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MICROBIOME

NEWSLETTER

THE DEPARTMENT OF MICROBIOLOGY

VIJAYA COLLEGE

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EDWARD JENNER

- Gutala Mounika

"I shall endeavour still further to prosecute this inquiry, an inquiry I trust not merely speculative, but of sufficient moment to inspire the pleasing hope of its becoming essentially beneficial to mankind."

- Edward Jenner

EDWARD JENNER

Edward Jenner was an English physician and scientist, born on May 17th, 1749 who pioneered the concept of vaccines including creating the smallpox vaccine, the world's first vaccine. At that time, smallpox was an infectious scourge affecting mainly children and killed many people (around 10% of the population). The first Recorded attempts to induce immunity were performed by the Chinese and Turks in the 15th century. Various reports suggest that the dried crusts derived from smallpox pustules were either inhaled into the nostrils or inserted into small cuts in the skin. A technique called 'Variolation'. The method was significantly improved by Jenner in 1798. Intrigued by the fact that milkmaids who were affected by mild disease 'cowpox' were subsequently immune to 'smallpox', Jenner reasoned that introducing fluid from a cowpox pustule into people (i,e inoculating them) might protect them from smallpox. To test this idea, he took material from a cowpox lesion of Saran Nelmes, a milk maid (suffering from cowpox), and inoculated it into the arm of an eight-year-old boy James Phipps on 14th may 1796.After observing that Phipps developed fever and uneasiness, but no full-blown infection, later he intentionally infected the child with smallpox. As predicted, the child did not develop small pox. Jenner's technique of inoculation with cowpox to protect against smallpox spread quickly throughout Europe. The introduction of cowpox vaccination by Jenner paved the foundation for immunization procedures. However, for many reasons including lack of obvious disease targets and knowledge of their causes, it was nearly a hundred years before this technique was applied to other diseases.

Awards and Grants to Dr. Edward Jenner

Dr. Edward Jenner was the recipient of many awards, lifetime and posthumous including:

1) 1789 - Honorary Fellow of the Royal Society of Medicine - an award to those whose discoveries and work have proven to be significant advances in human health.- acclaimed scientists Sigmund Freud, Charles Darwin, Louis Pasteur among others also received this award.
2) 1801-Diploma of Fellow of the Royal Society of Sciences at Gottingen, September 14.
3) 1802 - Manchester Infirmary: Certificate of the success of Vaccine Inoculation and complimentary address.
4) 1802 - Edinburgh (March 7) Diploma of Fellow of the Royal Medical Society of Edinburgh.5) 1902 - Paris (July 29) Official Letter of respect and congratulation upon the general success of Vaccination in France, from the Central Committee of Vaccination.

- Shreyas M G, Soundarya K R

THE CHALLENGES OF COVID-19 PANDEMIC
THE ULTIMATE BULLET- THE COVID VACCINES

As the COVID-19 pandemic raged around the globe, scientists created a history to produce safe and effective coronavirus vaccines in record time. Vaccination is a simple, safe, and effective procedure to protect a large mass of people against harmful diseases before they enter the body. The vaccine mimics the role of real infectious agents to our immune or defensive system. The development of vaccines takesmany years of research work. At present, the Covid vaccines are made based on the mRNA vaccine, Protein subunit vaccine, and vector vaccine. Scientists embarked on a race to produce safe and effective coronavirus vaccines in record time. The first mass vaccination program started in early December 2020 and as of May 2021, the highest vaccination has been done in Israel, UK, the USA, etc, and the lowest in India(10.23%). There are over 200 vaccine candidates that have been developed. Of these 52 are in human trials and 8 different vaccines have been rolled out globally. Because COVID vaccines have only been developed on the fast track in the past few months, it's too early to know the duration of protection of COVID-19 vaccines.

COVAXIN

COVAXIN (also known as BBV152) is an inactivated virus-based COVID- 19 vaccine being developed by Bharat Biotech in collaboration with the Indian council of medical research (ICMR). Bharat Biotech used a sample of the coronavirus isolated by India's National Institute of virology. Once the researchers produced large stocks of the coronaviruses, they doused them with a chemical called beta-propiolactone. The compound disabled the coronaviruses by bonding to their genes. The inactivated coronaviruses could no longer replicate, but their proteins, including spike, remained intact. The researchers then drew off the inactivated viruses and mixed them with a tiny amount of an aluminum-based compound called an adjuvant. Adjuvants stimulate the immune system to boost its response to a vaccine.Once inside the body, the immunocytes produce neutralizing antibodies against inactivated viruses. Antibodies that target the spike protein can prevent the virus from entering cells. Other kinds of antibodies may block the virus by other means. Covaxin is scheduled for two doses, given four weeks apart. And the efficacy of this vaccine is 81%.

COVISHIELD

The Oxford-AstraZeneca developed the vaccine based on the virus's genetic materials for building the spike protein. But unlike the Pfizer-BioNTech and Moderns vaccines, which store the instructions in single-stranded RNA, the Oxford vaccine uses double-stranded DNA. The researchers added the gene for the coronavirus spike protein to another virus called an adenovirus. Adenoviruses are common viruses the typically cause colds or flu-like symptoms. The Oxford-AstraZeneca team used a modified version of a chimpanzee adenovirus, known as ChAdOx1. It can enter cells, but it can't replicate inside them. The adenovirus provokes the immune system by releasing neutralizing antibodies to react more strongly to the spike proteins. The efficacy of this vaccine is 75%.

Pfizer-BioNTech Vaccine

The German company BioNTech partnered with Pfizer to develop a coronavirus vaccine known as BNT162b2, the generic name tozinameran or the brand name Comirnaty. A clinical trial demonstrated that the vaccine has an efficacy rate of 95% in preventing COVID-19. The Pfizer-BioNTech vaccine is based on the virus's genetic material mRNA. The mRNA molecule is fragile and to protect the vaccine, the mRNA is wrapped in oily bubbles made of lipid nanoparticles. The Pfizer-BioNTech vaccine requires two injections, given 21 days apart, to prime the immune system well enough to fight off the virus.

Moderna's Vaccine

Moderna, a Massachusetts-based vaccine developer, partnered with the National Institute of Health to develop and test a coronavirus vaccine known as mRNA-1273. A clinical trial demonstrated that the vaccine has an efficacy rate of 94.1% in preventing COVID-19. Like the Pfizer-BioNTech vaccine, Moderna's vaccine is based on the virus's genetic material. Moderna's vaccine will need to be refrigerated and should be stable for up to six months when shipped and stored at -20 degrees Celcius. Moderna's vaccine requires two injections, given 28 days apart to complete the vaccination.

Sputnik V

Sputnik V is the world's first registered vaccine based on a well-studied human adenoviral vector-based platform. It currently ranks among the top-10 candidate vaccines and the mass production on the WHO list. The Sputnik V post-registration clinical trial in Russia involved 40,000 volunteers. Clinical trials of the vaccine had been announced in the UAE, INDIA, VENEZUELA, and BELARUS. At present in India, this vaccine is developed in collaboration with Dr. Reddy's Laboratory, Hyderabad. The Sputnik V vaccine efficacy is confirmed at 91.4% based on data analysis of the final clinical trials. The Sputnik V vaccine efficacy against severe cases of coronavirus is 100%. In order to ensure lasting immunity Russian scientists came up with a breakthrough idea to use two different types of adenovirus vectors (rAd26 and rAd5) for the first and second vaccination, boosting the effect of the vaccine. The use of human adenoviruses as vectors is safe because these viruses which cause the common cold, are not novel and have been around for thousands of years. There are few vaccines in Pipeline and will be available to humans in the future once it is approved by WHO.

- Ananya V B, Chandrakala L, Praveen A

SCRAMBLE

1. CCAINIOATNV

2. SMPOAICTMTYA

3. SIVIEOLCDH

4.TNINRAEUAQ

5. MEFOINDCI

6. LBMCEAUAN

7. UYMITNMI

8. DOKOCWLN

9. RFECUW

10. VGEOLS

- Manoj Kumar K
Smitha B S

NOBEL LAUREATES - 2020

Harvey .J. Alter, Michael Houghton and Charles .M. Rice

For the discovery of the Hepatitis C virus.

In the year 2020, the Nobel Prize in physiology/ medicine was awarded to three scientists who have made a contribution to fighting against the deadly blood-borne hepatitis, a major global health problem that causes cirrhosis and liver cancer in people globally.

Harvey J. Change

Michael Houghton

Charles M. Rice

Harvey J. Change, Michael Houghton, and Charles M. Rice made fundamental discoveries of a novel infection of the liver by the Hepatitis C virus.

Harvey J. Alter was born in 1935 in New York. He received his medical degree at the University of Rochester Medical School and trained in internal medicine at Strong Memorial Hospital and at the University Hospitals of Seattle. In 1961, he joined the National Institutes of Health (NIH) as a clinical associate. He spent several years at Georgetown University before returning to NIH in 1969 to join the Clinical Center's Department of Transfusion Medicine as a senior investigator. In the 1970s, two types of hepatitis, A, and B, had been identified. Studies of people who had received blood transfusions allowed Harvey Alter and his colleagues to demonstrate that a previously unknown contagion also transmitted the disease. Alter and his colleagues were also able to show that this contagion was a virus.

Michael Houghton was born in the United Kingdom. He received his Ph.D. degree in 1977 from King's College London. He joined G. D. Searle & Company before moving to Chiron Corporation, Emeryville, California in 1982. He relocated to the University of Alberta in 2010 and is currently a Canada Excellence Research Chair in Virology. Michael Houghton and his colleagues were able to isolate the virus's genome of Hepatitis C in 1989. The virus turned out to be an RNA virus from the Flavivirus family and was given the name the hepatitis C virus. He received Hon. Doctorate from the University of East Anglia in 2019.

Charles M. Rice was born in 1952 in Sacramento. He received his Ph.D. degree in 1981 from the California Institute of Technology where he also trained as a postdoctoral fellow between 1981-1985. He established his research group at Washington University School of Medicine, St Louis in 1986 and became a full Professor in 1995. Since 2001 he has been Professor at the Rockefeller University, New York. Charles Rice and his research teams succeeded to show that a region in the virus's genome was crucial in causing hepatitis. The finding was an important step in developing blood tests and new medications that have saved millions of lives. In 2015 Charles was awarded with Robert Koch prize.

- Varun K and Manoj Kumar K

PLASMA THERAPY IN THE TREATMENT OF COVID-19

COVID – 19 is currently a big threat to global health. However, there are no approved specific antiviral agents for novel coronavirus disease 2019 hence, different methodological treatments are implemented in which convalescent plasma(cp) transfusion has been efficient to rescue severely affected patients.

Introduction to Plasma Therapy

Convalescent plasma therapy is classic adoptive immunotherapy. The process involves the extraction of plasma/serum from the blood of a person who has recovered from the infection. After the extraction, the plasma collected is injected into a patient suffering from the disease. The plasma contains antibodies that help the patient who is severely affected not only to battle the infection but also eases the symptoms and speeds up the recovery time

Plasma therapy in the treatment of COVID-19

Plasma therapy is proven to be one of the efficient methods in the treatment of coronavirus. One dose of convalescent plasma (200ml) is said to maintain the neutralizing antibodies at a high level, resulting in the disappearance of infection within 7 days. Meanwhile, clinical symptoms were significantly improved along with the increase of oxyhemoglobin saturation within 3 days. Radiological examination showed varying degrees of absorption of lung lesions within 7 days. These results indicate CP can serve as a promising rescue option for COVID-19, while the randomized trial is warranted.

How to extract plasma?

Plasma is a liquid part of blood that carries cells and proteins throughout the body. It is the intravascular part of extracellular fluid. Plasma can be extracted from the donor using 3 simple steps:-

*Draw 12 ml of whole blood for each 5mL of serum or plasma needed.
Collect in an appropriate collection tube.
*Centrifuge for at least 15 minutes at 2200-2500 RPM.
*Pipette the serum or plasma into a clean plastic screw-cap vial and attach the label.
Do not transfer the red cells to the vial.

Who can donate plasma?

People who have recovered from coronavirus (covid 19) can donate their plasma only after 20-30 days of recovery. They must be between the ages of 18 and 60 and should weigh 50 kilos and above. Most importantly, symptomatic patients are likely to be preferred over asymptomatic patients since they contain anti-SARS-Cov-2 IgG antibodies in their blood plasma.

Risks Involved…!

While there have been no known risks associated with plasma therapy, it is crucial that the procedure is conducted in the presence of a medical professional

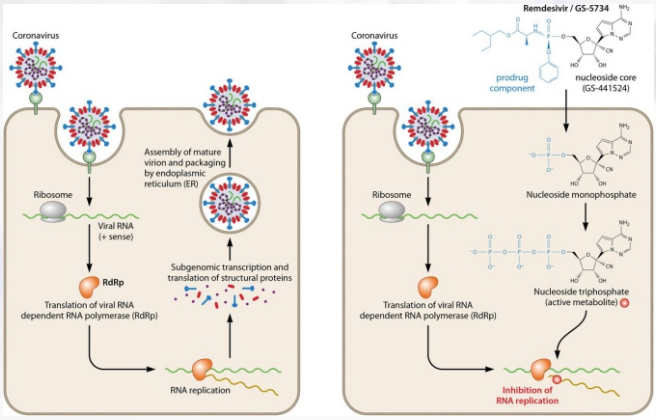
Measures to be taken while donating Plasma:-

*COVID-19 NEGATIVE results are the important criteria to again the eligibility as a plasma donor.
*The asymptomatic patients can donate plasma after 14 days of being tested positive. While symptomatic patients need to get tested after recovering from the virus.
*Pregnant women are not eligible to donate convalescent plasma
*A person who has received COVID-19 vaccination will not be able to donate plasma for 28 days from the date of vaccination.
*A person is ineligible to donate plasma if the particular individual is said to have inadequacy of antibodies in the blood.

- Amruthavarshini I, Akshath M H, Meghana C A

MECHANISM OF REMDESIVIR IN TREATMENT OF COVID-19

Remdesivir is an approved drug (Veklury, GS-5734) of choice in the 2nd wave of the Corona pandemic in India. It is a broad-spectrum antiviral medicine. Coronavirus is an RNA virus. The Coronavirus attaches to the receptor of the target cell (host) and inserts the viral RNA inside the host cell. Sequence or information on the RNA makes an enzyme called RdRp (RNA dependent RNA polymerase) where an RNA duplication (multiple copies of RNA) & by host ribosome protein is also synthesized. Thus the virus spreads from one person to another by different means like contacts, coughing, sneezing, etc..., Remdesivir drug prevents RNA duplication & also degrades the proofreading activities of the exonuclease enzyme. As a result, it delays the process of RNA viral replication, so it's called a delayed chain terminator.Remdesivir is a prodrug of ribonucleotide analog (Gs-5734) which when enters the cell converted into Gs-704277 and finally to Gs-441524 through the phospho amidase (almost active drug). The enzyme kinase converts the active drug complex where it is capable of preventing the entry of the RNA molecule of the virus into the host cell. This way Remdesivir can successfully prevent Viral replication inside the infected person.



- Shravani A S & Sindhu Priya M

MUCORMYCOSIS

The 'black fungus' maiming covid patients in India

Mucormycosis is a serious but rare fungal infection caused by a group of molds, which live freely in the environment, particularly in the soil, wet surface, and decaying organic matter such as leaves, compost piles, or rotten wood.. It is a life-threatening, invasive, opportunistic fungal infection caused by fungi belonging to the phylum Zygomycetes and it is Broad, non-septate hyphae of the fungus Mucor. People get mucormycosis through contact with fungal spores in the environment or by inhalation of the spores from the air. The infection typically starts growing from the nose, upper jaw, eyes and affects the brain. Once it reaches the brain, it is almost a death sentence. The black fungus that affects the lungs occurs after someone breathes in the spores. In free covid time, the infection is quite rare along with the world but since the pandemic, the cases have increased due to complications related to the virus. In India, few cases were reported last year, but now a new virus mutant has formed an infection across India.

There are three types of mucormycosis:

1) Sinonasal mucormycosis 2) Orbital mucormycosis 3) Rhinocerebral mucormycosis.

The black fungus infected those who used steroids, prolonged stays at hospital ICUs, diabetes patients and medication for major health problems. Even as a deadly second wave of covid-19 ravages India, doctors are now reporting a rash case involving a rare infection-also called the 'black fungus'- among recovering and recovered covid-19 patients. The symptoms are pain and redness of eyes, bleeding nose, black lesions on infected areas, partial loss of vision etc. The treatment is surgically removing dead and infected tissues, Antifungal therapy. The prevention is wearing a mask all the time and maintaining personal hygiene.

- Srikanth T

IMMUNITY BOOSTERS

COVID-19 pandemic has emerged as a major public health challenge. The infection of the disease, as well as the death rate, is increasing steadily throughout the globe. Along with the treatment and vaccine for this disease, there is a key role of immune boosters in the prevention of this disease.In the wake of the current spike in COVID-19 cases, enhancing the body's natural defense system (immunity) is importantin maintaining optimum health. Some of the important natural immune boosters are

LEMON

Scientific name: Citrus limon

1) Lemon is a pale yellow oval citrus fruit species of small evergreen trees in the flowering plant family Rutaceae with a native to South Asia especially Northeast India.
2) Lemon is acidic in nature with fragrance and rich in Vitamin C. Lemon has 88% vitamin C.
3)Vitamin C increases the production of immune cells that is white blood cells which help us fight against infections.

MEXICAN MINT

Scientific name: Coleus amboinicus

1) A small perennial plant is also known as Indian Borage belonging to the family Lamiaceae, having nativeto Africa and India. Leaves are the primary part used here for medicinal purposes.
2) A Mexican mint contains water as a major component along with Omega-6, Vitamin C, Vitamin A.
3) The high content of ascorbic acid found in the herb turns as an immunity booster.

TURMERIC

Scientific name: Curcuma longa

1) Turmeric is a powerful herb with over 300 nutrients including beta-carotene, ascorbic acid (vitamin C), calcium, flavonoids, fiber, iron, niacin, potassium, and zinc among others. But the active compound which has caught the attention of scientists, supplement industries, and food technologists is Curcumin for its anti-inflammatory and anti-bacterial properties

Benefits of having raw turmeric:
a) It facilitates smoother digestion; also helps treat stomach ulcers, irritation, and reduces inflammation in the body.
b) It not only purifies the blood but also regulates blood sugar level.

TULSI

Scientific name: Ocimum sanctum

1) Tulsi is also known as 'holy basil ' is an aromatic plant in the family 'Lamiaceae ' i,e mints, shares a long history of being a religious herb.
2) Rich in vitamin C and zinc, thus it acts as a natural immunity booster. It has immense anti-bacterial, anti-viral, and anti-fungal properties which protects from various infections.
3) Holy basil is an excellent remedy for cough, soothes the throat, and reduces the inflammation of the chest.
4) It also contains some phytochemicals, bioflavonoids, and anti-oxidant compounds such as rosmarinic acid, which is a good antimicrobial agent for treating infections in the respiratory tract.
5) Tulsi leaves extract increases the T helper cells (type of white blood cells) and natural killer cells, boosting the immune system.

GINGER

Scientific name: Zingiber officinale

1) Ginger is loaded with nutrients such as vitamin B6 and dietary minerals like magnesium and manganese.
2) It has other anti- bacterial and anti-inflammatory properties, which help with fighting various infections.
3) Due to the presence of 'Gingerol' an active component that makes ginger a perfect immunity booster.
4) Ginger being an effective antidote plays a vital role in the common cold and cough.

HEART LEAVED MOONSEED

Scientific name: Tinospora cordifolia

1) It mainly has hypolipidemic, hypoglycaemic, hepatoprotective anti-bacterial, anti-carcinogenic and anti-mutagenic effects.
2) In HIV-positive patients, it has been proved that this can reduce leukocyte count.
3) It is rich in iron, zinc, copper, calcium, phosphorus, manganese, and many secondary plant metabolites such as terrapins, alkaloids, steroids, glycosides, and flavonoids.
4) When a person is suffering from allergies this seems to significantly decrease sneezing, nasal itching, and stuffy nose.
5) It shows an ability to improve humeral and cell-mediated immunity against many viral diseases such as anemia, gout, and aflatoxicosis.

BLACK PEPPER

Scientific name: Piper nigrum

1) Mainly it is antioxidant, antimicrobial, gastroprotective, and rich in oleoresinous volatile oil and alkaloids.
2) As it is antibacterial in nature, it cures colds and flu. Also gives relief to the respiratory tract in the time of chest congestion due to viral infection, pollution, and flu.
3) Helps in promoting gut health which is linked to immune functions and chronic diseases.
4) It increases the absorption of essential nutrients and beneficial plant compounds.
5) It helps in fighting other diseases such as cancer, diabetes, Low BP, low sugar level, etc.

BROCCOLI

Scientific name: *Brassica oleracea var. italica*

1) Broccoli has lots of vitamins and minerals packed with vitamin A, C and E also has fibre and other antioxidant
2) Consumption of broccoli on a regular basis elevates beta carotene, which in response increases immune cells.

- Sharadhi A M, Sanjana S
Aishwarya K C, Monika M

ROLE OF ALLOPATHY IN COVID-19

Allopathic medicine or allopathy term was coined in 1810 by the inventor of homeopathy, Hahnemann. At present, it refers to modern medicines which include antibiotics, chemotherapeutic agents, vaccines, etc. The present treatment of covid19 infections is oxygen support and other life support systems in critical conditions. According to ICMR guidelines, different drugs are found to be effective against SARS-CoV

Chloroquine and Hydroxychloroquine

Chloroquine and hydroxychloroquine were used to treat malaria, systemic lupus erythematosus (SLE), and rheumatoid arthritis. Chloroquine and hydroxychloroquine prevent the entry of viruses into cells by modifying the glycosylation of host receptors. Initially, these drugs were used to treat covid patients but at present WHO doesn't recommend this particular drug for corona treatment.

Lopinavir/Ritonavir and Other Antiretrovirals

The Food and Drug Administration (FDA), USA, recommended lopinavir/ritonavir, an oral drug for HIV (Human Immunodeficiency Virus) which is a type of protease inhibitor. These drugs can be used during the early stages of viral replication but late usage of lopinavir/ritonavir had less effect on clinical conditions. Therefore for hospitalized patients, these drugs are not recommended.

Methylprednisolone which is an anti-inflammatory or immunomodulatory drug can be used for moderate to severe infection.

Tocilizumab

It is an Interleukin-6 inhibitor. Research showed that modulating the levels of IL-6 or its effects may reduce the severity of COVID-19 illness. Tocilizumab and dexamethasone together can be given to hospitalized patients who are exhibiting rapid respiratory problems due to COVID-19.

Remdesivir or Veklury

It is a broad-spectrum antiviral medication developed by the biopharmaceutical company Gilead Sciences. Remdesivir was approved for medical use in the United States in October 2020. It was originally used to treat Hepatitis and Ebola virus infections. It is a prodrug that activates inside the cell to convert to nucleoside analog and in turn, inhibits RNA polymerase of the virus. At present this is the drug of choice for severe covid infections.

Anti-SARS-CoV-2 Monoclonal Antibodies

The Emergency Use Authorization of Anti-SARS-CoV-2 Monoclonal Antibodies for the Treatment of COVID-19 was released on April 8, 2021. Bamlanivimab, the trade name is a neutralizing monoclonal antibody that targets the S protein (Spike protein) of SARS-CoV-2.The broad spectrum of antibiotics may be used to control the additional bacterial infection after a virus attack. Some drugs are under clinical trial and in the future these may be applicable. The best approach to fight viruses is vaccination.

- Asiya Rehman

ANSWERS: 1. VACCINATION, 2. ASYMPTOMATIC, 3. COVISHIELD, 4. QUARANTINE, 5. INFODEMIC, 6. AMBULANCE, 7. IMMUNITY, 8. LOCKDOWN, 9. CUREEM, 10. GLOVES

ROLE OF HOMEOPATHY IN TREATING COVID-19

The Scientific Advisory Board of the Central Council for Research in Homoeopathy (CCRH) under the directions of the Ministry of AYUSH(Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy) have recommended homeopathic medicines for asymptomatic to mild cases of COVID-19. These medicines can be given by only homeopathy practitioners but other safety protocols have to be maintained along with medicines like Gargle with warm water with an added pinch of turmeric and salt, eating fresh foods, etc.

Arsenicum Album 30- This Homoeopathy drug has become a subject of debate This drug has been recommended by several states for preventive use against Covid-19.

Mercurius solubilis as genus epidemicus- The usage for this medicine is awaited permission by the Govt of India. The application of this drug to patients showed promising results against Covid infections.

Camphora 1M- which uses the active ingredient camphor, used in over-the-counter cold and cough. This drug gained popularity as an immunity builder against a novel coronavirus.

Bryonia Alba- helps to develop early immunity against the COVID-19 virus and helps to develop antibodies.

Eupatorium Perfoliatum 30 and Lyropodium 30- Two generic Homoeopathy variants recommended by doctors to be taken in combination with Arsenicum Album 30 for 14 days.

- M Ameena Bi

BHOOTA JWARA!!

Aren't you shocked to hear the title? Well, calm down and have a look at this article.

BHOOTA JWARA: COVID-19 through the lens of Ayurveda.

INTRODUCTION: Ayurveda, the ancient holistic system of medicine of this great nation, has in it, precious pearls of wisdom and knowledge. Though ancient in time, it has adapted itself to the changing circumstances and situations. Today, while Modern Western Medicine and other medical systems are striving hard in finding a treatment for the COVID-19 disease, Ayurveda offers some promising solutions.

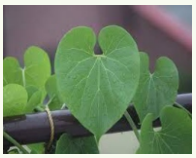
COVID-19 – In the language of Ayurveda: In the MWM, the current COVID-19 disease is considered to be pandemic in nature. In the system of Ayurveda, it is referred to as a Janapadodhwamsa Vikara (meaning, destroying large human communities at a time). These Janapadodhwamsa Vikara mainly arise due to vitiation of either of these – Vayu, Jala, desha, and Kala. Along with these, bhootas, rakshasa, adharma etc., also cause such pandemic diseases. Acharyas have commented bhootas as amanusha, microbes in the present-day scientific terminology. Thus COVID-19, according to Ayurveda is a bhootabhishangaja jwara (bhootabhishangaja-due to the association of microbes, jwara-disease). Hence the title!! Based on this consideration, treatment of COVID-19 can be performed by ayurvedic medication.

TREATMENT FOR COVID-19: In the system of Ayurveda, any individual is considered to be having a balanced composition of tridoshas – Vata, pitta, and Kapha. Together they constitute the Prakriti (body composition) of an individual. Any imbalance in these tridoshas, either in anyone or any two or in all, a person develops jwara. These imbalances may be due to various reasons, viral or microbial infection, or environmental changes, etc. Thus, treatment for any disease in Ayurveda completely depends on the patient and his/her body composition, sharira Bala (immunity), tridosha, comorbidities, stage and magnitude of infection, symptoms, etc. The same follows for COVID-19 disease too. However, some of the most commonly prescribed medications are provided in the table below.

COMMENTS: Apart from the physiological complications, psychological complications due to the SARS-CoV-2 (CORONA VIRUS) are the major issue that needs to be looked at. Yoga, another wonderful ancient wisdom comes to our help. The various asanas (postures) and pranayama methods described there not only address the physical aspect but also the psychological aspect of the body and provide peace and calmness to the mind and the body. Thus an integrative method of Ayurveda-Yoga can definitely be a silver line in this time of crisis.

CONCLUSION: Based on the information provided here, it is quite assuring that Ayurveda has plenty of solutions for the present-day crisis, which need to be explored. Thank you.

TABLE-1: Ayurvedic medicines for COVID-19 disease.

NAME OF THE MEDICINE	NAME OF THE HERB/S		PRESCRIBED AS	PROPERTIES
1. Giloy Ghan Vati	Giloy *Tinospora cordifolia*		Tablet and component of pathyadi kwath	Antipyretic, removal of toxins, anti- diabetic, blood purifier, enhancing liver function, treatment of heart related problems, maintaining proper metabolism
2. Ashwagandha vati	Ashwagandha *Withania somnifera*		Tablet	Provides immunity, pacifies Kapha and vata doshas, removes fatigue, enhances lung activity, removes blockage in GI Tract
3. Amla	Amla (Gooseberry) *Emblica officinalis*		Powder or raw consumption	Pacifies all tridoshas, improves appetite, antipyretic, improves heart function, reduces cough, anti-diabetic, improves immunity
4. Haldi	Turmeric *Curcuma longa*		Component of pathyadi kwath; used in foods	Pacifies vata and kapha dosha, removes toxins, reduces cough, reduces lung disorders
5. Harad	Haritaki *Terminalia chebula*		Component of pathyadi kwath	Pacifies the tridoshas, improves immunity, enhances liver function, antipyretic, enhances kidney function
6. Baheda	Bibhitaki *Terminalia bellerica*		Component of pathyadi kwath	Pacifies the tridoshas, antipyretic, improves blood, lymph, muscles; acts against common cold, reduces cough and lung disorders.
7. Neem	Neem *Azadirachta indica*		Component of pathyadi kwath; also consumed raw	Anti-toxic, increases appetite, increases liver efficiency, blood purifier, anti-diabetic, pacifies Kapha and pitta doshas

- Amith Bharadwaj S A, Varun K

IS HERD IMMUNITY POSSIBLE FOR COVID INFECTION?

Herd immunity is also known as community immunity /population immunity /herd effect. The term coined in 1923 by A.W Hedrich first recognized it as a naturally occurring phenomenon. Herd immunity protects people who can't get vaccinated because their immune system is weak and vaccines might make them sick. To have herd immunity and protect lots of people from disease, a very high percentage of people in any one area need to be vaccinated. This is called the threshold. Herd immunity stops the spread of infectious disease when a large percentage of people become immune to it! When herd immunity is developed an epidemic dies out gradually, though some people might not have the specified immunity, the population or herd is immune and when the herd is exposed to the disease again, the speed of infection would be very low. There are two ways to attain herd immunity: Exposure to disease & Immunization through vaccine. Therefore the mass immunity against Covid infection happens either through infections or through mass immunization. As the development of disease poses the risks of morbidity and mortality, the vaccination process of immunization is safest to protect the nation from this dreaded disease.

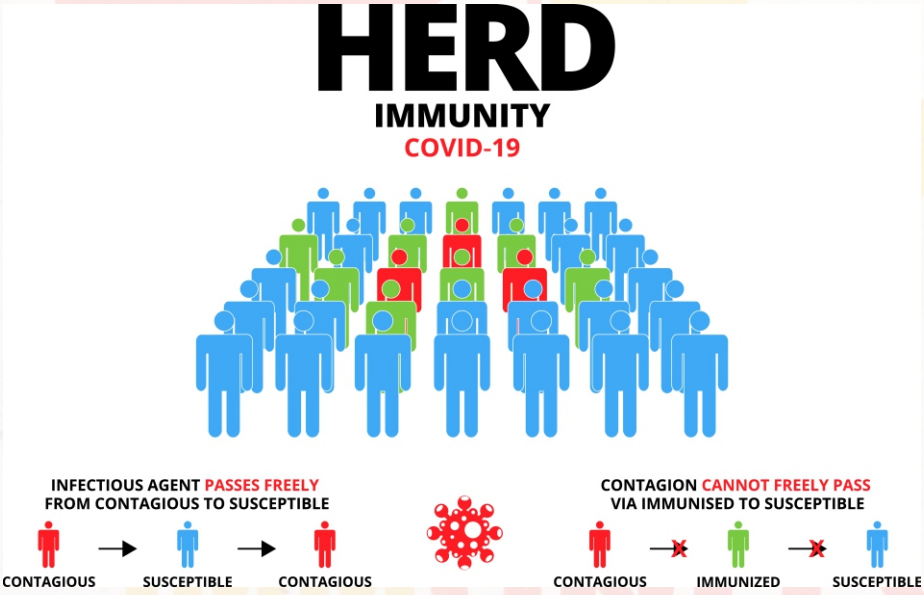
How have we achieved herd immunity for other infectious diseases?

Measles, mumps, polio, and chickenpox are examples of infectious diseases that once prevailed in the community but mass vaccination drives helped to establish herd immunity. Sometimes the outbreaks of vaccine-preventable diseases in communities are observed with lower vaccine coverage because they don't have herd protection. Other viruses (like the flu) mutate over time, so antibodies from a previous infection provide lesser protection. Population-based studies in Denmark have shown that an initial infection by SARS-CoV-2 is protective against repeat infection for six months. But this level of immunity could also be lower among people with weaker immune systems (such as aged people), and it's unlikely to be lifelong. This is the strongest reason for a mass vaccination program.

Can we achieve Herd Immunity against SARS-CoV-2?

What we all know about coronavirus thus far suggests that, if we were really to travel back to a pre-pandemic lifestyle, we might need a minimum of 70% of the population to be resistant to keep the speed of infection down without restrictions on activities. But this level depends on many factors, including the infectiousness of the virus (variants can evolve that are more infectious) and the way people interact (through social distancing, wearing masks, etc.), infection rates. But as society exposes more broadly and the virus mutates to become more contagious, infection rates go up again. To achieve herd immunity against SARS-CoV-2, it is now a race between INFECTION and INJECTION (Vaccine).

- Shravani M and Manoj Kumar K



MYTHS AND FACTS ABOUT VACCINATION

MYTH: The COVID -19 vaccine isn't safe because it has been developed so quickly.
FACT: The authorized vaccines are proven safe and effective. Although they were developed in record time, they have gone through the same rigorous Food and Drug Administration process as other vaccines, meeting all safety standards. No steps were skipped. The clinical trials and safety reviews actually are being done under stringent control.

MYTH: The COVID-19 vaccine will alter an individual's DNA.
FACT: The vaccine when enters an individual's body, the immune system accepts this as a foreign antigen and starts preparing antibodies to neutralize the antigen. The individual's own DNA never acts as a foreign antigen to the immune system. Therefore the vaccine cannot alter the DNA of the host cell.

MYTH: The COVID-19 includes a tracking device.
FACT: The basis for this theory stems from false claims of implanting microchips in the vaccine which are said to dissolve under the skin and leave "quantum dots" that are used to track people.

MYTH: People can get COVID-19 from the vaccine.
FACT: An individual cannot get COVID-19 from the vaccine. Since there is no live virus in the vaccine, it cannot revert to producing a live virus.

MYTH: The COVID-19 vaccine causes infertility in women.
FACT: Misinformation on social media suggests the vaccine trains the body to attack a protein in the placenta, which could lead to infertility in women. The truth is, there's an aminoalkanoic acid sequence shared between the spike protein and a placental protein; however, experts say it's too short to trigger an immune reaction and therefore doesn't affect fertility.

MYTH: Certain blood types have less severe COVID-19 infections, so getting a vaccine isn't necessary.
FACT: The ABO blood grouping may influence the susceptibility of COVID-19 and the severity of the disease. It is yet to evaluate the clinical impact of those ABO groups as a prognostic factor in COVID-19 patients.

MYTH: The COVID-19 vaccine has severe side effects like allergies.
FACT: Some participants within the vaccine clinical trials did report side effects almost like those experienced with other vaccines, including muscle pain, chills, and headache. Although extremely rare, people can have severe allergies to ingredients utilized in a vaccine or may be related to other predisposing factors.

- Shilpa S and Shalini M

AMAZING FACTS

Blowing birthday candle increases bacteria up to 1400% on the cake.
Keeping your toothbrush wet encourages the bacteria on it to grow.
Wearing earphones for just an hour will increase the bacteria in your ear by 700 times.
Samples from cattle suffering from bovine tuberculosis are used to treat bladder cancer in humans.
Bacteria present in the colon of kangaroo hold the key to stop greenhouse gas emissions.
Chocolate can kill dogs as it contains Theobromine which affects their heart and nervous system.
Gonorrhoea bacteria a type of bacteria that could lift up to 100,000 times their own weight.
Staphylococcus epidermis is responsible for the body odour associated with sweating.
If one wears sunglasses, your brain basically cannot tell your skin for the secretion of Vitamin D, this can lead to adverse reactions and also skin cancer.
Your brain is 73% water, even the smallest level of dehydration can have a negative effect on your attention, memory and cognitive skills.

- Tahia Irfan

ARTIFICIAL INTELLIGENCE IN TACKLING COVID-19

What is Artificial Intelligence?

Artificial Intelligence is a branch of computer science wherein machines are programmed to think like a human mind and also mimic their actions. Ex: robots, self-driving cars, disease mapping, etc; The arrival of the Covid crisis has put medical organizations in an urgent need to handle the pandemic and AI helps them in making proper decisions on time to avoid the spread.Multiple questions arose and many challenges have been imposed. AI and MACHINE LEARNING are looking ahead to fight against the new diseases along with the aid of new technologies like BigData and InternetOfThings aiming to support the healthcare system.AI technology helps in detecting the number of cases and predicting where this virus is/will affect in the future by collecting and analyzing all possible data.

Role of AI in tackling COVID-19

1) Tracking and prediction of patients.
2) Analyzing and proper screening.
3) Diagnosis and prognosis of the disease.
4) Treatments and vaccines.
5) Awareness among the public (Social control).
6) Major analysis and tests are done using AI.
7) AI is capable of providing information where there is a need for ventilators and respiratory supports in ICU.
8) AI is not only helpful in the treatment of Covid patients but also monitors them for any reoccurrence of the disease.
9) It also helps a note on confirmed and recovered patients and also the death cases.
10) AI mimics human mental behaviour and also plays a role in the development of drugs and vaccines.

AI in other fields:

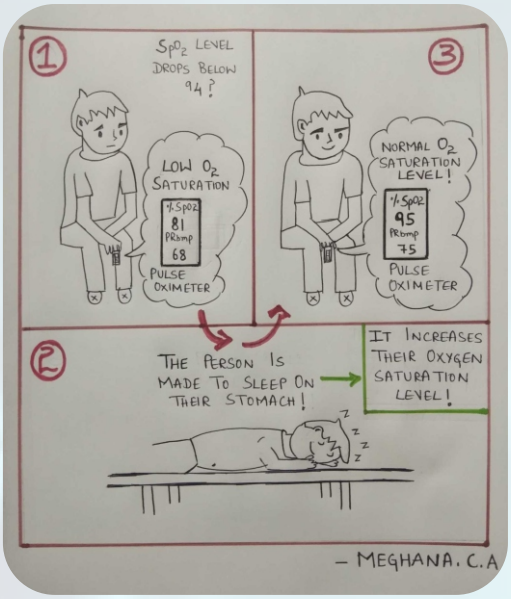
Recently it has also been discovered that the AI system looks at long functional MRI videos to figure out "the dance patterns" in the brain which no radiologist can do.
AI tools not only ensure faster diagnosis but also provide advanced clinical information to oncologists and pathologists to look at a cancer biopsy slide.
AI along with 3D visualization is helping to build a neuroinformatics platform.

Startups using Artificial Intelligence and Robotics in India to fight COVID-19:

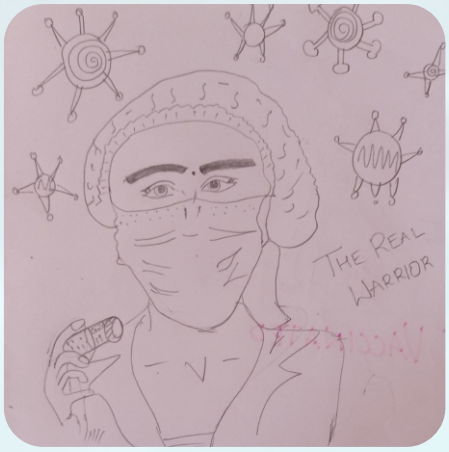
Invento Robotics: A Bangalore-based startup that uses robots to help workers with screening in case they are exposed to infected people.
Blocksapp.ai: AI-based drone monitoring solution was started by this startup to support police and local workers in monitoring people.
BlueSemi: This Hyderabad startup developed a contactless wireless thermal scanning device that can record temperature within a distance of 15cm from it.
Cogni Care: Monitors recurrence of the virus once the patients are cured

Conclusion: AI is likely to be a tool in the fight against Covid-19 and such pandemics. “AI systems are still at a preliminary stage, and it will take time before the results of such AI measures are visible”, Petropoulos (2020). After the first surveys of AI models against Covid-19, Bullock. et.al (2020) said, “Very few of the reviewed AI systems have operational maturity at these stages”. Artificial intelligence technology is used for proper screening, analyzing, predicting, and tracking the current and future appearing patients. While we may never get back to normal, AI welcomes the world to a new prospect.

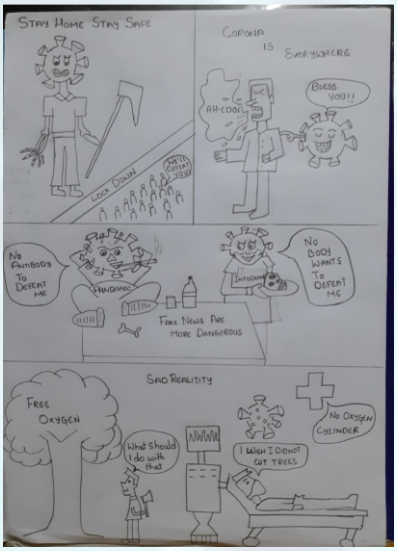
- Tahia Irfan, Smitha B.S, Apoorva Nandakar P



- Meghana C A



- Shravani M



- Smitha B S

FIND ME....??

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-Meghana.C A , Amruthavarshini.I

FIND ME....??
1. REMDESIVIR, 2. COVID SHIELD, 3. PNEUMONIA, 4. ANTIBODY, 5. CONGESTION, 6. PLASMA,
7. VECTOR, 8. EPIDEMIOLOGY, 9. EDWARD JENNER, 10. PULSOXIMETER, 11. IMMUNITY,
12. COVAXIN, 13. SPUTNIK, 14. HUMAN PATHOGEN

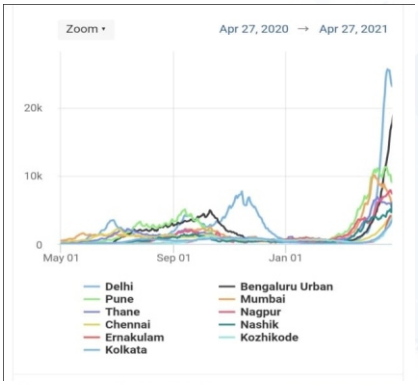
HISTORY OF CORONAVIRUS

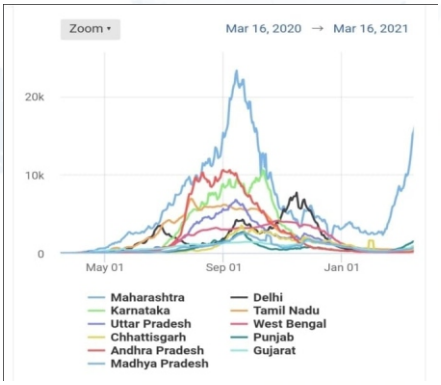
The word corona prefix comes from the Latin word for crown due to the crown-like appearance of the virus are a group of related RNA viruses that causes diseases in mammals and birds, In the 1920s acute respiratory infection of domesticated chickens appeared in North America with a mortality rate of 40-90%, In 1933 the virus was isolated and called infectious bronchitis virus(IBV) later discovered in mice and not realized these are related. The human coronavirus was discovered in the 1960s. In 1965, Tyrrell and Malcolm successfully cultivated the novel virus by passing serially through the organ culture of the human embryonic trachea and compared the structures of IBV-like cold viruses that were shown to be similar. (SARS-Cov-1) the outbreak in Asia isolated from Civets and SARS-like coronaviruses in Chinese in bats discovered in 2005. (MERS) in June 2012 outbreak ended up reported cases in 21 Countries, which WHO was likely to cause future epidemics. (SARS-Cov-2) the virus causing COVID-19 is a single stranded RNA virus reported in 2019 successor of (SARS-Cov-1) out-break in Wuhan, China.

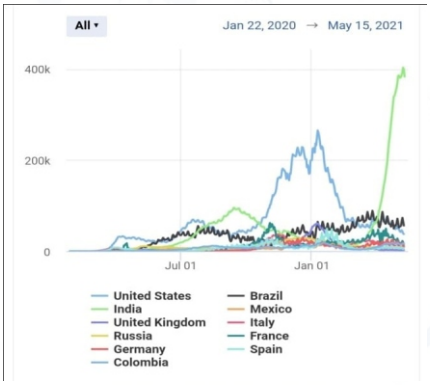
- Nithin B

TIME-LINE OF CORONA

The first case of coronavirus was reported in December 2019 within the Wuhan city of China as a pneumonia outbreak. Later the researchers identified a novel strain of coronavirus. Within weeks, the coronavirus spread to other nations like South Korea, Iran, Italy, United States, India, and Pakistan among others. The Covid-19 positive cases in India had begun to drop significantly from September 2020, however, it started rising again under a second wave from March 2021.The second wave of the Covid-19 pandemic in India is proving to be more devastating than the primary. The biggest worry is that 80-85% of the population in India are asymptomatic and still be the most important carrier of the coronavirus. As of April 2021, India has the second-highest number of confirmed Covid-19 positive cases within the world (after the United States) with quite 17 million reported cases of COVID-19 infection and 192,311 deaths as of April 25, 2021.



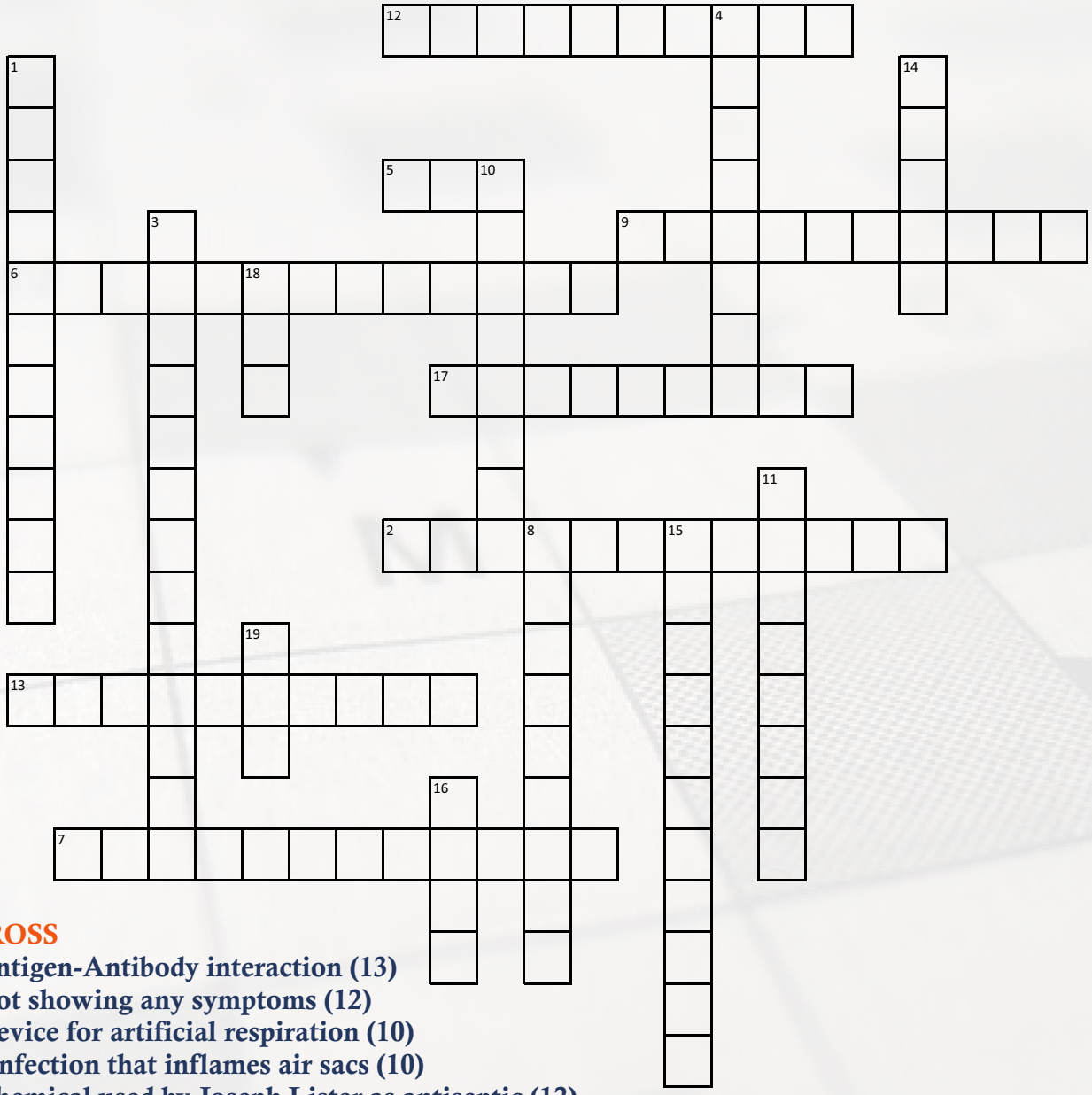




- Ganesh V

ACROSS:- 5. CARBOLICACID, 2. WHO, 6. ACCLIMATION, 7. ASYMPTOMATIC, 9. VENTILATOR
DOWNWARDS:- 1. ASTRAZENECA, 3. PLASMATHERAPY, 4. IMMUNITY, 8. BETAERINCK
11. PNEUMONIAE, 13. QUARANTINE, 17. LEUKOCYTE
10. OXIMETER, 11. PANDEMIC, 14. WUHAN, 15. INTERFERON, 16. MASK, 18. TMV, 19. RNA
ANSWERS

CROSSWORD



ACROSS

6. Antigen-Antibody interaction (13)
7. Not showing any symptoms (12)
9. Device for artificial respiration (10)
12 .Infection that inflames air sacs (10)
2. Chemical used by Joseph Lister as antiseptic (12)
5. Organization that strives to protect public health around the world (3)
13. Restriction on the movement of people to prevent the spread of disease (10)
17. Synonym of WBC (9)

DOWNWARDS

1. Vaccine developed for COVID-19, by the University of Oxford in collaboration with (11)
3. The treatment that uses antibodies found in blood taken from a recovered COVID-19 patient (13)
4. Body's ability to resist an infection (8)
8. Father of virology (9)
10. Device used to monitor oxygen level (8)
11. When an epidemic has spread to multiple continents/countries (8)
14. First case of coronavirus originated in (5)
15. Proteins that "interfere" with virus particles (11)
16. Protection to cover mouth and nose (4)
18. First virus to be discovered (3)
19. Genetic material of coronavirus (3)

- Megha K, Priyanka Kammar D

DEPARTMENTAL ACTIVITIES 2020-2021

1) 4th May 2020 the Sixth Volume of the Microbiome DIGITAL Newsletter was released and also uploaded to the Vijaya college website.

2) In-House Project –The Department is undertaking research projects of national importance in the field of microbiology to encourage students in doing research, present papers in National and International conferences, Publish their findings in reputed Journals, and also participate in co-curricular and extracurricular activities. The In-house projects are assigned to the students & guided by the departmental staff.

3) 10th May 2020 a Covid 19 Awareness-A video was prepared by Microbiology students and it was uploaded and released on College Website and YouTube channel.

4) Consistent Good Result (Avg 98%) in University Examination.

5) 15th June 2020 an International Webinar has conducted on "The journey of SARS-CoV-2: A deeper look into the virus that stunned the World" by Nilanjan Mukherjee, Life Science Research Professional II – Stanford University, Stanford, USA.

6) 22-06-2020 – 27-06-2020, Microbiology Department launched an online Quiz competition on Virology where Praveen A of V Semester student was the student coordinator.

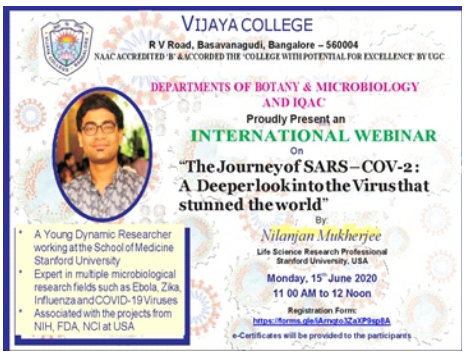
7) 6th,7th &8th July 2020, Webinar Series -JEEVAPATHA -CAREER GUIDANCE FOR LIFE SCIENCE STUDENTS was jointly organized by IQAC and the Department of Botany & Microbiology.

8) 19-10-2020 - 24-11-2020 a Webinar Series was conducted by IQAC and the Department of Botany & Microbiology.

9) 11-05-21 & 19-05-21 Poornima S K and Eesha Prasad of 2nd Semester gave a PPT presentation on Corona Virus and Symmetry of Viruses.

10) Amith Bharadwaj S A of VI the Semester BcGMb student has qualified in JAM-2021 (AIR-586). The Department of Microbiology has congratulated him for his achievement.

11) On 10-06-2021 Tahia Irfan of 6 th Semester Microbiology presented e Poster on "Preparation and Microbial Analysis of Eco-Friendly Solution from Organic Wastes" and Hamsini Harikumar of 4th Semester Microbiology presented e Poster on "A Review on Effect of Parabens on Reproductive System" in the National Conference organized by MLACW.



International Webinar conducted by The Microbiology Department

Mushroom Cultivation in Microbiology Lab

The Newsletter Microbiome is an effort of the department of Microbiology since 2015 to bring awareness about the latest information regarding diseases, Techniques, and Researches of Microbes. This is the active participation of Final year students of Microbiology under the careful guidance of teachers of the department to showcase their talents in writing Articles, Sketches, Scramble etc.., and made the annual volume a great success.