RAMAIAH UNIVERSITY OF APPLIED SCIENCES | Faculty of Pharmacy

FPH

Panpharmacon

A Quarterly E-Newsletter

Department of Pharmacology

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Faculty of Pharmacy
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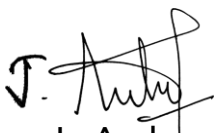
Editor's Note

Hello Readers !!!

As we emerge from the burning sparks of a global pandemic, this quarterly issue focus on recently published reports from different directions of health concerns globally. Apart from covering conventional informative scientific articles, the present issue also includes brain storming cross word for the readers, I personally encourage the readers to participate in it. I am thankful to the 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

Contents

Department of Pharmacology

Department of Pharmacology is one of the foundation departments of Faculty of Pharmacy, dedicated to the training of undergraduate, postgraduate and doctoral students. The vision of the department is to become a top-ranked research and academic centre in the Pharmacology and Toxicology discipline in India that will be responsible for services with the mission to contribute in the ovleadership in pharmacology education, training, research, development and related erall training of students, through enriching with the knowledge, attitude and skills needed to fit effectively and efficiently into both national and international arena. Department is involved in various *in vitro* and *in vivo* research projects that expertise in the area of toxicological research, neuropharmacology, molecular pharmacology and cardiovascular pharmacology.

Key Features of the Department

- The Department of Pharmacology is well known for its research activities and its well-maintained animal house is approved by central government body CPCSEA
- The Department has well-qualified, experienced faculty with dedicated vision of teaching and research
- The laboratories at Department are well equipped with instrumentation facilities with computer assisted learning, audio-visual aids and other resources with all safety measures
- The laboratories provide facilities for the students to carry out all types of basic pharmacological in vivo and in vitro screening activities with simulated exercises
- The Department provides hands-on experience on animal research with guidance from experienced faculty, technical skills and theoretical aspects of pharmacology
- Department provides an opportunity to students to interact with industry professionals through workshops, symposiums and seminars conducted in collaboration with pharmaceutical industries
- Keeping fit of postgraduates to make them competent in academics, research and industry with excellent placement support
- The department has legal Memorandum of Understanding with the reputed pharmaceutical industries to support our research scholars in performing advanced experiments and also understand the industrial climate

Introducing the logo of PANPHARMACON

Editorial team is very happy to introduce the logo of Panpharmacon!!! As Panpharmacon represents cure for all diseases, the logo comprises of a shield with the wings that emboldens to fly high with hale and hearty aura combating the hurdles.

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 acting Vice-Chancellor and Pro-Vice Chancellor for patronage and advising us on the importance of enhancing the visibility of workplace that stimulated us to come out with informative Panpharmacon, an E – Newsletter. The Editorial Board is thankful to The Himalaya Drug Company, Bengaluru for sponsoring this quarterly issue. We also thank all our colleagues, well wishers and friends for supporting us in making this newsletter.

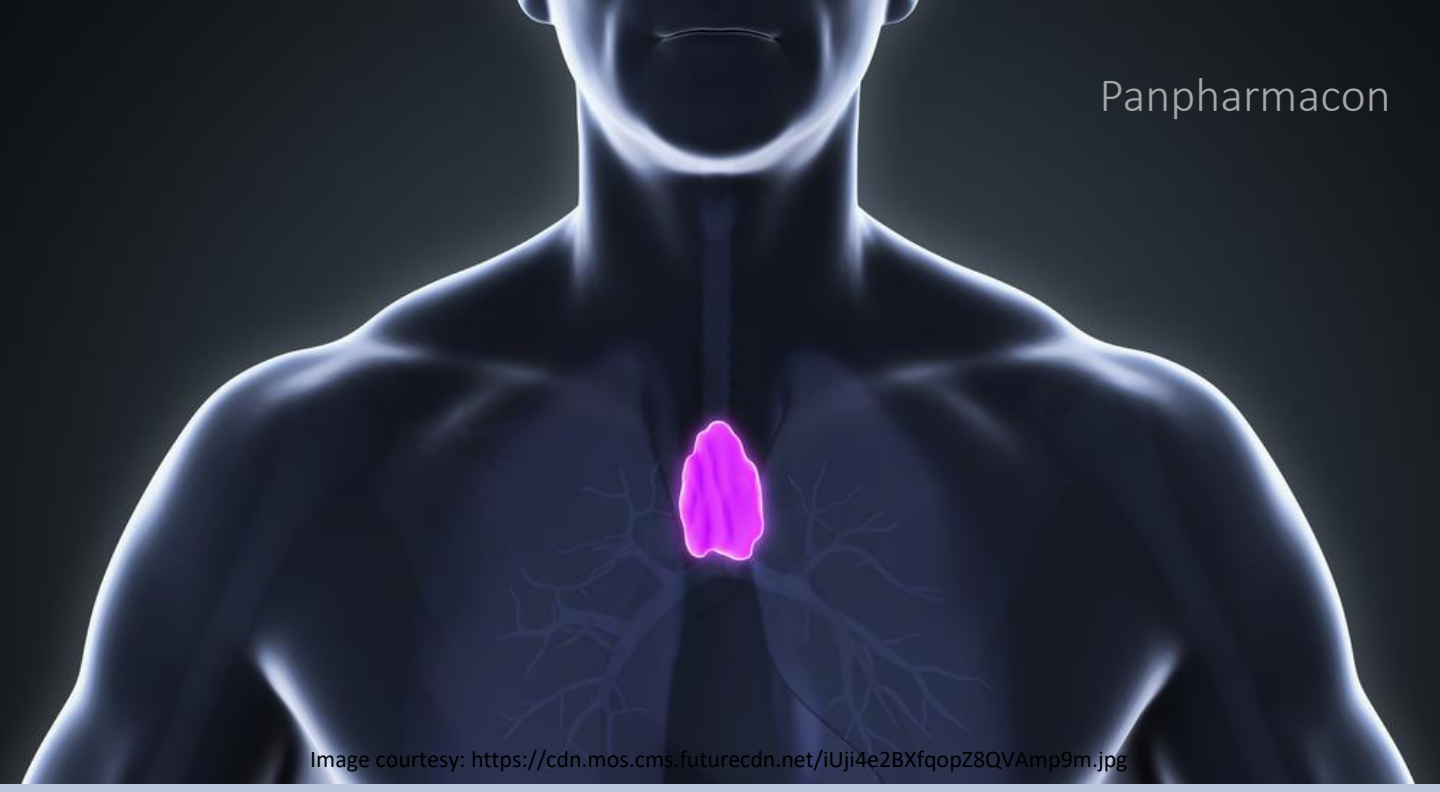


Image courtesy: https://cdn.mos.cms.futurecdn.net/iUji4e2BXfqopZ8QVAmp9m.jpg

Thymus Gland – Mystery Case Solved

The most complex and ingenious thing in the universe is our human body. Many things related to our body are already been discovered but there are still some mechanisms that our body follows and keeps us stunned as to how does this happen.

One such mystery about our body has been recently solved by an international research team which was led by University of British Columbia (UBC). Mystery was regarding the role of thymus gland in the prevention of miscarriage and controlling of gestational diabetes.

Thymus is a small gland tucked behind the sternum that helps pregnant ladies in healthy and safe delivery. You must be wondering how does it help, well even the researchers too wondered as to how our immune system adapts and supports mother and foetus.

The research team found that female sex hormones in pregnant ladies instructs some changes to the thymus gland and also ask to produce a specialized cell called as Treg which helps in managing the physiological changes by binding to Receptor Activator of Nuclear Factor Kappa B (RANK) present on the epithelium of thymus.

For better understanding of the above theory, it was experimented using mice where RANK receptors were deleted, it turned out that most of them did not have enough Treg cells present in their placenta and had miscarriages and also developed gestational diabetes.

Gestational diabetes is developed in about 15% of pregnant ladies throughout the world. It causes an increased body weight of the infants and also makes them prone to long lasting and transgenerational diabetes.

When these mice were supplemented with thymus-derived Tregs isolated from normal pregnancies, it reversed all the issues like miscarriages, maternal diabetes and normalised body weight of the pups proving the importance of thymus in labour.

So, all the pregnant ladies out there, take care of your thymus and it will help you in having a safe and healthy delivery.

Reference:

Paolino, M., Koglgruber, R., Cronin, S.J.F., Rausher, E., Harreiter, J., Pranjic, B., et al., (2020) RANK links thymic regulatory T cells to fetal loss and gestational diabetes in pregnancy. *Nature*. https://doi.org/10.1038/s41586-020-03071-0.

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Image Courtesy: https://img.etimg.com/thumb/msid-70737547,width-1200,height-900,imgsize-126123,overlay-etpanache/photo.jpg

Innovative UV-LED Bulbs for Corona Virus

Can UV-LED Radiation kill Corona virus? The first study revealed the effective disinfection of strains of Corona virus with the help of UV-LED radiations at different frequencies. In a present scenario where the entire world is looking for a practical solution to decontaminate the Corona virus, Professor Hadas Mamane, Head of the Environmental Engineering Program at Tau's School of Mechanical Engineering led the study to prove that Corona virus can be killed efficiently by the help of UV emitting diodes.

The impressive benefit for this technique, it does not require the manpower to spray the chemical in order to disinfect the surface areas or give time for the chemical agents to act on the surface. Sterilized systems based LED bulbs can be installed through robotic system in ventilation systems to sanitize the air sucked in and then emitted in the room. Study has claimed that the simplest technique to kill the corona virus is with the help of LED bulbs which radiate ultraviolet radiations. This bulbs are safer to use, can be used in all the areas consume little energy and they do not contain mercury in it.

The researchers have found that 285 nm can be considered as the optimal wavelength to kill the corona virus whereas 265 nm can efficiently deodorize 99.9% of the virus in less than 30 seconds. Thereby 265 nm wavelength bulbs can be selectively chosen as they have low cost and much effective in their action.

It is much effective but on the other hand it should be **dangerous technique used as it will cause harm to the human population on direct exposure**. The future prospect of this study is to work on various combinations of effective mechanisms to develop a potent action against virus by direct or indirect means on different surfaces.

Advancements with UV Lights:

• A study from American Journal of Infection Control (AJIC) reported that a large number of Coronavirus in a liquid culture can be inactivated by the help of UV-C Lights within a period of 9 mins.

• Far-UV-C Lights (207-222nm) can be used to disinfect the germs and cause less harm to the

skin and eyes. Far-UV-C Lights can effectively kill 2 types of human coronavirus (229E and OC43)

Reference:

Gerchman.Y., Mamane.H., Friedman.N., Mandelboim.M., (2020) UV-LED disinfection of Corona virus : Wavelength Effect,' *J photoch photobio b,'* pp. 1-32

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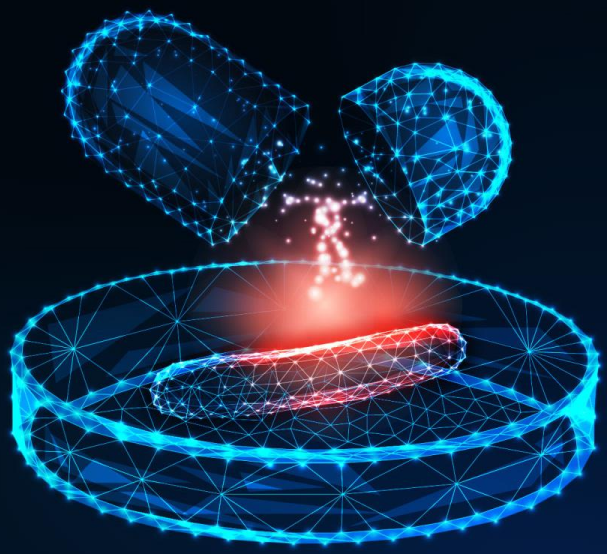

Image Courtesy: https://www.statnews.com/wpcontent/uploads/2019/12/Antibiotic_Resistance.jpg

The Newer Molecule Pursuing Antibiotic Resistance

As researchers around the world take up arms against a novel, deadly infection. The objective of University of Colorado was to find a new method to overcome microbial danger: a rising tide of anti-microbial safe microorganisms which are left unchecked, could slay an expected 10 million individuals yearly by 2050.

The COVID-19 circumstance is unquestionably putting us in danger of expanding protection from anti-toxins, so it's more significant now than any other time in recent memory that we think of medicines. In diary PLOS Pathogens, Detweiler and her exploration group revealed their most recent disclosure - a substance that works with a host's natural safe reaction to push past cell boundaries that help microbes to oppose anti-toxins. This study could help claim to provide a weapon to fight against the infections

In the event that we don't tackle the issue of finding new anti-infective agents or by one way or another making old anti-microbials work once more, we can still observe increasing deaths from bacterial disease, where we thought that we had overcome it in prior years.

In the United States alone, 35,000 individuals pass on yearly from bacterial diseases that couldn't be allocated with on the grounds that they've become impervious to existing medications. Endless others endure dangerous sessions with once-effectively treatable ailments like sore throat, urinary tract diseases and pneumonia. By 2050, there could be a bigger number of deaths from anti-toxin opposition than from disease.

The present drugs available for infection have altered so we are at risk that we may go back to 100 years such that even a negligible disease can also cause death. The pandemic has shone considerably lighter on the issue, the same number of patients bite the dust not from the infection itself but rather from difficult to-treat optional bacterial diseases. increased utilization of anti-infective agents to anticipate or treat those optional diseases, while now and again might be worsening obstruction.

Most anti-infection agents being used today were created during the 1950s, and drug organizations have since downsized on exploration in the field for more productive endeavours. To take care of this, a lab built up a procedure called SAFIRE for screening for new little particles which work

uniquely in contrast to more established medications.

With the help chemical genetics, a recently found small molecule called JD1, which inhibits the action of *Salmonella enterica* existing in macrophages. out of 14,400 competitors screened from a library of existing synthetic compounds; SAFIRE recognized 70 that hold guarantee. The new paper centers on "JD1," which seems by all accounts, to be especially fascinating at penetrating what are known as "Gram-negative microorganisms. With an intense outside layer that keeps anti-toxins from getting to the cell, and another inside film giving a cushion, these microscopic organisms (*Salmonella and E. coli*) are inalienably hard to treat. Yet, in contrast to different medications, JD1 exploits the host's underlying in susceptible attack on that external bacterial film, at that point slips inside and pursues the internal layer as well. This is the main examination to show that you can focus on a Gram-negative microorganisms' internal layer by misusing the natural safe reaction of the host.

In rodent experiments and laboratory, JD1 diminished endurance and spread of Gram-negative microorganisms called *Salmonella enterica* by 95%. In any case, while it harmed the bacterial cell layers, it couldn't infiltrate the fine layer of cholesterol that lined its mammalian host's cell films.

Microbes are defenceless against JD1 such that our cells are not, noticing that consequently, results would probably be negligible.

Further investigations are in progress to investigate JD1 and different combinations like it. a project organization have worked on different combinations which work by repressing siphons called "efflux siphons, that microbes use to tap out anti-microbials.

Basically, development is way more intelligent than the total of the researchers set up and these microbes will keep on advancing to oppose what we toss at them, we can't become fulfilled but we need to continue taking care of this microbes

Reference:

Dombach, J.L., Quintana, J.L., Nagy, T.A., Wan, C., Crooks, A.L., Yu, H., Su, C.C., Yu, E.W., Shen, J. and Detweiler, C.S., 2020. A small molecule that mitigates bacterial infection disrupts Gram-negative cell membranes and is inhibited by cholesterol and neutral lipids. *PLoS pathogens*, 16(12), p.e1009119.

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Let Us Not Give Alzheimer Caregiver Burden to Our Successors!!!

Ms. Sathiya Ramu*

Email: sathya.pharma@gmail.com

We all must be aware of an old-age home. Have you ever heard of Alzheimer's home? It's a place where people with memory loss are provided with residential facility and care. Alzheimer's disease is known as a progressive disease comprising memory loss and confusion as the major symptoms. If you have watched Finding Nemo, the famous animation movie, you can say Dory suffers from the same problem.

Currently, I live in a metropolitan city where I get to see Alzheimer's home vehicles on the road for pick up and drop off patients with Alzheimer's disease. As years pass on, we may see many more such vehicles and homes. It is much more obvious with the kind of sedentary and stressful life we have today. It is a challenging task to take care of patients with Alzheimer's disease at home and has become nearly impossible in this fast-moving world. On the contrary, Alzheimer's caregivers frequently report experiencing a high level of stress. Are we going to give this burden to our future generation who are already dealing with a lot?

Diabetes mellitus, which is commonly referred to as sugar, is another monster that attacks human beings despite clean habits. It is a metabolic disorder associated insulin insufficiency or resistance. Insulin resistance is a stage where the body cells do not respond to insulin and are unable to utilize glucose. Hence, it leads to the elevation of the blood sugar level, which is known as hyperglycaemia.

You will be surprised to know that there is a connection between these two diseases.

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* Ms. Sathiya Ramu, PhD Scholar from Faculty of Pharmacy, M. S. Ramaiah University of Applied Sciences, Karnataka, is pursuing her research on "Evaluation of Protective Effect of Sargassum Wightii in Diabetes Mellitus Induced Memory Dysfunction". Her popular science story entitled "Let us not give Alzheimer Caregiver Burden to our Successors!!!" has been selected for AWSAR Award.

Copy of original article from AWSAR booklet

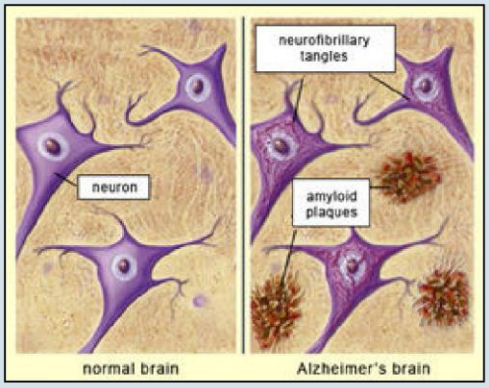
Persistent hyperglycaemia accelerates the oxidative stress on the neurons in the brain and damages them. Thus, it can lead to memory impairments to which old people are highly prone. It will be of great importance if a single compound can treat both the conditions simultaneously. Especially when it is from a natural source, it will be accepted by the public, as natural products are known for fewer side effects.

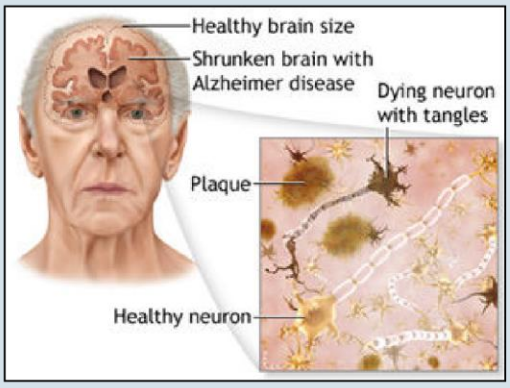
Imagine how disturbing the undissolved sugar in your coffee is. Similarly, there is the formation of insoluble proteins in the brain, which affects the normal structure and functions of neurons. The hallmark pathological change in Alzheimer's disease is the formation of senile plaques and neurofibrillary tangles due to insoluble proteins. Senile plaques are nothing but undesirable extracellular deposits of a protein called amyloid-beta protein, which provokes toxicity to neurons. Neurofibrillary tangles are the deposits of another protein called hyperphosphorylated tau protein in neurons, which causes subsequent neuronal loss and degeneration. Neuronal death always accompanies insulin insufficiency or resistance, which explains the connection between diabetes mellitus and Alzheimer's disease.

Seaweeds or marine algae are known to offer beneficial effects to the human body. It is a part of the diet in many countries such as China, Malaysia, Singapore, Indonesia, Philippines, Ireland, etc. It is mostly consumed in the form of soups, sushi or onigiri (riceballs) and dulce (sweet). The seaweed extract is currently used as diet pills that can suppress the appetite by gastric banding (feeling of fullness in the stomach). They are mostly farmed or foraged from the sea for these purposes. In India, it is not popular as a diet but has an emerging interest in the research field due to its diverse medicinal properties. Fucoidan is a sulphated polysaccharide obtained from brown marine algae, which has gained huge attention in recent days among researchers. It is reported to be useful in diabetes mellitus in high-impact journals. Our study aimed at evaluating its protective effect in diabetes mellitus–induced memory loss, which could be a dual benefit. The probability of this compound being useful in diabetes mellitus associated Alzheimer's disease is high based on its previously reported activities.

Streptozotocin is a chemical used in medical research to induce diabetes mellitus to animal models such as rats. It is a naturally occurring glucosamine–nitrosourea compound. It is selectively taken up into the insulin-secreting beta cells by a type of glucose transporter that causes DNA repair and subsequent destruction of insulin-secreting cells, which are known as beta cells. Hence, it leads to insulin insufficiency as well as insulin resistance, as seen in diabetes mellitus. It also causes damage to neurons, as mentioned earlier, due to insulin resistance. Unfortunately, compounds similar to these are seen in packed foods available in the market, which are collectively known as nitrosamines. They are silently creating a huge disaster for our future generation, where non-communicable diseases such as diabetes and Alzheimer's disease are

We all must be aware of an old-age home. Have you ever heard of Alzheimer's home? It's a place where people with memory loss are provided with residential facility and care. Alzheimer's disease is known as a progressive disease comprising memory loss and confusion as the major symptoms. If you have watched Finding Nemo, the famous animation movie, you can say Dory suffers from the same problem.





going to be a major challenge to the health care system.

In the present study, the protective effect of fucoidan isolated from brown marine algae was evaluated against streptozotocin-induced diabetes and associated memory dysfunction in Wistar rats. Wistar rats are a particular strain of laboratory animals, which serve as a highly suitable model to study diabetes or Alzheimer's disease. The rats are treated with fucoidan at two different doses of 100 and 200 mg/kg after the induction of the disease. The beneficial effect of fucoidan was studied by subjecting the animal to behavioural, biochemical and histopathological studies.

Behavioural studies involving Morris water maze and one-trial passive avoidance tests are used to understand the extent of memory impairment in animals. Animals treated with fucoidan exhibited better memory in behavioural studies compared with the animals left untreated. Similarly, the biochemical changes in the hippocampus (a region in the brain related to memory) were studied by preparing a homogenate of hippocampal tissue and subjecting it to biochemical estimation. Treatment with fucoidan (100 and 200 mg/kg) attenuated diabetes associated memory dysfunction by suppressing the levels of amyloid-beta protein, tau protein, nitrite, advanced glycation end products, malondialdehyde, and acetylcholine esterase, which are harmful. Meanwhile, the results showed an increase in protective parameters such as glutathione and superoxide dismutase.

> Diabetes mellitus, which is commonly referred to as sugar, is another monster that attacks human beings despite clean habits. It is a metabolic disorder associated insulin insufficiency or resistance.

Histopathology is a microscopic study that manifests the structural architecture of organs. In this study, the brain hippocampus was subjected to Congo red staining, a technique in histopathology to study the extent of amyloid-beta protein deposition. In our study, animals left untreated (diseased animals) showed extensive deposition of amyloid-beta protein and also damage to the neurons. Treatment with fucoidan, at both the doses restored the structural architecture of neurons and also reduced the amyloid-beta protein burden. Thus, fucoidan offered significant protection in diabetes-associated memory dysfunction.

Countries like India have almost eradicated the danger of communicable diseases, which were devils once upon a

time. The development of medicines for non-communicable diseases, which are otherwise known as lifestyle diseases, are the talk of the town now. Hence, this research addressed the need of the hour, and the test drug fucoidan was found to be beneficial in diabetes-associated Alzheimer's disease. Hence, we suggest that fucoidan, with an ample source of raw material from the sea, can be a cost-effective drug against diabetes-associated Alzheimer's disease.

Image Courtesy: httpswww.un.orgencoronaviruskids-and-families-broaden-global-perspectives-during-covid-19

My Experience with COVID – 19

All of a sudden nation stood still, with lockdown. Roads, Malls, Theatre, Park, Public places whichever once we took for granted was appearing empty! Wherever we had to go, we had to wear mask, apply sanitizer or wash hands frequently like a person with Obsessive Compulsive Disorder. Office works were being done from home, students used to sleep in the name of online classes, people were terrorized even if they had symptoms of common cold.

Well, whether people think it as a boon or curse still the whole idea of lockdown kept India healthy to the best extent possible when compared to the developed countries. Due to lockdown, I was having a good time with grandparents and my family, especially with my brother as we had lots of time to fight!

On 23rd October as my grandmother was suffering from fever, we decided to take her to hospital, during the screening process it was confirmed that she tested positive for COVID – 19. We were surprised with regards to her report as she had never stepped out of home. We were instructed to get ourselves tested as we were in primary contact with her. On October 24th we all went to hospital, lots of questions were running in my head and too much anxiety.

I was called first to give the sample for testing followed by my dad, mom and my brother. By the time they finished the sampling procedure of my brother my results were ready and I was called to see the result – I was POSITIVE !! I was happy that my family members had tested negative. I was hospitalized and my journey with COVID – 19 had started.

Grandma and I were kept in isolation. I had cough, fever, mild throat and body pain. But I never felt that I'm alone or anything, as everyone I know had started to encourage me, checking on my status through video call, phone calls and messages. They basically enabled me to be physically and mentally strong enough to fight against the situation.

My routine at the hospital was to help grandma in her daily needs, taking tablets, minor exercise, attending online classes, talking to friends and sleep. Even though I was feeling physically drained, calls from my parents, friends and more over from other people with whom I was not even in regular touch motivated me. All these really boosted my confidence that this time too shall pass and I will come out of this.

Finally, after one long week on hospital bed with continuous popping of pills, drying throat, aching body my sample was again taken for testing and this time also the result was POSITIVE! But again, I was happy because grandma test reports were NEGATIVE and she was being shifted to ICU for further monitoring due to post COVID complications. This time I didn't want to stay in hospital as my symptoms were mild and wanted to go for home quarantine, fortunately I was allowed to do so.

After reaching home I was totally isolated in a room with nothing to do whole day that's when the idea of sharing my experience with others popped into my mind! When mom served me dinner after I had a refreshing shower, I realized what I was missing on the hospital bed. On Nov 8th I was tested negative while my grandma was still on ICU. On 16th Nov I lost my grandmother as post COVID – 19 symptoms had affected her lungs badly.

In conclusion to my experience, I found that there is no need to panic if you are COVID – 19 positive, it's just a virus definitely not mightier than one's self-confidence and a strong immune system.

Wishing you all a healthy and safe year ahead! Stay NEGATIVE!

After all, staying NEGATIVE! is the new trend!!

Ms. Shadgunya Sreshta.P

1st Pharm.D

Faculty of Pharmacy

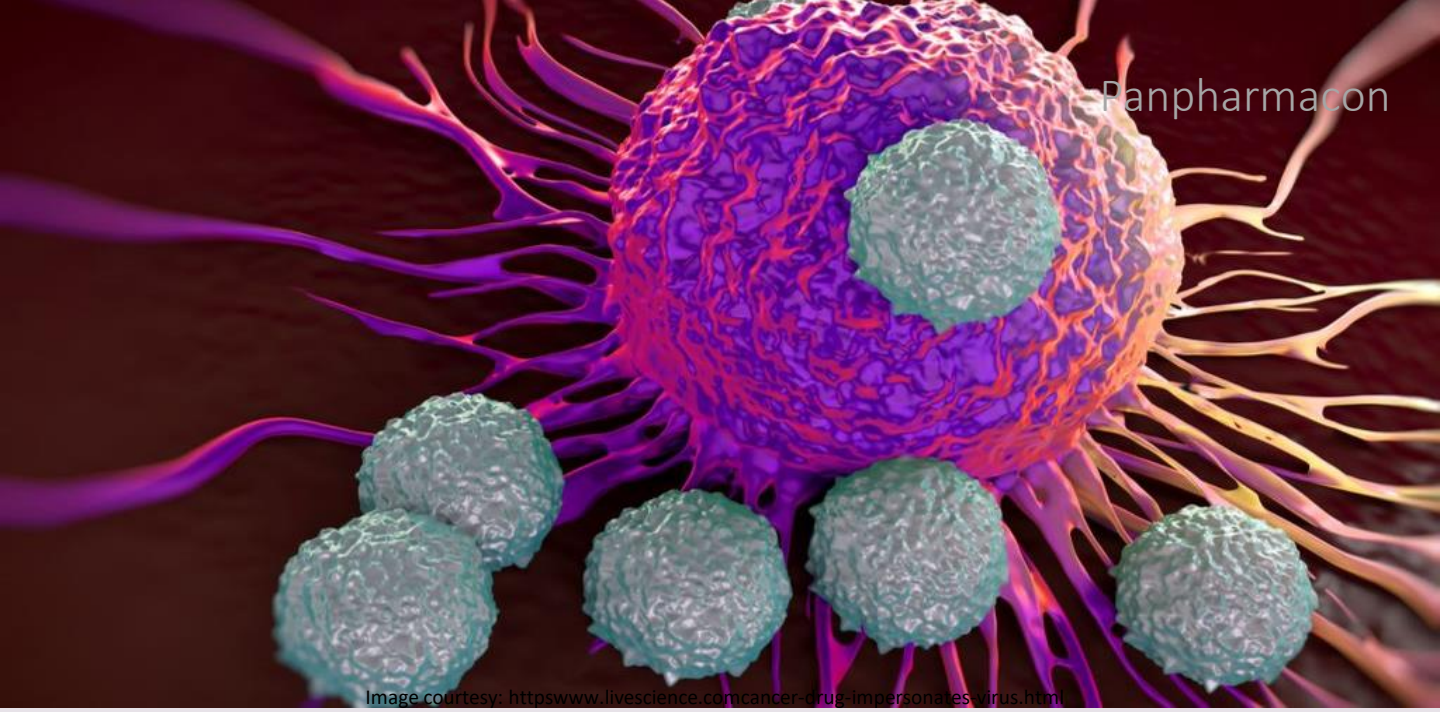


Image courtesy: httpswww.livescience.comcancer-drug-impersonates-virus.html

Webinar On Surface receptor-mediated targeted drug delivery systems for enhanced cancer treatment

Department Of Pharmacology, FPH, RUAS hosted a webinar entitled "Surface receptor-mediated targeted drug delivery systems for enhanced cancer treatment" on 4th - January - 2021

About Webinar

Cell surface receptors play critical roles in physiological and pathological processes including extracellular matrix processing, growth factors signalling's, and the activation of cells to microbial invasion. Importantly, cell surface receptors are involved in the progression of various degenerative diseases such as cancer, atherosclerosis, and neurological disorder. This webinar highlights diagnostic targeting and regulation of receptors to facilitate the understanding of the major pathological pathways and the development of therapeutic applications

Resource Person

Dr. K. Selvaraj

Associate Professor

Department of Biotechnology,
Kalasalingam Academy of Research and Education
(Deemed to be University), Krishnankoil.

Recorded Webinar can be accessed through the following link: Microsoft Teams: https://surl.ms/1lNz

Upcoming Event

Webinar on

Basic Pharmacokinetic Parameters: Estimations and Calculations

About Webinar

Pharmacokinetic parameters are assessed by monitoring variations in concentration of the drug and/or its metabolites in physiological fluids that are easy to access (i.e., plasma and urine). Pharmacokinetic parameters give an overall indication of the behaviour of the drug in the body.

This webinar not only provides an overview regarding various basic pharmacokinetic parameters but also intended to provide demonstration and hands-on training on basic PK calculations using MS Excel.

Resource Person

Dr. Md. Sulaiman Sait J

Assistant. Manager

Department of Clinical Pharmacology and Pharmacokinetics, Formulation R&D unit, Granules India, Hyderabad.

Speaker Profile

Dr. Sulaiman Sait J, has completed Pharmacokinetic analysis for over 250 Bioavailability & Bioequivalence studies. He also shares interest for Biopharmaceutics, PK Modelling, Physiologically based pharmacokinetic (PBPK) modelling, *In-vitro In-vivo* correlation (IVIVC) and Population Pharmacokinetics.

Over the past three years he has given guest lectures at various National and International Conferences and events sponsored by CDSCO, Govt of India and UGC. He is also a proud author of a book titled "The Blind trial" and bagged young achievers award for his academic and professional achievements..

Limited Seats: 100 Participants Only. Registration Link: https://forms.gle/vnut7S18RBT7zPgd6

Date: 06/Feb/2021

Time: 10:30 AM – 01:00 PM IST

E- Certificates will be provided to registered participants

Convener

Dr. S. Bharath

Event Co-ordinators

Dr. J. Anbu & Dr. Md. Azamthulla

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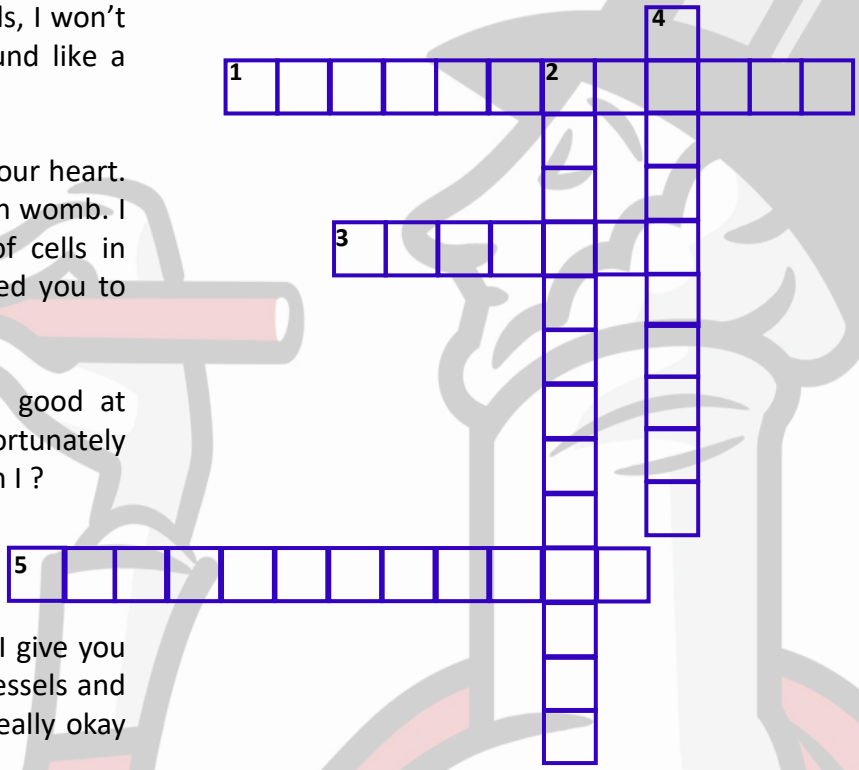
Solve the Crossword*



Across

1. I can control your sneezing, running nose and itching. I will be in your body for one day but won't impair your psychomotor performance. Unlike my close friends, I won't harm your healthy heart, and I sound like a fox

3. I can reduce your pain and save your heart. I am too good in protecting babies in womb. I can prevent uncontrolled growth of cells in your body, but sometime I can bleed you to death, Who am I?

5. I love many parts in brain. I'm good at helping and mimicry. Unfortunately automatism ditched my life. Who am I ?

Down

2. If you put me under the tongue, I give you best effect. I can relax your blood vessels and also I am good to heart. I am not really okay with sunlight. What am I?

4. Nerve end is not good to me but I'm still in a relationship. I increase your BP but also decrease. I can help you out in emergency. Who am I?

*** Terms and conditions**

- Solved crossword to be mailed to fphpanpharmacon@gmail.com on or before **10-Feb-2021**
- **Two** Winners will be decided by drawing lot
- Winners details will be announced in the upcoming issue
- Participation is restricted for Indian nationals only

Recent Research Publications

- **Haroon, HB**., Perumalsamy, V., **Nair, G.** Anand DK., Kolli R., Monichen J., Prabha K., 2020. Repression of Polyol Pathway Activity by *Hemidesmus indicus* var. *pubescens R.Br. Linn* Root Extract, an Aldose Reductase Inhibitor: An In Silico and Ex Vivo Study. Nat. Prod. Bioprospect. https://doi.org/10.1007/s13659-020-00290-w

- Abraham, S., Harsha, G.G.S, **Desai, K**., Srinivasan, B. and Furtado, S. 2020 Nano Calcium Oxide Incorporated Hydrocolloid Dressings for Wound Care, J. Pharm. Innov., https://doi.org/10.1007/s12247-020-09521-6

- **Ramu, S., Anbu, J**. and Krishnaraj, K., 2020. Therapeutic potential of fucoidan derived from *Sargassum wightii greville* in diabetic encephalopathy–behavioural, biochemical, histopathological and histochemical evidence. Phytomedicine Plus, p.100011. https://doi.org/10.1016/j.phyplu.2020.100011

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