



The NGS MIPS Herald

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Institute of Pharmaceutical Sciences, Mangalore



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Antibiotic Resistant Pathogens

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VISION

To build a humane society through excellence in education and health care.

MISSION

To develop Nitte University as a centre of excellence, imparting quality education, generating competent, skilled manpower to face the scientific and social challenges with a high degree of credibility, integrity, ethical standards and social concern.

'For Private Circulation Only'

From the Editor's desk

Friends,

Every year, the International Pharmaceutical Federation (FIP) urges member organizations and pharmacists from across the globe to participate in the World Pharmacists Day on September 25, ever since the 2009 Council meeting of the FIP Congress took place in Istanbul, Turkey. At this meeting, the Turkish Pharmacists Association suggested that World Pharmacists Day be celebrated annually on September 25 (the day that FIP was founded in 1912).

This proposal was unanimously accepted by the Council and since 2010, World Pharmacists Day has been coordinated by FIP and celebrated through the involvement of its Member Organizations, either with structured, widespread campaigns or small scale projects, to remind the society of the invaluable service performed by Pharmacists and Pharmaceutical scientists as integral part of the health team.

Every year, the FIP proposes a new theme and this year for the World Pharmacists Day, it announced the theme, '**Pharmacists – simplifying your medicines use, no matter how complex**'. Though the observance of the World Pharmacist Day has been followed by most nations for three years now, India has started to implement it only this year. The Pharmacy Council of India has made an official declaration that henceforth this day would be celebrated every year. The themes are however more health care oriented and in a country like India the pharmacy profession is mostly pharma industry based and the Pharmacist as a health care professional is yet to gain a firm foothold in a clinical set up where the Physician's word is law. Therefore the practice of such themes would be limited, however we can still make use of this opportunity to project our profession and bring to the public attention that the Pharmacist makes a difference to the lives of people directly or indirectly through the industry, hospital or teaching institution. I think, as pharmacy teachers it is up to us to inculcate this feeling among students so that one day they would be proud of the profession that they have chosen.



Marina Koland, *Executive Editor.*

One Day Workshop on 'Medicinal Plants and Mental Health', September 6, 2013



Dr. Ramananda Shetty with Dr. C.S. Shastry and other dignitaries at the inauguration of the workshop



Dr. Himanshu Joshi, Organizing Secretary of the workshop speaks



Dr. Satheesh Rao



Mr. D.S.V. Swamy

CAMPUS BUZZ

Orientation program for B.Pharm, M.Pharm and Pharm. D students

An orientation program for the fresher students of B.Pharm, M.Pharm and Pharm. D courses was organized by the NGSM Institute of Pharmaceutical Sciences at the seminar hall of the Nitte Institute of Communications (NICO) on August 14, 2013. The parents and students were addressed by Dr. C.S. Shastri, Principal, NGSMIPS who briefed them on the curriculum, examination system and various facilities and amenities available on campus including hostels, mess and bus facilities. Further, the various heads of the departments also introduced the new students to the different subject areas that they would need to study during their course. The Principal clarified some of the doubts raised by a few parents.

First year students visit NMAMIT campus at Nitte, Karkala

The first year B.Pharm and Pharm. D students were taken on a brief tour to Nitte, Karkala to give them a glimpse of the other institutions run by the Nitte Education Trust such as the scenic campus of the Nitte Mahalinga Adyanthaya Memorial Institute of Technology (NMAMIT). The students also had the opportunity to visit 'Sanmathi', the NET Botanical Gardens and specifically the Justice K.S. Hegde Memorial as well as the B.C Alva Indoor Stadium and the 'Gomateshwara Betta', the 45 feet statue of Gomateshwar.

One Day Workshop on 'Medicinal Plants and Mental Health'

ICMR sponsored one-day workshop on 'Medicinal Plants and Mental Health' was organized on Friday, 6th September, 2013 by the Department of Pharmacology, NGSM Institute of Pharmaceutical Sciences, Mangalore. The workshop was inaugurated by Dr. S. Ramanand Shetty, Vice Chancellor, Nitte University. Speaking on the occasion, Dr. Shetty emphasized that there is an urgent need for research activities in educational institutions. He said a considerable amount of funds go unutilized. It is therefore the responsibility of the institutions and the academia to associate with the government funding agencies and utilize such funds set aside for research and contribute to the development and progress of the nation.

The Organizing Secretary, Dr. Himanshu Joshi in his introductory remarks said that the objective of organizing the workshop was to create awareness about mental health. The workshop coincided with World Alzheimer's Month which is marked with various activities like conferences, workshops, Memory-walk worldwide to express solidarity with the various forums and associations in their spirit to fight against the disease. All the participants sported purple ribbons showing unity to the spirit and theme of the workshop.

The resource persons for the scientific session of the workshop were, Dr. Satheesh Rao, Professor and Head, Dept of Psychiatry, KSHEMA who spoke on '*Mental Health treatment in India-Present and Future Prospects*'; Mr. D.S.V. Swamy from the Dept of Psychiatric Nursing, Nitte Usha Institute of Nursing Sciences who spoke on, '*Problems and care in the management of mental illness*'; Dr. Hanumanthachar Joshi, Principal, Sharada Vilas College of Pharmacy, Mysore delivered a lecture on, '*Medicinal Plants with Neuroprotective*

activity'; Dr. Ganapathy Bhat, M.D., Jeddu Ayurveda Speciality, Mangalore spoke on '*Management of disorders in traditional system of medicine*' and Dr. H.N.Gopalakrishna, Dept of Pharmacology, A.J.Institute of Medical Sciences, Mangalore delivered a lecture on '*Preclinical drug screening methods for CNS disorders*'

A Wall magazine competition sponsored by *Elsevier* was also organized to complement the workshop which saw active participation from the students and delegates. Prizes were awarded for the best posters.

Onam celebrations at NGSMIPS

The institution premises bore a festive look on September 12, 2013 as students celebrated the harvest festival of Kerala, 'Onam'. Students and faculty were in their best traditional attire besides taking part in competitions such as 'Pookalam'. A small program was organized by the Malayali students with traditional dances and there were games conducted for staff and students.

Guest Lecture

Prof. (Dr.) Moodithaya, Director of Global Initiatives, Nitte University delivered a lecture on ISO certification to the teaching faculty on September 12, 2013. During the talk,



Prof. (Dr.) Moodithaya delivers his lecture

Dr. Moodithaya stressed the need for ISO certification for the institution. Moreover, he also elaborated the requirements and procedures essential for the ISO certification, the need to set specified goals with continuous monitoring and how to go about applying for certification.

Vanamahotsava

On September 24, 2013, the institution celebrated Vanamahotsava. Professor Rajshekar, Director of Staff Development College, Nitte University was invited to plant saplings in a small ceremony that was conducted on the college grounds. This event was organized by the NSS unit of NGSMIPS and was attended by students and faculty.

NGSMIPS celebrates Pharmacists Day

When nations across the globe celebrated 'World Pharmacists Day', on September 25, 2013, the NGSM Institute of Pharmaceutical Sciences also celebrated 'Pharmacists Day'.



This day was honored by the Institution by conducting a series of competitions for students with themes associated with the Pharmacy profession. Events for the competition included Quiz, Debate, Essay writing and College. Students from B.Pharm, M.Pharm and Pharm.D participated with enthusiasm and in large numbers. Winners of the competitions were awarded cash prizes.

Blood Donation Camp on “National Voluntary Blood Donor’s Day”

A blood donation camp was organized by the NSS unit of the NGSM Institute of Pharmaceutical Sciences, on October 1, 2013 in joint association with NSS Unit of Nitte University, Youth Red Cross Wing (A.B. Shetty Memorial Institute of Dental Sciences) and Blood Bank of Justice K.S. Hegde Charitable Hospital. The camp was inaugurated by the chief guest Dr. B. Rajendra Prasad, Dean, A.B. Shetty Memorial Institute of Dental Sciences with other dignitaries, Dr. C.S. Shastry, Principal, Dr. Murali Mohan, NSS Programme Coordinator, Nitte University, Dr. Santhosh Shenoy, Programme officer of Youth Red Cross Society Wing, A.B. Shetty Memorial Institute of Dental Sciences, Santanu Saha, NSS Programme Officer, NGSM IPS. A total of 30 volunteers including students, teaching and non-teaching staffs participated in the camp. National Voluntary Blood Donor’s Day was celebrated all over the country on October 1, 2013 to promote and create awareness on blood donation.

Appointments

Mr. Prashanth Nayak was appointed as Lecturer in the Department of Pharmaceutics with effect from August 23, 2013
Dr. Vijaya C Doddangoudar was appointed as Assist. Professor in the Department of Pharmaceutics with effect from August 27, 2013.

Mr. Sandeep D.S was appointed as Lecturer in the Department of Pharmaceutics with effect from September 10, 2013

DEPARTMENT ACTIVITIES

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

RESEARCH PUBLICATIONS

DR. JENNIFER FERNANDES, Professor

1. Synthesis of some novel oxazolidinones Having Benzo Thiazinen Derivatives as antimicrobial and anti-Inflammatory Agents. *Int Journal of Pharmaceutical Sciences and Drug Research* 2013; 5(3): 01-104.
2. Synthesis some novel oxazolidinones having benzo thiazinen derivatives as antimicrobial and anti-inflammatory agents. *Int. Res. J. Pharm.* 2013, 4(8) 260-264.

DEPARTMENT OF PHARMACEUTICS

RESEARCH PUBLICATIONS

DR. R. NARAYANA CHARYULU, Professor

1. Formulation and Evaluation of Acyclovir Matrix Tablet using Mucoadhesive Polymer. *Journal of Drug Delivery and Therapeutics* 2013; 3(5): 52-57
2. Formulation and Evaluation of Felodipine Transdermal Patches. *International Journal of Universal Pharmacy and Bio Sciences* 2013; 2(4)
3. *In-vitro, Ex-vivo and In-Vivo* Evaluation of Transdermal

Delivery of Felodipine. *Journal of Pharmaceutical Research* Apr-Jun 2013; 12(2): 53-60

4. Effect of Combination of HPMC and Carbopol 934P on the properties of the Gastric Floating Tablets of Timolol Maleate. *Journal of Drug Delivery and Therapeutics* 2013; 3(4): 20-25

DR. MARINA KOLAND, Professor

1. Investigation of the *ex vivo* and *in vivo* iontophoretic delivery of aceclofenac from topical gels in Albino rats. *Int J Pharma Investig* 2013; 3: 105-11.
2. Preparation and evaluation of lipid vesicles of camptothecin as targeted drug delivery system. *Pak J Pharm Sci* 2013; 26(4): 779-86

MRS. NISHA GIRISH SHETTY, Assist. Professor

1. Design, Development and Evaluation of Antiviral Drug Loaded Microcapsules Prepared by Microencapsulation Technique Research. *Journal of Pharmaceutical, Biological and Chemical Sciences* Jul-Sep 2013; 4(3): 585-595
2. A Study on Stability and *In Vivo* Drug Release of Naphazoline and Antazoline In Situ Gelling Systems for Ocular Delivery. *International Journal of Bio Sciences* 2013; 4(1): 161-171

Antibiotic Resistant Pathogens – The Case of Methicillin Resistant *Staphylococcus Aureus* (MRSA)

Dr. Vijaya C Doddangoudar
Assistant Professor
Department of Pharmaceutics

The golden era of antibiotics began in 1929 with Alexander Fleming's observation that the mold, *Penicillium* inhibited the growth of bacteria. Based on this foundation the modern chemotherapy expanded and many antibiotics were discovered and produced from both natural and synthetic sources.

Initially, antibiotics were considered to be magic drugs as they were effective in curing fatal infections such as tuberculosis and pneumonia. However, recently many antibiotics have become less effective due to their imprudent use which has contributed towards the development of antibiotic resistant pathogens.

Antibiotic resistance can occur via natural selection through random mutation or by an evolutionary stress on a population. Once a resistant gene is generated, the gene confers resistance to a set of antibiotics. Bacteria can acquire these genes by horizontal transfer by plasmid exchange and these genes are passed to their offspring, which will be resistant to antibiotics.

Studies have demonstrated that usage pattern of antibiotics have greatly influenced the development of resistant strains. If a strain carries several resistance genes, it is called as multi-resistant or, informally, a superbug. For example, overuse of broad-spectrum antibiotics, such as second- and third-generation cephalosporins, has significantly contributed towards the development of methicillin resistant *Staphylococcus aureus* (MRSA). Other factors contributing towards resistance include incorrect diagnosis, unnecessary prescriptions, improper use of antibiotics by patients, and the use of antibiotics as livestock growth promoters.



Antibiotic resistant bacteria are much harder to control than their predecessors were. The first penicillin resistance *Staphylococcus aureus* was reported in 1947, just four years after the drug was introduced into market. Later synthetic penicillin such as methicillin and oxacillin were introduced; soon MRSA was first reported in Britain in 1961 and is now a worldwide problem.

Most of MRSA strains are resistant to upto eight antibiotics leaving vancomycin as a drug of choice. However, wide use of vancomycin has lead to emergence of vancomycin non-susceptible strains (VISA), first detected in Japan in 1996. Since then VISA has been reported worldwide including India.

Only two new antibiotics have been introduced in recent past years i.e. linezolid and daptomycin and their effectiveness against MRSA was comparable to vancomycin, but are expensive and restricted to treat only selected infections. In addition to that linezolid and daptomycin resistance in MRSA

has been reported, suggesting the urgent need of new antibiotics that will be effective against MRSA.

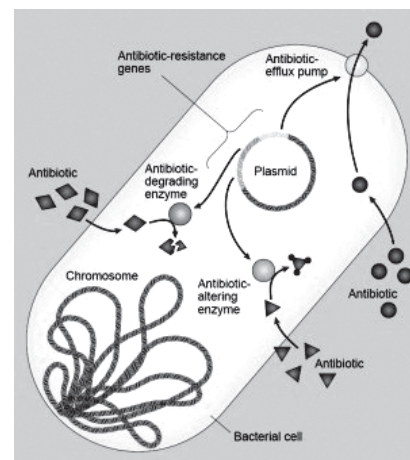
Evolutionary theory had predicted the development of antibiotic resistance, naturally and also due to antibiotic pressure. But evolutionary theory also indicates some specific strategies for delaying the development and spread of antibiotic resistant strains. These strategies include:

- 1. No antibiotics to treat viral infections:** Antibiotics are effective against bacteria, but not against viruses. If antibiotics are used in treatment of common cold or flu, it will not kill the viruses, but will act as a selective pressure on bacteria in the body, inadvertently selection of antibiotic resistance in bacteria.
- 2. Avoid ineffective doses of antibiotics over long time periods:** If an infection needs to be treated with antibiotics, a short-term, effective dose needs to be administered to inhibit the growth of the illness-causing bacteria, leaving no bacterial survivors. Any bacteria that survive a dose are likely to be somewhat resistant. Basically, it is an introduction of selective pressure (antibiotics) that makes the bacteria stronger.
- 3. Complete antibiotic dosage regimen:** Just as ineffective dose breeds resistance, an incomplete regimen of antibiotics leads to antibiotic resistance.
- 4. No use of antibiotics on livestock:** Use of antibiotics in livestock leads to the evolution of resistant strains in livestock pathogen. Later, may get transmitted to humans through occupation or food.

Ultimately, understanding evolution in *Staphylococcus aureus* should help us to control further resistance development and spread, prolonging the usefulness of currently available antibiotics.

Reference :

- Howden BP, Davies JK, Johnson PDR, Stinear TP, Grayson ML: Reduced Vancomycin susceptibility in *Staphylococcus aureus*, including vancomycin-intermediate and heterogeneous vancomycin-intermediate strains: resistance mechanisms, laboratory detection, and clinical implications. *Clinical Microbiology Reviews*. 2010; 23: 99–139.
- <http://www.cdc.gov/drugresistance/threat-report-2013/>



Mechanisms of Antibiotic Resistance in Bacteria

HETEROCYCLIC COMPOUNDS AND THERAPEUTIC APPLICATIONS

Dr. B.C. Revanna Siddappa

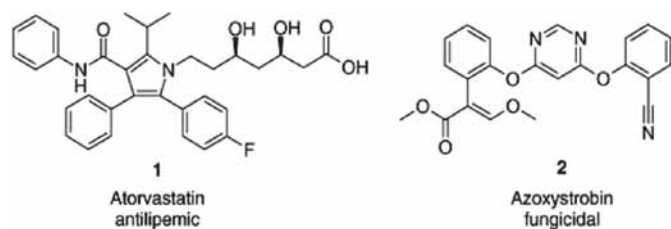
Assist. Professor

Department of Pharmaceutical Chemistry

Synthetic organic chemistry has attracted many researchers specially the organic chemists and many pharmaceutical industries. The heterocyclic compounds have received considerable attraction because of their wide variety of activities exhibited by these classes of compounds. Generally the heterocyclic molecules contain atoms like Nitrogen, Oxygen, Sulphur, etc., within their ring systems or on their side chains are found to possess various biological activities which are clinically significant.

Heterocyclic compounds occur largely in nature and in a variety of non-naturally occurring compounds. A large number of heterocyclic compounds are essential to life. Various compounds such as alkaloids, antibiotics, essential amino acids, the vitamins, haemoglobin, hormones, and dyes contain heterocyclic ring systems.

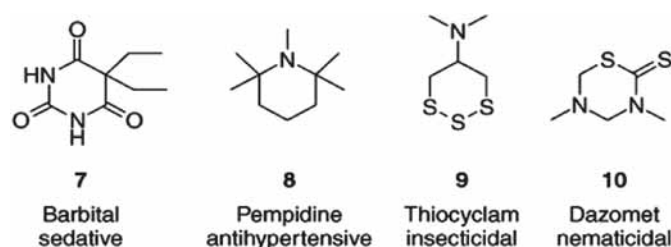
According to the definition, heterocyclic family is built from at least three compounds that fulfill the following conditions: (i) same heterocyclic scaffold, (ii) same mode of action, and (iii) similar substitution pattern.



Another important role of the heterocyclic core of several pharmaceuticals and agrochemicals is that of an easily accessible scaffold, which carries the substituents that are responsible for the biological activity in the right orientation

Approximately more than 70% of all pharmaceuticals and agrochemicals bear at least one heterocyclic ring. In addition, some of the biggest commercial products to date, such as the blockbuster blood cholesterol reducer Atorvastatin (for the treatment of dyslipidemia and the prevention of cardiovascular diseases and the broad-spectrum fungicide Azoxystrobin, currently applied against diseases of more than 100 different crops in more than 100 different countries, belong to this huge heterocyclic group of active ingredients.

Even simple aliphatic heterocycles display astonishing biological activities. The gem-diethyl-substituted barbituric acid derivative Barbitol (7) has been widely applied as a sleeping



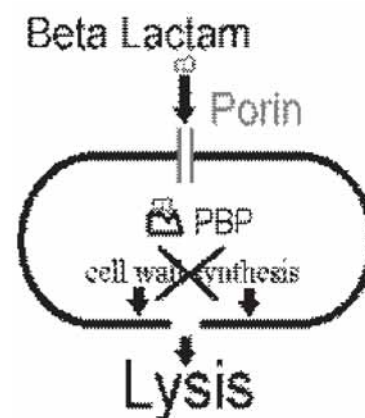
aid. The pentamethylated Piperidine pempidine (8) is used as a ganglionic blocker. The saturated bioactive heterocycles Barbitol (7), Pempidine (8), Thiocyclam (9), and Dazomet (10)

The efficacy of several heterocyclic active ingredients is based on the fact that the heterocycle is acting as a prodrug. Leflunomide is a prodrug against transplant rejection, which ring-opens quantitatively in the cellular system to the Hydroxypropenamide, which is responsible for the immunosuppressive efficacy.

Heterocyclic compounds as antimalarials: Malaria is one of the most serious, complex and refractory malady facing humanity this century. Some 300-500 million of world's population are infected by the disease, presenting 120 million clinical cases annually.

Primaquine is the drug of 8-aminoquinoline class, which is connected to amino acids by forming peptide bond to the amino group. These amino acid derivatives are known for higher activity and lower toxicity.

Heterocyclic compounds as antineoplastic agents: Cancer is a major human health problem worldwide and is the second leading cause of death in United States. Different types of antineoplastic agents are developed, which include nitrogen mustards (Bendamustine), tyrosine kinase inhibitors, 26S proteasome inhibitors etc. The quinazoline derivative drugs like Erlotinib, and Lapatinib are also important tyrosine kinase inhibitors.



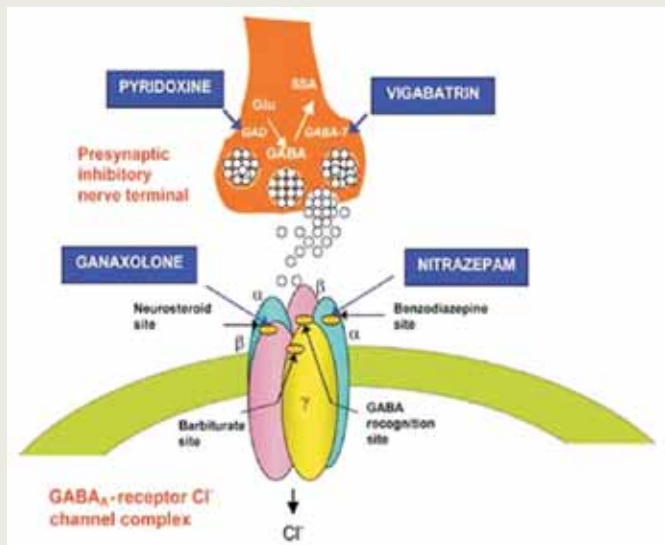
Mechanism of action of Penicillins

Heterocyclic compounds as antidepressants: An antidepressant is a psychiatric medication used to alleviate mood disorders, such as major depression, and dysthymia. Paroxetine, Reboxetine, are some of most useful antidepressants containing heterocyclic moiety.

Heterocyclic compounds as Diuretic agents: Diuretics are medicines that help reduce the

amount of water in the body. Acetazolamide is a potent carbonic anhydrase inhibitor, effect in the control of fluid secretion in the treatment of certain Convulsive disorder.

Heterocyclic compounds as anthelmintic: Helminthes are parasitic worms, which infect an estimated two billion people worldwide, nearly all in poor developing tropical or semitropical countries. Benzimidazole, Pyrazine, Isoquinoline, Tetrahydropyrimidine, Tetrahydro Quinolone, Piperidine,



Mechanism of action of Barbiturates

Piperazine, Triazoles, Indoleisoxazole derivatives are the different types of heterocyclic used as anthelmintics. Albendazole is the most active benzimidazole anthelmintic drug.

The alkaloids form a major group of naturally occurring heterocyclic compounds having varied biological activity. Most alkaloids contain basic nitrogen atoms. Ergotamine, the indole based alkaloid exhibits antimigraine activity. Cinchonine, a quinolone class of alkaloid shows antimalarial activity.

Conclusion:

Most of the heterocyclic compounds will be present in the available marketed pharmaceutical products. The presence of these compounds will influence the various biological systems and finally help in the prevention of various diseases.

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1. Joule, J.A. and K. Mills, 2000. Heterocyclic Chemistry, 4th Ed., Blackwell Publishing, pp: 369.
2. Butler. R. N. In Comprehensive Heterocyclic Chemistry; Katritzky A.R, Ress C.W and Scriven .E.F.V, Pergamon: Oxford, U.K., Vol. 4, pp-621

Orientation program for B.Pharm, M.Pharm and Pharm. D students



Blood Donation Camp - September 25, 2013



Vanamahotsava - September 24, 2013



Onam Celebrations, September 12, 2013



Book Post