



Rxplora

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HIGHLIGHTS



Leisure Reading



Institutional Activities

- Independence Day
- Field visit
- World Pharmacist Day
- GLP Seminar
- NGPL 6
- NEMFEST
- BLS Training



Achievements

- Articles (Research/Review): 11
- Patents : 1



Upcoming Events

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COVER ARTICLE

Menace of Drug Abuse and Substancesan alarming wake up call.

Dr. Sanjay D. Sawant, Director, Regional Institute of Paramedical and Nursing Sciences, Aizawl, Mizoram. Email: drsdsawant69@gmail.com



OUR VISION

NGI wants to see a world which is full of competent individuals, with enlightened eyes, at the highest level of success, to visualize about an education system that brings out the best from the thriving students, so that tomorrow they can make a healthy contribution towards the mankind.



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EDITORIAL MESSAGE

We are thrilled to bring you the latest edition of RxPLORE, the newsletter of NETES Institute of Pharmaceutical Science, Mirza, Assam. In this issue, we are delighted to share with you some remarkable achievements and activities that have marked another period of growth and excellence for our institute.

INSTITUTE ACHIEVEMENTS:

- **Articles (Research/Review): 11**
- **Patent Applied: 1**

INSTITUTE ACTIVITIES:

- **Workshop about GLP**
- **National Conference on “Northeast India’s Traditional Wisdom: Bridging The Past and The Present Through Knowledge Systems, Health Practices, Agriculture, Art, and Conservation”**
- **Industrial visit**
- **Hands on Training on Basic Life Support (BLS)**

These accomplishments and activities are a testament to the dedication and hard work of our entire NETES Institute of Pharmaceutical Science community. We are proud of our collective achievements and are excited about the opportunities that lie ahead.

We look forward to your continued support and involvement as we strive to make a lasting impact in the fields of research and education. Please stay connected with us through our various events and initiatives, and feel free to reach out with your feedback and ideas.

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COVER ARTICLE

MENACE OF DRUG ABUSE AND SUBSTANCES AN ALARMING WAKE UP CALL.



Dr. Sanjay D. Sawant,

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Preamble:

Recently, I had an opportunity to talk on Drug Abuse in an International Conference on Emerging Trends in Psychological Interventions organized by Mizoram University in Nov 2023 and I was shocked by some of the statistics that I came across while preparing for the talk. This has actually prompted me to write this article. Being a teacher of Medicinal Chemistry, if even 10% of the readers of this article remain away from drugs and related substances throughout their life, purpose of writing this article shall be served.

What are abused Drugs and Substances.

Certain drugs and substances, which are consumed for pleasure, euphoria, energy, stamina, muscle building, enhancing sexual performance etc. in excessive dose & duration, misused and consumed illegally & without authorization is considered as drug abuse. This doesn't include drugs prescribed by registered medical practitioners for their patients for the treatment of diseases or disorders.

It is well established that chronic use of these drugs and substances lead to physical, social and emotional issues such as drug dependence, addiction, health complications, impairment in psychological and social functioning. Drug addiction has devastated life & career of users and their families.

Commonly abused Drugs and Substances.

The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has made following ten classes of these drugs and substances.

1. Alcohol (Beer, Wine, Spirits/IMFL, Country liquor)
2. Caffeine (Tea, Coffee, beverages, medicines and supplements)
3. Cannabis/Marijuana (Dried cannabis, pre-rolled extracts, beverages and edibles)
4. Hallucinogens (LSD, Mescaline, Psilocybin, PCP, Ecstasy, Ketamine)
5. Inhalants (Paint thinners, gasoline, Nitrous oxide, Shoe polish)
6. Opioids (Opium poppy latex, Codeine, Fentanyl, Methadone, Oxycodone, Dextromethorphan, Propoxyphene)
7. Sedatives/Hypnotics:
8. Anxiolytics/Benzodiazepines (Alprazolam, Diazepam, Lorazepam, Chlordiazepoxide)
9. Stimulants (Amphetamine, Methamphetamine, Methylphenidate, Mephedrone)
10. Tobacco (Cigarette, bidi, tobacco for chewing in the pan, pan masalas)

Drug Addiction Cycle:

There is no single cause for drug addiction. Combination of genetic risk factors, personality traits, surrounding environment, curiosity of drugs to taste drugs and to derive pleasure out of it, peer pressure specially amongst youth are some of the reasons of drug addiction. Once exposed to these drugs/substances, the brain's reward systems reinforce drug use resulting in repeated use and thus the addiction. Following schematic may help understand the drug addiction cycle.

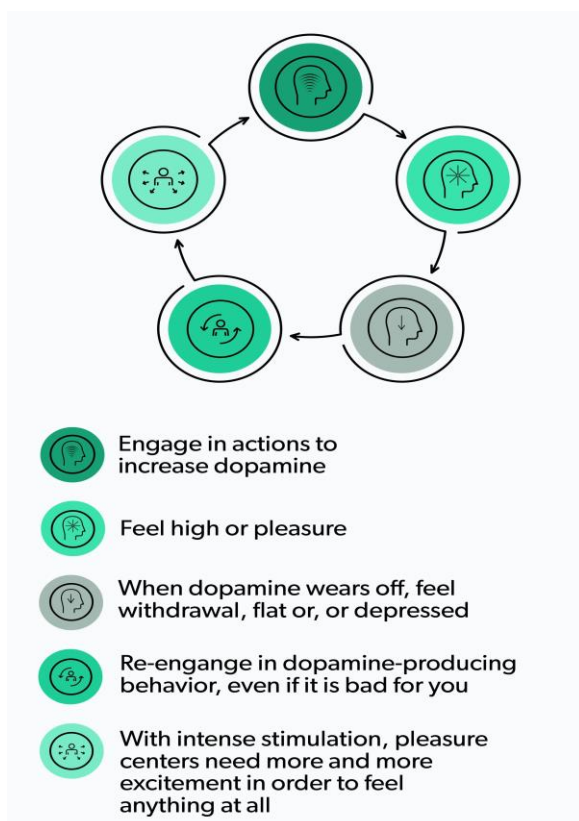


Fig. 1: Drug Addiction Cycle

Indian Scenario: Drugs and Substance Abuse:(A NDDTC, AIIMS, New Delhi Study Report - 2019)

Following brief data on various drugs and substances shall help understand number of uses in the country and population that needs medical/psychological interventions as well as awareness programs required to address the issues.

1. Alcohol

India constitutes around 16 crore alcohol users between age group of 10-75 years i.e. 14.6% of the total population, out of which around 5.6 crore are considered as problem users and 2.9 crore are dependent users. For every woman, there are 17 men consumers of alcohol in the country.

- 27.3% Men (above 18 years)
- 1.6% Women (above 18 years)
- 1.7% Children (between 10-17)
- 17.1% Adults (above 18 years)

Top five highest prevalence states of alcohol users in the country are:

- | | |
|-------------------------|----------------------------|
| 1. Chhattisgarh (35.6%) | 2. Tripura (34.7%) |
| 3. Punjab (28.5%) | 4. Arunachal Pradesh (28%) |
| 5. Goa (26.4%) | |

Out of current total alcohol users, 18.5% constitute to dependent users and following states are top four states in this category.

- | | |
|---------------------------|-----------------------|
| 1. Puducherry (48.3%) | 2. Punjab (44%) |
| 2. Andhra Pradesh (43.5%) | 3. Karnataka (40.3%). |

Overall prevalence of current use of alcohol is lower in the states where alcohol use is prohibited as per law, a substantial proportion of alcohol users in these states fall in the category of harmful or dependent alcohol use (Gujarat-30%; Bihar-16%; Manipur-17%; Nagaland-20%).

Following are top 10 states, whose population need help for alcohol problem users:

- | | |
|-------------------|---------|
| 1. Uttar Pradesh | : 160 L |
| 2. Andhra Pradesh | : 47 L |
| 3. Tamil Nadu | : 37 L |
| 4. Madhya Pradesh | : 31 L |
| 5. Maharashtra | : 30 L |
| 6. West Bengal | : 27 L |
| 7. Punjab | : 27 L |
| 8. Chhattisgarh | : 24 L |
| 9. Odisha | : 21 L |
| 10. Karnataka | : 20 L |
| All Other States | : 146 L |

2. Cannabis

Cannabis users in the country in year 2018 were around 3.1 crore i.e. 2.8% of the total population.

- Legal form of Cannabis (Bhang) : 2.2 Crore (2%)
- Illegal form of Cannabis : 1.3 crore (1.2%)
(Ganja & Charas)
- Problem Users : 72 Lakhs (0.66%)
- Dependent Users : 25 Lakhs (0.25%)

Top five highest cannabis user prevalence states are:

- | | |
|------------------|-----------------|
| 1. Uttar Pradesh | 2. Punjab |
| 3. Sikkim | 4. Chhattisgarh |
| 4. Delhi | |

3. Opioids

Total opioid users in the country are 2.3 crore i.e. 2.1% of the total population, out of which Problem Users are 77 lakhs and Dependent Users are 28 lakhs.

Following types is the classification of opioid uses.

- | | |
|--|--------------------|
| 1. Heroin (including smack or brown sugar) | : 63 lakhs (1.14%) |
| 2. Pharmaceutical opioids | : 25 lakhs (0.96%) |
| 3. Opium and its variants like poppy husk
known as doda/phukki) | : 11 lakhs (0.52%) |

Top five highest prevalence states (%) are

- | | |
|----------------------------|------------------|
| 1. Mizoram (6.9) | 4. Sikkim (5.1) |
| 2. Nagaland (6.5) | 5. Manipur (4.0) |
| 3. Arunachal Pradesh (5.7) | |

4. Sedatives: (non-medical, non-prescription users)

Total sedative users in the country are 1.18 crore i.e. 1.08 % of the total population, out of which, sedatives users in dependent pattern are 11.8 lakhs.

Top four highest prevalence states are

- | | |
|-------------|------------|
| 1. Sikkim | 3. Manipur |
| 2. Nagaland | 4. Mizoram |

Whereas top five user states are

- | | |
|------------------|-------------------|
| 1. Uttar Pradesh | 4. Andhra Pradesh |
| 2. Maharashtra | 5. Gujrat |
| 3. Punjab | |

5. Inhalants:

Total inhalant users in the country are 77 lakhs i.e. 0.7% of the population, out of which Problem Users are 22 lakhs whereas, Dependent Users are 8.5 lakhs. Adult users are 51 lakhs while Children users are 26 lakhs.

6. Cocaine:

Total cocaine users in the country are 10.7 lakhs i.e. 0.10% of the population out of which Harmful and dependent Users are 3.2 lakhs.

Top four states of cocaine users are

- | | |
|----------------------|-------------------|
| 1. Maharashtra (90K) | 2. Punjab (27K) |
| 3. Rajasthan (10K) | 4. Karnataka (8K) |

7. Amphetamine Type Stimulants (ATS)

Total Amphetamine type Stimulant (ATS) users are 19.4 lakhs i.e. 0.18% of the population, out of which harmful and dependent users are 7.0 lakhs.

Top five states of ATS users are

- | | |
|-------------------------|---------------------|
| 1. Maharashtra (5.3L) | 2. Telangana (2.4L) |
| 3. Uttar Pradesh (1.7L) | 4. Punjab (1.6L) |
| 5. Manipur (1.4L) | |

8. Hallucinogens (0.12%)**Challenges in Drug and substance Abuse**

1. Drugs and opium trafficking across international borders.
2. Indigenous illegal manufacturing of synthetic drugs such as mephedrone, amphetamine etc.
3. Alcohol, cigarette smoking, party culture becoming social norm.
4. Adolescents often become victims of advertisements of cigarette smoking.
5. Poor implementation of regulations by enforcement agencies
6. Youths opting for pleasure and also for making money due to inadequate job opportunities in certain parts of the nation.
7. Reach of the national programmes for treatment of substance use disorders is grossly inadequate.

For example:

Alcohol Dependents:

- a. Treatment Received : 25% (Hospitalization: 21% and other treatment: 79%)
- b. Treatment Not Received : 75%

Drug Dependents

- a. Treatment Received : 25% (Hospitalization: 44% and other treatment: 56%)
- b. Treatment Not Received : 75%

Interventions

1. Scientific evidence-based treatment at an adequate scale.

1. India needs massive investments in enhancing the avenues for treatment.
2. Enhancing treatment services as outpatient clinics with necessary trained human resources, infrastructure, medicines and supplies, a system of monitoring and mentoring is urgently required. Current De-addiction Centers caters to only hospitalized patients.
3. Scaling up of treatment services for substance use disorders would also require large-scale capacity building mechanisms.

2. Evidence-based substance use prevention programmes.

Prevention programmes must address the risk and protective factors aimed at not just preventing substance use, but also ensuring that young people grow and stay healthy into adulthood, enabling them to realize their potential and become productive members of their community and society.

Examples

1. Caring School Community Program: This is a universal family plus school program to reduce risk and strengthen protective factors among elementary school children.
2. Guiding Good Choices (GGC): This curriculum was designed to educate parents on how to reduce risk factors and strengthen bonding in their families.
3. Life Skills Training (LST) Program: LST is a universal program for middle school students designed to address a wide range of risk and protective factors by teaching general personal and social skills, along with drug resistance skills and education

4. Lions-Quest Skills for Adolescence (SFA): It is a commercially available universal life skills education program for middle school students in use in schools
5. Promoting Alternative Thinking Strategies (PATHS) It is a comprehensive program for promoting emotional health and social skills.
6. Adolescents Training and Learning to Avoid Steroids (ATLAS): It is a selective program for male high school athletes, designed to reduce risk factors for use of anabolic steroids and other drugs, while providing healthy nutrition and strength-training alternatives to illegal use of athletic-enhancing substances.

3. A conducive legal and policy environment is needed to help control drug problems

1. Laws and policies are to be more aimed at providing health and welfare services to people affected by substance use rather than subjecting them to the criminal justice system.
2. There is a need of fresh thinking and innovative solutions as far as legal and policy measures aimed at drug supply control are concerned.
3. Need of efficient coordination between the drug supply control sector as well as the entities involved in “Drug Demand reduction and Harm reduction”

4. The approach of generating and utilizing scientific evidence must continue.

A Way Forward

1. Urgent need of policies and programmes which can bring relief to the large number of affected Indian citizens.
2. These policies and programmes should be based upon scientific evidences and in consideration with local, socio-cultural context.

ARTICLES IN FOCUS

NOVEL EXTRACTION METHODS FOR EXTRACTION OF BIOACTIVE COMPOUNDS

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NITS, Mirza

Bioactive Compounds are secondary metabolites produced by plant cells. They have a multitude of properties like antimicrobial, anticancer, antioxidant, antiaging etc. For extraction of these compounds, various novel methods are used which have many benefits over traditional extraction methods like efficiency, being environmentally friendly, higher yield of extraction, better quality of extracted compounds etc. Some of these methods are:

1. Pulsed Electric Field (PEF):

PEF uses a high-voltage electric field (100–300 V/cm) applied in pulses (1 microsecond to 1 millisecond) to target materials. Two hypotheses explain its mechanism: enhancing solubility through increasing rate of chemical reactions and creating hydrophilic pores (electroporation), releasing bioactive compounds. High-voltage microsecond pulses improve recovery rates without compromising substance quality.

2. Microwave-Assisted Extraction (MAE):

MAE utilizes microwaves at 2.45 GHz, generating heat through ionic conductivity and dipolar rotation. The internal water within plant cells is heated by the microwave, increasing pressure and breaking cell walls to release bioactive compounds. MAE offers uniform heat application and precise temperature control.

3. Ultrasound-Assisted Extraction (UAE):

UAE employs acoustic waves with a frequency >20,000 Hz. Specific frequencies and amplitudes create cavitation bubbles in the solvent near cell walls, generating high temperature and pressure that break cell walls and release metabolites. Two types are Bath type and Probe type. It has a unique advantage of generating minimal heat to prevent bioactive compound losses.

4. Supercritical Fluid Extraction (SFE):

SFE uses supercritical fluids beyond the critical condition, isolating specific molecules without concentration steps. Supercritical CO₂, often used, has a critical point at 31 °C and 74 bar (7.4 MPa) pressure. SFE's advantage over liquid-based methods is that the solvent becomes a gas after extraction, conveniently concentrating analytes.

5. Pressurized Liquid Extraction (PLE):

PLE applies pressure and temperature, heating the solvent above its boiling point for enhanced extraction efficiency. Utilizing temperatures up to 200°C and pressures of 3.5-20 MPa, PLE improves solubility, reduces viscosity, enhances penetration into plant cells, and decreases solute-matrix interactions, albeit with reduced solute selectivity.

References

1. <https://doi.org/10.1016/j.trac.2023.117410>
2. <https://www.mdpi.com/1420-3049/28/2/887>
3. <https://www.mdpi.com/2227-9717/10/10/2014>

TONGUE TWISTERS

Rubi Das

Lecturer, Department of Allied Health Science, NGI

1. If you understand, say “understand”.
If you don’t understand, say “don’t understand”.
But if you understand and say “don’t understand,”
how do I understand that you understand?
Understand!
2. I wish to wish the wish you wish to wish,
but if you wish the wish the witches wish,
I won’t wish the wish you wish to wish.
3. If two witches were watching two witches ,
which witch would watch which witch?

ROBOT BASED DRUG DELIVERY

Rubi Das

Lecturer, Department of Allied Health Science, NGI

Chinese scientists launched a microscopic swimming robot which can deliver drugs in clear arteries in humans. The three-millimetre-long triangular machine was constructed by Tao Mei of the Chinese Academy of Sciences. The craft is propelled using an external magnetic field

which controls its microscopic fins. The fins are made from an alloy that contract in response to application of the field. Applying the field quickly makes the tiny submersible paddle forwards and gradually switching the field off slowly moves the fins back to their original position. Remote -controlled swimming machines could be used to deliver drugs to a particular part of the human body, through the blood stream.

Do you know?

-A blind worm is neither blind nor is it a worm. It is a lizard and has two noticeable eyes.

-Flying foxes are not foxes. They are large bats.

-*Hypsibius dujardini* are the microscopic water bear resemble bears and walk on eight tiny legs.

-The bacterium *Porphyromonas gingivalis* causes bad breath and gum disease, so make sure to brush and floss regularly to keep it in check.

-The human papillomavirus is a DNA virus surrounded by a circular capsid. This virus causes small tumours called papilloma that appear as warts. If left untreated, those tumours can become cancerous.

The human papillomavirus spreads by direct contact and is one of the most common sexually transmitted diseases worldwide. A vaccine is available to prevent infection from the major cancer-associated human papillomavirus types.

-The bacterium *Anabaena* known as cyanobacteria is the major source of oxygen supply to the atmosphere. This bacteria are even more interesting since some of their cells have special superpowers. This so-called heterocyst can “fix” nitrogen.

-*Clostridium botulinum*, the bacteria produce a neurotoxin known for causing botulism or commonly Clostridium food poisoning. But that same toxin is also a component of Botox. Just another way we use microbes for good.

CEREBROSPINAL FLUID LEAK

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To understand CSF leak, we first have to know what is CSF.

What is CSF?

Cerebrospinal fluid (CSF) is a clear, colourless body fluid found within the tissue that surrounds the brain and spinal cord of all vertebrates.

CSF is produced by specialised ependymal cells in the choroid plexus of the ventricles of the brain, and absorbed in the arachnoid granulations. There is about 125 mL of CSF at any one time, and about 500 mL is generated every day. CSF acts as a shock absorber, cushion or buffer, providing basic mechanical and immunological protection to the brain inside the skull. CSF also serves a vital function in the cerebral auto regulation of cerebral blood flow.

What is CSF Leak?

A cerebrospinal fluid leak (CSF leak or CSFL) is a medical condition where the cerebrospinal fluid (CSF) surrounding the brain or spinal cord leaks out of one or more holes or tears in the dura mater. A cerebrospinal fluid leak can be either cranial or spinal, and these are two different disorders. A spinal CSF leak can be caused by one or more meningeal diverticula (abnormal outpouchings of the arachnoid, the nerve root sheath or the common dural sac) or CSF-venous fistulas (an abnormal connection between artery and the vein) not associated with an epidural leak.

Symptoms:-

- Extremely painful orthostatic headache or thunderclap headache
- Neck pain or stiffness
- Photophobia
- Brain fog or difficulties with concentration
- Neuralgia
- Facial numbness or weakness

Diagnosis:-

Diagnosis of CSF leakage can be done by various imaging techniques, chemical tests of bodily fluid discharged from a head orifice, or clinical examination.

- ❖ **CT:** - Diagnosis of a cerebrospinal fluid leak is performed through a combination of measurement of the CSF pressure and a computed tomography myelogram (CTM) scan of the spinal column for fluid leaks. The opening fluid pressure in the spinal canal is obtained by performing a lumbar puncture, also known as a spinal tap. Once the

pressure is measured, a radiocontrast agent is injected into the spinal fluid. The contrast then diffuses out through the dura sac before leaking through dural holes. This allows for a CTM with fluoroscopy to locate and image any sites of dura rupture via contrast seen outside the dura sac in the imagery.

- ❖ **MRI:** - MRI studies may show pachymeningeal enhancement (when the dura mater looks thick and inflamed), sagging of the brain, pituitary enlargement, subdural hygromas, engorgement of cerebral venous sinuses, and other abnormalities. Contrast-enhanced brain MRI with sagittal reformats can assess for the following:
 - Subdural fluid collections
 - Enhancement of the meninges
 - Engorgement of venous structures
 - Pituitary swelling
 - Sagging of the brain

- ❖ **Assay:** - Fluid dripping from the nose (CSF rhinorrhoea) or ears (CSF otorrhea) should be collected and tested for the protein beta-2 transferrin which would be highly accurate in identifying CS fluid and diagnosing a cranial CSF leak.

- ❖ **Myelography:** - A myelogram can be used to more precisely identify the location of a CSF leak by injecting a dye to further enhance the imaging. CSF leaks are frequently not visible on imaging. For patients with recalcitrant spontaneous intracranial hypotension and no leak found on conventional spinal imaging, digital subtraction myelography, CT myelography and dynamic myelography (a modified conventional myelography technique) should be considered to rule out a CSF-venous fistula.[70][5] In addition, presence of a hyperdense paraspinous vein should be investigated in imaging as it is highly suggestive of a CSF venous fistula.

Treatment:-

Symptomatic treatment usually involves analgesics for both cranial and spinal CSF leaks. Initial measures can include rest, caffeine intake (via coffee or intravenous infusion), and hydration. Corticosteroids may provide transient relief for some patients. An abdominal binder, which increases intracranial pressure by compressing the abdomen, can temporarily relieve symptoms for some people. Sometimes a CSF leak will heal on its own. Otherwise, symptoms may last months or even years.

- ❖ **Fibrin glue sealant:** - If blood patches alone do not succeed in closing the dural tears, placement of percutaneous fibrin glue can be used in place of blood patching, raising the effectiveness of forming a clot and arresting CSF leakage.
- ❖ **Surgical drain technique:** - In extreme cases of intractable CSF leak, a surgical lumbar drain has been used. This procedure is believed to decrease spinal CSF volume while

increasing intracranial CSF pressure and volume. This procedure restores normal intracranial CSF volume and pressure while promoting the healing of dural tears by lowering the pressure and volume in the dura. This procedure has led to positive results leading to relief of symptoms for up to one year.

- ❖ **Neurosurgical repair:** - Surgery to treat a CSF-venous fistula in CSF leak patients is highly effective. Neurosurgery is available to directly repair leaking meningeal diverticula. The areas of dura leak can be tied together in a process called ligation and then a metal clip can be placed in order to hold the ligation closed. Alternatively, a small compress called a pledget can be placed over the dura leak and then sealed with gel foam and fibrin glue. Primary suturing is rarely able to repair a CSF leak, and in some patients exploration of the dura may be required to properly locate all sites of CSF leak.
- ❖ **Adjunct measures:** - The use of antibiotics to prevent meningitis in those with a CSF leak due to a skull fracture is of unclear benefit.

HAS ANYONE SEEN A NEW ANTIBIOTIC?

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Antibiotics are used to treat or prevent some types of bacterial infection. They kill bacteria or prevent them from reproducing and spreading. Antibiotics aren't effective against viral infections. This includes the common cold, flu, most coughs and sore throats. Antibiotics aren't routinely prescribed for mild bacterial infections. This is because the immune system can usually clear these on its own.

WHEN ARE ANTIBIOTICS USED?

Antibiotics may be used to treat bacterial infections that:

- are unlikely to clear up without antibiotics
- could infect others unless treated
- could take too long to clear without treatment
- carry a risk of more serious complications

ANTIBIOTIC RESISTANCE

Antimicrobial resistance happens when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them. That means the germs are not killed and continue to grow. Resistant infections can be difficult, and sometimes impossible, to treat.

Antimicrobial resistance is an urgent global public health threat, killing at least 1.27 million people worldwide and associated with nearly 5 million deaths in 2019. Antimicrobial resistance has the potential to affect people at any stage of life, as well as the healthcare, veterinary, and agriculture industries. This makes it one of the world's most urgent public health problems. According to the latest survey, this number could dramatically rise to 10 million by 2050 if timely action was not taken.

Ceftriaxone, among the most prescribed antibiotics in hospitals across India, is a drug with high potential to cause antimicrobial resistance. This result was deduced from a survey across 15 states. Ceftriaxone is usually prescribed to patients with bacterial meningitis, respiratory tract infections, urinary tract infections, soft tissue infections of the bone and joints, and gonorrhoea. Apart from being effective and safe, it is also associated with fewer side effects — except for diarrhoea in some cases — and is not a concern for the majority of the patients consuming it.

The first-of-its-kind survey, released by the Union health ministry's National Centre for Disease Control (NCDC), showed that 57 percent of the antibiotics prescribed in hospitals had high potential to cause antimicrobial resistance, which the World Health Organization (WHO) listed in 2019 as one of the top 10 threats to public health.

The Indian Council of Medical Research (ICMR) annual report of 2021 found that *Klebsiella pneumoniae*'s susceptibility to Imipenem has decreased from 65% in 2016 to 43% in 2021, while *Escherichia coli*'s susceptibility to imipenem has decreased from 86% in 2016 to 64% in 2021.

Bacteria and fungi do not have to be resistant to every antibiotic or antifungal to be dangerous. Resistance to even one antibiotic can mean serious problems. For example:

- Antimicrobial-resistant infections that require the use of second- and third-line treatments can harm patients by causing serious side effects, such as organ failure, and prolong care and recovery, sometimes for months.
- Many medical advances are dependent on the ability to fight infections using antibiotics, including joint replacements, organ transplants, cancer therapy, and the treatment of chronic diseases like diabetes, asthma, and rheumatoid arthritis.
- In some cases, these infections have no treatment options.

HOW AN ANTIBIOTIC BECOMES RESISTANT?

Resistance Mechanisms (Defense Strategies)		Description
Restrict access of the antibiotic		<p>Germs restrict access by changing the entryways or limiting the number of entryways.</p> <p>Example: Gram-negative bacteria have an outer layer (membrane) that protects them from their environment. These bacteria can use this membrane to selectively keep antibiotic drugs from entering.</p>
Get rid of the antibiotic or antifungal		<p>Germs get rid of antibiotics using pumps in their cell walls to remove antibiotic drugs that enter the cell.</p> <p>Example: Some <i>Pseudomonas aeruginosa</i> bacteria can produce pumps to get rid of several different important antibiotic drugs, including fluoroquinolones, beta-lactams, chloramphenicol, and trimethoprim.</p> <p>Example: Some <i>Candida</i> species produce pumps that get rid of azoles such as fluconazole.</p>
Change or destroy the antibiotic		<p>Germs change or destroy the antibiotics with enzymes, proteins that break down the drug.</p> <p>Example: <i>Klebsiella pneumoniae</i> bacteria produce enzymes called carbapenemases, which break down carbapenem drugs and most other beta-lactam drugs.</p>
Change the targets for the antibiotic or antifungal		<p>Many antibiotic drugs are designed to single out and destroy specific parts (or targets) of a bacterium. Germs change the antibiotic's target so the drug can no longer fit and do its job.</p> <p>Example: <i>Escherichia coli</i> bacteria with the <i>mcr-1</i> gene can add a compound to the outside of the cell wall so that the drug colistin cannot latch onto it.</p> <p>Example: <i>Aspergillus fumigatus</i> changes the <i>cyp1A</i> gene so that triazoles cannot bind to the protein.</p>
Bypass the effects of the antibiotic		<p>Germs develop new cell processes that avoid using the antibiotic's target.</p> <p>Example: Some <i>Staphylococcus aureus</i> bacteria can bypass the drug effects of trimethoprim.</p>

A novel discovery strategy attempted to counteract this dearth of new discoveries by screening large synthetic compound libraries in conjunction with genome-based target identification, but the results did not live up to expectations.

WHAT OTHER OPTIONS EXISTS FOR DEVELOPING ANTIBIOTICS?

We should not discount the creativity and dedication of researchers around the globe, both in academia and in industry, to step up to such challenges. Consequently, there is no reason not to go back to nature and search for novel antibiotics of microbial origin. Given that only an extremely limited phylogenetic variety of microorganisms was studied in the past for their ability to produce antibiotics, our chances to find novel anti-infectives among the global microbial diversity are indeed high. Estimates predict that <1% of the global microbial diversity has so far been cultured. Novel methods for exploring the remaining 99% for antibiotic discovery have continuously been developed during the past decades and are one reason for our cautious optimism that we can meet the challenge of antimicrobial resistance.

INSTITUTIONAL ACTIVITIES

Independence Day celebration at NGI on 15 August, 2023.



Field Visit of Diploma 1st year students (2022-2024) held on 7th September 2023 at Government Ayurvedic College and Hospital, Guwahati.



World Pharmacist Day celebrated on 25th September 2023 and theme for this year was Pharmacist strengthening Health systems.



A National seminar on Good Laboratory Practice (GLP) was organised on 3rd October 2023 by Department of Pharmacology NIPS in collaboration with the Experimental Pharmacological Society (EPL) under the Indian Pharmacological Society (IPS) and the Association of Pharmaceutical Teachers of India (APTI Assam State Branch). The Event was graced by eminent speakers Prof. Bikash Medhi, PGIMER, Chandigarh and Dr Ajay Prakash PGIMER, Chandigarh



NGPL Season 6 was successfully held from 7th November till 9th November. There were more than **50 teams** came to participate from various regions of India.



Celebrated 7 incredible years of growth, learning, and service at **NEMCARE Group's foundation day** was truly a momentous occasion! The stage was graced by the esteemed presence of some remarkable dignitaries:

Dr. Ranoj Pegu - Honourable Minister of Education, Govt of Assam

Mr. Ranjeet Kumar Das - Honourable Minister of Panchayat and Rural Development, Food and Civil Supplies, and Consumer Affairs, Government of Assam

Mr. Hemang Thakuria - Member of the Assam Legislative Assembly

Dr. Hitesh Baruah - CMD NEMCARE Group

Dr. Sanjive Narain - CMF Prag News cum Director NHPL

Mr. Dharanidhar Baruah - Director NEMCARE Group

Mr. Ranajan Kr Deka - Director NEMCARE Group

Their presence added immense grace to the festivities, making our 7th foundation day truly special. The NEMFEST 2023 was an embodiment of our journey and dedication towards excellence in education and healthcare.



Basic Life Support Training for Faculty of NGI was held on 17th November by **Dr. Sashibha Barman**, Consultant and Head Department of Emergency and Trauma NEMCARE Super speciality Hospital.



Basic Life Support training given by the teams of faculty of NGI at different locations of Assam.



Darwin Academy, Mirza



BLS Training at Mangaldai



BLS Training at Nagarbera



BLS Training at Hajo

Pre Bhogali-Bihu celebration on 12 January, 2023 at NEMCARE Group of Institutions, in presence of all the students of NGI, Faculty members along with some of the reputed members of NGI Family.



FACULTY ACHIEVEMENTS

Dr. Bhargab Jyoti Sahariah, Principal, NIPS, Mirza,

had successfully presented his worthy oral presentation titled “The Antimicrobial Efficacy against Selective Microbes, Antioxidant Activity and Pharmacological Screening of *Bambina Vulgaris*” in the International Conference on 2nd Pharma Summit 2023: Drug Discovery and Community Trial" organized by Association of Pharmaceutical Research (APR) on 04th & 05th December 2023 at Dubai, UAE.



Dr. Koushik Nandan Dutta, Associate Professor, NIPS, Mirza,

had successfully presented his worthy oral presentation titled “Formulation and Development of Anti-Inflammatory Transdermal Patch Loaded with *Pogostemon benghalensis* Leaves Extract” in the International Conference on 2nd Pharma Summit 2023: Drug Discovery and Community Trial" organized by Association of Pharmaceutical Research (APR) on 04th & 05th December 2023 at Dubai, UAE.



Dr. Apurba Talukdar, Vice Principal, NIPS, Mirza;

had successfully presented his worthy oral presentation titled “Synthesis and Characterization of pH-Sensitive Hydrogels for Controlled Release of Didanosine by Free Radical Polymerization of Methacrylic Acid (MAA) and Acrylamide (AAm).” in the International Conference on 2nd Pharma Summit 2023: Drug Discovery and Community Trial" organized by Association of Pharmaceutical Research (APR) on 04th & 05th December 2023 at Dubai, UAE



Mr. Sameeran Gam, Assistant Professor, NIPS, Mirza;

had received prestigious **BEST RESEARCH PAPER AWARD, 2023** by the Institute for publishing his research work in reputed journals for the year 2023.



Dr. Sanjib Kumar Das, Assistant Professor, NGI, Mirza;

had received prestigious **PROMISING RESEARCHER AWARD, 2023** by the Institute for his excellent contributions in the field of Academics and research for the year 2023

Mr. Pragyan Adhikary, Assistant Professor, Department of Food, Nutrition and Dietetics, NGI, Mirza,

had successfully cleared **UGC NET (Assistant Professor)** in Home Science, in December 2023.



INSTITUTIONAL ACHIEVEMENTS

1. Publication Details

S.L No	Authors	Title	Journal	Volume: Issue; Page Numbers	Year
1	Ruhul Amin, Chanam Melody Devi , Dona Sarkar, Javad Sharifi-Rad, Eda Sönmez Gürer, Anca Oana Docea, Daniela Calina,	Curcumin loaded nanomedicines as therapeutic strategy in malaria management	e Food	Volume 4, Issue 5	2023
2	Manoj Kumar Deka Akramul Ansary Tridib Kumar Das Amit Kumar Das Bhargab Jyoti Sahariah Manish Majumder	Development of three UV-spectroscopic methods for simultaneous estimation of raloxifene and aspirin in pharmaceutical dosage form: Whiteness and greenness assessment with application of Complex GAPI, AGREE, and RGB	Green Analytical Chemistry	Volume 8, March 2024, 100088	2023
3	Babita Deka *, Pooja Patowary, Deepshikha Bharali, Nilutpal Sharma Bora, Bhargab Jyoti Sahariah, Apurba Talukdar, Bhaskar Sarma, Chintu Lahkar and Hiyashree Sharmah	Scientific Corroborative Evidence of Anthelmintic Activity of Citrus Maxima Leaf: A Traditionally Used Herb Of Northeast India	IJPSR	14:10;5070-5073	2023
4	Babita Deka *, Apurba Talukdar1, Bhargab Jyoti Sahariah1	Conspectus Of Phytoconstituents and Pharmacological Activities Of	IJBPAS	12:10;496-512	2023

		Cyperus Spp.: A Review			
5	Mrinmoy Basak, Biplab Kumar Dey, Rosamund Jyrwa, Moksood Ahmed Laskar, SM Abdul Aziz Barbhuiya, Muslek Uddin Mazumder, Josef Yakin, Himangshu Deka, Nongmaithem Randhoni Chanu, Pal Gogoi, Mohidul Islam, Priyanka Goswami, Sajjidul Hoque Ansari, Md Rejwan Ahmed Choudhury	Antibacterial Activity Reported in Recent Years for the Synthetic Derivatives of 1, 2, 4-Triazine	Bulletin of Environment, Pharmacology and Life Sciences	12:2; 135-140	2023
6	Bhagawati, Hrishikesh & Sarma, Mrinal & Talukder, Abhijita & Das, Sumanjit & Nath, Debabrata.	Pico science: Pico technology's Advent in Health and Medicine.	Current Drug Therapy.	18(10)2174	2023
7	Abhijita Talukder , Purbajit Chetia *, Nayanika Neog, Priyakshi Chutia and Bhargab Jyoti Sahariah	Potential biomarkers of rheumatoid arthritis as a tool for research and development of new drug molecule: a review	IJPSR	14(7).3272-80	2023
8	Rubi Das, Dr P.K. Senthil Kumar	Halophilic Actinomycete Mediated Biodegradation of Arsenic in Waste Water collected from Different Sources of Chidambaram, Tamil Nadu	International Journal of Engineering Technology Research And Management	Volume-07 Issue 07, July- 2023	2023
9	Lakshyajeet Nath, Rosy Ahmed, Bhaswati Kashyap, Himshikhar Sarma, Nilutpal Sharma Bora, Sameeran Gam, Kangkan Deka, Sanduwinaki Siangshai, Bhargab Jyoti Sahariah	"Exploring the anti-inflammatory and antimicrobial potential of <i>Smilax zeylinica</i> extract through in vivo and in vitro analysis "	Journal of Pharmacognosy and phytochemistry	12(5): 273-279	2023

	and Dr. Koushik Nandan Dutta				
10	Piyangshu Sagar Dehingia, Dr. Angela Priyanka Gogoi	A Study of Sociodemographic, Cultural, economic and Psychological Characteristics associated with Adolescent Pregnancy from Tea Garden Communities of Sibsagar, Assam: A Cross- Sectional Survey	International Journal of Advanced Research	Int. J. Adv.Res. 11(04), 907-917	2023
11	Das,S.K.R., Deka,M.K.R., Sahariah,B.J.Y. And Hussain,Z.A.	Locally cultivated <i>Oriza sativa</i> chloroplast sequence	NCBI	ACCESSION ID 1023_533_001_PCR_RICE_RbcL-AF	2023

2. List of Patent Applied:

S.L No	Patent Title	Inventors Name	Application No./ Grant No.	Year	Status (Applied/Granted)	National/International
1.	Kolakhar-infused nutraceutical cleansing agent	Dr. Bhargab Jyoti Sahariah, Swapnaneel Sarmah, Nazibullah, Dr. Manoj Kumar Deka, Dr. Apurba Talukdar, Dr. Koushik Nandan Dutta, Dr. Nilutpal Sharma Bora, Dr. Deepak Kumar Gupta	202431003251	2024	Applied	International

UPCOMING EVENTS AND SEMINARS OF THE INSTITUTION

1. NATIONAL CONFERENCE ENTITLED “ Northeast India’s Traditional Wisdom: Bridging The Past and The Present Through Knowledge Systems, Health Practices, Agriculture, Art, and Conservation” organised by NEMCARE Group of Institutions (NGI), Mirza, Assam in association with Research Institute of World’s Ancient Traditions Cultures and Heritage (RIWATCH), Arunachal Pradesh and Association of Pharmaceutical Teachers of India (APTI).

National Conference on

NTTTHAC

February 23-24, 2024



PHARMACY	ELIGIBILITY	DURATION
Bachelor of Pharmacy (B Pharm)	10+2 (PCM/B)	4 years
Bachelor of Pharmacy Lateral (B Pharm Lateral)	D. Pharm	3 years
Diploma in Pharmacy (D Pharm)	10+2 (PCM/B)	2 years
Bachelor of Pharmacy (Practice)	D. Pharm with 5 years of professional experience.	2 years
Master in Pharmacy (Pharmaceutics/Pharmacology/Pharmacognosy /Pharmaceutical Chemistry)	B. Pharm	2 years
Ph.D. (Pharmaceutical Science)	ASTU-RET, GPAT, NET	-
NURSING	ELIGIBILITY	DURATION
B.Sc. Nursing	10+2 (PCB)	4 years
General Nursing & Midwifery (GNM)	10+2 (Any stream preferably Sc.)	3 years
ALLIED HEALTH SCIENCES	ELIGIBILITY	DURATION
B.Sc. Biotechnology	H.S. Pass (Science)	4 years
B.Sc. Microbiology	H.S. Pass (Science)	4 years
Masters in Hospital Administration	Degree in any discipline	2 years
B.Sc. in Food Nutrition and Dietetics	H.S. Pass (Science)	4 years
NEMCARE SKILL INSTITUTE	ELIGIBILITY	DURATION
X-Ray Technician	H.S. Pass (Any Stream)	1 year
X-Ray & Imaging Technology	H.S. Pass (Any Stream)	2 years
Dialysis Technician	H.S. Pass (Any Stream)	2 years
OT Technology	H.S. Pass (Any Stream)	2 years
Hospital Executive	H.S. Pass (Any Stream)	5 months
Emergency Medical Technician (Advance)	H.S. Pass (Science)/EMT	6 months
Diploma in Cardiac Technology	H.S. Pass (Any Stream)	2 years
Certificate Course in Blood Bank Technology	DMLT/B.Sc. MLT/ B.Sc. (Micro)	1 year
Diploma in Medical Records	H.S. Pass (Any Stream)	2 years