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**100 Years Birth Anniversary
Celebrations**



**“Karmayogi”
Dr. M. S. Ramaiah**

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Editor's Note

Hello Readers !!!

It is a great pleasure to launch the first issue for the year 2022. This issue is very special to us as we are paying our tribute to visionary Dr. M. S. Ramaiah on the occasion of his centennial birth anniversary. Apart from covering conventional informative scientific write ups, the issue also features brain storming section, I encourage the readers to participate in it. I would like to congratulate the winners of Mind Lab of previous edition & personally thank Ms. Manju Shree. S for her contribution for this issue and to all other contributors for having put their thoughts and experiences into an engaging read.

For any queries, suggestions, feedback or submission of articles, please do not hesitate to contact our team via fphpanpharmacon@gmail.com. We would love to hear from you and elevate the quality of the newsletter to serve you better. Happy reading !!!



Dr. J. Anbu

Editor-Panpharmacon

Acknowledgement

Team Panpharmacon is very much thankful to RUAS management for providing a wonderful platform to explore and utilise our knowledge and skills. We wish to thank our Hon'ble Vice-Chancellor and Pro-Vice Chancellors for their patronage and advising us on the importance of enhancing the visibility of workplace that stimulated us to come out with Panpharmacon, an E – Newsletter. We also thank all our colleagues, well wishers, student concilium and friends for supporting us in making this newsletter.



Centennial Celebrations of Karmayogi

Celebrating the *100th Birth Anniversary of Dr. M. S. Ramaiah*

1922 - 2022

A great visionary, who saw the distant future
& achieved the impossible



**Visionary
Ideas**
that transformed
**millions
of lives**

EARLY LIFE

Dr. M.S. Ramaiah hails from a working class family. His grandfather G.R. Ramaiah was an ordinary mason while Indian Institute of Science was under construction. His father Sampangappa was a brick contractor. Dr. M.S. Ramaiah is the only son of Sampangappa and Narasamma. He was born in April 1922. He did his primary and middle school education in Mathikere which was then on the outskirts of Bangalore City. Due to the problems in the family, he could not continue his education and he was forced to involve in agriculture. Since the land holding of the family was very meagre, he took an appointment in Industrial Testing Laboratory, which was a Government of Mysore concern.

Later, he joined Mysore Railways and put in a service for two years. At the age of 18, he followed his father and took up contract jobs. During the second world war, he supplied bricks to the construction of military camps in Bangalore. After the World War, he shifted his camp to Kolhapur, where the State Government had undertaken a dam work. During 1945-51, he did well in supplying bricks to the construction works and became a successful contractor. This made him to take up bigger projects and he ventured to the canal works of Ghattaprabha project.

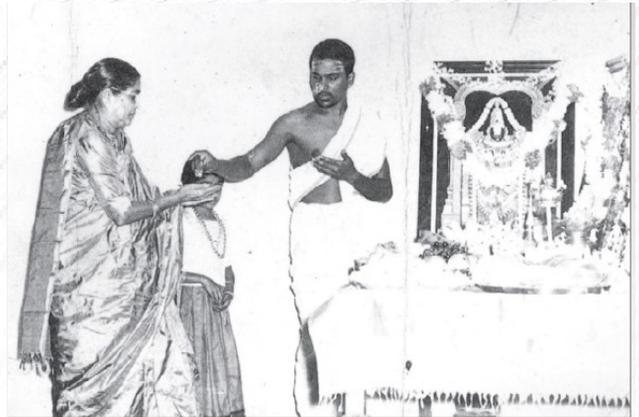
Later, he successfully completed the Talakalale dam of Sharavathi Hydro Electric Project and Dharma project, which is the longest earthen dam in the State. He also successfully completed the works of Gandak Project in Bihar. By 1960, he was a top most engineering contractor of the State.



EDUCATIONAL SERVICES

Due to poverty, Dr. M.S. Ramaiah could not have higher education for himself. He realised the value of education for the nation's progress, especially the need of technical personnel as he was an engineering contractor. Dr. Ramaiah was among India's most successful entrepreneurs. Working at a time when the nation was still a closed economy with few opportunities available to private enterprise.

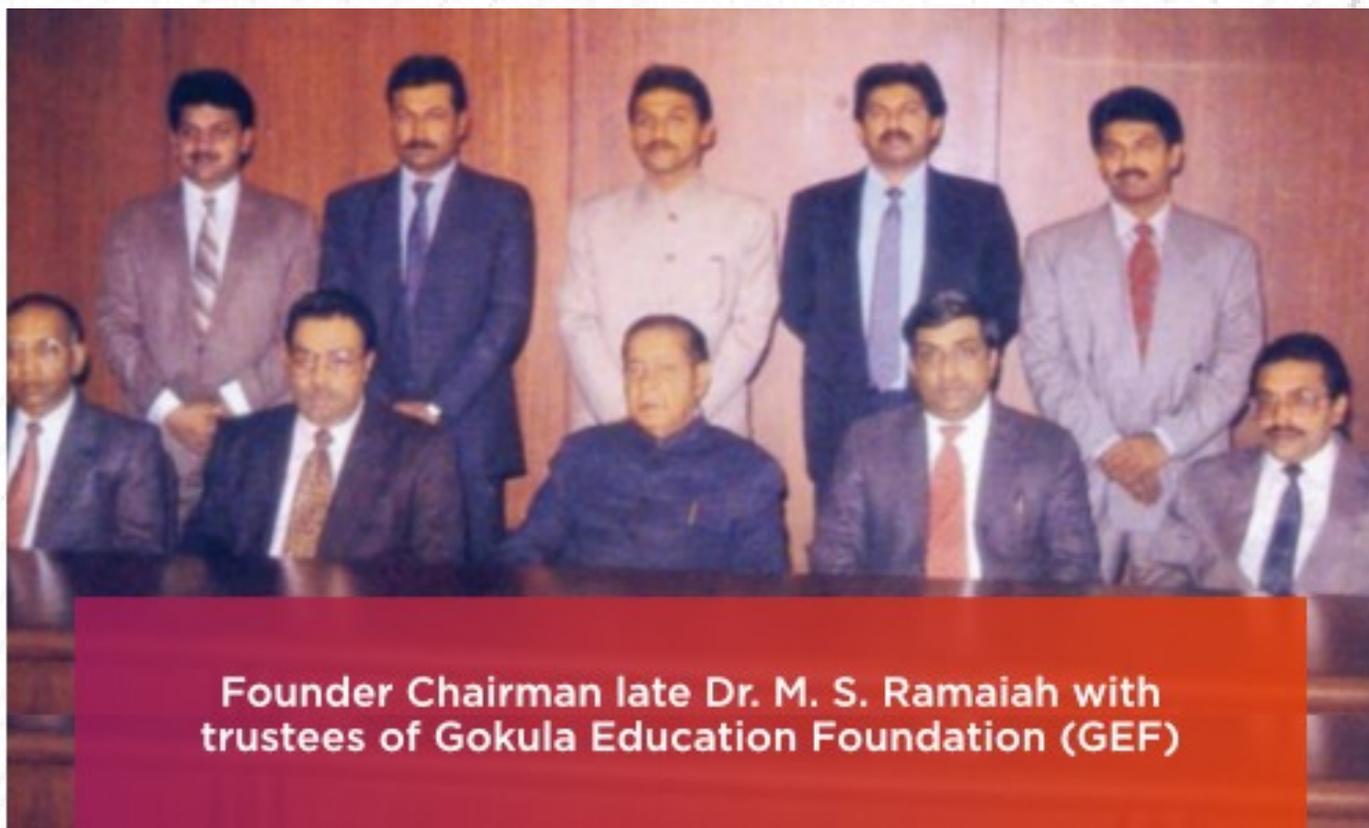
Dr. Ramaiah identified infrastructure as a growth area and worked on to become one of India's most successful names in the space - managing projects that were mind boggling in scale and complexity. Realizing that a rapidly growing nation needed technically qualified professionals to address the nation's demand for talent.



Hon'ble Founder's mother receiving 'Prasadam' during the pooja on the starting day of the College, 1962

He was dreaming of providing better training facilities for technical personnel. An opportunity came his way in 1962. He established Gokula Education Foundation, through which he started the M.S. Ramaiah College of Engineering. Later, this was renamed as M.S. Ramaiah Institute of Technology (MSRIT) and now it is also known as Ramaiah Institute of Technology (RIT).

This was a pioneering effort, a precursor in a way to private participation in education, a wave that empowered India's leadership in manufacturing, information Technology, Biotechnology and many more domains in the later years.



Founder Chairman late Dr. M. S. Ramaiah with trustees of Gokula Education Foundation (GEF)

RELIGIOUS SERVICES

Dr. M.S. Ramaiah was devotee of Kaiwara thathaiah and later he became the President of Yogi Nareyana Yateendra trust of Kaiwara in the year 1979. Today, Kaiwara Kshetra, situated near Chintamani in Kolar District has developed into one of the premier religious centres in Karnataka. Every year, more than 5 lakh pilgrims visit the Amara Nareyana temple and seek the blessings of the great saint of Kaiwara, Yogi Nareyana Yateendra. Various religious and social developments have taken place in Kaiwara. The improvements made to the Bheemalingeshwara temple is note worthy.



Dr. M. S. Ramaiah with Sri. Nijalingappa, Former CM Of Karnataka

Development of Kaiwara Yogi Nareyana Yateendra Thapovana which is totally a new concept is unique in the whole country. Apart from these activities, the Trust has been rendering significant social service by implementing various schemes. It is arranging free marriages every year for about more than 500 couples for a poorer section of the society.

The Trust also respects Sadhus and Saints who come in thousands on the Yogi Yateendra's birthday where saffron robes are distributed and dakshinas are given. The Trust also provides financial assistance and scholarship to the needy students of Kolar district for their studies.

Dr. M.S. Ramaiah was very passionate about the local language, Kannada, and participated in various cultural events with great enthusiasm, He organised the Kannada Sahithya Sammelana in Kaiwara in 1990 where he was the Chairman of the Reception Committee.



Dr. M. S. Ramaiah with Sri. Devraj Urs, CM of Karnataka (1973)

Karnataka's leading literary luminaries gathered for the first time in a serene, rural ambience and this was acknowledged as one of the best organised cultural events in the recent past.

SOCIAL SERVICES

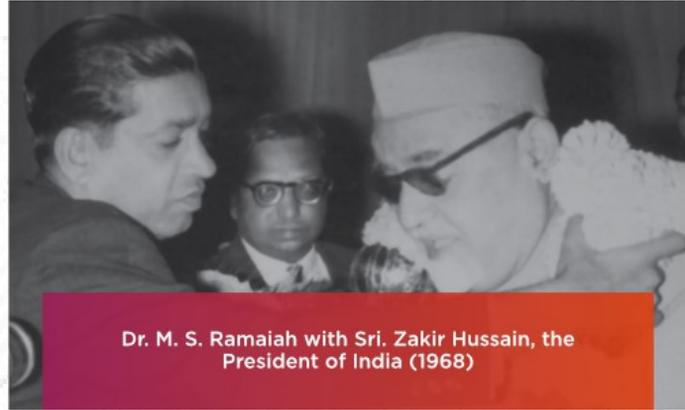
Dr. M. S. Ramaiah Charities Trust was established to help the poor and meritorious students to come up in life. The trust has been spending every year more than 25 lakhs by way of scholarship to backward class students who are pursuing higher studies. It also provides financial assistance to the candidates who appear for IAS and IPS examination. The trust has adopted several rural districts of Karnataka as the part of philanthropic activities.

All the needy students who have passed their PUC examination in first class and who are studying in degree class are provided scholarships irrespective of caste and community.



Dr. M. S. Ramaiah with Sri. Kengal Hanumanthaiah, Ex-CM of Karnataka

The students of backward communities studying in technical and professional colleges and Post Graduate studies are provided with financial assistance. Housing is a problem in any developing society, more so in a city like Bangalore which is the fastest growing city in the whole of South East Asia.



Dr. M. S. Ramaiah with Sri. Zakir Hussain, the President of India (1968)

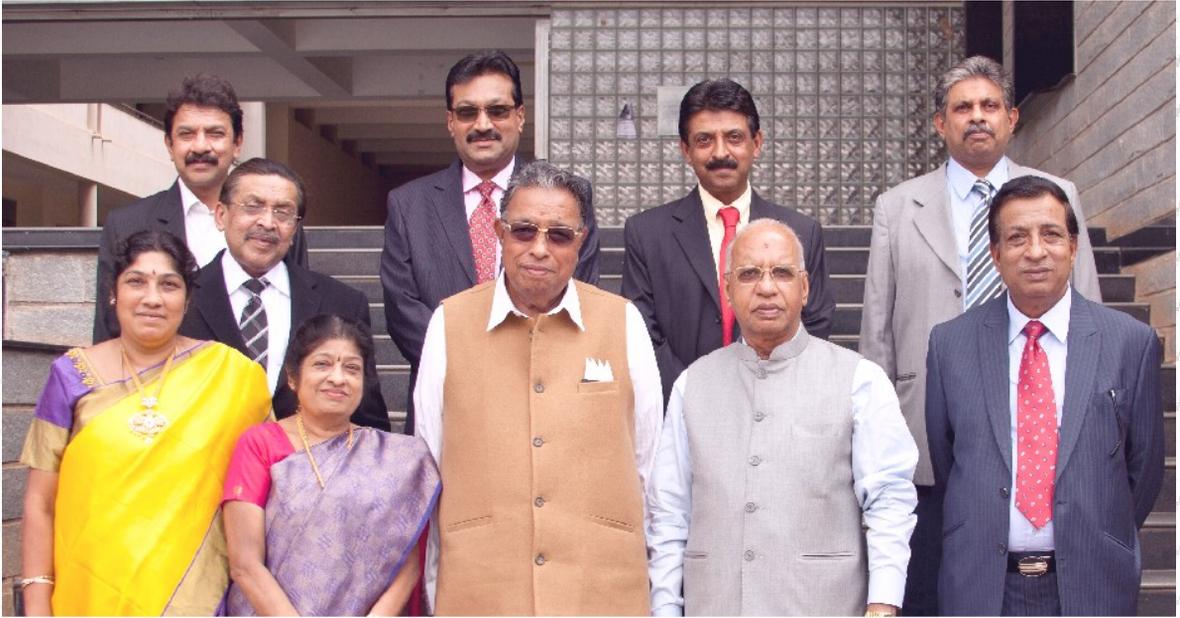
Dr. M. S. Ramaiah realised the problem of housing, he built extended residential buildings where the poor and middle class families can live at reasonable rents.



Dr. M. S. Ramaiah inaugurating a project exhibition. Sri. C Shanmukha, then HOD, Dr. Y A Prahlad Rao, former HOD, DME, and the principal



Last car used by Karmayogi



TRUSTEES - GOKULA EDUCATION FOUNDATION (GEF)

Ramaiah Group of Establishments

- Ramaiah Institute of Technology
- Ramaiah High School
- Ramaiah Medical College
- Ramaiah Medical College Hospital
- Ramaiah Institute of Nursing Education & Research
- Ramaiah College of Arts, Science & Commerce
- Ramaiah Composite Pre-University College
- Ramaiah Vidyaniketan
- Ramaiah Institute of Management
- Ramaiah College of Law
- Ramaiah Advanced Testing Laboratory
- Ramaiah Institute of Physical Medicine & Rehabilitation (Physiotherapy)
- Ramaiah Polytechnic
- Ramaiah Memorial Hospital
- Ramaiah College of Education
- Ramaiah International Medical School
- Ramaiah Clinical Research Centre
- Ramaiah Harsha Hospital
- Ramaiah University of Applied Sciences
- Ramaiah INDIC Specialty Ayurveda
- Ramaiah Public Policy Center
- Ramaiah Innovation Centre for Healthcare Technologies
- Ramaiah Leena Hospital
- Ramaiah Neha Prakash Hospital
- Ramaiah Clinic
- Ramaiah Sunshine Ayurveda Centre
- Ramaiah Officer's IAS Academy
- Ramaiah Quality Assurance Cell
- Ramaiah International Centre for Public Health Innovations



CRAFTMANSHIP PROVED OVER ORGAN-ON-A-CHIP

Computer chips mimicking human life are the stuff of fiction, but the ingenuity of hard-working scientists has made the technology of fiction into a reality. Organ-on-a-chip, a miniature device that behaves just like an organ, except that it is the size of a computer chip. It is a multi-channel 3D microfluidic cell culture, integrated circuit (chip) that simulates the activities, mechanics, and physiological response of an entire organ or an organ system, a type of artificial physiological organ. There are three components: organ chips, instrumentation and software app.

1) ORGAN CHIP

- Organ chip units are designed to recreate the natural physiology and mechanical forces that cells experience in the human body.
- They are lined with living human cells and their tiny fluid channels reproduce blood flow or air flow just as in the human body. This allows the chips to recreate breathing motions and also to undergo muscle contractions.
- Each unit, such as the lung, liver, intestine, or brain, is about the size of an AA battery.
- It's transparency allows researchers to see the organ's functionality, behaviour, and responses to certain inputs (reactions) at the cellular and molecular levels.

2) INSTRUMENTATION

- The organ chips are placed into a research system similar to a computer. The instrument is designed to recreate the human body's living environment – including blood flow and breathing motions.
- Scientists can use the instruments to induce medicines, chemicals, and other toxins to the chip's environment to test the organ's response and behaviour.
- The nature of the system allows scientists to observe and analyse the cells within them using a variety of research tools and instrumentation.
- In some cases, they can be interlinked so that scientists can observe how the different organ systems interact, effects caused in the human body and have a better understanding of the chip's nature.



Image courtesy: <https://thenewstack.io/organs-on-chips-emulates-human-organs-for-better-biomedical-testing/>

3) SOFTWARE APP

- During this process, scientists can extract data and analyse with the help of modern software, such as an app you would download on a tablet.
- The software is designed to provide precise control of the organ system's living microenvironment.
- The software offers the ability to configure cell architecture, tissue-to-tissue interfaces, mechanical forces, and the biochemical surroundings.

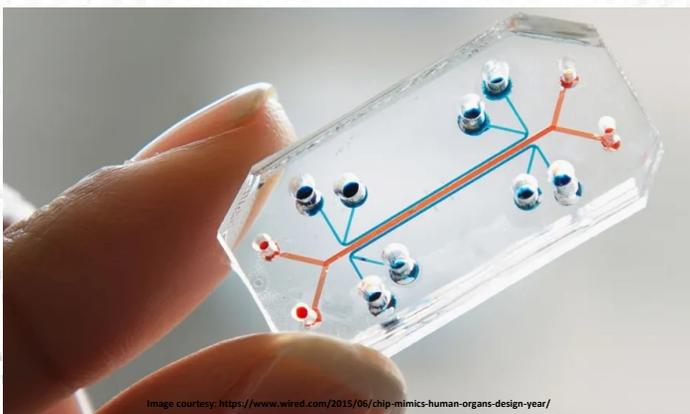
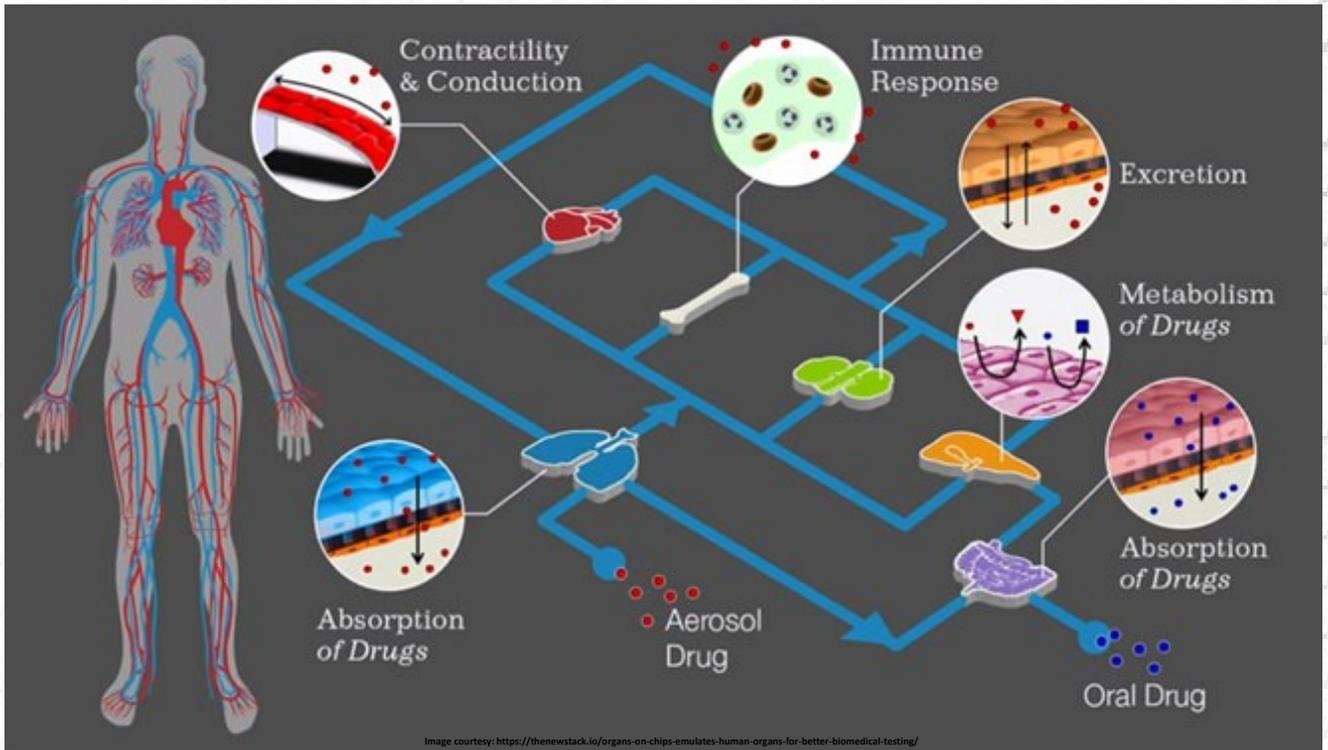


Image courtesy: <https://www.wired.com/2015/06/chip-mimics-human-organs-design-year/>



In this article, we have covered the recent progress in engineering 3D models for cancer tissues that replicated characteristics of their *in vivo* counterparts and also the significance of organ-on-a-chip

Significance of organ-on-a-chip

- 1) Organ-on-a-chip provides us to study the structure and function of the specific organ as well as its interaction. Scientists created an organ chip that studied in detail on the functioning of a gene (TGF)- β 1 on liver, lung, kidney, and adipose tissues.
- 2) It also provides an excellent platform for disease modelling. Study of chip in Chronic Obstructive Pulmonary Diseases successfully identifying new biomarkers associated with it.
- 3) A heart-on-a-chip model built by a team of investigators worked on the effects of isoproterenol and depicted the role of chips in drug screening.
- 4) This technology provides a broader perspective to understand the key aspects of cell viability and also tissue function in the context of regenerative medicine.

"Cancer-on-a-chip" technologies combine cancer organotypic culture with microfluidic devices to create a tumour microenvironment, which helps to study the effect of cancer on different organs.

- Cancer-on-a-chip has developed a 3D interface between cancer and blood vessels to investigate the invasion of a cancer cell into the bloodstream. In this model, macrophages were incorporated to study their role in inducing carcinoma. By tracking the information regarding the interaction using real-time imaging system, it was found that macrophages mediated vascular damage provides the way for the invasion of cancer into the bloodstream.
- Scientists successfully demonstrated a breast cancer extravasation by the seed-soil process, where seed means cancer cells and soil means tissues on chip that includes muscle and bone

"The organ-on-a-chip (OOAC) is a physiological organ biomimetic system built on a microfluidic chip that is among the top 10 emerging technologies"

mimicking units for studying organ selective cancer extravasation. In this model, endothelial cells were lined with microvascular-like gel and embedded with bone mimicking stem cells to study the pathway involved in cancer metastasis.

Conclusion:

Organ-on-chips can directly culture human cells for studies, which in turn helps to avoid the use of animal models. Organ-on-chips have played a major role in cancer treatment and also in discovering new anticancer drugs. However, the studies of cancer immunotherapies using these systems are still in their initial stage. Merging data of cancer – immune system-on-a-chip provided a way to understand the *in vitro* cancer immunotherapy, such as tumour penetration by immune cells, and lead to the discovery of newer medicines.

References:

- Wu, Q., Liu, J., Wang, X., Feng, L., Wu, J., Zhu, X., Wen, W., Gong, X., (2020). Organ-on-a-Chip: Recent Breakthroughs And Future Prospects. *BioMed Eng Online*, 19(9).
- Sun W, Luo Z, Lee J, Kim HJ, Lee K, Tebon P, Feng Y, Dokmeci MR, Sengupta S, Khademhosseini A. (2019). Organ-on-a-Chip for Cancer and Immune Organ's Modelling. *Adv Healthc Mater*. 8(4):e1801363.



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MOLECULES OF LOVE

We have seen a lot of love stories being played out in the media and other forms of entertainment. But what is love? Is it just a feeling or is there more to it? Brain researchers have found that love is a complex phenomenon, which has a biological basis as well as a psychological one. We all are in love, in love with people, food, animals, things etc. It is more of an emotion, more of a feeling of bonding, bliss, and happiness.

The reason behind this feeling of euphoria is an endogenous morphine named as "endorphins" – a chemical transmitter. Scientists have been able to get a better understanding of what love does for the human brain by studying endorphins. They are mainly attributed to reducing pain and increasing feeling of pleasure, which are released in our brain when we feel happy, satisfied, or aroused and produce a feeling of happiness. Moreover, in 2015, researchers from Oxford University published research in "Social Cognitive and Affective Neuroscience" found some striking similarities between relative stimulation of neurological centres that potentially releases Dopamine (DA), responsible for the feeling of euphoria. Inhibition of GABA increases the production and release of Dopamine, a neurotransmitter associated with pleasure. However, the role of the mesolimbic dopaminergic pathway goes far beyond Love addiction – animal studies have shown that DA is released in this pathway in response to rewards, including sex, food, water and drug addiction.

“Activation of Oxytocin (OT) and arginine-vasopressin (AVP) receptors in the reward circuitry is important for the development of pair bonding and love”

In 1990s, the most popular drug of ecstasy 3,4–methylene di-oxy methamphetamine (MDMA) was experimented on drug addicts globally which is chemically similar to methamphetamine and endorphin was illegally sold out on the streets. When people take ecstasy, they often report feeling an overwhelming sense of euphoria and bliss, because their brains have been flooded with massive amounts of endorphins.

A group of scientists from Carnegie Mellon University studied how endorphins affect the brain. The findings show that love helps people deal with pain, stress, and fear through a process called “harmonization”. The study also concluded that this harmonization is a result of the release of endorphins by the brain when we are in love.

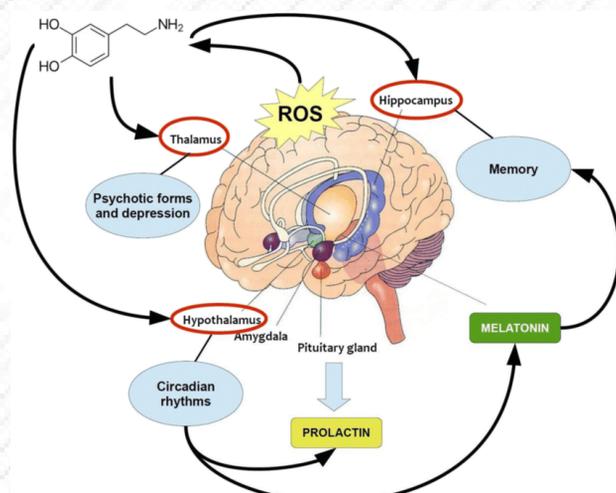


Image courtesy: [https://www.biologicalpsychiatryjournal.com/article/S0006-3223\(16\)32237-5/fulltext](https://www.biologicalpsychiatryjournal.com/article/S0006-3223(16)32237-5/fulltext)

Moreover, naturally rewarding activities such as love is controlled by feedback mechanisms that activate aversive centres that limit the destructive qualities of addiction seen with drugs. Studies reported that as a critical part of the rewarding process, DA appears to be a centre for the maintenance of love. Differences in DA and its receptor distribution densities have been reported to be involved in the rewarding process.

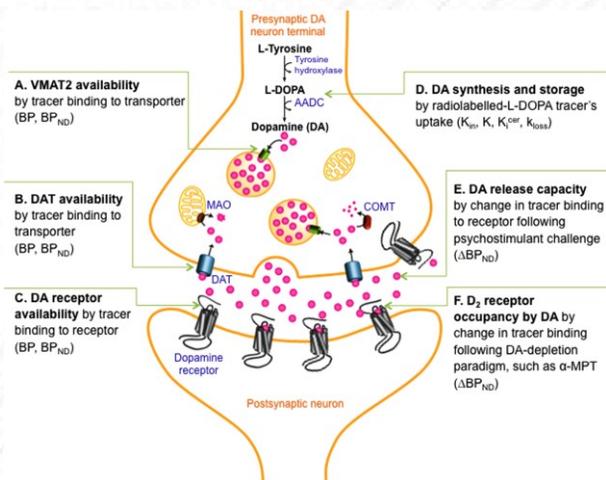


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Dopaminergic pathways appear to be more specific for partner preference than attachment. Endorphins bind to opioid receptors in the brain and induce feelings of pain relief and pleasure. They are released by the pituitary gland in response to pain or stress to act as natural painkillers for humans.

They also inhibit the transmission of pain signals by binding to the μ -receptors of peripheral nerves, which block the release of certain neurotransmitters. The mechanism in the CNS is similar but works by blocking a different neurotransmitter.

Drug Addiction and Love

The biological action of hormones in love is similar to that of neurochemicals related to drug addiction like Dopamine, Corticotropin-releasing hormone & Oxytocin. Oxytocin, now dubbed as the "hormone of love" or "cuddle hormone" play a key role in addiction, as we are aware that the reward system is responsible for addiction the same reward system plays a crucial role in love. Dopamine promotes maintenance of love in the similar way it also maintains drug addiction. D1R promotes maintenance of love similarly D1R and D2R promotes maintenance of drug addiction. Plasma concentrations of oxytocin have been reported to be higher amongst people who claim to be falling in love.

The reward circuit, or the mesocorticolimbic system, is responsible for regulating the association between substances and reward. Other hormones also have a crucial role in maintaining and disrupting love and addiction comparison mentioned in the below table.

	Love	Drug addiction
MAINTENANCE		
DA	D1R promotes maintenance Plasticity in striatal D1R promotes maintenance	D1R and D2R promote maintenance Plasticity in striatal D2R promotes maintenance
CRF	CRF promotes maintenance Plasticity in CRF promotes maintenance	CRF-R1 promotes maintenance CRF-R2 may inhibit maintenance Plasticity in CRF promotes maintenance
OT	OT is not necessary for maintenance	OTR inhibits maintenance Plasticity in the OT system promotes maintenance
DISRUPTION		
DA		D2R promotes relapse
CRF	Released after disruption Plasticity in hypothalamic CRF promotes return to partner	Released after disruption Plasticity in hypothalamic CRF-R1 promotes relapse, CRF-R2 may inhibit relapse
OT	Released after disruption OT inhibits return to partner	Released after disruption Endogenous plasticity in the OT system promotes relapse Exogenous OT inhibits relapse

DA, dopamine; CRF, corticotropin-releasing factor; OT, oxytocin; AVP, arginine vasopressin.

Image courtesy: [https://www.biologicalpsychiatryjournal.com/article/S0006-3223\(16\)32237-5/fulltext](https://www.biologicalpsychiatryjournal.com/article/S0006-3223(16)32237-5/fulltext)

References:

- Feldman, R., (2012). Oxytocin and Social Affiliation in Humans. *Hormones and Behaviour*. 61, pp 380-391
- Carter, C. S., (1998). Neuroendocrine Perspectives on Social Attachment and Love. *Psychoneuroendocrinology*. 23, pp 779-818



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IMPACT OF SMART INHALERS

Inhalers are the most important device in the management of COPD or Asthma when they are used appropriately. In reality, only around 30-40% of the patients are able to maintain their respiratory issues under control, but others do not take inhalers appropriately. Individuals with severe respiratory illness must follow a stringent treatment regimen, including daily intake medicines to minimize symptoms at bay. Despite, being aware of the significance of adhering to a strict drug schedule, many chronic patients are sloppy with refills & daily dosing.

Smart inhaler technology, potentially address this problem as well as offers a simple approach for patients to keep medication compliance and bring manifestations under control. Inhalation therapy is one of the most important technique for asthma & COPD, which incorporates the use of "smart inhalers", helps to alleviate symptoms and minimises the chance of aggravation.

However, with the emergence of revolutionary technology assist to analyse the patient's overall health, The internet has become a fundamental integral part of everyday life, but artificial intelligence is now enabling new-generation medical equipment to provide smart care & the way medicine is conducted has changed dramatically.

Bluetooth-enabled smart inhalers have been created to assist asthmatics in better managing their illness. The inhaler has a little chip connected to it that tracks the date & time of every dose as well as whether it was successfully delivered or not. This information is subsequently transferred to the users' of smartphones, allowing them to monitor and regulate their health. The sensors might be included inside the inhaler or they could

be separate devices connected to the primary inhaler. Clinical trials revealed that those who used the smart inhaler piece of technology needed minimal dose of ameliorating drugs and had longer days without them.

"The internet has become a fundamental integral part of everyday life, but artificial intelligence is now enabling new-generation medical equipment to provide smart care"

Numerous devices are now in development, such as those from Propeller Health in the United States and Adherium in New Zealand, fall into the latter clip-on type. Patients may be reminded to use their inhalers just at appropriate times, and they're often alerted if they fail to carry their devices with themselves. Furthermore, these gadgets are be able to handle the issue of non-compliance. These records may contain information that anticipates asthma episodes, helping the patients to comply with treatment regimen.

This might assist to lessen the clinical severity and duration of each episode, attempting to prevent lung damage from progressing. Without paper track records, smart inhalers help patients & their physicians to follow their status and assess the outcome in specific patients over time.

"The time as well as location monitoring might also help to recognise triggers, communicate data with doctors right away, and collect data for research"

The time as well as location monitoring might also help to recognise triggers, communicate data with doctors right away, and collect data for research. Some sophisticated devices can even detect excessive amount of pollutants in the air to alert patients to potential exacerbations.

Smart Inhalers are broadly classified into 3 types; they are, “pressurized or breath-actuated metered-dose inhalers”, “dry powder inhalers”, and “propellant-free multi-dose spray inhalers”. Inhalers contain lactose molecules, as a quick, sharp inspiratory effort is necessary to transport the drug into the air-stream & lungs.

The other varieties demand a four-second-long constant deep inhale, which most patients fail to perform. Smart inhalers also collect patient data that is relevant to their use. Such data would aid in identifying and correcting shortcomings in techniques & training, potentially saving millions of dollars in human misery plus financial expenditures.

Future aspects

As part of its long-term strategy, the United Kingdom's National Health Service intends to conduct pilot research with these devices. Such facts would aid in the improvement of smart inhaler technology by tailoring them to realistic healthcare system requirements and real-world patient care scenarios, hence maximising their benefits. Another key issue to be addressed are that the inevitable rivalry between manufacturers, gadgets plus data exchange mechanisms are built for unrestricted interoperability so that the patient doesn't experience idiopathic sufferings.

This will necessitates the development of technological standards for these kind of devices to enhance the compatibility with current electronic medical record systems, as well as the

unambiguous identification of who owns the data. If such barriers are conquered, smart inhalers have the potential to improve the standard of asthma & COPD patient's life by rendering effective and efficient treatment.

References:

- Blakey, J.D., Bender, B.G., Dima, A.L., Weinman, J., Safioti, G. and Costello, R.W., (2018). Digital technologies and adherence in respiratory diseases: the road ahead. *European Respiratory Journal*, 52(5), pp. 1801147.
- Van Boven, J.F., Cushen, B., Sulaiman, I., Greene, G., MacHale, E., Mokoka, M.C., Doyle, F., Reilly, R.B., Bennett, K. and Costello, R.W., (2018). Personalising adherence-enhancing interventions using a smart inhaler in patients with COPD: an exploratory cost-effectiveness analysis. *NPJ primary care respiratory medicine*, 28(1), pp.1-3.



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NOVEL METHOD FOR EARLY DETECTION OF CARDIOVASCULAR DISEASES

The risk of cardiovascular disease is significantly connected to Low Density Lipoprotein (LDL), generally known as "bad" cholesterol. Two proteins that carry these particles in the blood provide early and reliable danger information, according to a comprehensive study done by experts at Karolinska Institute. The researchers are now requesting to adapt new guidelines for detecting cardiac risk, implying that their findings could lead to preventive treatment and minimizing morbidity and mortality rate.

Cardiovascular diseases are the leading cause of death worldwide which includes a wide range of illnesses such as stroke, myocardial infarction and atherosclerosis. In many situations, the condition can be prevented or reduced by making lifestyle modifications or administering lipid-lowering medications.

To diagnose higher cardiac risk, reference values for LDL are widely used. Apolipoproteins, which carry cholesterol in the blood, are used to assess other types of fat particles in several medical conditions. For people with type II diabetes, a high BMI, and very high blood lipid levels, universal parametric advisory board recommend the apolipoprotein-B (apoB), which transports LDL as an alternative risk marker.

However, a recent study found that the apolipoprotein-A-1 (apoA-1), which transports the High Density Lipoprotein (HDL), is also worth considering. A risk quotient is calculated using the apoB/apoA-1 ratio, which represents the balance between "bad" fat particles that speed up atherosclerosis in vascular system and "good" protective apoA-1 particles that slow it down.

Swedish men and women aged 25 to 84 were evaluated in a study to check link between apoB/apoA-1 levels and cardiovascular disease. The participants were followed for 30 years, and 22,000 of them experienced a heart attack or stroke during study period. The techniques of analysis are simple, inexpensive, safe. Unlike LDL and non-HDL testing, they do not require fasting before the diagnosis. The researchers correlated laboratory analysis with database AMORIS of clinical diagnosis reports.

When comparing between the highest and lowest apoB/apoA-1 values had a 70% higher risk of severe cardiovascular disease and a nearly tripled risk of nonfatal myocardial infarction. Individuals with the highest risk quotient were also several years more likely than those with the lowest apoB/apoA-1 values to have serious cardiovascular disease.

"The higher the apoB/apoA-1 value, the greater the risk of myocardial infarction, stroke, and the necessity for coronary surgery"

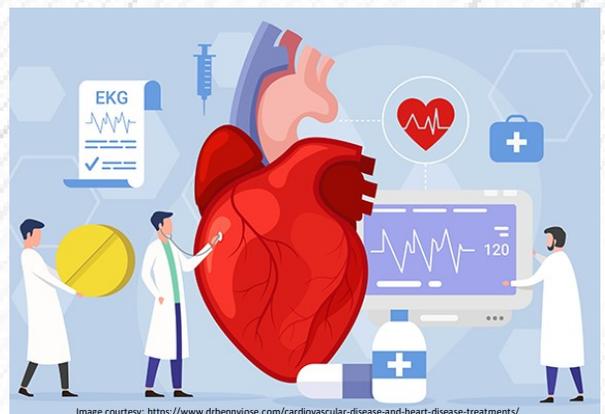


Image courtesy: <https://www.drbenjose.com/cardiovascular-disease-and-heart-disease-treatments/>

The cardiac disease correlation was seen in both men and women, and higher levels could be detected as early as 20 years before disease develops.

"The higher the apoB/apoA-1 value, the greater the risk of myocardial infarction, stroke, and the necessity for coronary surgery" the risk was further exacerbated in the presence of low protective levels of apoA-1, according to the study."

Reference:

- Walldius G, de Faire U, Alfredsson L, Leander K, Westerholm P, Malmström H, et al. (2021) Long-term risk of a major cardiovascular event by apoB, apoA-1, and the apoB/apoA-1 ratio— Experience from the Swedish AMORIS cohort: A cohort study. *PLoS Med* 18(12)



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M.Pharm

Department of Pharmacology

Mental health includes our emotional, psychological, and social well-being. It affects our thoughts, feelings, and actions. It also helps you decide how to deal with stress, interact with others, and make decisions. Mental health is important at every stage of life, from childhood to adolescence to adulthood.

Mental challenges are different from situational sadness and malaise. They are more severe and long lasting and can have a significant impact on daily life. Some common mental health challenges include anxiety, depression, eating disorders, substance use, and traumatic experiences. They can change the way teenagers usually think, feel, act, and interfere with their daily lives. In recent years, pandemics have not only killed lakhs of people but also locked us in, cut off social ties, took parents out of work and children out of school. As a result of these consequences the children and teens had tremendous level of anxiety, depression and still continue to experience the same.

Here's how social media affects Teens Mental Health

Twelve-and-a-half-year-old! This is the average age at which a child will open a social media account. The longer they spend on social media, the more likely they are to experience mental health symptoms such as anxiety, isolation, and despair. Also, a recent study found that four years of high-level social media use was associated with increased depression in middle and high school students. Teens, especially those with social anxiety and depression, tend to spend more time online and reduce actual direct contact with others. When a person is not involved in the world in a healthy way (interacting with others, learning

themselves in difficult situations, conducting interviews, whether speaking in class or resolve conflicts with peers) and use online presence instead, they can exacerbate alienation, hopelessness, isolation, anxiety, and depression.



Image courtesy: <https://www.timesrecordernews.com/story/news/2021/10/15/challenge-offers-2-500-stay-off-social-media/8469387002/>

The data show that people with Attention Deficit Hyperactivity Disorder (ADHD) can fall into the rabbit hole by spending more time on social media and less time in the world. This is especially true for games due to the way the game program is created. They act directly on the strengthening system of the brain, making it very stimulating. Participating in online games can be a refreshing experience, but it isolates one from direct interaction with the real person.

Colliding Crises of Teen's Mental Health and Nicotine Use

To inhale aerosols, e-cigarettes, e-hookahs, mods, vape pens, vapes, tank systems, and vaping devices, also known as e-nicotine delivery systems, are used. Some e-cigarettes look like regular cigarettes, pipes, pens, or USB sticks. It contains a fragrance, nicotine, or a heating element to vaporize liquids that may contain cannabis-derived compounds such as Tetra Hydro Cannabinol(THC) and Cannabidiol (CBD).

Electronic cigarettes are popular among teenagers and young adults. The health advisory board reported that 19.6% of high school students and 4.7% of degree-based students are currently using e-cigarettes. More than half of the students reported using flavoured e-cigarettes.

Some of the flavours used can be harmful when heated and inhaled in the form of aerosol. Social or peer pressure is cited as one of the most common reasons for increased adolescent use. Marketing strategies and misinformation on social media mislead the public about the use of nicotine-containing products.



Vape products are considered a safe and harmless alternative to flammable cigarettes. However, e-cigarette aerosols are not entirely harmless. They can contain potentially harmful substances, including heavy metals and inhaling such ultrafine particles is known to cause lung damage. Nicotine affects the physical and mental health of smokers. The impact on mental health is generally overshadowed by concerns about physical health. Contrary to popular belief, some vapor-breathing devices have a much higher nicotine content than flammable cigarettes. Some nicotine pods, like the Juul pod, contain the same amount of nicotine as a pack of cigarettes.

Researchers have investigated several mental health problems associated with vaping in adolescents and young adults. Nicotine addiction is associated with impulsivity, mood disorders, anxiety, suicidal tendencies, and depression.

“Pandemics have not only killed lakhs of people but also locked us in, cut off social ties, took parents out of work and children out of school”

Highly addictive nicotine has been studied and reported to affect certain areas of the brain that are also at risk of long-term injury.

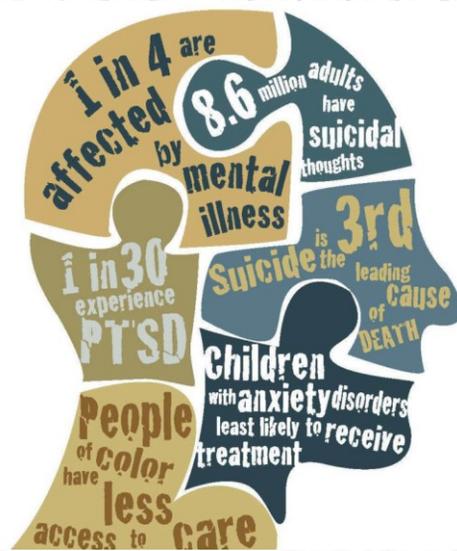


Image courtesy: https://neenahsatellite.com/wp-content/uploads/2017/10/Mental-Health-Bulletin_Page_1-773x900.jpg

Modifying Social Media Use and Anxiety Reduction

Forbearance is frequently suggested for treating medication or liquor fixation, yet for web-based entertainment compulsion, the ideal mental result is controlled utilization of the web. It's not important to surrender online entertainment altogether, however having systems for drawing certain lines is significant. The following few remedies would help to reduce the stress and addiction to social media.

- Set limits and stick to them
- Dedicate time to hobbies or activities.
- Turn off notifications
- Opt for analogue alternatives

It is basic to keep both adolescents and youth from vaping or smoking and to help the people with dependence to quit quickly. A 2014 meta-examination showed quitting smoking not just relates to lower levels of tension, despondency and stress but has also worked wonders on improving temperament issues and personal satisfaction. The following few remedies would help to reduce the stress and addiction to vaping.

1. Identify some alternative coping skills.
2. Buy gum, hard candies, toothpicks, and other things you can use to help fight the urge to vape.
3. Use a distraction and exercise
4. Celebrate your accomplishments

“Knowing our why can help us change any pattern or habit. Being clear on why we’re changing a behavior helps validate the decision to break that habit and gives us the motivation to discover a new habit or way of coping,”
-KIM EGEL

References:

- Bashir, Hilal, and Shabir Ahmad Bhat(2017). "Effects of social media on mental health: A review." *International Journal of Indian Psychology* 4.3: pp.125-131.
- Braghieri, Luca, Roe Levy, and Alexey Makarin (2021) "Social media and mental health."
- McNeill, Ann, et al. (2020) "Vaping in England: an evidence update including mental health and pregnancy." *Public Health England: London, UK*
- Patten, Scott B. (2021): "Vaping and mental health." *Journal of the Canadian Academy of Child and Adolescent Psychiatry* 30(1) pp. 3



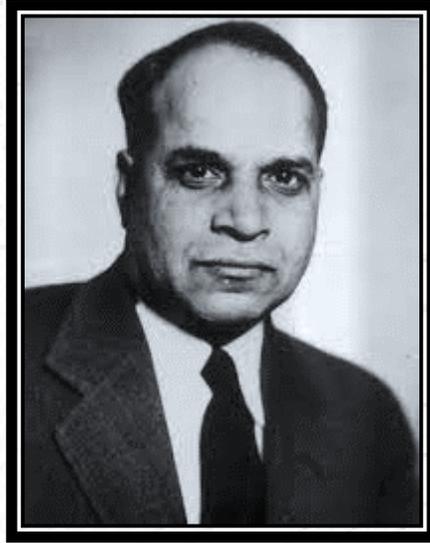
Ms. Manju Shree S
Assistant professor
Department of Pharmacology,
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PES University, Bengaluru

About Manju Shree

Ms. Manju Shree S is currently working as an Assistant professor at PES University. A well experienced with extraordinary ability to make students understand the complex topics in simpler manner. She is pursuing Ph.D. degree with PES University; her major research area is cardiovascular diseases. She is successfully guided students research projects and publications, also working with fellow professors to publish papers in international journals and conferences.

Manju Shree is a alum & received her master’s in Pharmacology from M.S. Ramaiah University of applied sciences, Bengaluru. Her Master’s research was focused on “Evaluation of cardiovascular activity of nanoparticles in wistar rat model”

MIRACLE MAN OF MIRACLE DRUGS



From the time of mathematician Aryabhata to Nobel Prize winner Sir CV Raman, India has been the birthplace of numerous researchers, inventors who have contributed magnanimously to the growth of science and dedicated their life for betterment of society. Along with being honored for their contributions and achievements with various recognitions and awards, these legends have decorated history books in their own way. Among them, Dr. Yellapragada Subbarao, the unsung hero who revolutionized the field of medicine seems to be forgotten.

In the year 1895 Dr. Yellapragada Subbarao was born to a Telugu Brahmin family in Bhimavaram of Andhra Pradesh. After completing his matriculation, he managed to get himself enrolled in Madras Medical College. His education there was supported by his friends and Sri Kasturi Suryanarayana Murthy, whose daughter he married later.

Ensuing Mahatma Gandhi's call to swadeshi movement, Dr. Y. Subbarao a stout nationalist started wearing surgical robe made of khadi; this

invited the displeasure of M.C. Bradfield, his surgery professor. Consequently, though he did well in the written papers, he was awarded the lesser LMS certificate and not the MBBS degree.

He took up a job as lecturer in Anatomy at Dr. Lakshmi pathi's Ayurvedic College. He was fascinated by the healing powers of ayurvedic medicines and began to engage in research to put ayurveda on a modern footing. A meeting with an american doctor, who was visiting India on a Rockefeller Scholarship motivated him. The support from Satyalinga Naicker Charities, Kakinada and financial assistance by father-in-law, enabled Subbarao's sail to US.

A generous person, by name Dr. Strong, came to his rescue and met his immediate expenses in US. He was struggling to manage his livelihood and had no choice apart from taking up various odd jobs, as his medical degree did not qualify for a scholarship or got him internship in Boston hospitals.

Subbarao earned his diploma from the Harvard

School of Tropical Medicine in June 1924. He then joined the Biochemistry Department and worked under the guidance of Cryrus Fiske in the area of muscle chemistry. He developed a method for estimation of phosphorous in body fluids and tissues known as the **Fiske-Subbarao method**. He got his Ph.D degree in the same year with this he went on to become the **first Indian** in Harvard history to earn a Ph.D in biochemistry.

Subbarao continued his research for a decade more at Harvard. His own independent contributions were hailed by his colleagues. But he was denied elevation to a regular faculty position. Because of which he moved to Ledrale laboratories in 1940, then a little-known pharmaceutical firm. He embarked on a programme of developing new drugs this opened new approaches for the treatment of nutritional infections and worm-transmitted diseases.

Subbarao fathered the identification of folic acid, which was then realized to be the factor deficient in anemia and tropical sprue – the disease responsible for his brother's death. This discovery was the product of his long search of 18 years for this Anti-Pernicious Anemia Factor (APAF). He even accidentally discovered vitamin B12 but wasn't able to identify it.

This discovery was followed by a long chain of achievements, including the discovery of the ATP molecule and phosphocreatine. Subbarao identified aminopterin, a molecule that reversed the action of folic acid and thus arrested the growth of cancer cells. He directed his colleagues to make all possible chemical modifications to the folate molecule and thus was born aminopterin, which eventually helped him in developing Methotrexate, one of the first chemotherapeutic agents that is still used widely. Humans were not the only ones to benefit from his research; wonder drug Hetrazan (Diethyl carbamazine citrate) the drug of choice for filariasis even today, was



introduced by him. WHO spread its adoption as a key element in the worldwide campaign to eradicate filariasis. He also spearheaded US medical research during World War II.

Subbarao established a project for protecting american soldiers fighting in the Pacific, from malaria and filariasis. He employed Dr. Benjamin Duggar to screen thousands of soil samples for anti-biotic producing bacteria and fungi. In August 1945, an interesting golden yellow mould was seen in a culture dish inoculated with extracts from soil samples. This proved to be a potent antibiotic producer and was extracted in pure crystalline form, first in the tetra-cycline group.

He introduced Aureomycin a single drug that could be used for controlling both gram-positive and the gram-negative bacterial germs. Fleming's penicillin could battle only the former, whereas Waksman's streptomycin only the later. Thousands of lives were saved in 1995, when plague broke out in the states of Gujarat and Maharashtra, by the Doxycycline an antibiotic discovered by him.

American Cynamid honoured his memory with a plaque at its research laboratory and inaugurated the Subbarao library. A drug was named *Subbaromyces splendens*. A memorial postage stamp was also released commemorate his memory.

“He identified Aminopterin which eventually helped him in developing Methotrexate – one of the first chemotherapeutic agents that is still under wide use”

Despite such an amazing track record, Subbarao was relatively hidden from the media eye. He didn't win the Nobel Prize or even an equivalent, and often took the backseat in terms of recognition. Often, when his research was being published in front of an audience, he would have to be pushed by his colleagues to go on stage and take a bow.

He died in his sleep on the night of August 8th, 1948 at the young age of 53. On his death, The New York Herald-Tribune hailed him as “one of the most eminent medical minds of the century.” The Jewish Advocate remembered him as “a giant among pygmies.”

His colleague, George Hitchings who shared the Nobel Prize with Gertrude Elion (The Hindu, September 5, 2001), said: "Some of the nucleotides isolated by Subbarao had to be rediscovered years later by other workers because Fiske, apparently out of jealousy, did not let Subbarao's contributions see the light of the day" (In Quest of Panacea by S.P.K. Gupta, 1999).

Perhaps, the only way to put his achievements in the field of nutrition and medicine into perspective would be to quote american author Doron Antrim –**“You’ve probably never heard of Dr. Yellapragada Subbarao. Yet, because he lived you may be well and alive today; because he lived you may live longer.”**

Timeline

1895: Born on January 12 in Bhimavaram, Andhra Pradesh

1919: Married Seshagiri on May 10

1922: Went to America and took admission in Harvard School of Tropical Medicine

1930: Discovered the role of ATP and obtained Ph.D degree

1940: Joined Lederle laboratories

1945: Discovered world's first Tetracycline antibiotic, Aureomycin and method to synthesize folic acid

1948: Died on August 9 in America, aged 53

Reference:

Kamath, P. & Shenoy, K.A., (2013). Yellapragada Subbarao: The Unsung Hero. *Muller Journal of Medical Sciences and Research*, 4(2), p.130.

NEVER STOP LEARNING



WEBINARS

Watch Us On
YouTube

Department of Pharmacology, FPH, RUAS believes in supporting students and pharma fraternity with sharing knowledge and information apart from regular curriculum. Following were the webinars conducted by the department.

STRATEGY FOR GPAT/ NIPER PREPARATION

By Ms. Srushti

Pharmaceutical Administration

Manipal College of Pharmaceutical Sciences

MEDICAL WRITING IN HEALTH CARE

By Dr. Chirag Desai

Associate Professor

Department of Pharmacology

ROFEL Shri G M Bilakhia College of Pharmacy

PHARMACOVIGILANCE IN VACCINE RESEARCH

By Dr. Shivani Desai

Associate Head

Department of Pharmacy Practice

Dr. D. Y. Patil Institute of Pharmaceutical Sciences and Research



UPCOMING EVENT



International Webinar on

Systematic Review and Meta Analysis

Speaker Profile

Dr. Arun Kumar, Ph.D., MS. PharmD, as an Assistant Professor at the University of Cincinnati College of Pharmacy. He is a results-oriented pharmaceutical researcher with over seven years of experience conducting studies in health research. With a zeal to advance his career in Pharmacoepidemiology, Dr. Kumar's work is centered on conducting studies to evaluate and compare pharmacotherapies in cardiovascular diseases to help selecting safe and effective treatment options. He completed his doctoral studies at the College of Pharmacy, University of Minnesota, wherein his dissertation work was focused on the comparative effectiveness and safety of antiplatelet drugs in acute coronary syndrome. The outcomes of his dissertation will help with decision-making if newer P2Y12 inhibitors offer any additional clinical benefits over traditional pharmacotherapy in the US real-world population. Dr. Arun has good experience in synthesizing evidence using real-world data, administrative claims data, systematic reviews, and meta-analysis. His strong research interest also includes the effective and safe management of venous thromboembolism



Speaker

Dr. Arun Kumar
Assistant Professor

Pharmacy Practice & Administrative Sciences
UC James L. Winkle College of Pharmacy
University of Cincinnati



28/May/2022



11:00 AM – 12:30 PM IST

Event Registration Link

[Google Form](#)



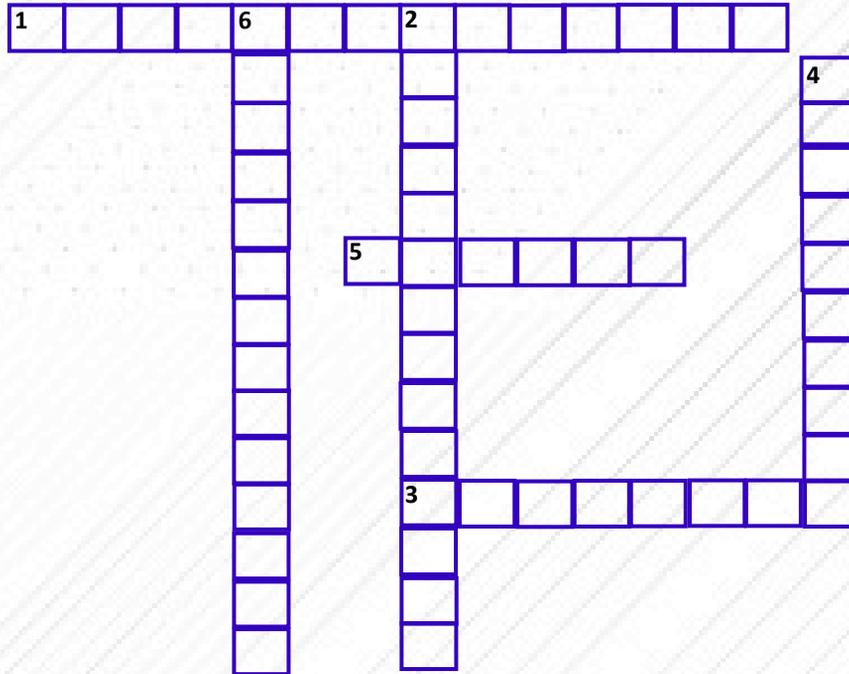
E-Certificate will be provided
for participants



Mind Lab



Solve the Crossword



Across

1. I'm 5HT₄ agonist, D₂ & 5HT₃ antagonist
3. Vitamin K analogue helps in blood coagulation
4. My deficiency in pregnancy causes neural tube defects

Down

2. First drug used for treatment of myasthenia gravis
5. I'm used in chronic stable angina for slowing heart rate by inhibition of I_f
6. First drug for the treatment of schizophrenia

Terms and conditions

- Mind lab – III consists of **Two** segments, Solved answers to be mailed to fphpanpharmacon@gmail.com on or before **15-June-2022**
- It is mandatory to answer both segments to be eligible for availing the prize
- One Winner will be selected by lot system & Editorial board – Panpharmacon reserves all the rights
- Winner details will be announced in the upcoming issue
- Participation is restricted for Indian nationals only



Find the word

T A B V Y U A B A P N A M
B P T P B P M C C E C V I
N A A I S I T A P A V A O
P R T L C N P B B T E P T
S E S I A M C E V M O R A
A C O M M C N E I O H I R
Z O T B B U T P N V S T G
V E E E V B D I R I I I V
E S M A I I S P L R V N Y
R I E T X E E C I O J I V
G A Z T S V M I C R L B S
K I A C A B H T A C N O R
R R T A Z O O N P M H R N

Tazemetostat, Avapritinib, Lactitol, Vioice, Cabenuva

Winners – Mind Lab IV



Mr. Arun Kumar H. S.

III B.Pharm
Faculty of Pharmacy,
Ramaiah University of Applied Sciences



Saba Maanvizhi

Associate Professor
Department of Pharmaceutics
Sri Ramachandra Institute of Higher
Education and Research (DU)



ACHIEVEMENTS & RECENT RESEARCH PUBLICATIONS

ACHIEVEMENTS

- ❖ **Dr. Jayaraman Anbu** participated in the Five Days On-Line Faculty Development Programme on 'Advances in Research, Professional Development and Academic Leadership' under GURU-DAKSHTA Faculty Induction Programme offered by Amity University, Uttar Pradesh
- ❖ **Mr. Chethan S** gave an oral presentation titled 'Evaluation of *Acacia nilotica* Bark for the Management of Salt Induced Wet Litter Associated Problems in Broiler Chickens' during the International Conference on "Drug Discovery In The Next Decade (DDND)" organized by Santhiram College of Pharmacy, Andhra Pradesh
- ❖ **Ms. Anjani Singh** gave an oral presentation on the topic 'Anti-Ulcer and Ulcer-protective Activity of *Calycopteris floribunda* Lam. Leaf Extract on Indomethacin Induced Peptic Ulcer' during an international conference on "The Changing World of Health Care" offered by Dayanad Sagar University, Bengaluru
- ❖ **Mr. Chetan S** presented a paper entitled 'Evaluation of Herbal Formulation in Broiler Chickens to Prevent Wet Litter Associated Problems' at an International Conference on "Pharmaceutical and Healthcare Challenges in Global Transformation" (Aushadh 2022) organised by Vishnu Institute of Pharmaceutical Education & Research, Telangana
- ❖ **Mr. Kirthi Bhushan A** gave an oral presentation on the topic 'An in-silico Approach to Evaluate the Binding Efficacy and Stability Profile of Rutin with Folate Receptor for the Treatment of Breast Cancer' in an International Conference on "Materials and Biological Researches (ICMBR-2022)" organised by Dr. R. K. S. College of Arts and Science, Kallakurichi



PUBLICATIONS

- ❖ **Haroon, H. B., Mukherjee, D & Jayaraman, A.** (2021) Brain-targeted Intranasal Formulation Of *Centella Asiatica*: A Potential Strategy For Treating Alzheimer's Disease. *Alzheimer's & Dementia*, 17 (Suppl 9), pp. e053363
- ❖ **Kumar, S., Md Azamthulla.,** (2022). A review on Atherosclerosis and Associated Risk Factors with Biomarkers and Treatment. *Zeichen Journal.*, 8 (3), pp. 230-249
- ❖ **Moushumi, B., Jayaraman, A., Himangshu. S. M., Ramya, K. P. S and Dibya, D.** (2022). Evaluation of Acute and Sub-acute Toxicity of *Sivanar amirtham* In Albino Mice and Wistar Albino Rats. *Journal of Medical Pharmaceutical and Allied Sciences.*, 11 (1), pp. 4196-4204
- ❖ **Ramu, S., Jayaraman, A., Damodar, N. A., and Kaliaperumal, K.,** (2022). Fucoidan Isolated from *Sargassum Wightii Greville* Ameliorates Intracerebro-ventricular Streptozotocin Induced Cognitive Deficits, Oxidative Stress and Amyloidosis In Wistar Rats. *Bioactive Carbohydrates and Dietary Fibre*, 27(2)
- ❖ **Singh, A., Md Azamthulla.,** (2022). Herbal Remedies Used for The Treatment of Peptic Ulcer. *Zeichen Journal.*, 8 (2), pp. 346-355
- ❖ **Md Azamthulla., Devadath, N.G., Ashoka, B. V. L and Basavaraj, B. V.,** (2022) Stomach Specific Low Density Floating Microballoons For Extended Delivery of *Rhynchosia densiflora* Extract in the Treatment of Peptic Ulcer. *Trends in Pharmaceutical Sciences*, 8 (1), pp.125-131
- ❖ **Kumari, K., Md Azamthulla.,** (2022). Angina Pectoris: A Review on Current and Future Treatment Strategies. *Zeichen Journal.*, 8 (2), pp. 150-157
- ❖ **Ashoka, B. V. L, Shanaz, B and Md Azamthulla.,** (2022) Comparative Anti-Inflammatory Potential of Betalains of Hairy Root Culture of Beta Vulgaris. *World Journal of Pharmaceutical Sciences*, 11(2), pp. 1166-75
- ❖ **Sukanya, M., Md Azamthulla.,** (2022). A Detailed Review on *Seigesbeckia Orientalis*. *Zeichen Journal.*, 8 (2), pp. 23-32



STUDENT CONCILIUM



Master of Pharmacy (Pharmacology) – 2nd Year (Batch 2020-22)

From left to right Standing – Evangelene K, Abhilash S, Chethan S, Harsha R, Pruthvi Nayak V, Sumit Kumar, Kirthi Bhushan A, Goutami Ramappa Basannavar

From left to right Sitting – Anjani Singh, Susan Ealias Attasseril, Khushboo Kumari, Kuruba Manasa, Sukanya M



Master of Pharmacy (Pharmacology) – 1st Year (Batch 2021-23)

From left to right Standing – Sameera H R, Shannon D Almeida, Akilesh Vatti, Nihal G S, Girish H L, Govardhan K R, Rajendera S, Mohammad Furquan Faisal, Shashank S K, Sharath Holalkere

From left to right Sitting – Shreeraksha H S, Aditi S H, Choekyila Ladingpa, Vismaya A

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Rank

15th
Rank

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Source: NIRF 2021 Rankings

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