Volume 2
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Rx FACTOR

News letter by

NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS

www.nationalpharmacology.org

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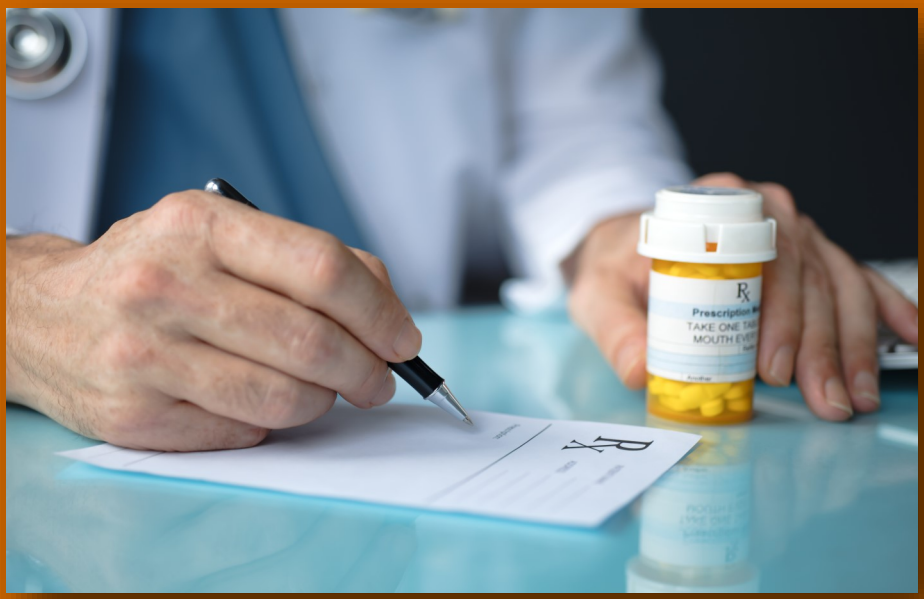

Supported by

Highlights

1) Academic Corner

Current Therapeutics, New Drugs, Banned Drugs, Integrated Approach to Therapeutics

2) Research Corner

Trends in Current Research, Areas of Research for UG & PG, Innovations & Techniques in Research

3) Vigilant Corner

Adverse Drug Reaction Updates, Widening the Horizon of Safe Therapeutics

4) Medical education Corner

Competency Building, Skill Development, OSPE, New Teaching & Learning Methods

5) Ethics & Regulations

Current Updates from Regulatory Bodies

6) Current affairs

Latest medical news

7) Cool corner

Mini quiz, Puzzle, Cartoons, Mnemonics

From the editorial desk

Warm greetings to all.

Welcome to the second edition of '**RxFactor**', a one of a kind initiative from the NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS (NPT) . The inaugural edition of Rxfactor was very well received and we thank you all for the words of encouragement and appreciation.

RxFactor has been designed to encompass the range and breadth of Pharmacology and therapeutics ranging from Medical Education, Pharmaco-vigilance, Research and Therapeutics.

The current edition of Rxfactor newsletter has interesting and relevant articles on use of innovative approaches of teaching pharmacology to medical students, from comic strips to using debate as part of CBME curriculum. We also have an interesting case report which highlights the critical role that Pharmacologists can play in therapeutics. Electives have been made a part of the new GMER regulations and it is important that we are able to offer some relevant and useful electives to our students. In this regard, a few suggested Electives in Pharmacology are also part of the newsletter. New drug approvals and recent drugs in COVID pharmacotherapy are other prominent inclusions in the current issue. The national list of essential medicines (NLEM) 2021 along with a simple and practical way to prepare an alcohol based sanitizer are other noteworthy articles. Further, as always the 'cool corner' has a crossword & cartoons to add a fun element to pharmacology learning.

We would like to thank all the contributors of RxFactor for their efforts and support in making this issue of Rxfactor a grand success.

"An investment in Knowledge always pays the best interest". Benjamin franklin.

We look forward to a happy education and mutual learning with all our readers.

Jai Hind.

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Dr Sushil Sharma
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PRESIDENT'S MESSAGE

Dear distinguished colleagues

Since its inception in August 2021, NPT is growing at a fast pace through its membership, medical education, research and advocacy related activities. We are committed to inspiring and motivating all fellow pharmacologists through mutual sharing and strong networking all over the nation.

It is my pleasure to share with you the activities of NPT through this newsletter. The first executive meeting of NPT was organized on 24th October 2021 through online mode with the enthusiastic participation of all executive members from 22 states and 4 union territories. Increasing the NPT activities and membership drive across the states, plan of activities of the official journal, newsletter and joining the National Medical Commission and Ministry of health and family welfare through an intervention writ petition in Delhi high court (Refer case WP (Civil) 11452/2021) to safeguard the interest and future of fellow pharmacologists were among the main agenda of discussion in the executive meeting

Based on the recommendations and suggestions of fellow pharmacologists, NPT has sent its comments to NMC on Draft Teachers Eligibility and Minimum Qualification in Medical Institution Regulations, 2021. (Ref: Public Notice No. NMC/MCI-23(1)/2021-Med./ dated 18.11.2021)

Online CBME-2 National workshop was organized in September 2021 which was a grand success with the participation of almost 300 pharmacology colleagues from across the country. All the certificates related to the CBME-2 workshop and most of the life membership certificates have been dispatched to the members concerned.

At the National Association of Pharmacology and Therapeutics, we are committed to empowering medical pharmacologists through academic, research, and networking activities.

I urge you to join us in our efforts and you will find NPT membership professionally and personally rewarding

Jai Hind

Long Live NPT

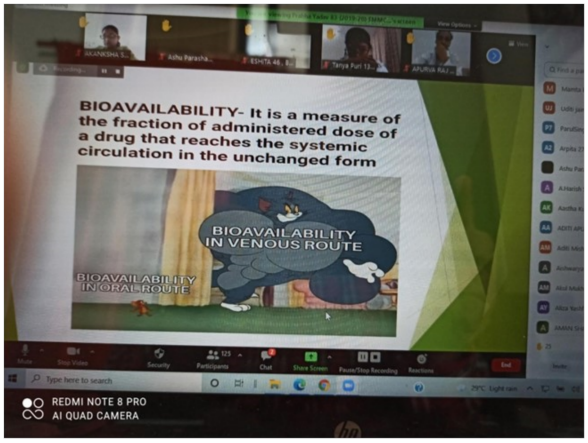
Dr Padmaja Udaykumar
President
Professor and Head
Department of Pharmacology
Father Muller Medical College, Kankanady, Mangalore, Karnataka.

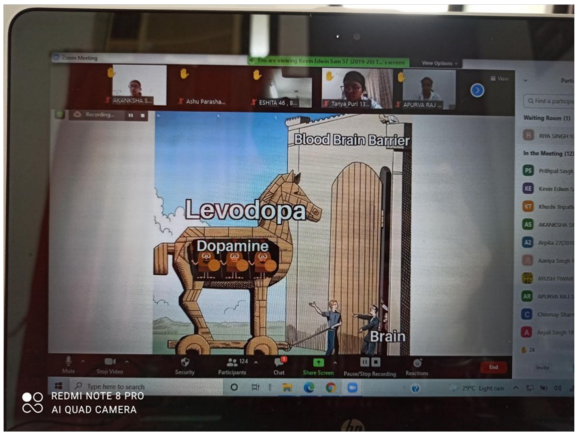
Use of Animated/Comical strips in Pharmacology

To promote concept of General Pharmacology (Animated/ Comical Strip) the students of the Batch 2019 (CBME Batch) of TMMC&RC, Moradabad, UP were given an assignment to make up either an animated or a comical strip for better understanding of the topic after the completion of General Pharmacology Topic.

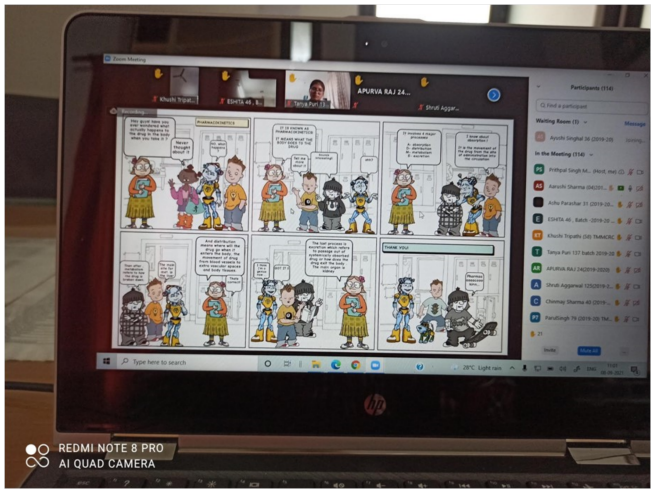
This exercise was a part of Self Directed Learning (SDL) recently introduced in the new curriculum of NMC. After the preliminary round in which all the students participated, a total of 30 students were short-listed for the Final Round which was held on 8th September, 2021. The event was held on the online mode via Zoom Platform and was Judged by Faculty of immense repute in the stream of Pharmacology.

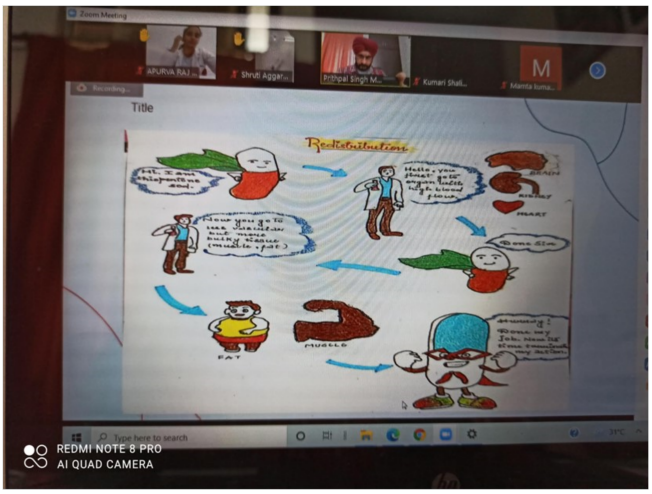
All the students presented their concept in form of animation/ comical strip on the online platform in 2-3





minutes and were judged on three criteria's for their presentation – Concept, Content and Understanding of the Topic. The concept of having a animated/comical strip not only helps the student in incorporating technology into medical field it also enhances their memory and understanding of the topic.





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Preparation and use of hand sanitizer

At present WHO recommends that alcohol-based hand sanitizers to be used for both hygienic hand asepsis and for pre-surgical hand preparation. Two formulations for Hand sanitizer preparation are currently recommended by WHO, which are based on Ethanol and Isopropyl (more preferred)

Method: For 10 litres of hand sanitizer preparation:

FORMULATION1	FORMULATION2
Ethanol 96%:8333ml	Isopropyl alcohol99.8%:7515ml
Hydrogen peroxide3%:417ml	Hydrogen peroxide3%:417ml
Glycerol 98%:145ml	Glycerol 98%:145ml

Step by step preparation:

1. The alcohol is poured into large bottle or tank up to graduated mark.
2. Hydrogen peroxide is added using measuring cylinder.
3. Glycerol is added with measuring cylinder and rinsed with sterile distilled water and emptied into bottle
4. Bottle topped up done to 10 lit mark with sterile distilled water or cooled boiled water.
5. The screw or lid is placed immediately to prevent evaporation
6. The solution is mixed gently by shaking or by using a paddle.(2)

By proper calculation of required ingredients smaller amount of hand sanitizers can be made for 100ml.

Mechanism of action.

It acts by precipitating microbial proteins. Some amount of moisture is required pyl alcohol is the main active ingredient and acts as antiseptic and microbicidal and kills majority of germs for antiseptic action and hence 100% or dehydrated alcohol doesn't have antiseptic property.

Hydrogen peroxide helps in eliminating the contaminating spores. Glycerol acts as humectants & Distilled water or boiled and cooled water acts as diluent and vehicle

Storage

Undiluted ethanol is highly inflammable and may ignite at 10^0 C.

Flash point of ethanol and isopropyl alcohol is 17.5^0C and 19^0C respectively.

Production and storage must be done ideally in air-conditioned room or in cool environment.

Open flames and smoking are strictly prohibited in production and storage areas.

References:

World Health Organization (WHO). Guide to Local Production:
WHO- recommended Handrub Formulations Introduction: Who
[Internet]. 2010;(April):9. Available from: https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf

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Essential Medicines for India: Overview of NLEM

World Health organization(WHO) defined Essential medicines as "medicine that satisfy the priority health care needs of the population". Essential medicines are intended to be available within the context of functioning health systems at all times, in adequate amounts, in appropriate dosage forms, with assured quality, at a price the individual and the community can afford.

Salient features of NLEM 2021

The Government of India has updated the National List of Essential Medicines (NLEM) in September 2021 containing 399 essential drugs. Detail list is yet to be available in public domain.
39 new drugs including anti-cancer, anti-diabetes and antiretroviral drugs are added to the existing list. 16 drugs are deleted from the NLEM 2015.

The new drugs added to the list include:

Amikacin, Azacitidine, Bedaquiline , Bendamustine Hydrochloride, Buprenorphine , Buprenorphine (A) + Naloxone (B) , Cefuroxime, Dabigatran, Daclatasvir, Darunavir (A) + Ritonavir (B), Delamanid ,Dolutegravir, Fludarabine, Fludrocortisone, Fomepizole, Fulvestrant, Insulin Glargine, Irinotecan, Itraconazole, Ivermectin, Lamivudine, Latanoprost, Lenalidomide, Leuprolide acetate, Montelukast, Mupirocin, Nicotine replacement therapy, Nitazoxanide, Ormeloxifene , Phenoxymethyl Penicillin, Procaine Benzyl Penicillin, Rotavirus vaccine, Secnidazole, Tenecteplase, Teneligliptin, Tenofovir + Lamivudine + Dolutegravir, Tenofovir, Alafenamide Fumarate [TAF], Terbinafine and Valganciclovir.

The list of medicines deleted from NLEM 2015 are

Alteplase, Atenolol, Bleaching Powder, Cetrimide, Erythromycin, Ethinylestradiol + Norethisterone, Ganci clovir, Lamivudine + Nevirapine + Stavudine, Leflunomide, Nicotinamide, Pegylated interferon Alfa 2a and pegylated interferon Alfa 2b, Pentamidine, Prilocaine + Lignocaine, Rifabutin, Stavudine + Lamivudine and Sucralfate.

Potential uses of NLEM

- Guide safe and effective treatment of priority disease conditions of a population
- Promote rational use of medicines
- Optimize the available health resources of a country. It can also be a guiding document for:
- State governments to prepare their list of essential medicines
- Procurement and supply of medicines in the public sector

Dr Chaitali Chindhalore (Assistant professor)
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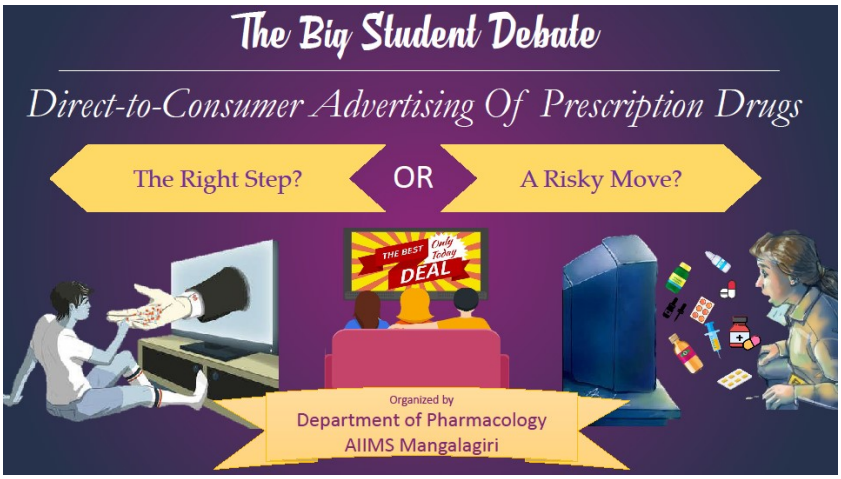
Debate as a Teaching-Learning method in CBME

The CBME curriculum envisages an Indian Medical Graduate (IMG) who is not just a Clinician but a Communicator, Leader, Life-long learner, and a Professional. To this end, we need to ensure that we provide adequate TL activities to our students to ensure that he/she is able to fulfill all these roles once he/she comes out from our medical colleges and becomes an IMG. Debate as a Teaching-learning (TL) method not only promotes self directed learning (SDL) but also is proven to help in acquisition of important skills in UG students such as critical thinking, communication skills and team work.



The Department of pharmacology, AIIMS Mangalagiri organized a debate on 'Direct to consumer advertising of prescription drugs' which is an contentious issue in medical field.. Many experts feel that it would help in making patients more informed and empowered during the medical consultation and decision making process,. However, there are obvious downsides to it with many studies suggesting that it has the potential to lead to irrational and more expensive treatment.

The debate was a big success with students arguing both against and in favour of 'Direct to consumer advertising of prescription drugs'. The students performed excellently. The way, they were able to present their arguments and logic was appreciated by one and all. The feedback from the students was really heart warming and encouraging. Use of Debate as a TL method engages the learners, makes them actively involved, encourages SDL and improves communication skills. They also learn to work in team and to weigh the pros and cons of a diagnostic or therapeutic dilemma which they invariably will encounter in their future clinical practice. To this end, Debate can be made be made an integral part of learning in CBME.

Dr. Sushil Sharma,
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Indian Medical Graduate at the end of 3rd MBBS part -1 and before the commencement of 3rd MBBS part -2 needs to complete an important curricular program called '***ELECTIVES***'. As per the revised regulations of GMER 2019 an 'Elective' is defined as a learning experience created in the MBBS curriculum to provide an opportunity for the learner to explore, discover and experience area or streams of interest. This curricular element consists of two blocks of which the first block has to be a preselected pre/paraclinical subject topic of 4 weeks duration.

Research in Pharmacology integrates knowledge from multiple scientific disciplines. Therefore experience gained through projects in this discipline will provide a foundation for other clinical subjects in long run. Electives module developed by the Expert Group of MCI Academic cell guides institutions to develop their own set of topics basing on their locally available infrastructure/ facilities. Therefore careful selection of elective topics in Pharmacology carries immense importance in the MBBS curriculum. Skills achieved through certifiable competencies like prescription auditing, appraisal of drug promotional literature, ADR reporting etc. during 2nd Professional MBBS can be utilized as research tools during electives. Moreover selection of non-certifiable topics for example; medication error detection, rational drug use, medication adherence, pharmacoeconomics, drug utilisation patterns, antibiotic resistance pattern etc. is equally important to enhance lateral thinking, build experiential and immersive experiences in a medical graduate. In case the institute is in collaboration with a nearby Pharma Industry, selection of relevant projects like BA/BE studies, newer drug delivery systems, drug formulations etc. will help the student explore newer avenues in Pharmacology as a discipline. Choosing research projects on some topics where integration can be brought out by conducting the research pertaining to Pharmacology during block-1 (4 weeks) and it's clinical / field application in block-2 (4 weeks) appears justifiable in resource limited [in terms of research supervisors/guides] settings. As clinical postings cannot be compromised during Block-1 of electives, choosing topics relevant to clinical pharmacology will be more beneficial. This will ensure a continuum of learning experience for the medical graduate.

Below given is a list of electives in Pharmacology which can serve as a toolbox to students in their area of interest.

Sl. No.	Pharmacology Topic [Block-1]	Clinical /Community set up Topic [Block-2]
1	ADRs related to Analgesics in a health care set up	Outcome of analgesic use among patients suffering from osteoarthritis / rheumatoid / gouty arthritis
2	ADRs related to Antimicrobials	Antimicrobial usage pattern among patients suffering from UTI / STDs / PIDs / adults /paediatric age group in a healthcare facility
3	ADRs related to Anti-TB Drugs	Outcome of Anti-TB medication among MDR-TB patients in a district TB centre
4	ADRs related to Antimalarials	
5	ADRs related to Chemotherapeutic agents	Retrospective evaluation of treatment outcome in various malignancies
6	ADRs related to Hormones	Quality of life / Pharmacoepidemiological studies among patients suffering from chronic illness like diabetes, hypertension, arthritis using questionnaire based methods
7	Practice of ADR reporting among different HCPs in a tertiary/peripheral/private hospital- questionnaire based studies	
8	Prescription audit of common OPD/IPD prescriptions	
9	Drug utilisation studies in special population- Pregnancy, Children, Geriatric	
10	Preanaesthetic medication practice	
11	Evaluation of medication error at different levels in a health facility	
12	BA/BE studies	
13	PK/PD analysis of antiseizure medications	
14	Evaluation / comparative studies of herbal remedies in therapeutics	
15	Toxicokinetic studies/ preclinical studies as along with post graduates thesis	

Please note that this is not a comprehensive list because some degree of variation in delivery of course contents and feasibility between different institutions is anticipated. Proper planning, listing of short, concise and achievable research projects in the academic calendar, training faculty for active supervision and preparing the students for self-directed learning are the three pillars for effective implementation of Electives in the present curriculum. To conclude, importance of Pharmacology as a subject from academics, therapeutics as well as pharma industry perspective can be inculcated among medical graduates by appropriate selection of research topics.

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MOLNUPIRAVIR - New molecule for Covid-19

Molnupiravir, an antiviral pill being developed by Merck & Co., has been touted as a potential game changer in the fight against Covid-19. The medication was shown to reduce the risk of hospitalization or death by about half in a late-stage study of adults with mild-to-moderate cases.

Mechanism of Action:

Molnupiravir, like Remdesivir, is a nucleoside analogue, and mimics some of the building blocks of RNA. ways. When SARS-CoV-2 enters a cell, the virus needs to duplicate its RNA genome to form new viruses. Remdesivir is a 'chain terminator'. It stops the enzyme that builds these RNA 'chains' from adding further links. Molnupiravir, on the other hand, gets incorporated into burgeoning RNA strands and, once inside the compound can shift its configuration, sometimes mimicking the nucleoside Cytidine and sometimes mimicking Uridine. Those RNA strands become faulty blueprints for the next round of viral genomes. Anywhere the compound gets inserted and that conformational shift happens, a point mutation occurs,. When enough mutations accumulate, the viral population collapses. "That is what is termed as 'lethal mutagenesis'. The virus essentially mutates itself to death. And because the mutations accumulate randomly, it's difficult for viruses to evolve resistance to Molnupiravir .

Study Results:

Interim analysis of data from a randomized trial found that it cut the risk of hospitalization by about 50%, Merck said in a statement on October 1, 2021. Of 385 patients who got the drug, 28 (7.3%)were hospitalized, compared with 53 out of 377 (14.1%) who got a placebo. Through day 29, no deaths were reported in patients who received Molnupiravir, but eight died in the placebo arm. The study was relatively small, and further research is required. But results were so encouraging that Merck , in consultation with USFDA, halted the trial and began the process of gaining regulatory clearance.

Dosage:

Molnupiravir was taken orally every 12 hours for five days by adults with mild-to-moderate Covid. Studies are still underway to determine the most efficacious regimen. A study earlier this year showed Molnupiravir had little effect when it was given to patients already hospitalized with severe disease. One study is testing whether it can be used to prevent SARS-CoV-2 spreading in households in which one or more members have Covid.

Adverse Reactions:

Interim analysis found no increased incidence of adverse events. Only 1.3% of participants taking Molnupiravir quit the therapy due to an adverse event, compared with 3.4% in the placebo group. Still, Molnupiravir will need to be assessed in a much larger group of patients to properly determine its safety. People involved in the trial were instructed to abstain from heterosexual sex or use contraception. While this is routine practice with some other medicines, such as cancer chemotherapy, it suggests that Molnupiravir has the potential to cause birth defects should someone become pregnant.

Conclusion:

Vaccination remains the most effective shield against Covid-19. Still, Covid-19 cases are continuing to occur even in highly vaccinated populations, meaning antiviral therapies will play an important role in limiting the disease's severity, especially in the elderly and people with weakened immune systems for whom vaccination is less effective.

Dr Pinaki Chakravarty
Professor and Head
Department of Pharmacology
Tezpur Medical College and Hospital Sonitpur, Assam

Pharmacologist in Therapeutics: Need of the hour

As a pharmacologist, I always felt the importance of application of knowledge of pharmacology in clinical practice. Contribution of Pharmacologist to therapeutics can be of immense benefit in the management of many cases. I wish to share my experience in this regard.

A 25yrs old boy was diagnosed with hypertension. Metoprolol 50mg was started by a physician after which he started complaining of disturbed sleep and nightmares. This went on for almost a period of week. Parents were worried. After consultation, Zolpidem was given with no relief. Physician advised Obstructive Sleep Apnoea (OSA) study. Patient was preparing for the competitive exams, so he was under stress, had also put on some weight and his BMI was 27 kg/m^2. On OSA, he was found to have mild apnoea. So Continuous Positive Airway Pressure (CPAP) was advised. But even after that there was not much improvement. I, being a pharmacologist, suspected metoprolol as the culprit. After literature search I realized B blockers, especially propranolol and metoprolol, being lypophilic are the most common cause for the disturbed sleep and hence nightmares. There were so many reviews by patients about suffering from this side effect when on metoprolol. On my advice, dechallange was done with patient getting classical relief. Telmisartan was started as an antihypertensive.

What was more surprising that the physician, the pulmonologist and many other physicians to whom I talked to were not at all aware of this side effect and were shocked to know this. They were modest enough to accept that this may have been reported by their patients in the past, but they failed to correlate this adverse effect with the medication.

This compelled me to think about the importance of active involvement of pharmacologists in therapeutics. What would have happened if I had not got involved? He might have landed up taking a psychiatric treatment or pulmonologist might have suggested to buy CPAP instrument which is quiet expensive. What is the solution to this? We all pharmacologists feel that we can play significant role in therapeutics but it has never materialized, at least not in most of the medical institutes. Can we have a regular ward round once a day and go through the treatment which the patients are receiving, talk to the patients to check if they have any contraindication to a drug that has been prescribed or if they suffer from any side effect? If there is something suspicious, it can be discussed with the treating clinician. Purpose is not to criticize someone's treatment plan but to offer whatever best we can give to the patient as a medical unit.

We, as Pharmacologists are in a unique position to help and advice about the correct medicines and dosages especially in patients with complex conditions that affect multiple organ systems and therefore need several different medicines. We can also ensure the cost-effectiveness of new treatments and make recommendations on medicine usage. Initially, there may be resistance from the clinicians, but slowly with our valuable inputs based on the knowledge of pharmacology and literature search , they will not only be open to our suggestions but also welcome this initiative of having a pharmacologist with them during regular ward rounds . Further, every few days, some new drug is added to the list or old drugs are getting updated with new information. It is practically not feasible for the clinicians to keep themselves updated with such a huge information due to their hectic schedules. We as pharmacologists can bridge this gap by providing our services to the hospital. This will also increase importance of our field in medical community and among undergraduates too as all these cases from the hospital can be discussed in the practical sessions. This will also enhance ADR reporting. This will enable healthcare professionals to achieve the main goal of improving patient care through the safe, economic and effective use of medicines, by working together as a cohesive unit.

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EXTRACT

Source: Group discussion NMDP

 # Mosquirix- World's first malaria vaccine approved by WHO:
Mosquirix is a vaccine that is given to children aged 6 weeks to 17 months to help protect against malaria caused by the parasite *Plasmodium falciparum*.

 # Covid vaccine boosters not appropriate at this stage:
Vaccine efficacy against severe COVID19, even for the delta variant, is so high that booster doses for the general population are not appropriate at this stage in the pandemic, according to a review by an international group of scientists published in The Lancet. *https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02046-8/fulltext

 # Increased risk of cardiac arrest with Diclofenac:
Diclofenac increases the risk of heart attacks and stroke by 50 percent. Initiation of diclofenac poses a cardiovascular health risk, both compared with no use, paracetamol use, and use of other traditional NSAIDs.
* https://doi.org/10.1136/bmj.k3426

 # Revised Basic Course Workshop:
Even if a faculty has completed Basic Course Workshop, RBCW is mandatory as per the prevailing guidelines.

 # Multiple ethics committees in one institute:
Institutes with large number of research proposals can have multiple ethics committees functioning independently. Now various institutes have 2 Ethics committees, one for regulatory clinical trials and other for academic trials. They need to follow Standard Operating Procedures and Terms of References of the institute.

 # Antibiotic stewardship committee:
An independent multidisciplinary committee with members from Pharmacology, Microbiology, Hospital administration and Clinical specialities. Primary aim of this committee is to promote appropriate antimicrobial use.

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 # Teaching Critical evaluation of Drug Promotional Literature: Role play or exercise
Use WHO guidelines & analyse DPL & students can comment on how much it complies. Assess using OSPE with checklist Ethical concerns with DPL by role play/video. Assessment using OSPE with checklist

 # National Pharmacovigilance week: Celebrated from 17th – 23rd September in various institutes

 # CBME 2 conducted by National Association of Pharmacology & Therapeutics:
CBME 2 was very helpful series for better implementation of CBME. Its contents are available on official website of National Association of Pharmacology and Therapeutics

Compiled by:

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IMPORTANT NEW DRUG APPROVALS

S. No	New Drug	Class/MOA	Indication
1.	Ansuvimab-zykl	A fully human monoclonal IgG1 antibody against the GP1, 2 surface protein	Used in the treatment for Ebola virus disease. Given as an one-time IV over 60 minutes.
2.	Atogepant	Calcitonin gene–related peptide receptor antagonist.	To prevent episodic migraines, 10-60 mg OD for 12 weeks
3.	Avacopan	C5a receptor antagonist	To treat severe active anti-neutrophil cytoplasmic auto-antibody associated vasculitis in combination with standard therapy, including glucocorticoids. Dose is 30 mg twice daily
4.	Avalglucosidase alfa -ngpt	Targets the mannose-6-phosphate receptor	To treat late-onset Pompe disease (LOPD), 20 mg/kg for LOPD patients ≥30 kg or 40 mg/kg for LOPD patients <30 kg) and is administered IV .
5.	Belzutifan	Hypoxia-inducible factor inhibitor.	To treat von Hippel-Lindau disease; Dose: 120 mg once daily
6.	Berotralstat	Blocking the enzymatic activity of plasma kallikrein in releasing bradykinin.	To prevent attacks of hereditary angioedema (HAE). Dose: 150 mg capsule orally with food every day.
7.	Difelikefalin	Selective agonist of kappa opioid receptors	To treat moderate-to-severe pruritus associated with CKD . Dose: 0.5 µg/kg BW thrice weekly
8.	Eptinezumab-jjmr	Binds to both α and β isoforms of CGRP and inhibits the interaction between CGRP and its receptor.	Prophylactic management of migraine in adults. Dose: 100 mg IV every three months given over 30 minutes.
9.	Lumasiran	The first small interfering ribonucleic acid (RNA_i) therapeutics	Indicated for the treatment of primary hyperoxaluria type 1 (PH1). 3 mg/kg SC once monthly x 3 doses followed by 3mg/kg every 3 months.
10.	Maralixibat	Apical Sodium-dependent Bile acid Transporter (ASBT) inhibitor.	To treat cholestatic pruritus associated with Alagille syndrome. Dose: 190 mcg/kg orally 4 times daily.
11.	Tirbanibulin	A non-ATP competitive Src kinase inhibitor and a tubulin polymerization inhibitor.	Used to treat actinic keratosis on the face or scalp. One package of ointment is applied on the affected area of face or scalp 1 time a day for 5 days in a row
12.	Vibegron	A Selective human β -3 adrenergic receptor agonist.	Relaxes the detrusor smooth muscle during bladder filling & used in overactive bladder.

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Demonstrator,
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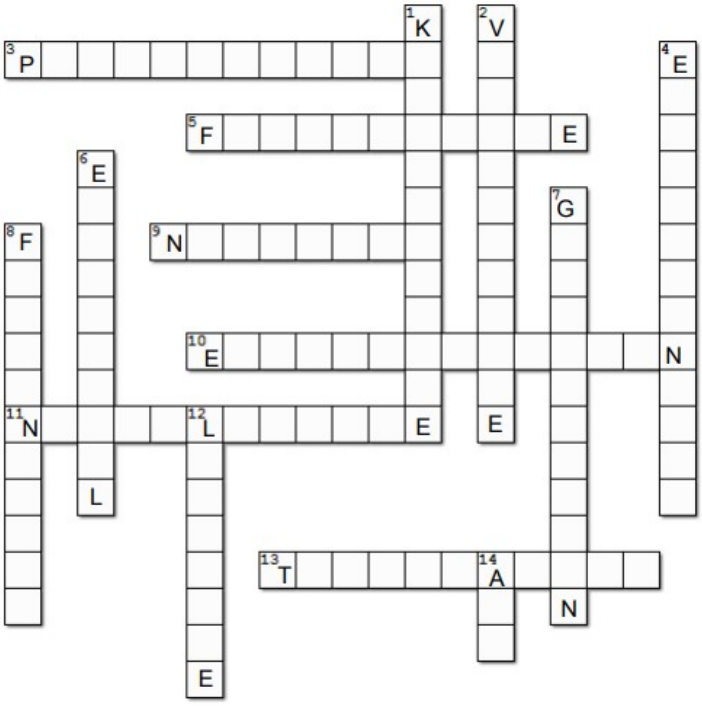
Atal Bihari Vajpayee
Government Medical College Vidisha (MP)

Dr. Ruchi Baghel,
Associate Professor
Department of Pharmacology
R D Gardi Medical College , Ujjain (MP)

COOL CORNER

CROSSWORD (Anti-Fungal agents)

Dr Divya Shanthi (Assistant Professor) Dr Dhivya Elango M (Senior Resident) ,
Department of Pharmacology, JIPMER Puducherry

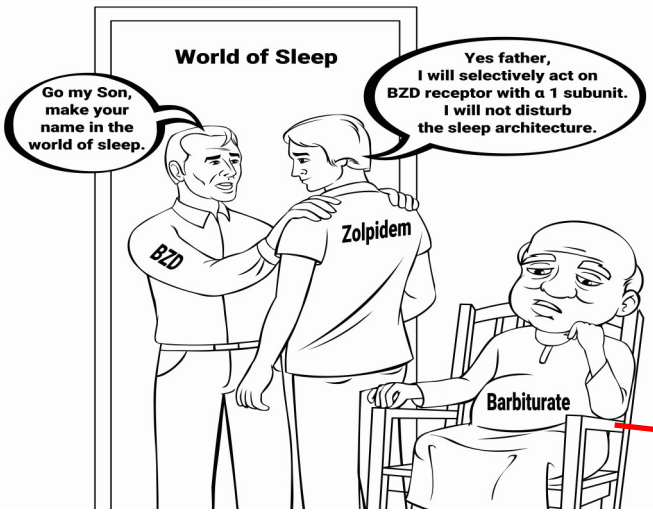


Across

3. Run away mucor!! Run away mucor!! Because I'm here. Who am I?
5. I believe in team work and like to work together with Amphotericin B. Who am I?
9. I melt in your mouth/paint your mouth to wash away the thrush
10. 'I will make you fair because of pallor" says Amphotericin B. What is reduced to cause anaemia?
11. Preload with me to save the kidney from Amphotericin B.
13. I will make your fungal nails fine and no doubt it will shine. Who am I?

Down

1. Mr. X loses his interest in Mrs. X if he is treated with me for a long time
2. I will make you see red apple as green apple when you are treated with me. Who am I?
4. Though we have sweet name we destroy the fungal cell walls without mercy. Name us.
6. I can attract all Polyenes towards me. I am in the membrane. Who am I?
7. I will do wonders if you take me with Biryani and cheese Pizza. Who am I?
8. I flow through CSF to blow away the fungus. Who am I?
12. 'Let me be free...why do you want to pack me inside this bag' says AMB. What is that bag?
14. I scare black fever and will make Leishmania rare.



Answers for Crossword on next page

From the book: **"Drug Autobiographies in Pharmacology"**
Dr. Sushil Sharma

Amazing drug molecules
'Oral Drugs with 100 or Near 100 Percent Bio-availability'

Drugs administered by oral route has to pass through several barriers including the first pass metabolism in the GIT, liver etc. Hence most of the oral drugs are unable to achieve complete bioavailability. However there are few molecules/drugs which even when administered by oral route are able to attain 100% oral bioavailability like the intravenous route.

Antimicrobial Agents [AMAs]	Antitubercular Drugs (HRZE)	INH
		Rifampicin
		Pyrazinamide
		Ethambutol
	Anti-Leprotic Drugs	Dapsone
	Others	Linezolid
		Trimethoprim
		Sulfamethoxazole
		Levofloxacin
Anti-Seizure Drugs		Valproic Acid
		Phenobarbitone
		Levetiracetam
		Diazepam
		Chlordiazepoxide
Bile Acid Binding Resins		Fenofibrate
		Gemfibrozil
Others		Glimepiride
		Niacin
		Indomethacin
		Lithium
		Pseudoephedrine
		Tamsulosin
		Salicylic Acid
		Ethacrynic Acid

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Source: Goodman and Gilman's
The Pharmacological basis of Therapeutics 13th Ed

Answers to Crossword

Across		Down	
3	Posoconazole	1	Ketoconazole
5	Flucytosine	2	Voriconazole
9	Nystatin	4	Echinocandins
10	Erythropoietin	6	Ergosterol
11	Normal Saline	7	Griseofulvin
13	Terbinafine	8	Fluconazole
		12	Liposome
		14	AMB

NATIONAL ASSOCIATION OF PHARMACOLOGY AND THERAPEUTICS

Promoting Pharmacology and Therapeutics for a better tomorrow

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A national organization of medical doctors specialized in pharmacology /clinical pharmacology and therapeutics. Envisaged to provide strong leadership to promote pharmacology and therapeutics for a better tomorrow. The association is fostered by NMDP (National MD Pharmacology), a prestigious group of eminent pharmacologists.

Aims and objectives

- Empowering medical doctors specialized in Pharmacology/Clinical Pharmacology and Therapeutics.
- Promoting academic and clinical research in Pharmacology/Clinical Pharmacology and Therapeutics.
- Enhancing the standard of teaching/training in Pharmacology/Clinical Pharmacology and Therapeutics
- Promoting Pharmacology/Clinical Pharmacology and Therapeutics for the benefit of patients and society.

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