rhizinus communis



Acalypha indica



Lantana camara

COVID-19 due to their potential action on ACE2. The significant advantage of using herbs in viral respiratory infections is due to their potent anti-inflammatory and immunostimulatory action. Various edible plants have been reported to have a potential for the treatment of COVID-19 disease. Considering the pathogenesis of COVID-19, we identified some Indian medicinal plants with potent anti-inflammatory, immunomodulatory, and antiviral activities for developing potential treatment of COVID-19. We investigated potential chemical constituents from plants (Phytoconstituents).

Several **Rasayana** botanicals described in Ayurveda are used in clinical practice for strengthening immunity. Among various **Rasayana**, we found **Solanum nigrum** (Makoya) and **Euphorbia prostrata** were found to be the most appropriate plants that can be used for the treatment of COVID-19. Both are reported to possess antiviral, immune-modulator and anti-inflammatory activities. In addition, they also have, other desirable effects that may be due to ACE2 or ORF. **Solanum nigrum L.** (Fam. Solanaceae) commonly called as Black Nightshade in English and Makoya in Hindi, grows in temperate climate zones and found throughout the country in dry parts. The drug "Kakamachi (whole plant)" of Ayurveda is used in Sotha (inflammation), Hrdroga (Heart disease), Jvara (fever),



Dr. Mahaveer Dhobi

emerging comorbidities. Principal molecular targets for COVID-19 are host ACE2, viral RdRp, and Open Reading Frame (ORF8) proteins. Viral replication, cytokine surge, inflammation, apoptosis of Type 1 & 2 cells in alveoli, and dissociation of iron from hemoglobin involving porphyrin, and thereby the failure of internal

respiration turned out to be the therapeutic targets for the management of COVID-19.

HERBAL APPROACH FOR THE TREATMENT OF COVID-19

Various herbal phytoconstituents (baicalin, glycyrrhizin, scutellarin, and hesperetin), are considered for

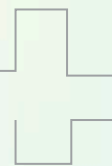


Prameha (Diabetes), Hikka (Hiccups). It is described as Kaphahara, Pittahara, Vatahara and Rasayana. **Solanum nigrum** possesses various compounds that are responsible for diverse activities. **Euphorbia prostrata** (Euphorbiaceae) is a small, prostrate, more or less pubescent annual herb found throughout India as a naturalized weed. It is commonly called as Dudhi in Hindi and Svaduparniksirni in Sanskrit. The Ayurvedic drug, Dugdika, consist of whole plant and mainly used for Svasa (Dyspnea, bronchial Asthma), Prameha (Diabetes), Raktapitta (bleeding disorders), Raktarsa (Bleeding piles). In Ayurvedic it has been described as Kaphahara, Mutrala (diuretic), Hrdya (heart disease), Vistambhini (Anti-carminative), Grahi (anti-diarrhea), Malastambhaka etc. **Solanum nigrum and Euphorbia**

prostrata possess various compounds that are responsible for diverse activities. Among various compounds reported we found that Solanine to have docking score of -9.424 with ACE2 and also the Rutin to have the docking score of -10.871. Similarly, from *Euphorbia prostrata* the various compounds (Apigenin: -6.204; Apigenin-7-glucoside: -8.06 and Luteolin 7-O-glucoside: -9.297 with ACE2. Interestingly some compounds from *Euphorbia prostrata* showed very high binding with ORF 8 (Apigenin: -9.033, Apigenin-7-glucoside: -12.603, and Luteolin 7-O-glucoside: -13.06). Clinical reports of the patients and mortality cause analysis of the deceased patients from various parts of the world have revealed that cardiovascular disturbances including hypertension & thrombotic events, diabetes and acute respiratory

distress are emerging comorbidities. Principal molecular links of these morbidities and COVID-19 prognosis emerged are angiotensin converting enzyme-2 (ACE2) and Open Reading Frame (ORF8). Viral multiplication, cytokine surge, inflammation, apoptosis of Type 1 & 2 cells in alveoli and dissociation of iron from the 1-beta chain of hemoglobin getting attached to the surface glycoprotein porphyrin and thereby failure of internal respiration. Preliminary work has been carried out on different plants reported in Ayurveda as the Rasayana, out of which two plants **Solanum nigrum and Euphorbia prostrata**, found in Aravalli Hills Biodiversity of Delhi as well available in Andaman & Nicobar Islands.

Based on extensive work on certain plants reported in Ayurveda as the Rasayana, we found *Solanum nigrum*




L. (family - Solanaceae) might be the most effective in COVID-19. Its phytoconstituents may have antiviral activity against SARS-CoV-2. Also, it may be effective against associated comorbidities, including respiratory failure and cardiovascular complications. The results were correlated with published pharmacological studies. Since, certain formulations of exclusive were available in India and this plant is an eatable vegetable in certain parts of the world, it was given to patient as add-on

nutraceutical to some patients. They are now looking into the development of a phytopharmaceutical products containing single plant bioactive compounds that are quantitatively and qualitatively defined.

Out of various plants identified, we shortlisted *Solanum nigrum*, *Euphorbia prostrata*, *Acalypha indica*, *Lantana camara* and *Ricinus communis* as potential plants. A literature searches to identify the phytoconstituents of these plants revealed that they contain flavonoids, flavonoid glycosides, triterpenoids, steroidal glycoalkaloids and other compounds of different classes. Flavonoids, in particularly, luteolin, quercetin, apigenin, amentoflavone, epigallocatechin (EGC), epigallocatechin gallate (EGCG), gallic acid, gallic acid gallate (GCG) and kaempferol have been reported to inhibit the proteolytic activity of SARS-CoV 3CLpro and 3a channel protein of coronavirus. We docked certain compounds for the ACE2 activity¹⁰. Results of docking studies it was found that many compounds from

Solanum nigrum like rutin, verbascoside, and hesperidin bound tightly at the active site of ACE2. The compound rutin (docking score: -11.5 kcal/mol) well occupied the receptor cavity through hydrogen bonding with Ala348, Asp350, Phe390, Ser44, Ser47 Arg393, Asn394 and verbascoside (docking score: -10.2 kcal/mol) showed hydrogen bonding interaction with Ala348, Asp350, Asp382, Phe390, Glu375, His37, Asn394 and Glu402, whereas hesperidin (docking score: -9.5 kcal/mol) showed hydrogen bonding interaction with Ala348, Asp350, Trp69 and Tyr385.

We developed a phytopharmaceutical formulation, and validated its pharmacological activities, including antiviral, anti-inflammatory, and immunomodulatory actions. A purified extract of *Solanum nigrum* with four active phytoconstituents (Solanine, Solamargine, Rutin and Luteolin) was used for pharmacological evaluation and validation of the beneficial activities on ACE2 with its receptors, AT1 and AT2 receptors as well as ORF8 as the principle targets based on our preliminary docking studies. The extract with phytoconstituents was tested in vitro viral cell lines at the University of Missouri, USA.

Most patients turned COVID negative (as per the qRT-PCR) report and there has been a distinct improvement of the WHO Ordinal scale by 2+ . It is expected that the herbal formulation will soon be released after due approvals from the Govt. bodies. 

With inputs from Prof. C. R. Babu (Aravalli Biodiversity Park, New Delhi), Pat Krishnan (Remedium, USA), Dr. Bhoomika Patel (Nirma University), Prof. Rajiv Tonk (DPSRU), Dr Mahaveer Dhobi (DPSRU), Dr. Jaseela Majeed (DPSRU), Dr. Kalicharan Sharma (DPSRU) and Dr. Jammi Narsimhan (Jammi Pharmaceuticals)



DRUG REPUR POSING

The development of herbal formulation in the current scenario for the prevention and treatment of COVID-19 has been possible because of the uses of miraculous molecular docking studies of the phytoconstituents...

**DR KALI CHARAN SHARMA AND
DR MAHAVEER DHOBI**





A countless use of drug repurposing is to identify drugs that were developed for treating other diseases to treat a new disease. Drug repurposing can be accomplished by conducting systematic drug target interaction (DTI) analyses. It is important to identify potential DTIs for both approved drugs, natural compounds and drug candidates, which serves as the basis of repurposing drugs and selection of drug targets without DTIs that may cause side effects.

The computational approaches such as computer-aided virtual screening and molecular modelling provide a significant breakthrough in understanding the structural aspects of various molecular targets of coronavirus and identification novel lead molecules. Natural molecules are one of the probable alternatives as many of these compounds possess ideal drug likeliness and pharmacokinetic features and might probably be used as lead molecules against various targets of SARS-CoV-2. Our study provides a computational strategy to combat SARS-CoV-2 and its genetic and structural information, conventional drugs currently used and their shortcomings, various antiviral compounds present in nature, computational approaches for molecular modelling of the target proteins, major drug targets that are identified, and virtual screening of herbal-based molecules using molecular docking and molecular dynamic simulation studies. Our study focused on portraying the relevance of utilizing natural lead molecules by virtual screening and ADMET prediction for the development of effective lead molecules against SARS-CoV-2.

Jenwitheesuk and Samudrala completed a study that used a protein-inhibitor docking approach against HIV Protease 1 to find out saquinavir and nelfinavir. HIV-1 protease has special flaps that are in motion upon binding. Since the structure of target protein is rigid, the opening and closing of the flaps is not performed. This protocol was used to simulate the flexible



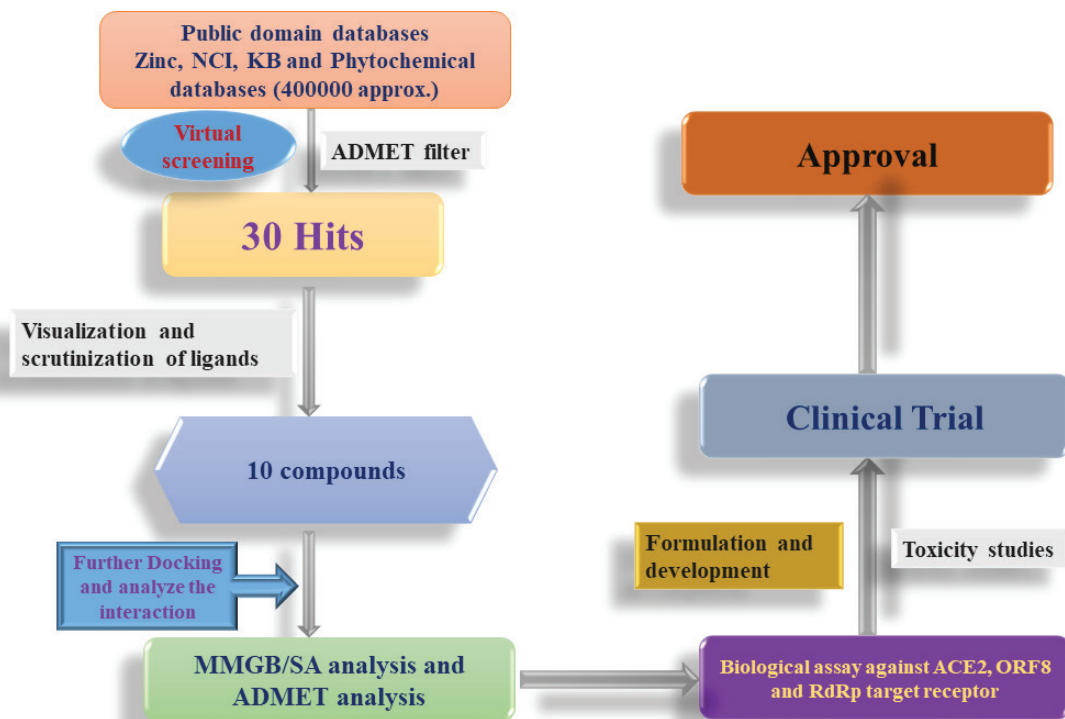
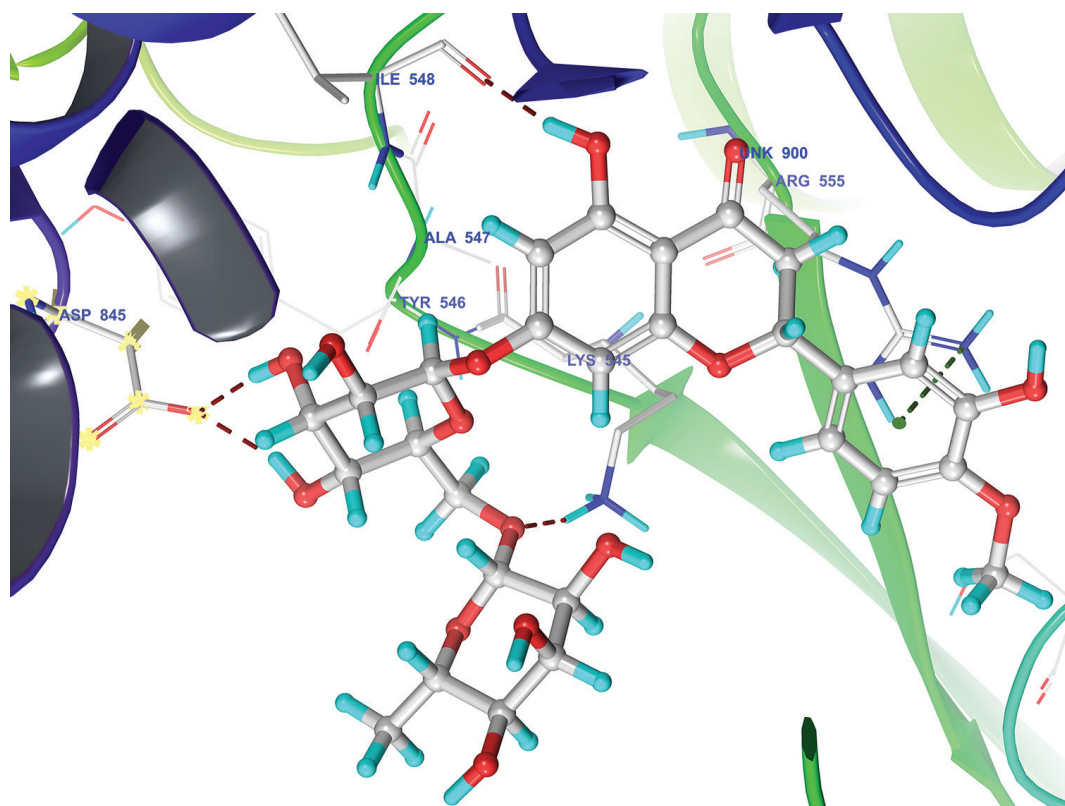
nature between the ligand and the enzyme.

TARGET IDENTIFICATION AND MOLECULAR MODELLING METHODOLOGY:

In this work, we applied multiscale modelling techniques to identify drugs that may be repurposed to target SARS-CoV-2 ACE2, ORF8 and RdRp target receptor. Three proteins ACE2 (PDB ID: 2AJF), ORF8 (PDBID: 6BB5) and RdRp (PDBID: 7BV2) were selected for docking protocols for identifying SARS-COV-2 ligands.

Phytoconstituents molecules were docked using the GLIDE module of Maestro 9.6 as per the Glide protocol given in Schrödinger. All the default parameters were used. For ligand preparation, the pH was 7.0 ± 2.0 , the force field was OPLS3, and ionization was done using Epik. For protein preparation, the pH was 7.0 ± 2.0 , the force field was OPLS3, ionization had done using Epikand.

A total of 400000 compounds





synthetic or natural origin were docked to the binding site of five proteins ACE2 (PDB ID: 2AJF), ORF8 (PDB ID: 6BB5) and RdRp (PDB ID: 7BV2) with Glide docking module of Schrödinger. During Virtual screening, we put the ADMET filter to remove undesired compounds. The docked poses were then analyzed using Schrödinger software's imaging tools. After Virtual screening we have got 10 hits which were again go for MMGB/SA analysis and ADMET for selected compounds.

SCHEMATIC REPRESENTATION OF MOLECULAR MODELLING STRATEGY

MOLECULAR DOCKING STUDIES OF VARIOUS PHYTOCONSTITUENTS WITH ACE2, RDRP AND ORF8

Since the outbreak of COVID-19

which are in use for the treatment of respiratory viral infections and act as immunomodulators is no exception to this. In these directions, two types of targets are mainly exploited; first is SARS-CoV-2 proteins to prevent the entry of virus in host cells to reduce viral load, and second is to modulate human proteins to control the replications of virus and/or to counter the immune-pathogenicity. With continuous research, a lot has been known about the COVID-19 right from SARS-CoV-2 entry in human beings till the severity of pathology it imposes, and mechanism involved therein.

SARS-CoV-2 binds to ACE2 on the host cell membrane and, by endocytosis, enters into the cell. Small molecules targeting the viral binding to the host cells, namely ACE2 in SARS-CoV-2, and nucleoside analogues which interfere with viral

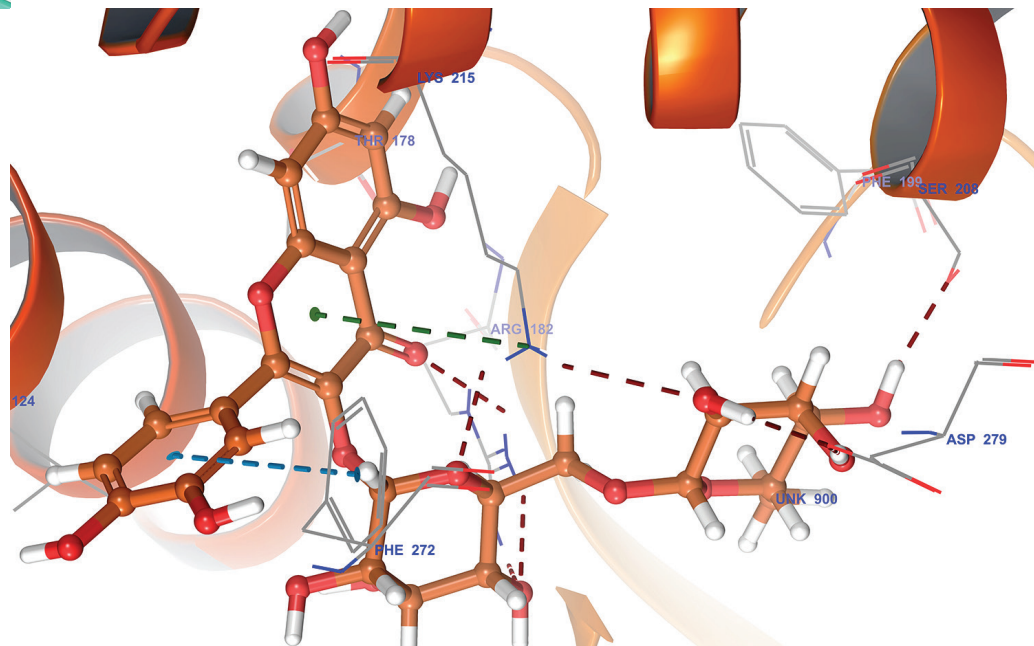
therapeutic treatment of COVID-19.

The natural compounds, especially from plant resources, remained the choice in the lead identification programs due to their abundance, safety and broad spectrum of ensuing activities. The natural products (esp. flavonoids, bioflavonoids or polyphenolic compounds) are a group of secondary metabolites present in fruits and vegetables and are well known for their health benefits. Some of the active phytoconstituents in medicinal plants have inhibitory action on coronaviruses, however determination of functional actions on ACE2 is critical to elucidate agonist/activation or inhibitor/antagonist.

We have attempted to identify naturally occurring phytoconstituents that may target ACE2 and block viral entry using molecular docking studies. We also evaluated the molecular interactions of a selected number of naturally occurring phytoconstituents at host AT1 and AT2 receptors, and SARS-CoV-2 RdRp and ORF8 proteins using molecular docking.

IDENTIFICATION OF MEDICINAL PLANTS FOR THE SELECTION OF POTENTIAL PHYTOCONSTITUENTS THROUGH MOLECULAR DOCKING STUDIES

We identified some Indian medicinal plants with potent anti-inflammatory, immunomodulatory, and antiviral activities for developing potential treatment of COVID-19. These plants identified were *Solanum nigrum*, *Euphorbia prostrata*, *Acalypha indica*, *Lantana camara* and *Ricinus communis*. A literature search to identify the phytoconstituents of these plants revealed that they contain flavonoids, flavonoid glycosides, triterpenoids, steroidal glycoalkaloids etc. Flavonoids, in particularly, luteolin, quercetin, apigenin, amentoflavone, epigallocatechin



pandemic, continuous attempts are being made worldwide to develop a vaccine and utilize repurposing approaches to find out an effective cure and preventive measure. Drug development using herbal drugs

replication, are potential therapeutics for treating viral diseases. There are no known viral entry blockers that target host ACE2. Blocking viral entry into host cells may be the most effective strategy for prophylactic and



Sr. No.	Name of phytoconstituents	ACE2	RdRp	ORF8	Plant name	Phytochemical group
1	Solanine	-6		-5.546	Solanum nigrum	Steroidal Glycoalkaloid
2	Rutin	-11.49	-10.774	-10.871	Solanum nigrum & Acalypha indica	Flavonoid glycoside
3	Quercetin	-7.006	-8.159	-10.493	Solanum nigrum & Acalypha indica	Flavonoid
4	Hesperetin	-7.299	-6.055	-9.667	Solanum nigrum L. & Acalypha indica	Flavonoid
5	EGCG	-8.582	-9.154	-11.606	Solanum nigrum	Phenolic compound
6	Apigenin-7-O-glucoside	-8.06	-8.552	-12.603	Euphorbia prostrata	Flavonoid glycoside
7	Luteolin 7-O-glucoside	-9.297	-9.066	-13.06	Euphorbia prostrata	Flavonoid glycoside
8	Verbascoside	-10.16	-12.749	-9.929	Lantana camara	Phenolic compound
9	Hesperidin	-9.95	-10.821	-14.452	Acalypha indica	Flavonoid glycoside
10	Naringin	-9.167	-9.507	-11.216	Acalypha indica	Flavonoid glycoside
11	Luteolin	-6.023	-7.147	-10.001	Solanum nigrum & Euphorbia rostrata	Flavonoid
12	Apigenin	-6.204	-6.316	-9.033	Solanum nigrum, Acalypha indica & Euphorbia prostrata	Flavonoid
13	Kaempferol	-6.349	-6.896	-9.818	Solanum nigrum & Acalypha indica	Flavonoid
14	Naringenin	-6.392	-6.307	-9.256	Solanum nigrum	Flavonoid
15	Solasodine	-4.802		-2.049	Solanum nigrum	Steroidal alkaloid
16	Solamargine	-5.629		-4.666	Solanum nigrum	Steroidal Glycoalkaloid
17	Solasonine	-2.622		-5.719	Solanum nigrum	Steroidal Glycoalkaloid
18	Lantadene A	-4.51	-2.134	-2.248	Lantana camara	Pentacyclic triterpenoid
19	Lantadene B	-3.577	0.162	-4.878	Lantana camara	Pentacyclic triterpenoid
20	Lantadene C	-3.968		-1.55	Lantana camara	Pentacyclic triterpenoid
21	Acalyphin	-5.239	-6.515	-6.637	Acalypha indica	Glycosides
22	Galangin	-5.277	-5.855	-9.825	Acalypha indica	Flavonoid
23	Ricinine	-3.198	-5.628	-6.001	Ricinus communis	Alkaloid
24	Oleanolic acid	-4.374	-2.331	-1.16	Ricinus communis	Pentacyclic triterpenoid
25	Dioscin	-6.361		-4.215	Solanum nigrum	Steroidal glycosides
26	Myricetin	-6.529	-8.891	-10.75	Solanum nigrum	Flavonoid



(EGC), epigallocatechin gallate (EGCG), gallic acid (GCG) and kaempferol were reported to inhibit the proteolytic activity of SARS-CoV 3CLpro and 3a channel protein of coronavirus. Certain flavonoids viz., luteolin, quercetin, rutin, kaempferol, and apigenin showed ACE inhibitory activity. In addition to flavonoids, we have also docked certain other compounds of phytochemical groups like triterpenoids, steroidal glycoalkaloids, phenolic compounds since these were major chemical constituents of the antiviral plants mentioned above. Molecular docking study was also carried out for selected steroidal glycoalkaloids: solamargine, solasonine, solasodine, solanine; flavonoids: rutin, naringenin, luteolin, myricetin, quercetin, apigenin, kaempferol and hesperetin, hesperidin, apigenin-7-O-glucoside, luteolin-7-O-glucoside; triterpenoids: Lantadene A, B, C, oleanolic acid, acalyphin, ricinine, dioscin, and epigallocatechin gallate, verbascoside.

MOLECULAR DOCKING AGAINST ACE2

The results of the docking studies revealed that the compounds rutin, verbascoside, and hesperidin bound tightly at the active site of ACE2. The compound rutin (docking score: -11.5 kcal/mol) well occupied the receptor cavity through hydrogen bonding with Ala348, Asp350, Phe390, Ser44, Ser47, Arg393, Asn394 and verbascoside (docking score: -10.2 kcal/mol) showed hydrogen bonding interaction with Ala348, Asp350, Asp382, Phe390, Glu375, His37, Asn394, and Glu402, whereas hesperidin (docking score: -9.5 kcal/mol) showed hydrogen bonding interaction with Ala348, Asp350, Trp69, and Tyr385 (Table 1).

MOLECULAR DOCKING AGAINST RDRP OF SARS-COV-2

Phytoconstituents have better docking at the RdRp than remdesivir



(- 6.7 kcal/mol). For example, hesperidin (docking score -10.01) bound tightly in the active site of RdRp. Hesperidin well occupied in the receptor cavity and makes hydrogen bonding with Arg555, Ile548, Asp845, and Lys545. The phytoconstituents provide promising lead compounds for designing novel RdRp inhibitors.


MOLECULAR DOCKING AGAINST ORF8

Molecular docking studies were performed against ORF8 and results reveal that the compounds luteolin-O-glucoside and hesperidin bound tightly to an active site of ORF8. The compounds luteolin-O-glucoside and hesperidin interact with Tyr42, Phe43, His58, Lys61, His87 and Asn97. These compounds showed docking scores of -13.06 and -14.45 kcal/mol, respectively, against ORF8 and provide insights into developing ORF8 inhibitors.

Docking studies revealed that phytoconstituents interact with ACE2. Although the functional implications of these phytoconstituents on ACE2 activity are yet to be confirmed, available evidence suggests that

inhibition of ACE2 may be a pivotal step to inhibit SARS-CoV-2 virus infection and consequent inflammatory damage. Phytoconstituents may interact with catalytic and/or S-protein binding sites. Phytoconstituents also may have inhibitory actions on SARS-CoV-2 replication. Thus, phytoconstituents may have multiple sites of action, protecting and countering the inflammatory damage. Phytoconstituents may be useful both as prophylactic and treatment for COVID-19.

CONCLUSIONS

Currently, chemo informatics and molecular modelling method approaches are becoming vital components in the drug discovery due to reduction in cost and time. Computational methods signify a competent approach to efficiently alter large and diverse compound libraries to potential candidates for drug development. There are many compounds suggested by computational methods that could be evaluated quickly with in vitro techniques. 

(The authors are from Delhi Pharmaceutical Sciences and Research University, New Delhi)



REPURPOSING WITH PURPOS

In the past years, drug repurposing combined with innovative approaches for drug validation, and with appropriate animal models, significantly contributed to the identification of new molecules and targets for therapeutic intervention....

BY PROF RAJIV K. TONK/ DR JASEELA MAJEED



Prof Rajiv K. Tonk



Dr Jaseela Majeed

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The use of existing drugs with purposing for the treatment of orphan drug diseases is an emerging strategy for expediting the approval of effective and safe therapeutics. It is known as drug repurposing.

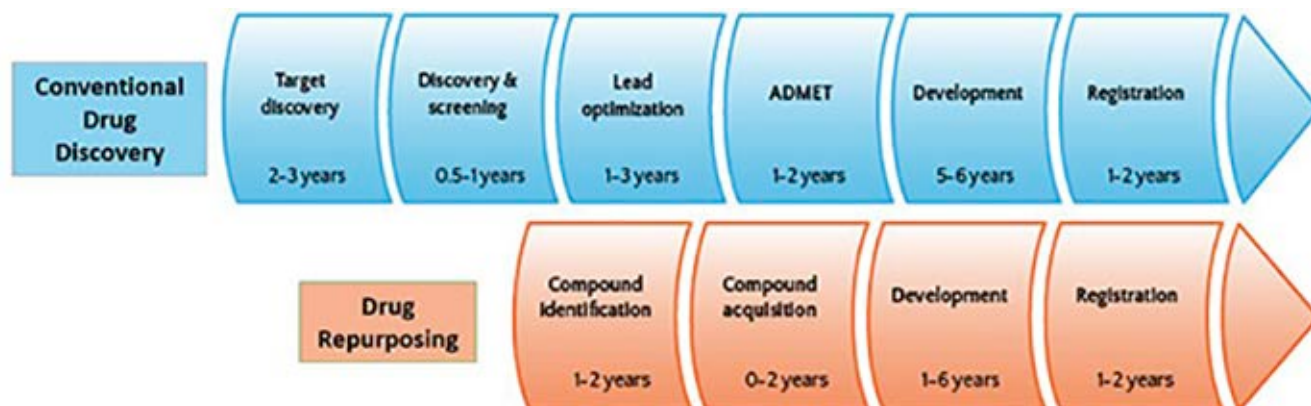
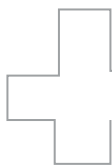
ADVANTAGES OF REPURPOSING:

- Low cost and less time-consuming (essential for the development of drugs to treat neglected diseases)
- Possibility to skip preclinical trials (no animal studies) and to directly enter phase 2 clinical trials
- Potential for combination strategies with the possibility to delay or reduce resistance associated with monotherapy
- Often analogs (together with pharmacological information) are already available for testing
- Academic/small laboratories can be determinant in the drug-discovery process

Fig. 1: Advantage of Drug repurposing process over the conventional drug discovery

It is well postulated that Drug repurposing are cost-effective methods in drug development and can be facilitated by in silico data analysis.

Successful
D r u g



Repurposing depends on knowledge of relationships among drugs, drug targets, pathogens, and hosts. If a drug is known to have a specific drug target present in a specific pathogen, then it can be repurposed to a new pathogen with the same drug target. Genomics and transcriptomic data analyses have contributed to the identification and validation of these relationships. An ideal platform for drug repurposing is a user-friendly database where a query of a pathogen will lead to all known drugs and all drug targets associated with individual drugs. Similar, a query of a drug will show all relevant pathogens

and associated drug targets.

Fig. 2: Steps involved in repurposing of drug with drug/diseases centric purpose

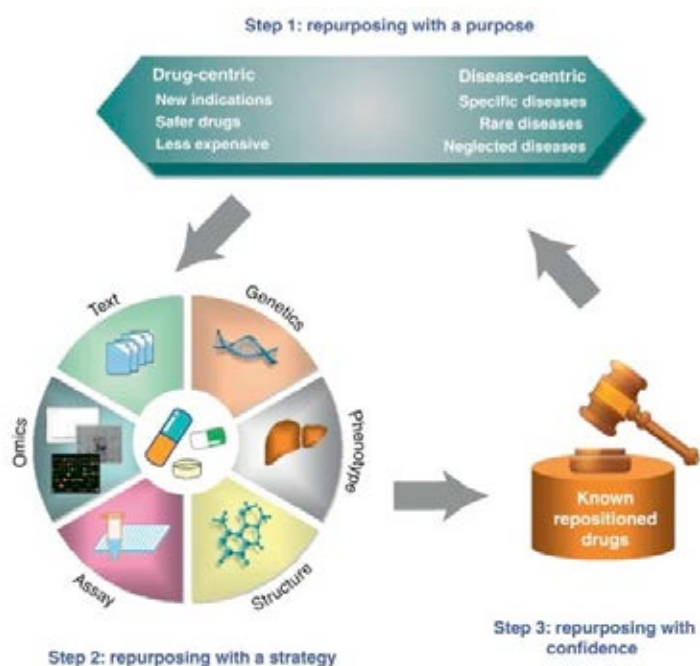
The repurposing can be carried out in two stages as described follows. In the first stage, the approved drugs are screened in-silico against a particular disease target. In the second step, the selected identified molecules are further experimentally investigated both in vitro and in vivo in specific disease models of interest. After getting successful results of preclinical studies during these second stage of repurposing, the clinical trial

of the identified drug candidates embarks on human subjects. Figure 2 describes several possibilities of drug repurposing.

Fig. 3: Mixed Approaches for repurposing of drug

Opportunities come with challenges. The first example of drug repurposing was an accidental discovery in the 1920s. After about a century of development, more approaches have been proposed for accelerating the process of drug repurposing. For this reason, drug repositioning has acquired great achievements. Massive machine learning algorithms were introduced to improve the performance of drug repurposing in this scenario.

In addition to computational approaches, experimental approaches that give direct evidence of links between drugs and diseases were developed, such as target screening approaches, cell assay approaches, animal model approaches and clinical approaches. These approaches are consistent and reliable. In recent years, increasing numbers of researchers have combined computational approaches and experimental approaches to find new hints for drugs, called mixed approaches. The results of computational methods was validated by biological experiments and clinical tests. Mixed approaches offer



Drug Discovery Today



opportunities for developing repositioned drug effectively and rapidly as shown in figure 3.

In the covid-19 pandemic situation, when most of the synthetic repurposed drugs even antiviral drugs became ineffective or showed side effects, scientists are exploring alternative medicine that offer fewer side effects than conventional treatment.

Traditionally herbal drugs are in use for the treatment of various diseases, including respiratory viral infections due to their potent anti-inflammatory and immunostimulatory action. Reported research works have shown that some of the active phytoconstituents in medicinal plants have inhibitory action on coronaviruses and could be explored as important resources in the development of COVID-19 treatment in two ways, i.e., either as immunomodulators or viral target inhibitors based on their established roles in managing other viral diseases. The secondary metabolites and other chemical compounds from plants could prove as promising



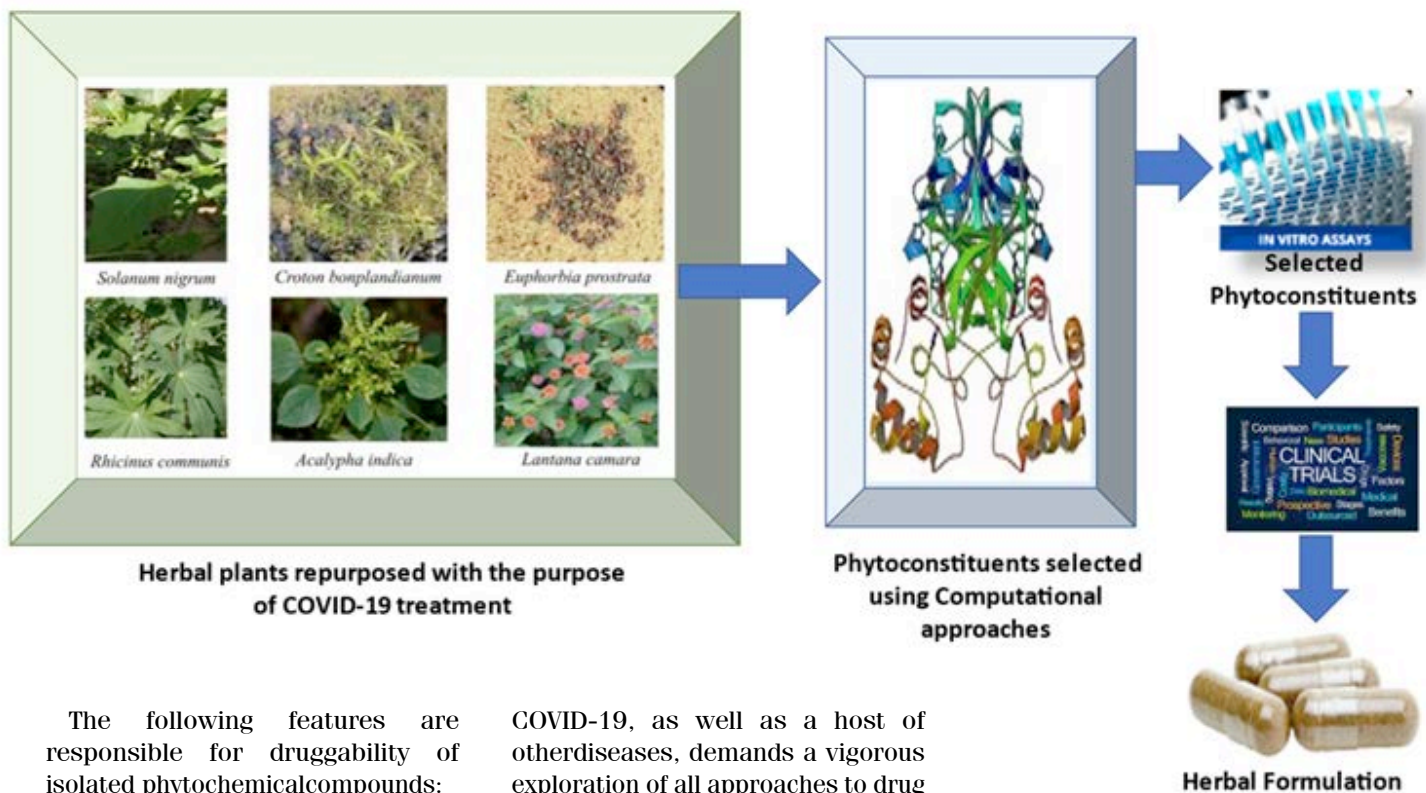
therapeutic agents as antiviral either by inhibiting the viral replication or viral cell entry and/or otherwise treating the underlying infection caused by SARS-CoV-2 and thus could prove a safer and innovative

treatment for this viral infectious disease.

A NEW PROSPECTIVE OF PHYTOCHEMICAL DRUG REPURPOSING USING MIXED APPROACH



There are various examples of development of new drugs from the plant sources. Morphine was isolated from opium produced from cut seed pods of the poppy plant (*Papaver somniferum*) approximately 200 years ago. Various drugs developed from natural sources have undoubtedly revolutionized medicine, like antibiotics (e.g. penicillin, tetracycline, erythromycin), antiparasitics (e.g. avermectin), antimalarials (e.g. quinine, artemisinin), lipid control agents (e.g. lovastatin and analogs), immunosuppressants for organ transplants (e.g. cyclosporine, rapamycins), and anticancer drugs (e.g. paclitaxel, irinotecan).



Herbal plants repurposed with the purpose of COVID-19 treatment

Phytoconstituents selected using Computational approaches

Herbal Formulation

The following features are responsible for druggability of isolated phytochemical compounds:

- Greater number of chiral centers
- Increased steric complexity
- Higher number of oxygen atoms
- Lower ratio of aromatic ring atoms to total heavy atoms
- Higher number of solvated hydrogen bond donors and acceptors
- Greater molecular rigidity
- Broader distribution of molecular properties such as molecular mass, octanol water partition coefficient, and diversity of ring systems


The realization that the number of NCEs in drug development pipelines is declining may have led to the rekindling of interest in “rediscovering natural products”, as well as amounting appreciation of the value of natural product-like models in “improving efficiency” in so-called diversity-oriented synthesis. The urgent need for new pharmaceuticals for the treatment of cancer, HIV and recent infectious diseases like

COVID-19, as well as a host of other diseases, demands a vigorous exploration of all approaches to drug discovery, and it is clear that Nature has played, and will continue to play, a vital role in this process. In the light of above facts and considering the pathogenesis of COVID-19, a team of researchers at DPSRU identified some Indian medicinal plants from Aravalli Biodiversity park of Delhi with potent anti-inflammatory, immunomodulatory, and antiviral activities for developing potential treatment of COVID-19 as shown in figure 4. The plants identified were *Solanum nigrum*, *Euphorbia prostrata*, *Acalypha indica*, *Lantana camara* and *Ricinus communis*. A literature search to identify the phytoconstituents of these plants revealed that they contain flavonoids, flavonoid glycosides, triterpenoids, steroidal glycoalkaloids and other compounds of different classes.

Fig. 4: Repurposing with computational and experimental approaches

CONCLUSIONS:

Drug repurposing is a cost-effective alternative in drug development because of three reasons: First, pharmacodynamics (what a drug does to the body or to the pathogen in the body) and pharmacokinetics (what the body or pathogen in the body does to the drug) of the drug typically are already known. Second, the potential side effects have already been thoroughly tested for getting the drug through the regulatory authority, and Third, the problem of synthesis and mass production of the drug has already been solved.

Thus, repurposing of existing drugs with purposing can be attractive as the process is often less risky, more cost effective and can be undertaken in less time. 

(The authors are from Delhi Pharmaceutical Sciences & Research University, New Delhi)

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REMOVE EVERY B A





OUR BALDNESS

There is a very good reason why the hair on your head is called 'crowning glory'. A glorious mane of hair can enhance one's personality, make you stand out among the crowd, and build your self-confidence like nothing else can.....

BY DR. AMRENDRA KUMAR

But not everyone is blessed with ever-growing hair. For many reasons, be they hormonal, medicine-induced, lifestyle and cosmetic treatments, or other health issues, many begin to lose hair even in their late twenties these days. Surveys have shown that diet, hair treatments for fashion, stress can all become potential reasons why millennials staring at male pattern baldness an early age. This affects one's self-esteem and attitude to life, and young men begin to despair their looks. But these days, thanks to medical advancements, one does not have to despair lost hair for long! Hair transplantation is now a minimally invasive procedure.

WHAT IS HAIR TRANSPLANTATION?

It is a procedure that involves transfer of hair follicles (called grafts) from one part of the



body (donor area) to the scalp where baldness has set in (recipient area). This procedure is mainly used to treat male pattern baldness – also called Androgenetic alopecia. This is the most common condition responsible for baldness in males which affects more than 80% of the male population. Hair transplantation is one of the most opted for procedures to get back a head full of hair, for someone affected with baldness. It's a basic procedure that's done under a local anaesthesia – where hairs from the donor area are grafted onto the bald scalp. The donor



Dr. Amrendra Kumar

area is that part of the body that's resistant to balding (such as the back and sides of the scalp, beard hair and at times, other body hair), and so, the transplanted hairs last a lifetime. This procedure is considered a generally very successful one as clinical studies have shown that about 85-95% of all implanted hair grows pretty soon in the transplanted area.

IT'S FOR BOTH MEN AND WOMEN

Usually, this is a process that helps those men with male pattern baldness. However, this procedure can also be used to restore hair in female pattern hair loss, eyebrows or eyelashes hair restoration, beard hair restoration and even, in some cases of hair loss due to surgery or trauma. Natural hair growth in groups called follicular units (number of hairs vary from 1-4). Today, modern hair transplantation techniques can reproduce the exact natural growth pattern of hair by transferring complete hair follicular units to the





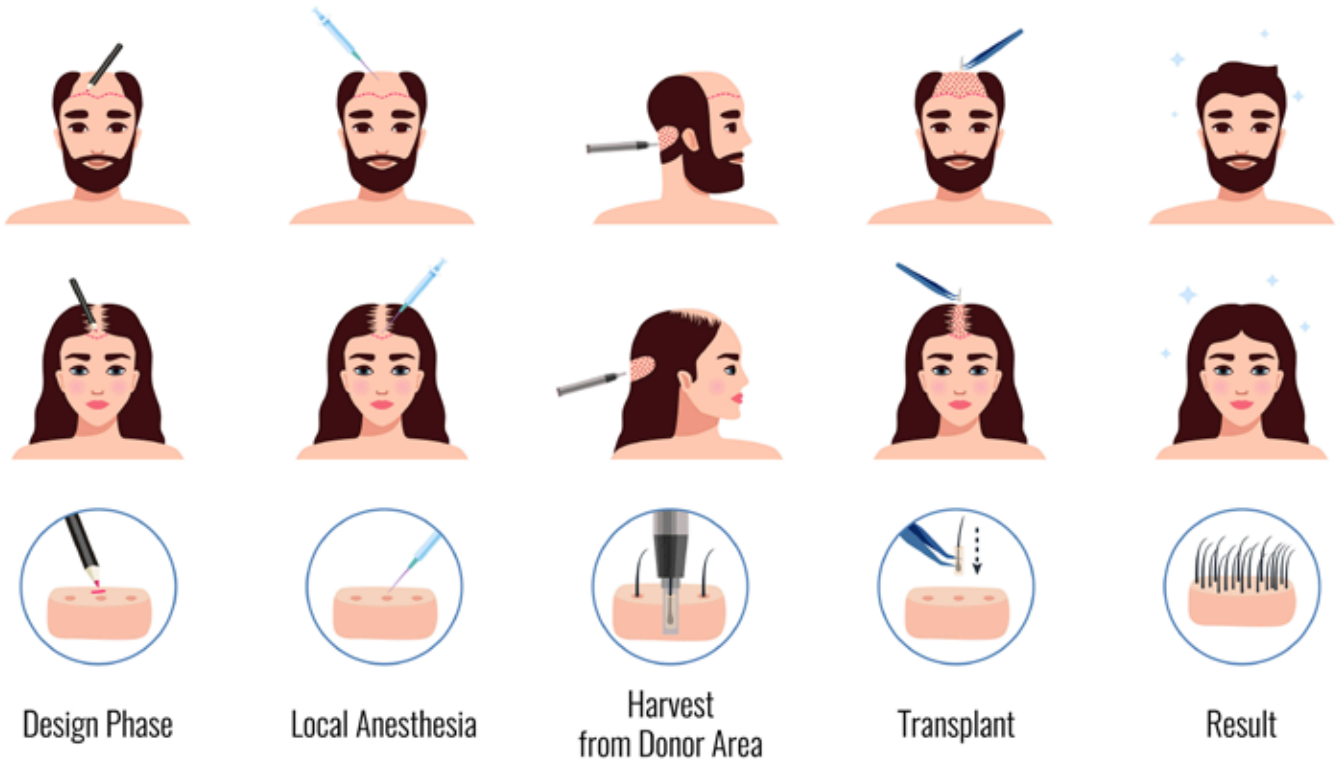
scalp. The result? Ahead full of very natural-looking hair that mimics the natural orientation of the hair follicles.

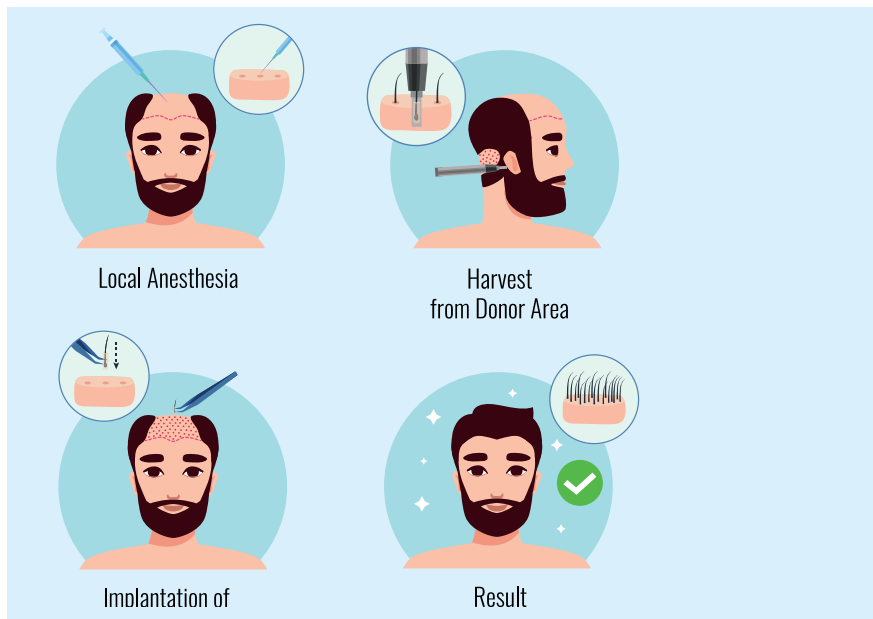
**THE PROCEDURE:
WPRE-OPERATIVE
ASSESSMENT AND PLANNING**

Like for every cosmetic procedure, a pre-operative assessment and planning is done at the first consultation with the patient. Even though it's considered a fairly successful procedure, hair transplant results vary from person to person depending on many factors. This is what the dermatologist/surgeon assesses during the first consultation. They analyse the following things:

- The first and the foremost is the condition of the scalp – is it normal, does it have issues

Hair Transplantation





MYTHS SURROUNDING HAIR TRANSPLANTATION PROCEDURES

- Hair transplantation can affect brain and eyes: No, it does not. Neither does it cause cancer
- Only men can have hair transplantation: No, women can, too
- Transplant is very obvious: No, it is not. If implanted at the natural angle and direction of growth, they look absolutely natural
- Transplanted hairs do not grow back after trimming: They do. They are just like natural hair
- Another person's hair can be transplanted onto my head: No – that is impossible
- The transplanted area can also go bald: No, if the hair is extracted from a safe donor zone, they last exceptionally long, up to a lifetime
- You cannot wash transplanted hair: Yes, you can. Transplanted hair can be taken care of with simple shampooing just as natural hairs
- You must take lifelong medications: No. Absolutely not. Transplanted hair do not need medications to grow
- Older people with underlying medical conditions like diabetes should not go for hair transplantation: They can. Hair transplantation is a very safe surgery; however, certain care should be taken before hair transplantation in these persons
- FUE is better than FUT or vice versa: The results totally depend on surgeon's expertise
- Robotic hair transplantation is better: No. Till date, an expert surgeon's hand is better than a robot. So far, only ARTAS robot is approved for hair transplantation and that too has some flaws. Most devices advertised as 'robots' are not robots
- Good hair transplant shows immediate results: No. Transplanted hairs take nine to 12 months to grow fully
- It is a very costly procedure: No. It is very affordable, though the costing depends on many factors

affect the transplantation results

- History of medications – to see if it may affect local anaesthesia or bleeding during surgery
- Lifestyle – smoking habits, alcohol consumption, etc

THE PLANNING STAGE

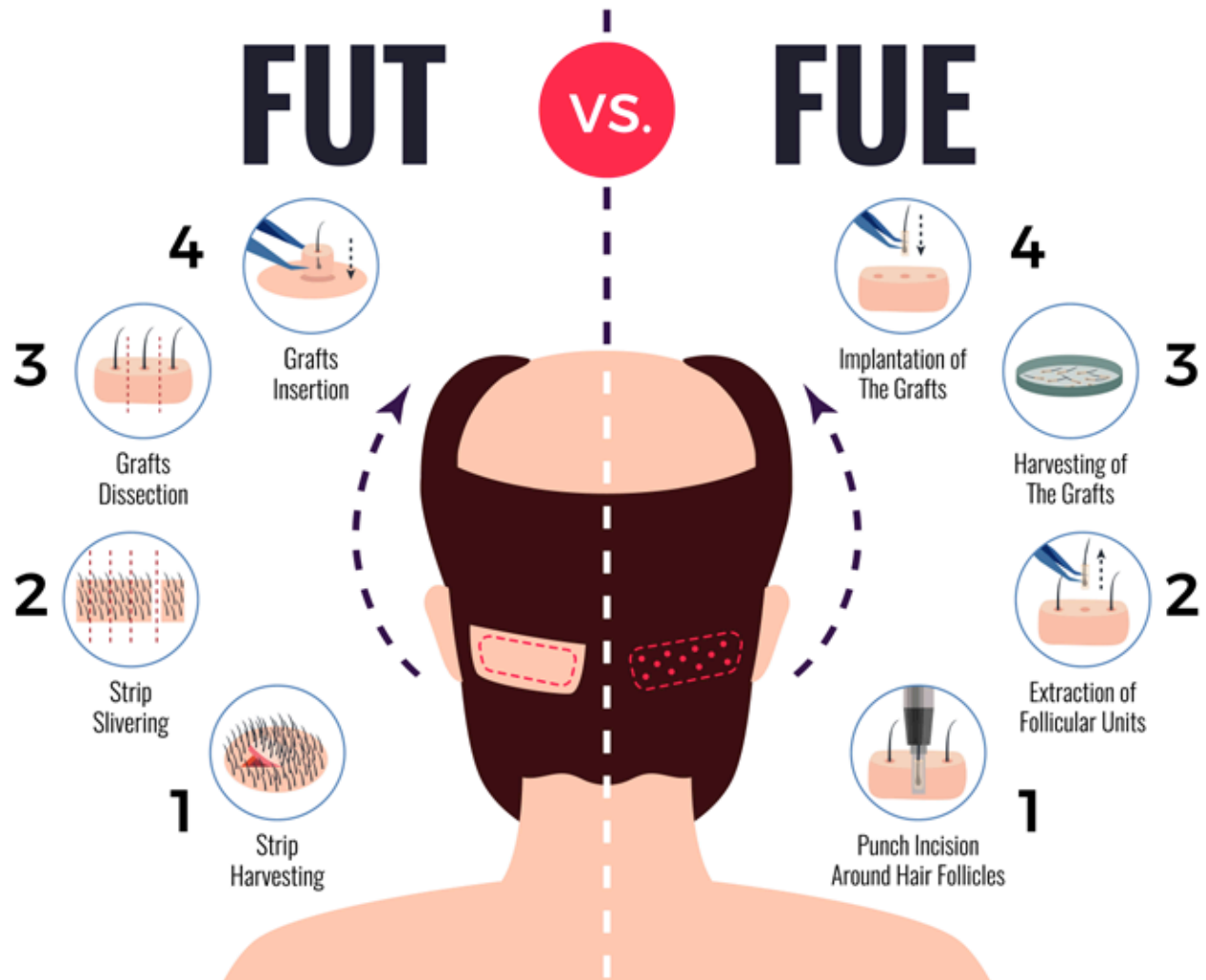
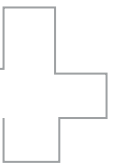
Based on the pre-operative assessment, the actual transplantation is planned. The surgeon will discuss the best approaches suited for the person undergoing the transplant charts out the best method suited for that patient, among other things. The surgeon will also discuss...

- The techniques of transplantation, the patient's preferences
- Results expected
- Number of grafts required
- The desired density versus expected density of transplanted hairs
- The quality and nature of grafts and their impact on the results
- Number of sessions needed
- Post-operative instructions/medications

THE PROCEDURE OF TRANSPLANTATION

Hair transplantations are outpatient procedures done under local anaesthesia. Pre-operative medications may include antibiotics, along with shampooing of scalp, sterilisation of the area. After that, the procedure follows the following steps:

- Extraction: This is usually done using the Follicular Unit Transplantation (FUT or strip method) or Follicular Unit Excision/extraction method (FUE). A lot depends on the surgeon's experience here – in the strip method, a chunk of skin with hair is sliced out from the donor area and the



hairs in the strip are separated and transplanted. This process always leaves a scar. In FUE method, the follicular units are extracted directly. This method is best for extracting hairs from scalp, beard or other body parts. Scars are minimal.

- Recipient area designing: The surgeon creates multiple holes in a calculated manner – these slits must be perfect otherwise grafts may look unnatural.
- Implantation: The extracted hairs are implanted, usually done by the technicians using extreme caution not to damage the hairs.
- Dressing: Usually of the donor


area after the transplant

WHAT HAPPENS AFTER THE TRANSPLANTATION?

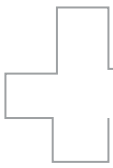
One of the biggest things here is not to worry when the transplanted hairs begin to fall off. It is a natural part of the process. The hair will begin to grow after three months, and will gradually increase in density. It will take nine to 12 months on an average for the full head of hair to grow back.

Possible complications/side effects
Universally, hair transplantation is very safe and can be performed even on children and aged persons. However, sometimes a few adverse effects can be seen, though long-term complications are exceedingly rare.

Complications may include pain, or excessive bleeding and are usually manageable. Immediate post-operative complications may include pain, swelling on face, infection and itching. These complications need close monitoring – and are easily addressed.

A word of caution here: FUT and FUE complications can turn ugly sometimes, therefore it is advised that one always goes to certified, reputed surgeons with many years of experience. 

(The author is well known dermatologist, hair transplant surgeon and director, Dermaclinix)



NO MIXOPATHY TO SAVE THE MODERN MEDICINE

In an interview with **Double Helical Dr Vinay Aggarwal**, Past National President, Indian Medical Association and Chairman, Pushpanjali Medical Centre, Past National President- Indian Medical Association, Past President, CMAAO (Confederation of Medical Associations in Asia and Oceania), Ex Member, Medical Council of India, Executive Member, Delhi Medical Council, says that it is extremely strange and unfortunate policy of Mixopathy adopted by the Ayush Ministry with CCIM diluting the purity, ethically, safety and quality of Indian healthcare system.....

AMRESH K TIWARY

The meaning of Mixopathy, as used by the doctors, is a critical way to refer to what they see as an effort to integrate different kinds of alternative medicine systems, like homeopathy and Ayurveda, with modern medical science. But recently the doctors all across the nation, after a call from Indian Medical Association, protested against Mixopathy.

Mixopathy unlike Allopathy, Homeopathy, itself was not a procedure in medical sciences. Origin of this word has a link with Central Council of Indian Medicine Notification on dated 20th, November, 2020. It is a statutory body under the AYUSH Ministry, Government of India.

This notification amended The Indian Medicine Central Council (Post Graduate Ayurveda Education) Regulation 2016. It is now named as The Indian Medicine Central Council (Post Graduate Ayurveda Education) Regulation 2020.

These new regulations allowed Post Graduate Scholars of Shalya and

Shalakyas to perform surgery independently. For MS (Ayurveda) Shalya Tantra (General Surgery), There is a description of Thirty Nine Procedures of surgery. While in the MS (Ayurveda) Shalakyas Tantra, Nine procedures for Eyes, Three procedures each for Ear and Nose & Two procedures each for Mouth and Dental health are discussed.



EXCERPT FROM INTERVIEW

Q-DO YOU THINK, IS THERE ANY SCOPE OF MIXOPATHY A MEDICAL PROCEDURE?

ANS- Not at all, After this Gazette Notification, we condemned the move.

According to them, it is an attempt to mix the knowledge, procedures and techniques of modern Medical Sciences with traditional Ayurveda.

We are stating Central Council of Indian Medicine to develop their own medical procedures according to their ancient texts.

IMA is a national organization of doctors of modern scientific system of medicine in India, which look after the interest of doctors, healthcare of the country and the well being of the country at large. With nearly 4 lakh members and 2000 active local branches in all states and union territories in India, INM is the largest association of doctors in the world. India healthcare and Indian doctors have earned the peak positions in the world healthcare scenario. IMA is proud to all its doctors, healthcare workers and all stakeholders contributing to the healthcare of India. IMA has worldwide spread with its modern medical doctors delivering the experience to the world.



Q- WHAT IS YOUR TAKE ON MIXOPATHY?

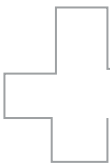
ANS- It is extremely strange and unfortunate policy of Mixopathy adopted by the Ayush Ministry with CCIM diluting the purity, ethically, safety and quality of Indian healthcare system. THE CCIM notification is hazardous and unsafe in its every aspect. People will need land up in unsafe, inexperienced, unqualified and unprofessional hands of surgery. The qualified surgeons will be left with no choice but to sit and watch the ridiculous, wrong and unsafe surgical healthcare being delivered to people. Their righteousness will prove futile in front of the legal unethicality of Mixopathy due to the said notification.

Q- DO YOU NOT RESPECT ALL OTHER SYSTEM OF INDIAN MEDICINE LIKE AYURVED?

ANS- Yes, we respect Ayurved and all other system of Indian Medicine. We welcome and propose that all our traditional system should strive hard and make themselves more people centred and evidence based. We are against the slated Mixopathy in the Indian healthcare. New government policy of Mixopathy of all systems, in which the mutually unrelated in principles and mode of operandi and integrated unscientifically together as a one system. We have launched the freedom struggle of modern medicine from the force of Mixopathy. Under the our special campaign "Save Healthcare India Movement" we are vowed to success this campaign as the national public safety. All specialty associations across the country have united and joined the movement through Federation of Medical Associations under aggies of IMA.

Q- WHY NOT MIXOPATHY, JUST GIVE A VALID REASON?

ANS- I would only say just to save modern medicine from a risky fusion



but in allowing Ayurveda practitioners to do surgeries, they are eroding a system that works and poaching modern medicine. Our all doctors have observed relay hunger strike for 14 days. Our all women doctors observed hunger strike all across the nation in recent past.

Q- CAN SURGERY BE A PART OF AYURVEDA?

ANS- In my opinion not at all. Because it has questioned the competence of Ayurveda practitioners to carry out these procedures, and called the notification an attempt at Mixopathy. Recently, a government notification listed out specific surgical procedures that a postgraduate medical student of Ayurveda must be practically trained to acquaint with, as well as to independently perform. What happens earlier means before notification postgraduate education in Ayurveda is guided by the Indian Medical Central Council (Post Graduate Education) Regulations framed from time to time. Currently, the regulations formulated in 2016 are in force. The latest notification of November 19 is an amendment to the 2016 regulations.

The 2016 regulations allow postgraduate students to specialise in Shalya Tantra, Shalakya Tantra, and Prasuti evam Stree Roga (Obstetrics and Gynecology), the three disciplines involving major surgical interventions. Students of these three disciplines are granted MS (Master in Surgery in Ayurveda) degrees.

Ayurveda practitioners point out that students enrolling in Ayurveda courses have to pass the same NEET (National Eligibility-cum-Entrance Test). Their course runs for four-and-a-half years, followed by one year of internship, six months of which are spent at an Ayurveda hospital, and the remaining six months at a civil or general hospital, or a primary health care centre..

with alternative medicine. As a esteemed advisory board member of “Indian Medical Association” (IMA), an apex body of doctors in India, had called for a nationwide strike in recent past to express our opposition of the government’s decision to allow Ayurvedic practitioners to perform medical surgeries. We stood up for India, lost 700 doctors to Covid.-19. Our main objective is to save modern medicine from Mixopathy.

The government of India’s policy of Mixopathy is the result of attempting to provide care on a shoestring budget to all Indians. The Government is concerned about care for all. We are concerned about standards of care. The government’s urgency and anxiety in providing minimum care to all is shared by us. Unfortunately, our

concern on standards of care appears to be not shared by the Government.

Q-AS YOU KNOW THAT RECENTLY THE DOCTORS UNDER THE BANNER OF IMA WENT ON STRIKE TO SAVE “MODERN MEDICINE” FROM A RISKY FUSION WITH ALTERNATIVE MEDICINE. SO TELL US WHY YOU PEOPLE ANGST OVER MIXOPATHY?

ANS- Undoubtedly our angst over Government’s move to allow a section of Ayurveda doctors to undertake certain surgeries. If govt does not listen to us we will bound to go on strike again across the country to protest against Mixopathy. Today Indian healthcare professionals have been at the forefront in managing healthcare systems in all over world

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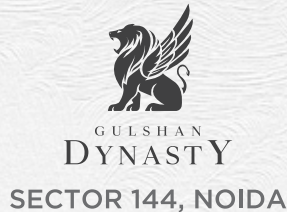

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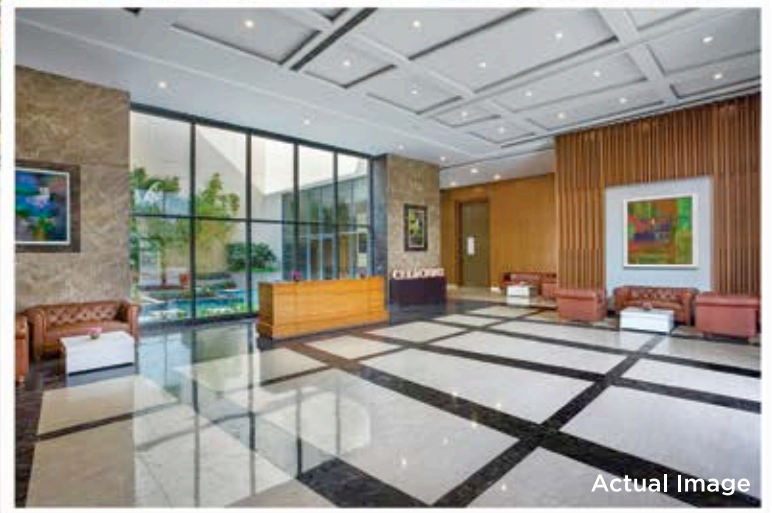
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