



PRAKRITI SANRAKSHAN

Newsletter

Volume 4, Issue 1, Jan. - Mar., 2021

ABOUT US

Save the Environment (STE)

SAVE THE ENVIRONMENT (STE) is the organization that aims to spread awareness to the society about environment, health and water. It was founded and registered on 19th November 1990. STE has collaborated with various organizations in the past 29 years such as All India Institute of Hygiene & Public Health, AIIH&PH and India Canada Environment Facility, DRDO Ministry of Defence, Department of Science and Technology (DST), Indian Institute of

Management (IIM), Ahmedabad to mitigate the effects of arsenic and provide arsenic-free drinking water.

The vision of the society is to protect present and future generations from various Environmental Hazards. The NGO has been actively organizing various interactive sessions such as conferences (National and International), workshops, seminars and awareness programs including poster competitions, quiz competitions, science exhibitions and webinars among the future generations.

STE Annual Awards 2021

(NOMINATION AND APPLICATIONS ARE INVITED)

LAST DATE 15th November, 2021

Annual Awards of STE are the tangible symbol to signify eminence of contributions made by a person or institution. This boosts the enthusiasm of the contributors who have contributed in different fields of science and social service with their excellence, expertise and approach towards achieving certain goals for the society. Recognition of such extraordinary activities is eventually very important to boost their confidence and to honour them for what they have done for the science and society. STE confers following categories of awards and honours to such eminent personalities.:

STE Dr. APJ Abdul Kalam Award

STE Fellowship Awards

STE Water Awards

STE Dr. Praloy O Basu Life Time Achievement Award

STE Best Ideas/Innovations/Technology for Environment Awards

STE International Achiever Awards

STE Green Excellence Award

STE Meritorious Award

STE Best Teacher Award

STE Young Researcher Awards

STE Women Awards

For more information, please log on to our website www.stenvironment.org/ste-awards/

ARTICLES ARE INVITED FOR THE INTERNATIONAL JOURNAL OF ENVIRONMENT AND HEALTH SCIENCES

This journal is being published by Save the Environment. Send your manuscripts for peer-review by e-mail. The authors must mention address, Contact Nos. and E-MAIL ID in their forwarding letter. Proof will be sent for correction before publishing. A pledge for originality will be signed by the authors.

We are pleased to announce that the DOI prefix for International Journal of Environment and Health Sciences is now available from Crossref, the official Digital Object Identifier (DOI). The journal is now indexed in International Scientific Indexing (ISI).

For further details, please contact, Chief Editor at: ijheditor@gmail.com or visit our website: www.stenvironment.org

OUR EVENTS



SAVE THE ENVIRONMENT

A Society for Research Awareness and Social Development

FORTNIGHTLY LECTURE SERIES

Save The Environment (STE) as a society for research, awareness and social development has continued its efforts for conducting the Fortnightly Lecture Series, which was started on 22nd January 2021 and was concluded on 23rd March 2021 on Zoom Platform, under the aegis of MoE's Innovation Cell, Government of India, in collaboration with NEERI-a part of CSIR, Royal Society of Chemistry, North India Section and The Hindu College Innovation Council.

LECTURE -1 # “Innovation: Creating impact and prosperity for tomorrow”

The inaugural lecture was given by **Dr. David S. Ricketts**, Fellow at Technology and Entrepreneurship Centre at Harvard(TECH), Harvard John A Paulson School of Engineering and Applied Sciences on 22nd January, 2021.

He delivered his talk on the **topic “Innovation:**



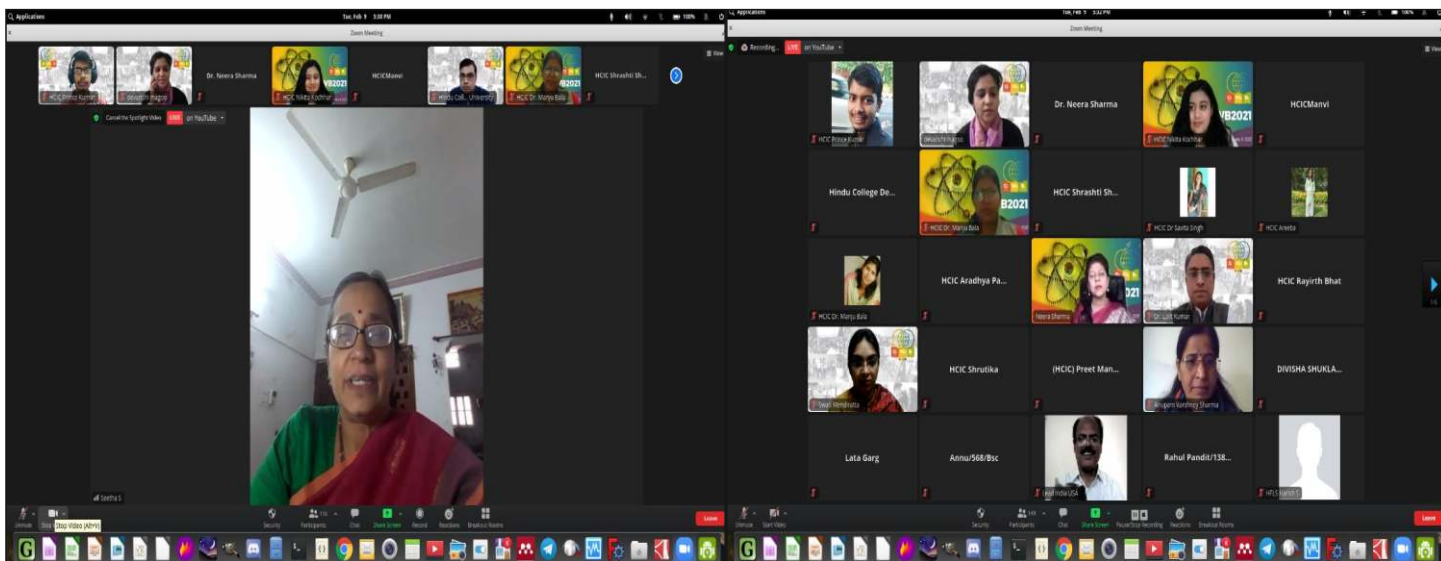
Creating impact and prosperity for tomorrow". He discussed about how to understand the untapped snags in the market and discover new solutions to the high-impact problems, in order to outperform their competition. He revealed that the key roots to innovation is to start with product thinking, moving ahead with the thinking of people, finding the problems

and finally look for the possibilities. With short stories, visuals and real-life examples, Dr. Ricketts kept the audience engaged throughout his talk. This lecture was attended by more than 300 students from all over India. The lecture ended with a question-and-answer session wherein certain selected questions from all over India were put forth the speaker.

LECTURE 2 # "What is Exciting about Science?"

The second edition of the Fortnightly Lecture Series focused on the importance and aspects of empowering diversity in science and thus collaborated with **IUPAC** (International Union of Pure and Applied Chemistry) and **GLOBAL WOMEN'S BREAKFAST**, which was promoted in India by The **Association of Chemistry Teachers Homi Bhabha Centre** of Science Education. The **second lecture** of Fortnightly Lecture Series was given by **Dr. Seetha Somasundaram**, Emeritus Scientist, **Raman Research Institute**, Bangalore, Ex-director of Space Science program office at **ISRO** and

the woman behind many successes of **ISRO** on **9th February, 2021** on the topic **"What is Exciting about Science?"** In her lecture Dr. Seetha emphasized on the beauty of science and how it has affected human lives so far and revolutionized the mere existence of man from a hunter to a highly sophisticated living being. She motivated students to study not for the sake of marks or prizes but for the knowledge. She asked students to find their interests and work diligently towards them. Dr. Seetha's talk was highly informative and galvanizing. The session was followed by online Poster presentation competition.



LECTURE-3 # "Emerging Challenges for Youth Volunteers: Innovation, Inclusion & Integration"

Third Lecture was given by **Padma Shri Prof. Anil K. Gupta**, CSIR Bhatnagar Fellow 2018-21, Founder, Honey Bee Network, SRISTI, GIAN & NIF Visiting Faculty, IIMA & IITB, Academy Professor, ACSIRON **25th February, 2021** on the topic **"Emerging Challenges for Youth Volunteers: Innovation, Inclusion & Integration"**. In his lecture he threw light upon the power of innovation and how Innovation and



creativity can come from any sector or part of the society irrespective of its background. Dr Gupta talked about Honey bee network and its work with grassroots innovation. Since its founding, the network's database of original inventions has grown to more than 100,000. He elucidated simple yet efficient examples of

innovative solutions in daily life which can solve great enigmas. This was followed with an interesting follow up session where Dr Gupta and students discussed every aspect of the innovation building process in great detail. Overall, this talk was highly enthralling and engaging.

LECTURE -4# “Story of Inventions”

Dr. Ramendra Lal Mukherjee, Scientist, Founder HMRC (Research Organization), Inventor of Micro Microscope delivered his talk on the topic “Story of Inventions” on 23rd March, 2021. Dr Ramendra Lal Mukherjee has 30 international patents for instruments ranging from a device that can help detect skin diseases

to a super telescope and a UV emitting device that kills microbes. During his lecture he talked about the stories behind these inventions. This was followed with a question-and-answer session in which Dr. Ramendra answered all the queries of the students. Overall, the event was a great success and a huge milestone in the journey of Hindu College Innovation Council.



SAVE THE ENVIRONMENT
(A SOCIETY FOR RESEARCH, AWARENESS & SOCIAL DEVELOPMENT)
KOLKATA, WEST BENGAL

&

HINDU COLLEGE
UNIVERSITY OF DELHI

In Cognizance of
INTERNATIONAL WOMEN'S DAY

present

WOMEN IN LEADERSHIP:
Achieving an Equal Future in a COVID-19 World

STE PRERANA SAMMAN, 2021
Honouring the Women Pioneers

Dr. GG Pandit Adjunct Professor IIT Bombay & Former Head Environmental Monitoring & Assessment BARC, Trombay	Mrs. Priti Kataria Vice President & HR Head - BFSI SBU Wipro, Mumbai	Ms. Gurjeet Kaur Social Development Professional HUMSAFAR, Lucknow & Former CEO, Janvikas, Gujarat

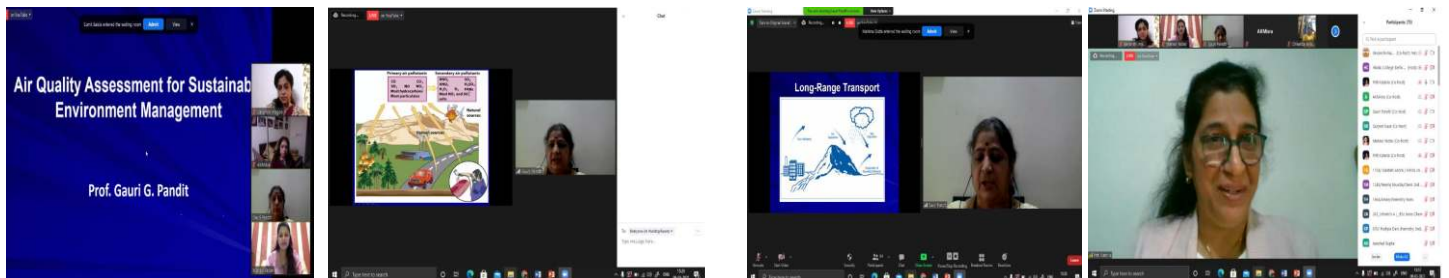
DATE: 8th March, 2021
TIME: 3 to 6 PM
[Click here to join the meeting](#)

[Click here to register](#)



With the theme for **International Women's Day, "Women in Leadership: Achieving an Equal future in a COVID-19 World"**, STE in association with Hindu College organized a webinar on **8th March, 2021**, along with **STE's Prerana Samman 2021** to celebrate the enormous efforts by women and to recognize the extraordinary talent and

commitment demonstrated by them. The **STE Prerana Samman** was awarded to **Dr. Gauri G. Pandit, Mrs. Priti Kataria** and **Ms. Gurjeet Kaur** for their exemplary role in different sectors of our society. This was attended by over 100 participants and it ended with the vote of thanks by the STE President, Dr. Kshipra Misra.



ARTICLES

SARS-CoV-2: PANDEMIC and BRAINDEMIC Neurological Manifestations of COVID-19

Pahul Sachdeva
Student, ITL Public School, New Delhi, India

Abstract
From previously established neurological tropism of corona viruses, in particular for SARS-CoV-1 which shares highly similar genomic sequences with SARS-CoV-2 and likely similar biological properties, this paper explores the possibility of the collapse of the Respiratory Center in the brain being responsible for 'Respiratory Breakdown' in

COVID-19 Patients. In animal models, SARS-CoV is proven to penetrate the brain through the olfactory bulb and, from there, to spread within the CNS, cerebrospinal fluid (CSF), hypothalamus and cortical neurons. Thus, creating a possibility that the ambiguous nucleus and the solitary tract in the brain stem, responsible for respiratory control, can be targeted by corona viruses, hinting towards centrally poventilation mechanisms likely contributing to the commonly reported cause of death due to COVID-19 infection: respiratory failure. Apart from the direct virus invasion into the brain causing SARS-CoV2 to be considered a respiratory pathogen, it has also been localized in the brains of infected patients both clinically and symptomatically, suggesting its ability to impact normal neurologic structures and functions which has been demonstrated in a survey on 200 subjects, 94 of whom confirmed their test results as Covid-positive.

Keywords: SARS-CoV-2, central hypoventilation, Respiratory failure, COVID-19, Neurologic

Introduction

From one of the earliest articles published in May 2020, “Potential neurological impact of Coronaviruses: Implications for the novel SARS-CoV-2” by Joy D. Iroegbu, Chibuzor W. If enatuoha and Omamuyovwi M. Ijom one; we come to an understanding that the corona viruses are enveloped, positive sense viruses with a single-stranded polyadenylated RNA that bears five genes that code for structural proteins (S, E, M, N, HE), as well as other non-structural proteins encoding genes.

Expanding further on the role of each structural protein in corona viruses, the spike (S) protein enables the virus to recognize the right cellular receptor where it infects the susceptible cell. The spike protein is also responsible for the corona shape, and hence the name of the virus. The envelope (E) protein assembles the virion and ensures the optimum curvature of the viral envelope. The membrane (M) protein aids in the formation of the corona shape of the virus, as well as maintains the structure of the virion through its interaction with all the other structural proteins. The nucleocapsid (N) protein is responsible for encapsulating the viral genome in a helical nucleocapsid inside the viral particle. Lastly, the Haemagglutinin Esterase (HE) protein, similar to the S protein, plays a role in haemagglutination. It functions similar to acetyl-esterase, which aids in the release of the viral particles from the infected cell occurring during the end of the replication cycle in β -corona viruses. The corona viruses are known to be capable of rapid mutation and recombination. The corona viruses belong to the family Corona viridae in the order

Nidovirales. Members of this family include the pathogenic human corona viruses (HCoV) such as HCoV-229E, HCoV-OC43, HCoV-HKU1 and HCoV-NL63 and the more commonly known severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). The currently named SARS-CoV-2 (by the International Committee on Taxonomy of Viruses), commonly addressed as the novel Coronavirus Disease 2019 (COVID-19), is a newly discovered member of the CoV (considered highly pathogenic due to the above explained structure) that resembles the SARS-CoV in that it elicits similar symptoms and shares a similar receptor, the Angiotensin-Converting Enzyme 2 (ACE-2).

The outbreak of the novel SARS-CoV-2, classed as a pandemic by the World Health Organization (WHO) has had unprecedented implications on public health and global economy. According to data available on “Aarogya Setu”, an

Indian open-source CoVID-19 "Contact tracing, Syndromic mapping and Self-assessment" digital service, developed by the National Informatics Centre under the Ministry of Electronics and Information Technology, as of 18 July 2020, COVID-19 has currently infected over 1.04 million people in the country, and the number of deaths continue to rise well over 26,273. There are over 14.1M confirmed cases, 603K deaths globally, with more than 213 countries affected. From these reported cases, the prominent clinical features include common symptoms like fever and dry cough that usually occur specially at the onset of the disease. The subsequent characteristic symptoms presented in patients are respiratory distress syndrome (dyspnoea), myalgia, anorexia, diarrhoea, pharyngalgia, abdominal pain and fatigue. Though human CoV is mostly known to cause respiratory diseases, there have been concerns of both direct and indirect neurological consequences; however, this has often been neglected.

Therefore, this paper and survey aim to demonstrate, from recent evidence, the possible neurological impact of the coronaviruses on the CNS, while highlighting neurologic implications for the novel SARS-CoV-2.

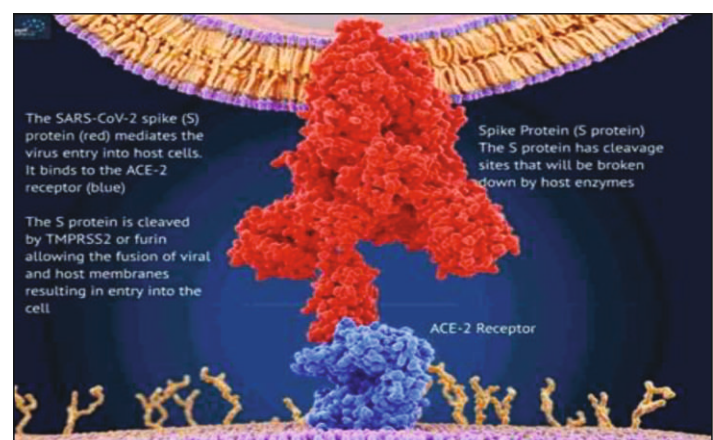
General Mechanism of Coronavirus Pathogenesis

1) Entry of SARS-CoV-2

Two specific nose cells (goblet and ciliated cells) that express the ACE-2 receptor have been identified as likely infection points for the SARS-CoV-2. At the microscopic level, the SARS-CoV-2 engages ACE2 as an entry receptor and employs the host cell enzyme, Transmembrane Serine Protease 2 (TMPRSS2) or furin for spike protein priming. Priming of the spike protein occurs by cleavage of the spike protein (by host cell enzymes), exposing fusion peptides (that fuse the viral membrane with the host cell). Once fusion occurs, the virus can enter the cell.

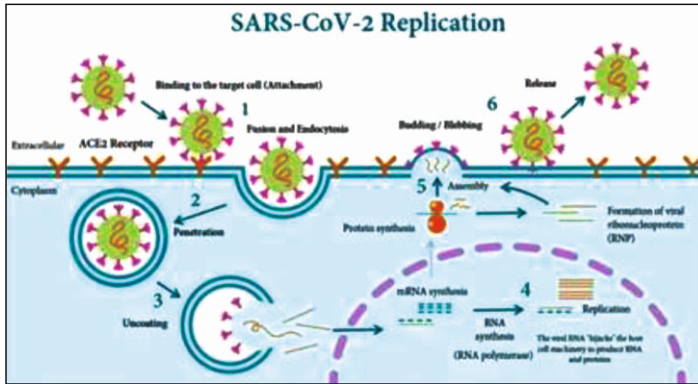
1) Viral Replication

Once inside the host cell, the foreign viral RNA 'hijacks' the host cell machinery inducing it to produce RNA and proteins that produce new viral particles. These viral particles will then exit the cell to infect new cells.



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The ACE2 receptor is broadly expressed in vascular endothelium, respiratory epithelium, alveolar monocytes, macrophages, neurons, and glial cells, oral and nasal mucosa, nasopharynx, stomach, small intestine, colon, skin, lymph nodes, thymus, bone marrow, spleen, liver, and kidney.

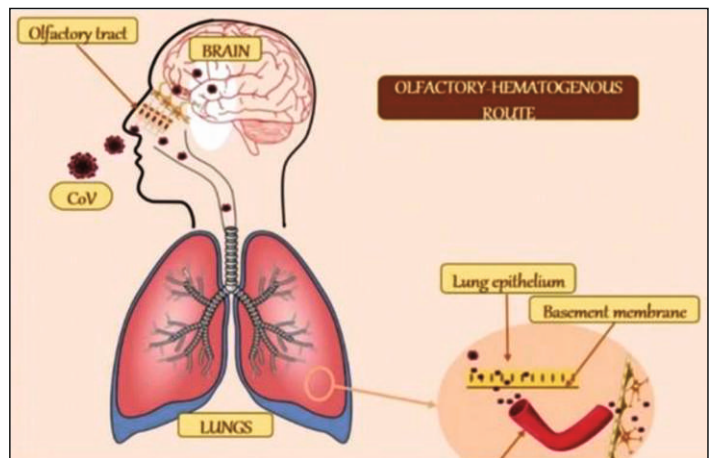
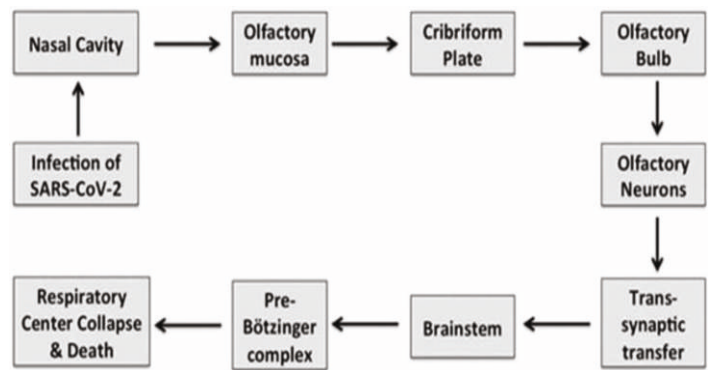
Neuroinvasion of Coronavirus: Mechanisms through which it infiltrates the Nervous System

As early as August 2008, techniques such as immunohistochemistry, electron microscopy and real-time reverse transcription-PCR have been used by Netland J, Meyerholz DK, Moore S, Cassell M and Perlman SJ Virol, to detect the presence of CoV in the brain. This has led several authors: Desforges M, LeCoupance A, Dubeau P, Bourgoign A, Lajoie L, Dubé M and Talbot PJ, to focus their research on identifying the possible routes by which this virus invades the CNS in their article "Human Coronaviruses and other Respiratory Viruses: Underestimated opportunistic pathogens of the Central Nervous System". Since then, many studies have postulated the olfactory-haematogenous pathway, trans-neuronal machinery and lymphatic pathway, as putative routes of coronavirus entry into the CNS. The olfactory tract has been implicated as a major route through which toxicants reach the CNS.

Simplified from the works of Sonu Gandhi, Amit Kumar Srivastava, Upasana Ray, and Prem Prakash Tripathi from the Indian Institute of Chemical Biology (CSIR-IIC), the following schematic representation shows how SARS-CoV-2 may infect the respiratory center of the brain:

- SARS-CoV-2 may enter the brain through the olfactory mucosa present in the upper nasal cavity.

- From there, through olfactory axons, it makes an opening in the cribriform plate and projects to the olfactory epithelium and olfactory bulb.
- SARS-CoV-2 further migrates to deeper parts of the brain such as the thalamus and brain stem by trans-synaptic migration and targets the pre-Bötzinger complex, thus possibly causing the collapse of the respiratory center of the brain.



Schematic representation of the olfactory-haematogenous route of CoV neuroinvasion from "Potential Neurological Impact of Coronaviruses: Implications for the novel SARS-CoV-2" by Joy D. Iroegbu, Chibuzor W. Ifenatuoha and Omamuyovwi M. Ijomone.

Evidence of CNS Involvement

With the first ever case of viral encephalitis associated with SARS-CoV-2 reported on March 4, 2020, at Beijing Ditan Hospital, researchers have confirmed the presence of SARS-CoV-2 in the cerebrospinal fluid (CSF) by genome sequencing.

Subsequently, another case of SARS-CoV-2 encephalitis, reported in Japan where SARS-CoV-2 has been identified in the CSF in the absence of nasopharyngeal positivity has

raised the question on the possibility of direct infection or alternate routes of transmission such as haematogenous routes.

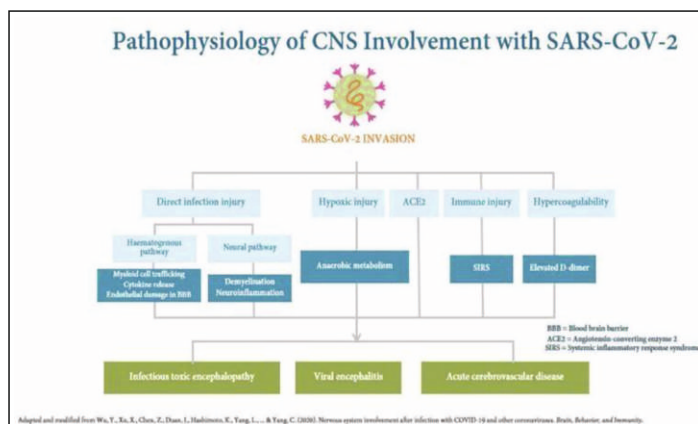
Since then, there have been numerous cases of neurological involvement associated with SARS-CoV-2.

The transmission electronmicroscopy of the brain tissue of a 74-year-old male with SARS-COV-2 by Alberto Paniz-Mondolfi and Clare Bryce in April 2020, with concrete evidence indicated the neuroinvasive nature of the virus and the likely routes of transmission to the CNS.

- Front all obe sections showed presence of 80 to 110nm viral particles
- Spherical viral-like particles were observed individually and in small vesicles of end othelial cells.
- Blebbing of viral particles in/out of the endothelial wall- indicative of viral entry-transit across the brain microvascular endothelial cells in to the neuralsystem.
- Neural cell bodies exhibited distendedcy to plasmic vacuoles containing enveloped viral particles with distincts talk-like projections.

Pathophysiology of CNS Involvement

SARS-CoV-2 can take two pathways to involve the brain; direct and indirect pathways.



Postulated Direct pathways –

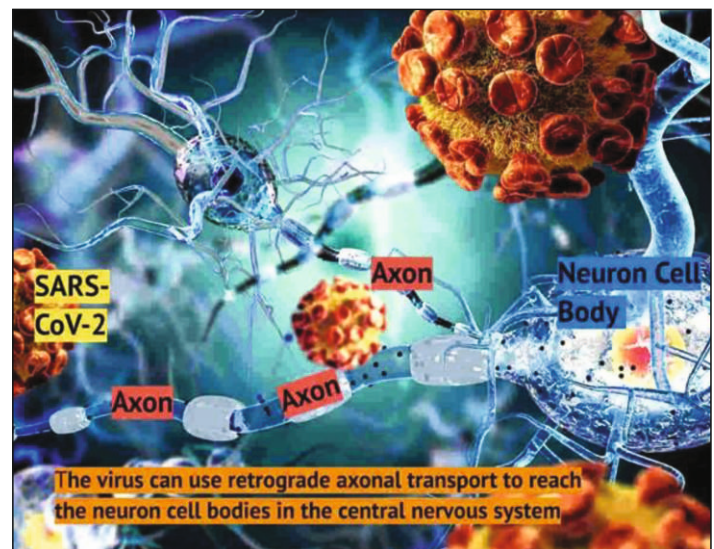
1. The Haematogenous route

- The virus gains access by infecting end othelial cells of the blood-brain-barrier, epithelial cells of the blood-cerebrospinal fluid barrier in the choroid plexus, or using inflammatory cells as Trojan horses to gain access to CNS (myeloid cell trafficking).
- Observation of viral-like particles in brain capillary end othelium and actively budding across endothelial cells

strongly suggests the hematogenous route as a highly likely pathway for SARS-CoV-2 to the brain.

1. Neuronaltransport

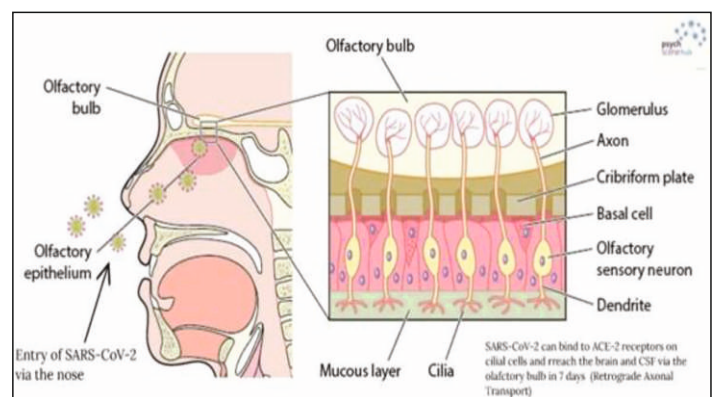
- The virus can travel from axon terminals across the axon to reach the neuron cell bodies in the central nervous system.
- This transport can occur through all: the olfactory, respiratory, and enter in nervous system networks.



Olfactory network

Neural transport via the olfactory pathway (across the cribriform plate of the ethmoid bone to the olfactory bulb situated in the forebrain) is a highly possible route given not just how near it is to the brain but also due to the presence of ACE2 receptors on olfactory cilia.

The virus can reach the CSF and brain through the olfactory nerve and bul band can cause inflammation.



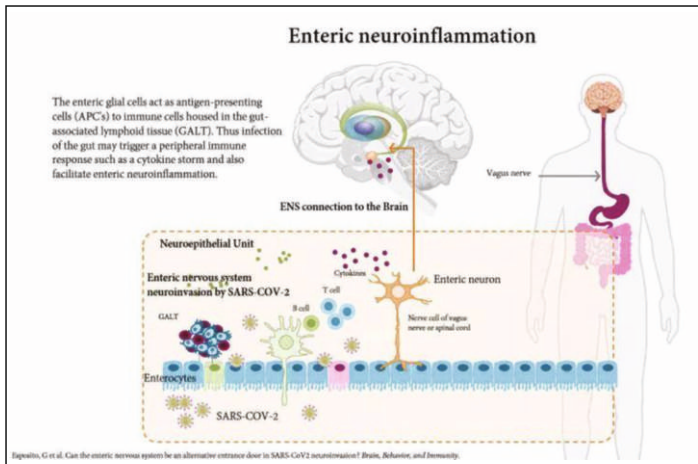
Respiratory network in the brain

The virus may also enter via neuronal transport via axons from the peripheral nerves of the respiratory network in to the medulla oblongata, where respiratory rhythmis generated and regulated.

Gut-Brain Axis

Through study of general viruses, we know that viral shedding in faeces is known to occur up to 5 weeks post-infection. Therefore, the gut is postulated as a key entry point due to the following factors:

- The higher relative expression of ACE-2 receptor in enterocytes than lungs.
- Evidence that SARS-CoV-2 can directly infect and replicate in intestinal cells.



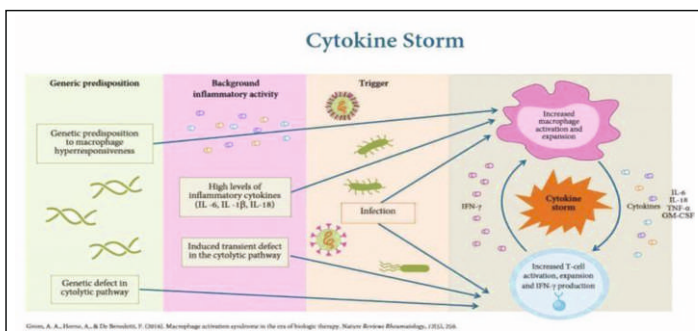
The enterocytes are connected to the enteric nervous stem, which is why they can become a source of entry to the brain. They act as antigen-presenting cells (APC's) to immune cells present in the gut-associated lymphoid tissue (GALT). An infection in the gut may trigger a peripheral immune response such as a cytokine storm causing the virus to flow easily to the brain.

Once the virus enters the brain, it can control the immune cells of the brain to start a cascade of neuroinflammation.

Postulated Indirect Mechanisms of Brain Involvement include:

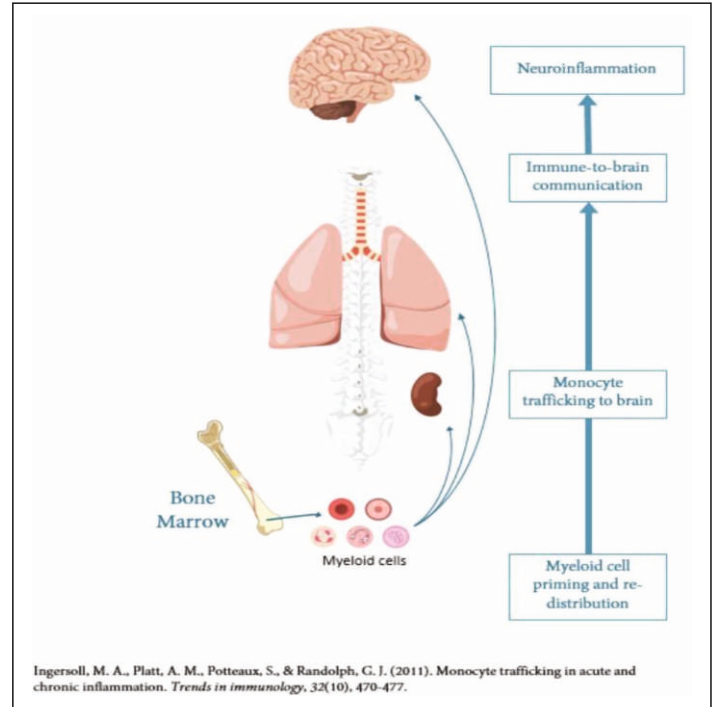
1. Cytokine dysregulation

- Pro-inflammatory cytokines (e.g. IL-6 and TNF) are more in number in COVID-19 patients, which has previously been linked to cytokine storm syndrome-related encephalitis, the known brain virus.



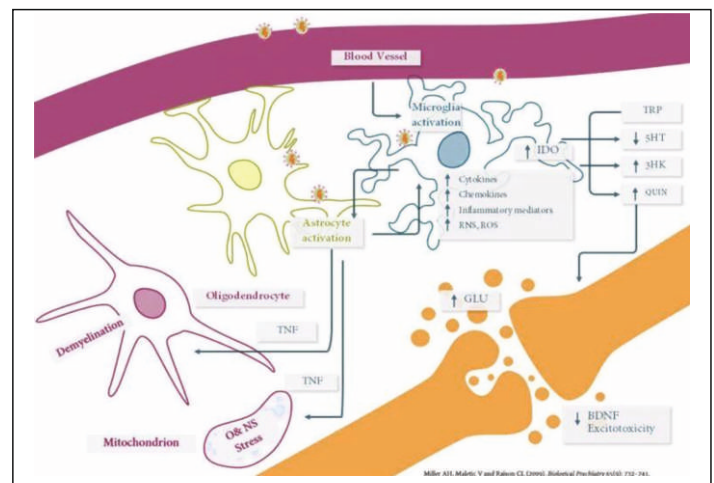
2. Peripheral immune cell transmigration

- Human coronaviruses may play a possible role in the development of psychiatric symptoms through the opportunistic infection of peripheral myeloid cells (using Trojan Horse mechanism), which then again flow to the brain, causing neuro inflammation and virus-induced neuropathology.



3. Neuroinflammation

- Cytokines released through peripheral inflammation increase the permeability of the BBB providing a pathway for the virus to enter the brain.
- Once in the CNS, it can infect astrocytes and microglia, yet again activating the cascade of neuro inflammation and neurodegeneration through the release of TNF, cytokines, ROS and other inflammatory mediators.



4. Hypoxic injury

- Hypoxia in the brain may occur through direct infection of the lung tissue but it can also occur due to the neuro-invasive potential of the virus directly, affecting the medullary cardio-respiratory centre.
- Hypoxia of the brain increases anaerobic metabolism in the mitochondria of the brain cells, and the resulting lactic acid leads to cerebral oedema, reduced blood flow, raised intracranial pressure, which can clinically present with a range of neuro-psychiatric symptoms.

5. Immunomodulatory treatments and Injuries caused by them

- There is evidence that some patients have been treated with high-dose corticosteroids during the acute phase of the virus.

This type of therapy is linked to acute neuropsychiatric side-effects such as sleep disturbances, delirium, mania, depression and psychosis.

6. Gut Microbiome Translocation (ACE-2)

- Inflammation disrupts the intestinal barrier resulting in 'gut leak' causing bacterial translocation into the bloodstream.
- Increased intestinal permeability leads to the influx of large amounts of lipopolysaccharides which in turn causes the release of TNF α , IL-1 β , and IL-6, further exacerbating systemic inflammation.
- The infection can cause changes to the microbial composition in the gut which may be linked to psychiatric disorders.

Angiotensin-converting enzyme2 (ACE-2) receptor involvement:

- The virus uses the ACE2 receptor for entry into cells and results in the destruction of ACE2-producing tissues.
- ACE2 is thought to be an essential regulator of the renin-angiotensin system (RAS) essential for cardiac function and blood pressure control. ACE-2 is a negative regulator of the RAS.
- ACE2 cleaves Ang I and Ang II into the inactive Ang 1-9 and Ang 1-7, respectively preventing hypertension.
- Loss of ACE2 can be detrimental, as it leads to the functional deterioration of the heart and progression of cardiac, renal, and vascular problems.

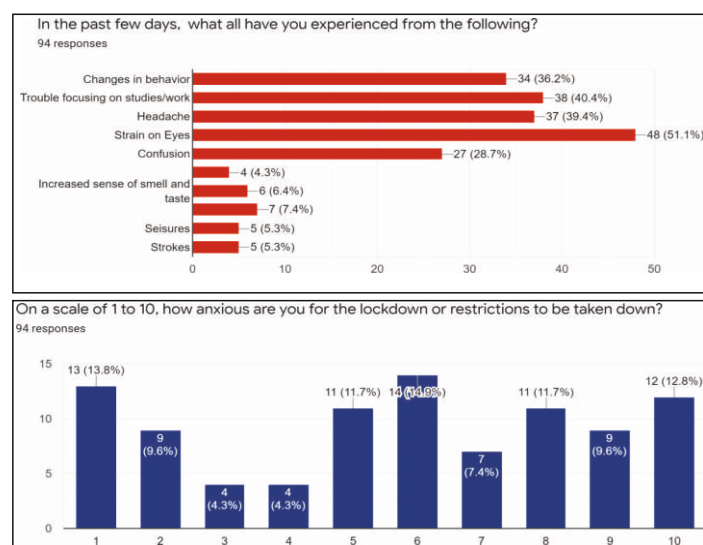
7. Hypercoagulability

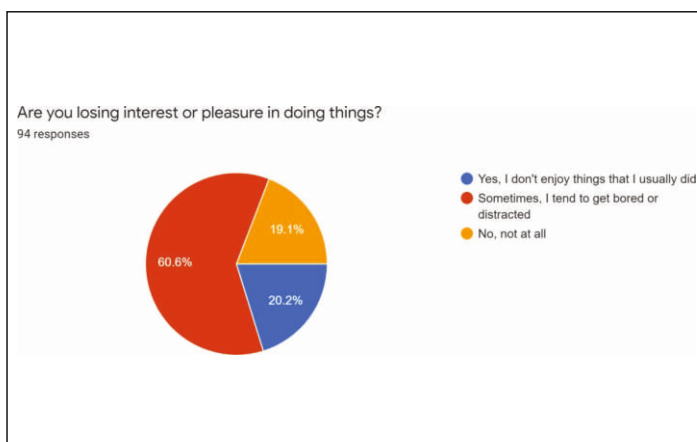
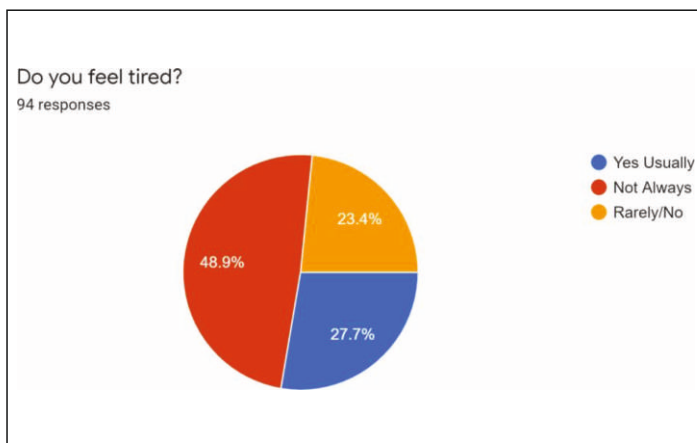
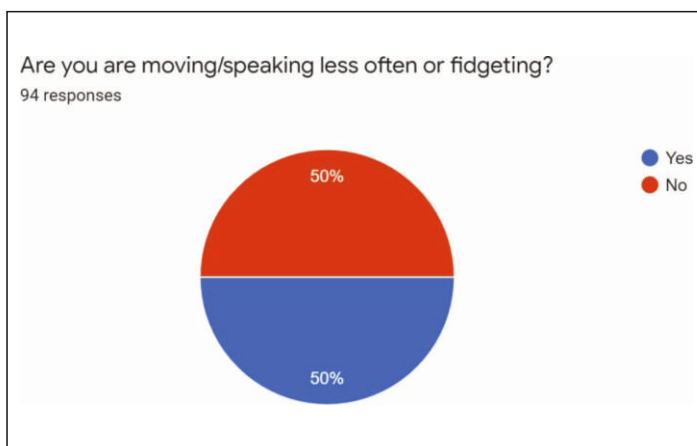
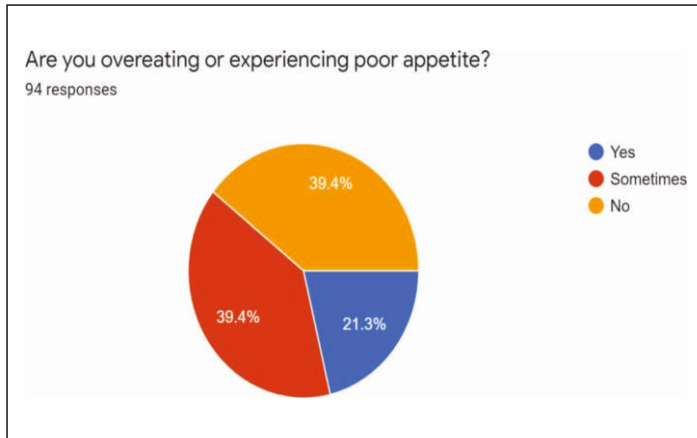
Hypercoagulability is seen in more severe/acute cases of COVID-19. The persistent inflammatory status in severe and critical COVID-19 patients acts as an important trigger for the coagulation process in the body. Potential mechanisms as postulated by Dr. Renge in his article "COVID-19 and the Brain – Pathogenesis and Neuropsychiatric Manifestations of SARS-CoV-2 CNS Involvement", are:

- Certain cytokines, including IL-6, could activate the coagulation system and suppress the fibrinolytic system.
- Pulmonary and peripheral endothelial injury due to direct viral attack.
- Endothelial cell injury can strongly activate the coagulation system via exposure of tissue factor and other pathways.
- Dysfunctional coagulation may cause an aggressive immune response setting up a vicious cycle.
- Thrombotic microangiopathy caused by endotheliopathy with a haemorrhagic predisposition.
- Production of anticardiolipin and anti- β 2GPI antibodies.
- The pathogenesis of neuropsychiatric involvement via antiphospholipid antibodies may provide some clues towards the pathogenesis of brain involvement in COVID-19.

Direct Neurological impact of SARS-CoV-2 on virus positive patients

As reviewed in the online neurological and social psychological survey titled "THE PANDEMIC PROJECT" through Google Forms [<https://forms.gle/ePaA2iwF5b7E9PxP7>], 94 responses from COVID-19 positive patients on the neurologic impact of the SARS-CoV-2 on them are summarised in visual charts as follows:





The table formulated below summarises the neurological symptoms that have been reported in the above survey:

Sr.	Neurological Symptoms	Implications	No. of Reports	References
1	CNS symptoms	Headache	37/93*	Li Y, Li H, Fan R, Wen B, Zhang J, Cao X, Wang C, Song Z, Li S, Li X. Coronavirus infections in the central nervous system and respiratory tract show distinct features in hospitalized children. <i>Intervirology</i> 2016; 59(3): 163–169.
		Convulsion	27/93*	Li Y, Li H, Fan R, Wen B, Zhang J, Cao X, Wang C, Song Z, Li S, Li X. Coronavirus infections in the central nervous system and respiratory tract show distinct features in hospitalized children. <i>Intervirology</i> . 2016; 59(3): 163–169.
		Stroke	5/93*	Rabin RC (2020) Some coronavirus patients show signs of brain ailments. <i>The New York Times</i> . Accessed April 2020
		Seizure	5/93*	Rabin RC (2020) Some coronavirus patients show signs of brain ailments. <i>The New York Times</i> . Accessed April 2020
2	PNS symptoms	Diminished sense of smell, taste	4/93*	Rabin RC (2020) Some coronavirus patients show signs of brain ailments. <i>The New York Times</i> . Accessed April 2020
		Loss of speaking ability	46/93*	Rabin RC (2020) Some coronavirus patients show signs of brain ailments. <i>The New York Times</i> . Accessed April 2020
3	Cognitive impairment	Attention and memory deficit	38/93*	Kapfhammer HP, Rothenhäusler HB, Krauseneck T, Stoll C, Schelling G. Post traumatic stress disorder and health related quality of life in long-term survivors of acute respiratory distress syndrome. <i>Am J Psychiatr</i> . 2004;161(1):45–52.

		Impaired visual-spatial abilities	48/93*	Herridge MS, Tansey CM, Matté A, Tomlinson G, Diaz-Granados N, Cooper A, Guest CB, Mazer CD, Mehta S, Stewart TE. Functional disability 5 years after acute respiratory distress syndrome. <i>N Engl J Med.</i> 2011; 364(14):1293–1304.
		Impaired learning	65/93*	Jacomy H, Fragoso G, Almazan G, Mushynski WE, Talbot PJ. Human coronavirus OC43 infection induces chronic encephalitis leading to disabilities in BALB/Cmice. <i>Virology.</i> 2006; 349(2):335–346.
		Auditory and visual hallucinations	6/93*	Sheng B, Cheng SKW, Lau KK, LiHL, Chan ELY. The effects of disease severity, use of corticosteroids and social factors on neuropsychiatric complaints in severe acute respiratory syndrome (SARS) patients at acute and convalescent phases. <i>Eur Psychiatry.</i> 2005;20(3):236–242.
4	Mood-altering behaviour	Anxiety	64/93*	Deja M, Denke C, Weber Carstens S, Schröder J, Pille CE, Hokema F, Falke KJ, Kaisers U. Social support during intensive care unit stay might improve mental impairment and consequently health related quality of life in survivors of severe acute respiratory distress syndrome. <i>Crit Care.</i> 2006;10(5):R147
		Depression	34/93*	Severance EG, Dickerson FB, Viscidi RP, BossisI, Stallings CR, Origoni AE, Sullens A, Yolken RH. Coronavirus immunore activity in individuals with a recent onset of psychotic symptoms. <i>Schizophr Bull.</i> 2011;37(1):101–107.
		Abnormal behaviour or speech	76/93*	Bookstaver PB, Mohorn PL, Shah A, Tesh LD, Quidley AM, Kothari R, Bl and CM, Weissman S. Management

				of viral central nervous system infections: a primer for clinicians. <i>J cent Nerv Syst Dis.</i> 2017;9:1179573517703342
5	Muscular symptoms	Tiredness	72/93*	Li Y, Li H, Fan R, Wen B, Zhang J, Cao X, Wang C, Song Z, Li S, Li X. Coronavirus infections in the central nervous system and respiratory tract show distinct features in hospitalized children. <i>Intervirology.</i> 2016;59(3):163–169.

*All responses have been recorded and reviewed keeping in consideration the following consent:

Sr.	Genetic Neurological Disorder	No. of Responders
1	Alzheimer's Disease	7
2	Huntington's Disease	1
3	Epilepsy	5
4	Parkinson Disease	12
5	Strokes	22
6	None	61

CONCLUSION

SARS-CoV-2 is possibly neuroinvasive and neurotropic, with potential neuropathological consequences in vulnerable populations. Although it is widely accepted that human coronaviruses such as MERS-CoV, SARS-CoV and the novel SARS-CoV-2 are usually confined to the respiratory tract, and mostly result in respiratory diseases, this paper has also highlighted the numerous studies that demonstrate neuroinvasive potential and potential neurological consequences of human coronaviruses. The online survey tests the self-reported behavioural and structural alterations brought about by the coronavirus neuroinfection on the patients. This review demonstrates strong neurological implications for the novel virus. Therefore, understanding the underpinning mechanisms of neuroinvasion and interaction of coronaviruses, especially SARS-CoV-2 with the nervous system is essential to evaluate potentially pathological consequences and to design novel diagnostic and intervention strategies.

Additional Information

The observed peak in the graphs of the 106 Covid -ve and unmentioned testing category out of which 75% responders are students, suggests “Strain on Eyes” and “Trouble



focusing on Studies” as majorly faced problems. Some comments submitted by this category are:

- This pandemic and lockdown has surely created a block in people's brain which might not get cleared until they regain the opportunity to explore or incentive to try something new.
- Sometimes I feel depressed.
- Socioemotionally disconnect”
- I just feel angry all the time.
- All well.
- I haven't gotten tested but the fear of being infected bothers me.
- I am facing difficulty in learning because of the scare of the spread of coronavirus”
- Test positive or not I get headaches and panicattacks, and they are happening a lot during quarantine. I have a lot of anxiety.
- So many people, that too Covid-19-ve, are committing suicide. The virus is figuratively and metaphorically hijacking our brains.

These highlight the indirect psychological implications of SARS-CoV-2.

Acknowledgements

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This paper has been written under the supervision of **Dr. Vaishali Mishra**, M.Sc.-B.Ed-Ph.d, Banaras Hindu University and Head of Department (HOD)-Chemistry, ITL Public School, New Delhi, India.

THE PANDEMIC PROJECT survey has been conducted and circulated in Delhi NCR region under the mentorship of **Ms. Shikha Sikka**, M.Sc.-M.Phil-B.Ed, Guru Nanak Dev University, Punjab, India and Head of Department (HOD)-Biology, ITL Public School, New Delhi, India.

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A GREEN TECHNOLOGY : TURNING AIR TO “BLUE GOLD”- A BOON FOR OUR THIRSTY PLANET

- *Water, water everywhere and not a drop to drink.....*

Rainwater harvesting has been the most common technology adopted in water conservation but is limited to areas experiencing ample rainfall. When we think about sources of water, fog or humidity in air is not the first thing that springs to mind ,but a pioneering new technology in harnessing water-**Fog Harvesting** offers communities facing severe water shortages in arid and foggy coastal or mountainous regions an affordable and sustainable source of clean drinking water.

The **Fog Catcher** technology allows drawing water directly from moisture in the air even in the driest locations where fog and wind are common. The technology is based on the **principle** that wherever mist or fog touches a metallic or net surface it condenses to form dew or droplets of precious water.

Fog harvesting is used in countries like Chile, Peru and Ecuador, Atlantic coast of southern Africa (Angola, Namibia), South Africa, Cape Verde, China, East Yemen, Oman, Mexico, Kenya and Sri Lanka. **This simple technique has indeed resulted in some awe-inspiring incidents on earth. Reversing Migration-Marrakech**

which is on the edge of the Sahara, in southwest **Morocco**, is the **world's largest functioning fog collection project**. This region became increasingly depopulated in the last decades as inhabitants were forced to migrate due to lack of water. To tackle this problem, large fog collectors were set up, and since then the technology has become a lifeline for people living in the area. They provide **over five million litres of water each year**, meaning they no longer have to trek hours each day to retrieve water from open wells, or worry about dropping groundwater levels due to overuse and climate change.

Chungungoa town in Chile and commune of Angola, located in the province of Hulla also has the same fog Collectors which provides approx.33 litres of drinking water per day to each of the 330 villagers.

This technology is used in some part of India such as Gujarat and Uttarakhand. This technology can be implemented in India in the coastal and hilly terrains where dense fog is common, especially in winter. Even in Delhi , Gwalior, Kanpur, Allahabad etc. also where prominent and prolonged fog in winter.

Such innovative, traditional ,environmentally appropriate, socially beneficial and low cost **Fog Catcher** an **alternative and sustainable solution** to turn **grey to blue** to be more explored in the water -scarce arid zones to overcome the inadequacy of water as well as arrest ground water decline .

- **“A drop of water is worth more than a sack of gold to a thirsty man”**



Source: Water portal and Wikipedia

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कविताएं

सिर्फ एक अहसास

मुझे याद ममत्व
अपनापन है वह अहसास
एक टक निहारते अश्रु-युक्त नेत्र

वह फैला हुआ हाथ
तबीयत ठीक न होने पर
प्यार भरी फटकार
और फिर दुलार
मैं भूल नहीं सकती

भूलना चाहती भी नहीं
किन्तु समय की परतो
.....में वह भाव
कही खा गया वह भाव
बचपन का अहसास
धूमिल हो गया
समय के बहाव में
बह गया।

आज एक बार फिर
ज्वर के आगोश में
बच्चे के तम तमाये शरीर से
निकली वहीं लहर
विचलित मन ने समझा वह अनुराग

ममत्व की व्यथा
स्नेहमयी फअकार
वह दुलार
सिर्फ एक अहसास

मधु शर्मा

अंतर्राष्ट्रीय शैक्षिक सलाहकार

मेरा शहर (लखनऊ)

भीड़ से दबा वह नाजुक सा शहर अपनापना सजोये
धीरे से अंगड़ाई लेकर,
मुझे अपनाता है,
अपनी बाहों से जकड़ कर
घर पर रास्ता बतलाता है।
तुम उस टैम्पो को ना देखो
ना देखो बिजली से चमकते रास्ते
ना देखो थके धरे रिक्शा चालक को
बस देखो वह आईना
चमकते हुए मेरे प्रतिबिम्ब को।

पहचान

तुम्हारी पहचान को
पत्तों में दबी उस सच्चाई को
हमने जान लिया
हमने देख ली वह उलझन
वह समझौते के बने सोपान
वह कुचलते हुए स्वप्न
वह डूबती हुई हसरतें
फिर भी अनजान रहे
व्यवहार-कृशलता की आड़ में
तुम्हारे अस्तित्व को टाल गये
स्वयं में तुमसे देख कर
अपने आप को नकार गये।

आश्रय

घर से निकले अकेले
रूपरेखा के बिना
काम करने के लिए
तलाश भी कुछ हाथों की
किसी के संरक्षण की
समस्याओं से घिरे मरुस्थल में
जीवन की प्यास थी।
अनेक हाथों ने था लिया
प्यास बुझ गई
हाथों-हाथ लिया
रूपरेखा स्वयं बनी
तलाश पूरी हुई
गारे वे सीमेंट से बना घर
नवीन रूप लिए
मन में उमंग रहा
सिर्फ काम न रहा
किसी का आश्रय बना।

मधु शर्मा

अंतर्राष्ट्रीय शैक्षिक सलाहकार

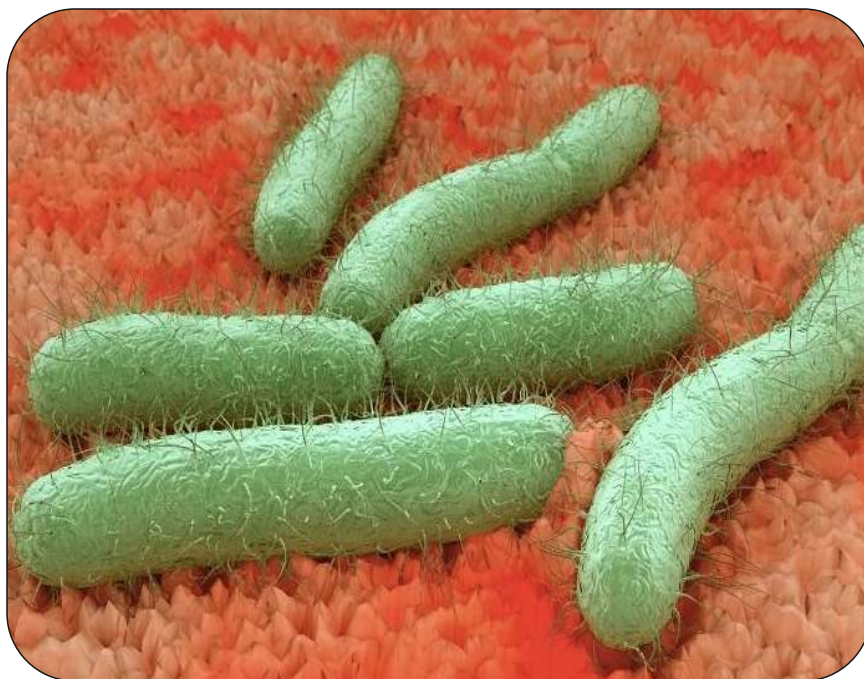
USING AI FOR PREDICTING WATER QUALITY

Every minute a newborn die from infection caused by lack of safe water and an unclean environment.

– World Health Organization

Obtaining clean water is a critical problem for most of the world's population. Waterborne diarrheal diseases are responsible for 2 million deaths each year, with the majority occurring in children under 5. Climate change-induced flooding and droughts can impact household water and sanitation infrastructure and related health risks. For instance, flooding can disperse fecal contaminants, increasing risks of outbreaks of waterborne diseases such as cholera. In addition, water shortages due to drought can increase risks of diarrheal disease. Waterborne illnesses are many and varied, from diarrhea and cholera to polio and meningitis. They can be incredibly severe, life-changing and even life-threatening to those who are infected but there are steps we can take to protect ourselves from waterborne diseases and illnesses.

Proper household water and sanitation practices can increase resilience to waterborne disease risks. These measures include sanitary sewage disposal, safe water piping materials and storage, and education on hygiene behaviors. Energy-efficient water infrastructure and water conservation measures can also decrease the burden of waterborne diseases. For regions in the world in which access to clean water is a continuing problem, simpler test methods could dramatically help prevent water-borne diseases and save lives.



Also, if we could detect the water contaminants in real time, it could give us the water quality and will allow to access risks of consuming contaminated water. Traditional water quality monitoring involves three steps namely water sampling, Testing and investigation. These are done manually by the scientists. This technique is not fully reliable and gives no indication beforehand on quality of water. However, **Artificial intelligence (AI)** can play a major role in detecting water contaminants such as *E. coli*. or lead particles in real time, using pattern recognition and machine learning.

This is accomplished with a digital microscope connected to a laptop computer operating system and the Neural Compute Stick. After analysis, contamination sites are marked on a map in real time. It detects the shape of the molecules using the microscope, and maps the findings to alert the people using that water source.

Each bacterium has a different shape, so under the microscope it's very easy for AI to identify different strains of bacteria and monitor them in real time. The test system determines the shape, color, density, and edges of the bacteria. With advancement of technology, AI will

help to distinguish between good microbes and harmful bacteria.

A rendering of *E. coli* bacteria, one of the most common and dangerous water contaminants.

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प्रकृति का दर्द

प्रकृति हमारी बड़ी निराली
इसी से जुड़ी यह दुनिया हमारी
प्रकृति से ही धरा निराली
प्रकृति से ही फेली हरियाली
वृक्ष प्रकृति का हैं श्रृंगार
क्यों इन पर हम करें प्रहार
स्वार्थ सधने पर मुँह फेल लेना
क्या यही है तेरी मानवता?
प्रकृति की गोर में जन्म लिया है
फिर क्यों इसे उजाड़ना है चाहता?
प्रकृति दात्री है जिसने हमें सर्वस्व है दिया
फिर मानव इसे क्यों दासी है समझता?

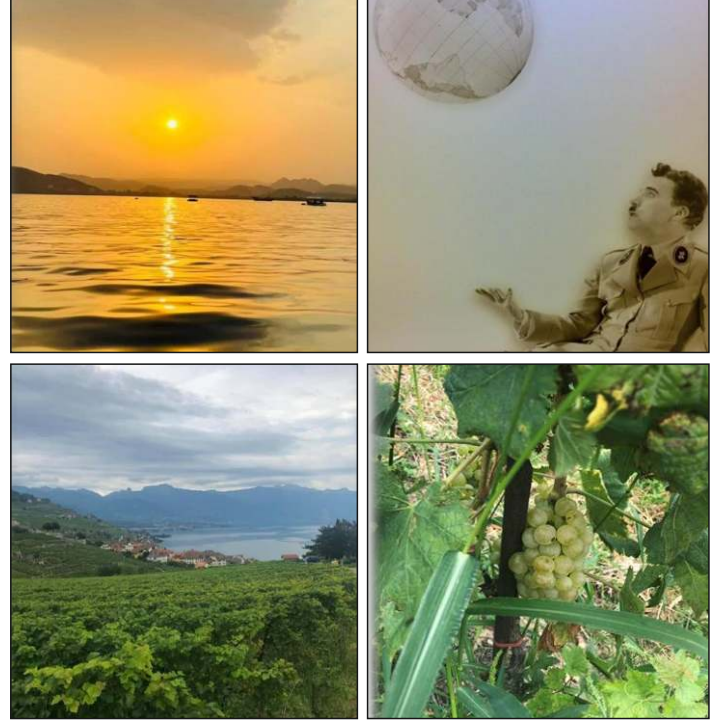


मोनिका कपूर
हिंदी अध्यापिका

फोटोग्राफी एवं पर्यावरण

फोटोग्राफी अभिव्यक्ति का एक सशक्त माध्यम है क्योंकि जब हम किसी भी दृश्य को देखते हैं तो उसकी सुंदर छवि हमारे मस्तिष्क में अनायास ही घर कर जाती है। व्यक्तिगत रूप से मुझे फोटोग्राफी का अच्छा खासा शौक है और मैं उसे सीखने के लिए भी सदैव तत्पर रहती हूँ। मुझे घूमने और दुनियाँ देखने का भी अवसर मिलता रहा है। मैं अपनी यात्राओं के दौरान फोटोज लेती रहती हूँ और यत्न से उन्हें सँजोकर अपनी अभिव्यक्ति का माध्यम बनाकर सोशल मीडिया व रचनात्मक कार्यों में समय वृ समय पर प्रयोग करती ही रहती हूँ।

इसीलिए इस संस्करण के लिए मैंने सोचा कि यह एक बहुत ही विशेष अवसर है कि पिछले दो महीनों में 22 मार्च को "विश्व जल दिवस" और 22 अप्रैल को "विश्व पृथ्वी दिवस" हम सबने मनाया और हमउसके साक्षी बने। जब कि अभी तक वर्ष 2020 से 2021 में भी हम वैश्विक महामारी कोविड-19 से जूझ रहे हैं।



ऐसे समय में ये फोटोज हम सब में एक नई ऊर्जा, उम्मीद और नव जीवन संचार कर सकते हैं।

इसी प्रसंग में कुछ फोटोज दिखाकर उनके विषय में बताना भी चाहती हूँ। नीचे पहली फोटो वह है जो मैंने पिछले महीने अपनी उदयपुर यात्रा के दौरान नाव में सवार होकर पिछौला झील से खींची थी। जिसमें सूर्यास्त के समय झील की लहरों और डूबते सूरज की परछाई का अद्भुत मिलन है। पृष्ठभूमि में राजस्थान के पहाड़ों और बादलों की छटा मन को मोह लेती है। मैंने 22 मार्च "विश्व जल दिवस" के अवसर पर इस फोटो प्रदर्शित किया क्योंकि जल ही जीवन है। हमारे पंचभूतों में जल एक बहुत ही महत्वपूर्ण तत्व भी है, इसलिए यह फोटोमुझे अवसर के अनुकूल लगी।

बाकी फोटोज मैंने 22 अप्रैल "विश्व पृथ्वी दिवस" के अवसर पर प्रदर्शित की क्योंकि धरती माँ ही हमारी संरक्षक है, सभी प्राणियों का जीवन आधार है। जो पंचभूतों में सबसे महत्वपूर्ण तत्व भी है, इसलिए यह फोटो मुझे अवसर के अनुकूल लगी।

ये फोटोज मैंने वर्ष 2019 में अपनी स्विट्जरलैंड यात्रा के दौरान खींची थीं। सारी दुनियाँ को हँसाने वाले प्रसिद्ध अभिनेता चार्ली चौपलिन संग्रहालय का है। जिसमें वह दुनियाँ को खुशहाल देखकर उसे उछाल रहे हैं। उसके बाद सड़क के किनारे एक रेस्टोरेंट से ली गई फोटो है जिसमें हरे-भरे अंगूर के पेड़, उसके गुच्छे, झील, पहाड़, बादलों का मनभावन दृश्य बरबस हमें आकर्षित करते हैं।

आशा करती हूँ आप सभी को मेरी यह प्रस्तुति पसंद आएगी।

श्रीमति तृप्ति श्रीवासत्वा
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THE IMPORTANT DAYS OBSERVED

- ❖ **WORLD WETLAND DAY** is celebrated every year on **2 February** at international level to focus attention and help raise public awareness about the value of wetlands. A variety of events to raise awareness such as- lectures, seminars, nature walks, children's art contests, sampan races, community clean-up days, radio and television interviews etc conducted at school and college level. The **theme** of this year for World Wetlands Day is '**Wetlands and Water,**' highlights the importance of wetlands as a source of freshwater and encourages action to restore them and stop their loss.
- ❖ **WORLD CANCER DAY** is observed every year



on **4 February** to raise awareness about cancer and reduce the stigma that surrounds this disease. The objective of this day is to encourage the prevention, detection, diagnosis and treatment of cancer as early as possible. By adopting a healthy life style that includes balance diet ,yoga and regular Exercises can reduce the impact of cancer .

- ❖ **INTERNATIONAL POLAR BEAR DAY** is an

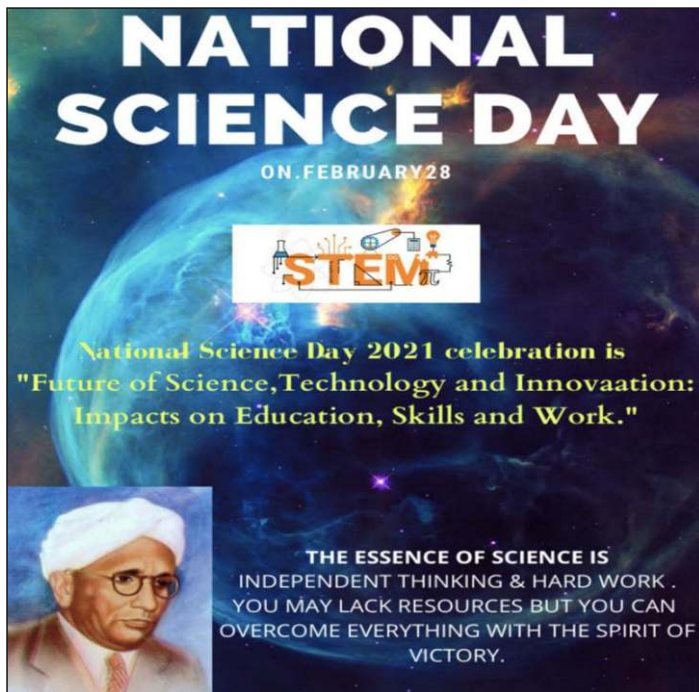


annual event celebrated every **February 27** to raise awareness about the conservation status of the polar bear.

- ❖ **INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE** is observed on **11 February**. In order to achieve full as well as equal participation of women and girls in science, the United Nations General Assembly declared 11 February as the ***International Day of Women and Girls in Science.*** Science and gender equality are both vital for the achievement of the internationally agreed development goals, including the 2030 Agenda for Sustainable Development. Over the past 15 years, the global community has made a lot of effort in inspiring and engaging women and girls in the field.
- ❖ **NATIONAL SCIENCE DAY** is observed on **28**



February to mark the discovery of Raman Effect by Sir C V Raman. February 28 holds a special place in history, as on this day in 1928, India's prominent scientist, Sir C.



V. Raman discovered "Raman Effect." For this remarkable discovery, Sir C.V. Raman was awarded the Nobel Prize in Physics in 1930. Celebrated as National Science Day, the main objective of the day is to bring awareness among people about the importance of Science in daily lives, and to popularize Science and technology among the youth. It aims to develop scientific temper and a spirit of inquisitiveness, so that India can break free from the shackles of irrational rituals and emerge into a modern and progressive society. **This year, the theme for National Science Day is "Future of STI: Impacts on Education, Skill and Work."**

❖ **WORLD WILD LIFE DAY** is celebrated on 3 March



2021 under the theme "Forests and Livelihoods: Sustaining People and Planet", as a way to highlight the central role of forests, forest species and ecosystems

services in sustaining the livelihoods of hundreds of millions of people globally, and particularly of Indigenous and local communities with historic ties to forested and forest-adjacent areas. This aligns with UN Sustainable Development Goals 1, 12, 13 and 15, and their wide-ranging commitments to alleviating poverty, ensuring sustainable use of resources, and on conserving life land.

❖ **MARCH INTERNATIONAL DAY OF ACTION**



OF RIVER-The theme of International Day of Action for **Rivers 2021** is "**Rights of Rivers**". International Day of Action for Rivers celebrates and brings together river restoration and protection initiatives across the world on **March 14** every year. Communities across the globe are celebrating their rivers on this day, seeking to educate people about the threats facing our rivers, and learning about better water and energy solutions.

❖ **WORLD SPARROW DAY** (विश्व गौरिया दिवस) -World



Sparrow Day is a day designated to raise awareness of the house sparrow and then other common birds to urban environments, and of threats to their populations, observed on **20 March**.

❖ **21 MARCH WORLD FORESTRY DAY**-is celebrated every year on **21 March**. The **theme for 2021** is "**Forest restoration: a path to recovery and well-**

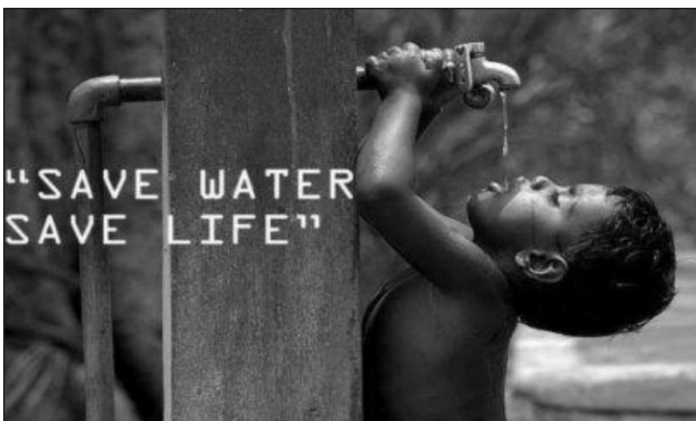
being” aims to emphasise how restoration and sustainable management of forests can help address climate change and biodiversity crisis.

❖ **WORLD WATER DAY** is observed on **22 March**.



Students took pledge to conserve water and inspire others also to take action to make a difference. The theme for World Water Day 2021 is "**valuing water**" and highlights the importance of conserving water and its value.

❖ **WORLD METEOROLOGICAL DAY** highlights the



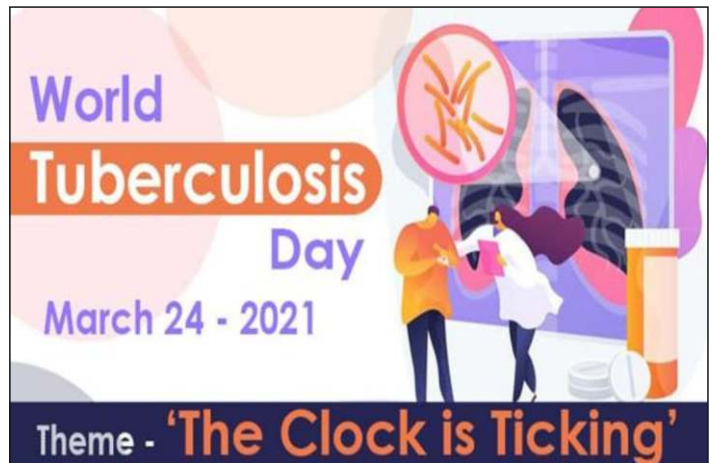
importance of the atmosphere of the earth and behaviour of the people connected with each other. It is observed

on **23rd March** every year to commemorate the establishment of the World Meteorological Organisation. The **theme** of World Meteorological Day **2021** is the ocean, our climate, and weather. It focuses on connecting the ocean, climate, and weather within the.

❖ **WORLD TUBERCULOSIS DAY**-is observed every



year on March 24 to raise public awareness about the devastating health, social and economic consequences of TB, and to step up efforts to end the global TB epidemic.





From the Editor's Desk

Dear Readers,

I would like to welcome you to the 1st issue of 4th volume of PRAKRITI SANRAKSHAN quarterly newsletter of STE.

*We all know that the whole world is suffering from the disastrous impact of*Coronavirus (COVID-19) Pandemic leading to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case in India of COVID -19 was reported on 30 January 2020 in Kerala. Deadly second wave beginning in March 2021 was much harsher and dangerous*than the first, and shortages of vaccines, hospital beds, oxygen cylinders and other medicines further made the problem deadly In India COVID -19 spread from cities to small towns. The virus that causes COVID-19 is mainly transmitted through droplets, generated when an infected person coughs, sneezes, or exhales. These droplets are too heavy to hang in the air, and quickly fall on floors or surfaces. India began its vaccination programme (Covishield, Covaxin)on 16 January 2021. While on one hand people across India and around the globe are largely confined to their homes with businesses and educational institutions all shut down in an attempt to *combat the virus, and on the other hand doctors, health-care workers, and medical staff members are fighting the battle against COVID-19 from the front. In the fight against coronavirus doctors, nurses, medical cleaners, pathologists, paramedics, ambulance drivers, health-care administrators and the brave medical army stands strong with thermometers, stethoscopes, and ventilators as their weapons. A tribute to frontline corona warriors who have sacrificed and have been sacrificing their lives while saving patients during the ongoing COVID-19 pandemic. We wish that this ongoing devastating pandemic will be normal very soon.*

Our Jan-March issue highlights the Fortnightly Lecture Series on - the story of Invention, Empowering Diversity In Science, Emerging Challenges For Youth Volunteers: Innovation, Inclusion & Integration. This issue also contains articles and poems based on environmental issues. The important days observed from the month of January to March have been also included in this issue.

I express my sincere thanks to all the people who have contributed informative and inspirational articles to make this newsletter successful. I would like to express my profound gratitude to the President of STE Dr Kshipra Misra, the editorial team and Mr. Gian Kashyap for designing this issue of PRAKRITI SANRAKSHAN and giving it the desirable shape.

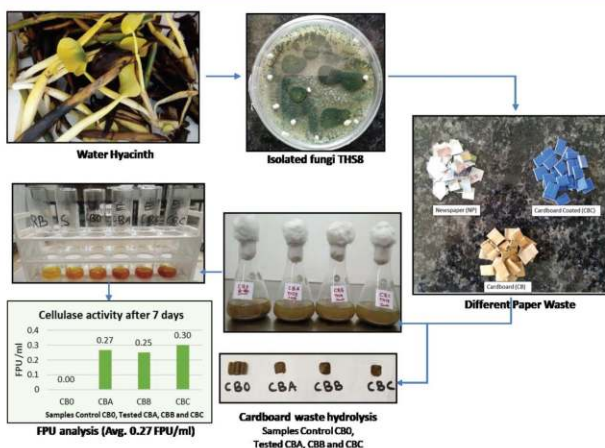
Dr. Vaishali Mishra

Editor (English), Prakriti Sanrakshan, STE

ARTICLES ARE INVITED FOR THE INTERNATIONAL JOURNAL OF ENVIRONMENT AND HEALTH SCIENCES

This journal is being published by Save the Environment. Send your manuscripts for peer-review by e-mail. The authors must mention address, Contact Nos. and E-MAIL ID in their forwarding letter. Proof will be sent for correction before publishing. A pledge for originality will be signed by the authors.

We are pleased to announce that the DOI prefix for International Journal of Environment and Health Sciences is now available from Crossref, the official Digital Object Identifier (DOI). **The journal is now indexed in International Scientific Indexing (ISI).**



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STE Annual Awards 2021

(NOMINATION AND APPLICATIONS ARE INVITED)

LAST DATE 15th November, 2021

Annual Awards of STE are the tangible symbol to signify eminence of contributions made by a person or institution. This boosts the enthusiasm of the contributors who have contributed in different fields of science and social service with their excellence, expertise and approach towards achieving certain goals for the society. Recognition of such extraordinary activities is eventually very important to boost their confidence and to honour them for what they have done for the science and society. STE confers following categories of awards and honours to such eminent personalities.:

STE Dr. APJ Abdul Kalam Award

STE Green Excellence Award

STE Fellowship Awards

STE Meritorious Award

STE Water Awards

STE Best Teacher Award

STE Dr. Praloy O Basu Life Time Achievement Award

STE Young Researcher Awards

STE Best Ideas/Innovations/Technology for Environment Awards

STE Women Awards

STE International Achiever Awards

**For more information, please log on to our website
www.stenvironment.org/ste-awards/**

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