Faculty of Pharmacy
RAMAIAH UNIVERSITY OF APPLIED SCIENCES
ज्ञानं विज्ञानं च भक्तिसहितं

Volume 03 Issue 01
January – March 2023

SCINTILLA

QUARTERLY E-NEWS LETTER

DEPARTMENT OF PHARMACEUTICS

http://www.msruas.ac.in/academics/pharmacy

SCINTILLA

QUARTERLY E-NEWS LETTER

Scintilla is the quarterly E-news letter of Department of Pharmaceutics, FPH, RUAS which seeks to provide to world outside, News, Views, and Creative expressions from the members of the department. Scintilla comes directly from Latin, where it carries the meaning of "spark" - that is, a bright flash such as you might see from a burning ember or spark of specified quality or feeling, which is almost synonymous to department's intent, hence the name SCINTILLA

EDITORIAL BOARD

STUDENTS HAMLET

Ph.D Scholars : Jithu Jerin James, Amit Bhosle
PG Students : Sharon, Shwetha Jain, Manisha, Megha

My heart fills with immense pleasure as I perceive the progress being made at Nava Bharat Schools. Education is not just about the s

EDITORIAL

Lovely Readers!!!

Wishing you all a fantastic and fabulous new year – HAPPY 2023

Introducing the first issue of volume three with slight but yet significant changes in data delivery, the Scintilla team is highly pleased. The fact that I am writing these words for the first issue of 2023 is a matter of great pride. It is appropriate to record the department's appreciable progress in several domains especially in setting and strengthening standards for reaching the short term targets.

In order to create the expected level of dynamism and take advantage of the students' real potential, the department launched three clubs. These clubs provide extensive coverage on instilling the spirit of professionalism through multitasking and team building activities..

Ensuring cognitive and emotional growth and stability, SNAP CLUB plays a larger role in understanding the concepts of mutual addiction and acceptance. Club SCIENTIA, a scientific platform for the exploration and expansion of pharmaceutical sciences fostering excellence in the profession. The third club, Mind Miners Club aka book club encourages the students to create a book bank, both soft and hard copies, for the circulation of diversified information for the overall development of students. As anticipated, received a colossal response from students to take it to the next level. I certainly hope they change radically to become productive professionals.

The articles, though few in number, illuminate the prevailing scenario of the pharmaceutical field with a strong message that there is no end to innovation and creative thinking.

I sincerely apologize for being slightly behind on this issue due to pressing and unavoidable work commitments. Here thereafter, the SCINTILLA team ensures that the calendar is respected by publishing the next editions.

My hearty regards to all the contributors and modest appeal to the readers and supporters for contributing high quality articles in big numbers for good readability and impacting the reading community

We are open to criticism and good advice to improvise this e-newsletter, do not hesitate to do so Remember … Do not follow the majority, follow the right way.

Do stay positive, better days are ahead.

Twinkle of JOY, PEACE and HEALTH untill our next meeting

Dr. S. Bharath
Chief Editor

For any further queries and suggestions contact :

Dr. R.Deveswaran

deveswaran.ps.ph@msruas.ac.in

080-23608942

CONTENTS

DEPARTMENTAL PRIDE

Publications

- V. R. Sanal Kumar, Bharath Rajaghatta Sundararam, Pradeep Kumar Radhakrishnan, Nichith Chandrasekaran, Shiv Kumar Choudhary, Vigneshwaran Sankar, Ajith Sukumaran, Vigneshwaran Rajendran, Sulthan Ariff Rahman Mohamed Rafic, Dhruv Panchal, Yash Raj, Srajan Shrivastava, Charlie Oommen, Anbu Jayaraman, **Deveswaran Rajamanickam, Bharath Srinivasan (2022)** In vitro prediction of the lower/upper-critical biofluid flow choking index and in vivo demonstration of flow choking in the stenosis artery of the animal with air embolism, Physics of Fluid, 34, 101302
- K Bhagyasree, **Dhrubojyoti Mukherjee**, Mohammad Azamthulla, Shouvik Debnath, Lakshmi M Sundar, Sahana Hulikal, Banala Venkatesh Teja, Shvetank Bhatt, Devanand Kamnoore (2022) Thiolated sodium alginate/Polyethylene glycol/Hydroxyapatite Nanohybrid for Bone Tissue Engineering, Journal of Drug Delivery Science and Technology (Elsevier),76, pp. 1-12
- Nausheen Ahmed, **R. Deveswaran**, P. Parasuraman, S. Bharath, C. Priyanka, P.S. Santosh (2022) Topical delivery of natural extract for accelerated wound healing, Materials Today: Proceedings, Article in press
- Shreeshail Tumbagi, **Bharath Srinivasan** and Pushpendu Gaurav (2022) Analytical Method Development and Validation of Taxol-Containing Drug by UV Spectrophotometric Method, Indian Journal of Natural Sciences, 13(75), pp. 50572-50578

DEPARTMENTAL PRIDE

Conference Presentations

- Jithu Jerin James, Parashuram Pavadai, **Sandhya K V** (2022) Screening of Placental Proteins Against Proteases for their Potential use in Osteoarthritis: A Computational Approach, Proceedings at International Conference on "Current Trends in Drug Discovery Development and Delivery"- CTD4 2022: in Royal Society of Chemistry
- Surekha MKL, **Sharon C F, Sindhu Abraham, Shwetha K** (2022) Nanoformulated epigallocatechin gallate for its potential management of oral squammous cell carcinoma, Proceedings at International Conference on Current trends in Drug Discovery Development and Delivery – CTD4 2022: in Royal Society of Chemistry
- Amrita Rana, **Sindhu Abraham, Sharon Furtado**, Megha, K and Anbu, J. (2022) In vivo skin irritation potential of a topical gel loaded with tea tree oil nanosponges, Proceedings at International Conference on Current Trends in Drug Discovery, Development and Delivery, KL University, Guntur, Andhra Pradesh
- **Shwetha, K.** and **Basavaraj, B. V.** (2022) Optimization of vanillin crosslinked chitosan/polycarbophil superporous hydrogel hybrids containing tablets for regulated drug delivery, Proceedings at International conference on "Current Trends in Drug Discovery Development & Delivery" – CTD4-2022

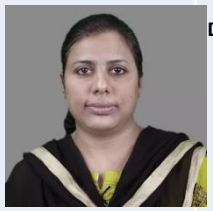
LIST OF PATENT DISCLOSURE FILED FROM THE DEPT – 2022

Dr. S. Bharath and team	Intranasal in-situ gelling drug delivery system targeting brain for treatment of motion sickness
Dr. R Deveswaran and team	Gel based delivery system containing lignin and tannin for wound healing
Dr. Sindhu Abraham and team	• Novel film forming excipient from a natural source
Dr. Sharon C F and team	Nanostructured Lipid Carrier Based Gel of Tamanu oil for management of Psoriasis
Dr. Sandhya K V and team	•Reconstituted oral suspension of diosmin microparticle for the treatment of angina pectoris
Dr. Basavaraj B V and team	Novel Composition for Oral Care and Other Applications
Dr. Basavaraj B V and team	Topical formulation loaded with pomegranate seed oil for the treatment of psoriasis
Mrs. K Shwetha and team	A pH sensitive, psyllium based superporous hydrogels for smart drug delivery Disinfectant tablet for promotion of public health

II YEAR PG PROJECT MENTORS ALLOCATON

SL.NO	NAME OF THE STUDENT	PHOTOGRAPHS OF STUDENTS	TITLE	GUIDE	GUIDE PHOTOGRAPHS	CO-GUIDE
1	**Adrija Chowdhury 21PHPS058001**		Development of multivitamins with mineral tablets by dry granulation process using roller compaction and slugging process	**Dr. R Deveswaran**		Mr. Rajkumar Aland
2	**Mamillapalle Annapoorna 21PHPS058002**		Development of wound care delivery system using selected medicinal herb	**Dr. R Deveswaran**		Dr. J Anbu
3	**Manisha U Kunder 21PHPS058003**		Development of sunscreen cream containing hesperidin liposomes	**Dr. Aswathi R Hegde**		Mrs. Gouri Nair
4	**Megha N 21PHPS058004**		Mucoadhesive nanogel formulation of Sanseviera Aethiopica leaf extract for management of oral candidiasis	**Dr. Sharon Futado**		———
5	**Nikita Singh 21PHPS058005**		Development of novel invasome-based intravaginal mucoadhesive gel for sustained contraceptive effect	**Dr. B V Basavaraj**		Dr. Ravindra Kanchi
6	**Sharon Esther Samuel 21PHPS058006**		Formulation and evaluation of wound healing potential of polymer based self-healing hydrogel system	**Mr. Tanmoy Ghosh**		Mr. Damodar Nayak

II YEAR PG PROJECT MENTORS ALLOCATON

SL.NO	NAME OF THE STUDENT	PHOTOGRAPHS OF STUDENTS	TITLE	GUIDE	GUIDE PHOTOGRAPHS	CO-GUIDE
7	Shreya Singh 21PHPS058007		Particulate delivery of nutraceutical for management of gastrointestinal health – An investigational study	Dr. Sandhya K V		———
8	Shwetha Singh 21PHPS058008		Formulation development of Go-Ark ethosomal hydrogel for psoriasis management	Dr. B V Basavaraj		Dr. Ravindra Kanchi
9	Tejas R 21PHPS058009		Novel topical formulation for treatment of skin disorders	Dr. S Bharath		Dr. J Anbu
10	Akhila Jain 21PHPS058010		Development of foam dressings loaded with extract of Plectranthus ambonicus for burn wound healing	Dr. Sindhu Abraham		Dr. Kesha Desai
11	Anjan Prasad 21PHPS058011		Formulation of vitamin C effervescent tablets by adopting different granulation techniques	Dr. B V Basavaraj		Mr. Rajkumar Aland
12	Shruthi M 21PHPS058012		Development of chemopreventive niosomal gel containing citrus peel extract	Dr. Sharon Furtado		———
13	Shwetha Jain 21PHPS058013		Design of gastro-resident atorvastatin raft formulation	Dr. S Bharath		Dr J Anbu

FORTH COMING EVENT

RAMAIAH UNIVERSITY OF APPLIED SCIENCES | Faculty of Pharmacy

INSTITUTION'S INNOVATION COUNCIL (Ministry of HRD Initiative)

SCIENTIA CLUB 01 Soap Box

PHARMACEUTICAL MARKETING & MANAGEMENT

Cordial Invitation

MR. SUDHEER S is currently a Business Head in Himalaya Wellness Company, Bengaluru, Karnataka. He has completed B-Pharm, MBA and PG Diploma in Leadership in collaboration from MIT, Columbia Business School and Tuck Executive Education. He his accredited for strengthening companies to lead in highly competitive situations, targeting senior level assignments in Sales & Marketing / Business Development with leading organizations of repute

Mr.Sudheer S
Business Head
Himalaya Wellness Company
Bangalore

Scientia Club extends an open invitation to all the Pharma Marketing aspirants to participate in this mind altering event notably for fostering the marketing skills in the ever growing pharma sector

Date and Time: 25th Feb, 2023, 10:00 am onwards
Venue: Classroom – 1, II Floor, Heritage Block

President
Ms. Akhila Jain
II PG

Vice President
Ms.Spoorthy K S
I PG

Staff Co-ordinator
Mr.Tanmoy Ghosh
Assistant Professor

Scientia Enablers
Ms. Raksha C A
Ms.Thejeswini
I M-Pharm

DEPARTMENT OF PHARMACEUTICS

FORTH COMING EVENTS

RAMAIAH UNIVERSITY OF APPLIED SCIENCES | FACULTY OF PHARMACY
INSTITUTION'S INNOVATION COUNCIL (Ministry of HRD Initiative)
AIR # 52 NIRF

DISTINGUISHED LECTURE SERIES (Hybrid mode)

Theme: Advances in Drug Delivery Technologies

SPEAKER
Dr. Prakash Hazam
Post Doctoral Fellow
Academia Sinica
Yilan County, Taiwan, Taiwan

DATE 25 Feb, 2023 | TIME 11:00 am onwards

SPEAKER
Dr. Lalit Kumar
Assistant Professor
Department of Pharmaceutics
NIPER HAJIPUR

DATE 11 Mar, 2023 | TIME 11:00 am onwards

RAMAIAH UNIVERSITY OF APPLIED SCIENCES | Faculty of Pharmacy

INSTITUTION'S INNOVATION COUNCIL (Ministry of HRD Initiative)

Department of Pharmaceutics
Faculty of Pharmacy

Cordially invite you to attend the **Alumni Talk**

on

"Gateway of opportunities at CRO"

Ms. Shivani, completed her B Pharm and M Pharm in Pharmaceutics from Faculty of Pharmacy, M S Ramaiah University of Applied Sciences. She has worked as a Research Associate in Drug Safety and Pharmacovigilance Department at MMSH Clinical Research and soon will be holding a position as a Client Services Associate in Client Services and Contract Department of ICON PLC. A hardworking and self-motivated personality, Ms. Shivani is also the recipient of Prof. U.N.R. Rao award from KSTA.

Shivani Srinivasan
Client Service Associate
ICON PLC
Bangalore

Who should attend?

UG/PG students in the domain of Pharmacy, B.Sc. Biotechnology and Life Sciences, Dental and Medical Sciences

Date and Time: 25th March
Venue: Classroom – 1, II Floor, Social Sciences, Heritage Block

Convener
Dr. S. Bharath
Dean, FPH, RUAS

Chief Co-ordinator
Dr. Basavaraj BV
Prof & Head-Department of Pharmaceutics
basavaraj.ps.ph@msruas.ac.in

Co-ordinator
Mrs.shwetha K
Asst. Prof, Department of Pharmaceutics
Shwetha>ps.ph@msruas.ac.in

PHARMA INNOVATIONS 2022

The pharmaceutical industry is witnessing a massive revamp. Traditionally slow in the adoption of technology, the industry is now undergoing rapid changes due to the development of several technologies. The prominent pharma industry trends include artificial intelligence (AI), additive manufacturing, blockchain, and other Industry 4.0 technologies. The increasing investments, growth of technology start-ups, and the expiry of several key patents, as well as increasing inter-organizational collaborations and a favourable regulatory environment, are spurring innovation across the pharma industry trends

- In addition, the industry's efforts to combat the pandemic have created fresh platforms for innovation and growth. These include the messenger RNA (mRNA) technology used in Covid-19 vaccines and the monoclonal antibodies (mAbs) used in several treatments for the virus

Compiled
Ms. Janahvi S
(1st M.Pharm)
Dept.of Pharmaceutics

PHARMA TRENDS

- Artificial Intelligence
- Big Data & Analytics
- Precision Medicine
- Curative Therapies
- Blockchain

The pharma trends has impact from drug discovery and development to medical imaging and patient engagement, artificial intelligence occupies a prominent position in the industry. Along with big data and analytics, more than a third of pharma startups are working on software solutions for the industry. The use of real-world data to collect accurate patient experiences, blockchain to securely transact and manage patient records, and augmented, virtual, and mixed reality (AR, VR & MR) solutions also find a place in these pharma trends. However, these trends cover only a small fraction of the breadth of innovation in the industry.

Artificial Intelligence

Artificial intelligence (AI) in Pharma refers to the use of automated algorithms to perform tasks that traditionally rely on human intelligence. For pharmaceutical businesses that thrive on innovation, and the patients that benefit, this is very important. AI can assist in structure-based drug discovery, with AI-designed molecules and, when used for simulation and modelling, has the potential to make processes faster and more cost-effective, with the hope of reducing the time a new drug takes to reach the patient.

Using AI leads to better recruitment and candidate selection for clinical trials, improved study design, and data analysis driven by algorithms which enhances product pipelines and clinical outcomes and, importantly, drives more compounds into early phase development.

Pangaea Data- Patient Cohort Identification

Pangaea is based in San Francisco, London and Hong Kong and was founded by experienced entrepreneurs who have raised more than £130 million through their academic research and is advised by leading experts from industry. Pangaea Data Limited provides a novel AI based software product to its customers from the biopharmaceutical and healthcare industry for faster identification of patient cohorts based on phenotypes (clinical characteristics and symptoms) from doctors' notes and such unstructured textual data which comprises 80% of a patient's electronic health record (EHR).

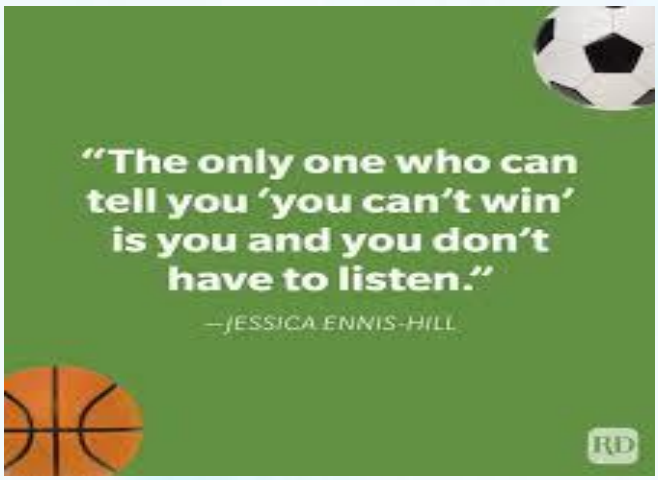
In-vivo AI – Drug Discovery

Canadian startup In-vivo AI develops novel algorithms for drug discovery. The startup uses different machine learning approaches, such as few-shot learning, reinforcement learning, active learning, and representation learning, to aid the drug discovery process. The deep learning solution uses small and noisy datasets to predict and optimize potential drug candidates, further eliminating the need for large datasets

Big Data & Analytics

The pharma industry requires high-performance systems to analyse the large volumes of data generated during the drug discovery and development process. Pharmaceutical companies use third parties to share data with collaborators, making data management a crucial area of focus.

The advancement in analytical techniques is also turning historical and real-time data available with pharmaceutical companies into valuable assets for predictive, diagnostic, prescriptive, and descriptive analytics. Moreover, these analytics techniques are used on almost all types of medical data from patient records, medical imaging, and hospital data, to name a few.



Pryml – Secure Data Collaboration

Belgian startup Pryml develops a platform that allows data scientists to build applications on confidential or sensitive data of organizations. Pryml creates a synthetic version of the confidential data available with pharmaceutical companies. This enables the restricted sharing of this data with third-party companies for business applications or research collaborations. Pryml' s solutions integrate within the customers' data architecture for the development of solutions such as predictive models for drug recommendations.

Pomicell – In-Silico Modeling

Israeli startup Pomicell offers software tools for big data analytics in pharmaceutical research and development (R&D). The startup utilizes machine learning techniques to analyse and aid in the development of in-silico models. The startup further builds customized drug development road-maps by augmenting the available data, analysis, and insights through matching and in-silico Modeling.

Precision Medicine

Precision medicine is a novel approach to the treatment and prevention of diseases. Using a patient's full medical profile – from genetic data, medical history, environmental factors, and even lifestyle – precision medicine aims to create a customized and unique treatment and prevention protocol for every patient. There is a reason that precision medicine is sometimes known as personalized medicine. The creation of a unique treatment requires access to virtually all of the personal medical data of an individual.

Exact Cure – Drug Exposure Model

Exact Cure is a pioneering startup offering a software solution to reduce the impact of inaccurate medication. Their vision is to live in a world where each individual has access to a personalized medicine. Their ambition is to become the world leader in personalized bio-modelling of medicines within 5 years.

Tepthera – Individualized Cancer Vaccine

Swiss startup Tepthera offers platform technologies for the identification of T cell antigens. The MEDi platform helps in the rapid identification of tumor-specific antigens from patient human leukocyte antigens.

After the selection of antigens, the solution identifies tumor-specific epitopes and then monitors antigen-specific T cells. The platform provides patients with individualized therapeutic vaccines for treating their condition.

Curative Therapies

There is a paradigm shift happening in the area of treating illnesses from managing diseases to curing diseases altogether. Curative therapies such as cell and gene therapies are changing the way we deal with chronic diseases or difficult to treat conditions by eliminating the need for long-term treatments. In gene therapy, genetic material is introduced into the cells to compensate for abnormal genes or to make a beneficial protein. Genetically engineered viruses are the most common vectors used for gene therapy.

Mogrify – Cell Therapy

Mogrify is a British startup that develops a proprietary direct cellular conversion platform to transmogrify any mature human cells. The platform technology identifies the transcription factors or small molecules required to convert any mature cell into any other mature cell type by analysing sequencing data and regulatory networks. Mogrify develops novel cell therapies for musculoskeletal, auto-immune, and cancer immunotherapy, as well as ocular and respiratory diseases.

Lacerta Therapeutics – Gene Therapy

The US-based Lacerta Therapeutics is a clinical-stage gene therapy startup working on cures for the central nervous system and lysosomal storage diseases. The startup' s proprietary adeno-associated virus (AAV) vector technology platform develops novel AAV vectors with improved transduction, tissue- or cell subtype-selectivity, and immune escape profiles. Lacerta further offers novel capsid variants and a scalable vector manufacturing platform with limited production components.

Blockchain

Blockchain technology is very significant for the pharmaceutical industry in every stage of the production and distribution of drugs. The stakeholders in the pharma industry are, in general, extremely secretive about their data due to the sensitive nature of the data. Blockchain technology is also being explored to tackle the use of counterfeit medicines and substandard drugs that enter into the pharmaceutical supply chain and kill thousands of patients every year. The digitalization of transactions makes blockchain a promising solution for tracking and securing the pharma transaction ecosystem

Pharma Trace – Smart Contracts

PharmaTrace, a German startup offers a blockchain-based ecosystem to secure data and deploy smart contracts in the pharmaceutical industry. The ecosystem provides a secure system for sharing crucial and sensitive information between stakeholders in the pharmaceutical marketplace.

3D PRINTING

COMPILED BY
RAKSHA C A
(I M-Pharm)
Department of Pharmaceutics

The pharmaceutical sector is developing tremendously. The creation of innovative dose forms for targeted therapy is now largely owing to modern technologies. However, the industry still relies on traditional drug delivery methods, particularly modified tablets, and the production of innovative dosage forms at an industrial scale is still constrained. The use of 3D printing technology by the pharmaceutical sector has expanded the potential for the study and creation of printed objects. The creation of customised doses, forms, sizes, and release characteristics in small quantities of medications is one of 3D printing technology's key advantages. Personalized medicine may eventually become a reality as a result of this method of drug production.

INTRODUCTION

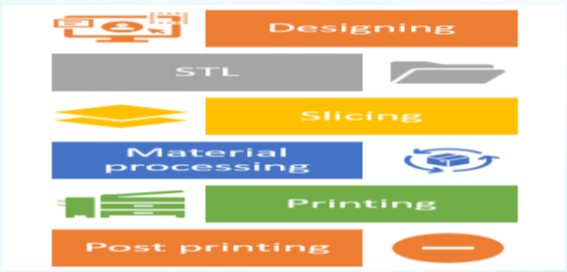
The term three-dimensional printing was defined by International Standard Organization (ISO) as: fabrication of objects through the deposition of a material using a print head, nozzle, or another printer technology.

This technique is one of the methods of additive manufacturing (AM) in which the parts are prepared from 3D model data in the process of joining materials layer by layer. The practical approach of AM is called rapid prototyping (RP) and its advantages include the reduction of prototyping time and costs, easy modifications of a product at a designed level, the possibility of manufacturing of small objects, individualized product series or structures impossible to be formed with subtractive techniques.

HOW IT WORKS

Preparation of 3D-printed object includes several stages:

- the design of 3D object with computer-aided design software and optimization of the geometry according to printer specification.
- the export of 3D model to a common and printer recognizable file format e.g. STL which includes only 3D geometry in form of each vertex position data or OBJ in which additionally information about polygonal faces or color texture are coded.
- the import of the file to the software and generation of layers which will be printed; the height of the printed layer essentially influences the quality of the printed object as well as printing time.
- the fabrication of the object by subsequent application (or solidification) of the material layers dedicated to the specific printing method.



APPLICATIONS

- Aprecia's proprietary technology combines 3D printing and formulation science to produce rapidly disintegrating oral medicines, including Spritam, which contains levetiracetam
- IND has been granted to the drug T-19 for the treatment of rheumatoid arthritis (Company: Triastek).
- Vaginal RingsThree shapes were made: O, Y and M. PLA and PCL was used. Designed for contraceptive drugs as well as anti-cancer drugs.
- Gastro DDS: Solid SNEDDS was designed using PEG 6000, Poloxamer 188 and oil phase along with the drug dapagliflozin. A floatation system for riboflavin was printed using PLA
- Other DDS: Dronedarone capsules have been produced using PVA (Matijasic). Bilayer tablet containing metformin and glimepiride using Eudragit RL and PVA. Fast dissolving oral films using PEO and PVA (Ehtezazi). Polypill containing 5 different drugs (Khaled et al)
- Zipdose Technology patented by Aprecia. Can be used in case of orphan drugs.

PEPTIDE THERAPEUTICS: CURRENT STATUS AND FUTURE DIRECTIONS

CONTRIBUTED BY
SPOORTHI K S
(1 M.PHARM)
Dept.of Pharmaceutics

Peptides are recognized for being highly selective and efficacious and, at the same time, relatively safe and well tolerated. Consequently, there is an increased interest in peptides in pharmaceutical research and development (R&D), and approximately 140 peptide therapeutics are currently being evaluated in clinical trials. Given that the low-hanging fruits in the form of obvious peptide targets have already been picked, it has now become necessary to explore new routes beyond traditional peptide design. Examples of such approaches are multifunctional and cell penetrating peptides, as well as peptide drug conjugates. Here, we discuss the current status, strengths, and weaknesses of peptides as medicines and the emerging new opportunities in peptide drug design and development. More than 7000 naturally occurring peptides have been identified, and these often have crucial roles in human physiology, including actions as hormones, neurotransmitters, growth factors, ion channel ligands, or anti-infective. This aspect might also be the primary differentiating factor of peptides compared with traditional small molecules.

Furthermore, peptide therapeutics is typically associated with lower production complexity compared with protein-based biopharmaceuticals and, therefore, the production costs are also lower, generally approaching those of small molecules. Thus, in several ways, peptides are in the sweet spot between small molecules and biopharmaceuticals. Naturally occurring peptides are often not directly suitable for use as convenient therapeutics because they have intrinsic weaknesses, including poor chemical and physical stability, and a short circulating plasma half-life. These aspects must be addressed for their use as medicines. Some of these weaknesses have been successfully resolved through what we term the 'traditional design' of therapeutic peptides as described below).

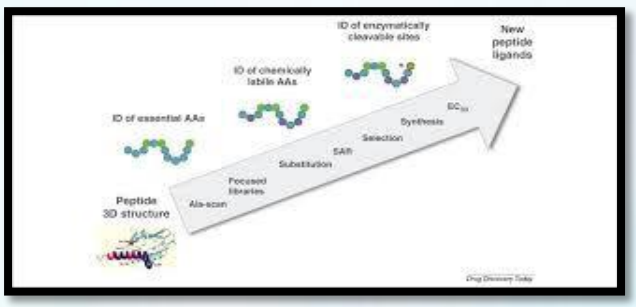
Peptide drug market During the past decade, peptides have gained a wide range of applications in medicine and biotechnology, and therapeutic peptide research is also currently experiencing a renaissance for commercial reasons. For example, the peptide-based medicine LupronTM from Abbott Laboratories for the treatment of prostate cancer and more, achieved global sales of more than US$2.3 billion in 2011 . In addition, LantusTM from Sanofi (which is really at the border between a peptide drug and a small biopharmaceutical) reached sales of US$7.9 billion in 2013.

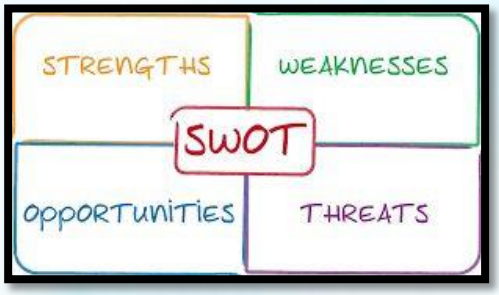
Traditional peptide technologies Peptides have evolved as highly potent signal transduction molecules, exerting powerful physiological effects. As illustrated in our SWOT analysis, they are generally characterized by a relatively short circulating plasma half-life, as well as suboptimal physical and chemical properties for their use as medicines.

Rational design of peptide therapeutics Rational design can start with a known crystal structure of the peptide giving the secondary and tertiary structure. Then, via input from various analyses, such as alanine substitutions (Alascan), and small focused libraries, the structure–activity relation (SAR). is built in sequential steps that lead to the identification of essential amino acids and also sites for possible substitution.

In this process, and especially when liquid drug formulations are the desired final product, it is an important step to identify amino acids that are chemically labile and prone to events. Which often have a tendency to aggregate and are sometimes poorly water soluble .

Approaches for plasma half-life extension In general, natural peptides have a relatively short circulating plasma half-life and, thus, several techniques for half-life extension have been developed. A first-line approach is to limit the enzymatic degradation of the peptide through identification of possible molecular cleavage sites followed by substitution of REVIEWS Drug Discovery Today Volume 20,Number 1 January 2015 Drug Discovery Today Peptide 3D structure ID of essential AAs ID of enzymatically cleavable sites ID of chemically labile AAs e tial AAs ID of chemically labile AAs Selection Ala-scan SAR Focused libraries Synthesis EC50 Substitution New peptide ligands.





BIOSINSPIRED NANOPARTICLE FOR OCULAR DRUG DELIVERY

The drug delivery to the eye is posed with several difficulties such as the presence of several physical boundaries such as the Blood-Retinal Barrier (BRB), corneal and conjunctival epithelium, blood-aqueous barriers (BAB). These barriers control the transit of molecules and fluids across eye and this is the reason the drug is unable to enrich the deeper layers. The most common drug administrations are eye drops or suspensions due to patient compliance but only 5% is delivered to the deeper ocular layers. Other methods of administration are intravitreal injections and through periocular route but due to complications such as hemorrhages, retinal detachments and cataracts and reduced action of drug and vitreous concentration due to the physiological eye phenomena it demonstrates the drugs failure to treat retinal and deeper posterior segment injuries.

Hence after various studies Nanoparticles were employed in the treatment of ocular diseases and were shown to have higher biocompatibility and bioavailability.

The major drawback of employing Noble Metal Nanoparticles was cytotoxicity, non-degradability along with the inability to be excreted out of the human body. This brought in the attraction of utilizing Bio-inspired Nano Particles among researchers as they provide low toxicity, better biocompatibility, unique property such as photosensitivity and biodegradable.

Bio-Inspired Nanoparticles used as alternatives to metallic Nanoparticles are-

CONTRIBUTED BY
MS.Saira Ameen
(V Semeter) B.Pharm

1. Liposomes

Liposomes consist of a lipid bilayer, resembling a cellular membrane, that surrounds an aqueous core. They are often referred to as nanoparticles but vary in properties when compared with traditional Nanoparticles.

They are widely used in pre-clinical studies to improve drug delivery, through Blood Brain Barrier (BBB). Liposomes tend to improve drug delivery to the retina and its photoreceptors due to its high half-life, permitting the long-term drug absorption. Liposomes also have the ability to significantly improve pharmacokinetics and pharmacodynamics of any loaded drug compared to the free drug. They are highly biocompatible, biodegradable and can remain in circulation for a longer period of time offering greater therapeutic effect.

Liposomes encapsulated with the anti-inflammatory and anti-angiogenic drugs possessed the ability to contrast oxidative stress by enhancing the activities of antioxidant enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GSH-Px).

Ocular liposome-mediated delivery can be used for drugs that have low stability. A liposome system can be used as a delivery carrier for age-related macular degeneration therapy in the ocular posterior chamber as it can entrap two drugs at same times using the third polyamidoamine dendrimer.

The surface modification of liposomes has also been widely studied to improve their specificity of targeting and to deliver them in different eye compartments. The cationic PEGylated liposomes having an average zeta potential below +20 mV can efficiently penetrate the murine retina and the liposome having surface zeta potential values above +20 mV were retained on vitreous section. This did not change whether PEGylated or non-PEGylated liposomes were used. Hence through modifications targeted therapy in the various parts of the eye can be achieved.

2. Niosomes

Niosomes are vesicular systems comprising of bilayer made up of nonionic surfactants that are formed by the admixture of surfactant and cholesterol with hydration by water. The most commonly used surfactant are Sorbitan fatty acid esters, Spans (Span 20, 40, 60, 65, 80, and 85), Tweens (20, 40, 60, and 80). They are biodegradable, non-toxic, good stability, non-immunogenicity and controlled release ability. It is an alternative controlled ocular drug delivery system to liposomes as it can overcome the problems associated with sterilization, large-scale production, and stability

Niosomes are one of the best tools for various site-specific drug delivery systems such as ophthalmic drug delivery. Surfactants of different HLB values and cholesterol are the fundamental components for these formulations. Its advantages are that it enhances the adhesion or retention ability of drug at the ocular site. Hydrophilic or lipophilic or amphoteric drugs can be easily encapsulated in niosomes and delivered to the target site useful for the treatment of many ocular diseases.

Niosome-DNA complexes, named as nioplexes, demonstrate good transfection ability and nioplexes based on cationic niosomes vectoring minicircle DNA are powerful agents in retinal diseases therapies. The niosomal formulations are high tolerated and non-irritant in nature.

Natural Hydrogels: Chitosan Nanoparticles (CHNPs)

Chitosan is a natural hydrogel cationic polysaccharide of co-polymers glucosamine and N-acetyl glucosamine obtained by alkaline deacetylation of chitin, constituent of crustacean shells of shrimps, lobster, and crab. It is hydrophilic in nature and can be degraded by human enzymes resulting in its biocompatibility and biodegradability. They are used as delivery systems for the controlled release of therapeutic ingredients. Chitosan-based hydrogels are potentially engineering scaffolds to obtain tissue repair achievements.

Alginates can also be used for ophthalmic applications in combination with chitosan. Chitosan coated sodium alginate NPs loaded with drug have higher release ability and distribution at target site as compared to free drug. Chitosan NPs can be encapsulated with an antibiotic to treat ocular infections and they have a higher permeability through ocular layers. Due to its characteristic muco-adhesive properties the drug can be retained in the ocular region for a longer period of time. The optimization of the formulation of NPs can enhance the corneal retention of drug without inducing irritation . Encapsulation of high levels of drug within chitosan-coated NPs shows its targeted delivery to the retina and its efficient release. These biocompatible NPs, show the ability to load high amount of plasmid DNA and can be successfully delivered to retinal pigment epithelium.

4. **Active and Self-Propelling Nanoparticles**: New Generation of Nanobots in Retinal Disease

The Nanoparticles can be customized during formulation at a molecular level to produce interesting outcomes by reproducing macro- and microorganisms' survival mechanisms like the cells ability to sense and actively respond to external stimuli by the generation of movement. They convert an external energy source into mechanical work that induce migration.

Through our inspiration of natures mechanisms, we now have a set of Nanoparticles that are able to self-propel towards a gradient of nutrients and to mimic biological taxis. This development is met with challenges due to its size (in nanoscale) the physical principles of propulsion are different due to the presence of the Brownian effect that can interfere with nanomptors by collisions with solvent molecules and derailing its pat

h. Bacteria like Escherichia coli achieve propulsion by its motion of long flagella and its asymmetric body shape which is critical for motion generation in a specific direction preventing itself from drifting to any other direction which provides the inspiration for these nanoparticles.

Self-propelling NPs represents a new powerful tool in drug delivery. These strategies are employed for delivery in ocular medicine. Micro-vehicles that can actively propel through the vitreous humor to enrich retina through helical magnetic micropropellers with liquid layer coating to reduce the adhesion of biopolymeric network. The inspiration for nanotool development is due to the liquid layer that characterized in the carnivorous Nepenthes pitcher plant, which has a slippery surface on the peristome to catch insects. These micropropellers show controllable propulsion from eyeball to retina in a faster duration as compared to silica microparticles that cannot penetrate the vitreous.

The analogy to LEGOTM bricks is a good one because the possible combinations of amino acids into peptides are almost unlimited, for example, a combination of any of the 20 naturally occurring amino acids built into a 20-mer would alone give 2020 = 1.05 e26 possibilities. Taking all of the above into account, we are convinced that peptides offer enormous growth potential as future therapeutics for the treatment of unm et medical needs. (Keld Fosgerau, 2015)

BIO-INSPIRED NANO PARTICLES FOR TARGETED DRUG DELIVERY

What are Nano Particles and how are they synthesized?

A nanoparticle is a “nano-object with all three external dimensions in the nanoscale” where nanoscale was defined as size ranging from 1 nm to 100 nm. In the 21st century after the introduction of nanotechnology there has been an emergence of various routes to synthesize Nano Particles (NPs) through synthetic and recently through biological routes

The nano particle system has shown promising results in field of therapeutics and diagnostics due it its various advantages such as, minimizing the drawbacks associated with the drugs like solubility, stability and bioavailability, tunable physico-chemical properties, enhanced therapeutic index as it can deliver the drug to specific tissues and provide controlled release therapy.

But due to its extremely small size generally ranging from 100 to 500 nm it raises the concern of toxicity due to the remnant of the nanoparticle in the tissues and the high cost of formulation and its non-degradable nature it is disadvantageous.

These disadvantages led to the emergence of “Bio-Inspired Nano Particles” in the recent years. Bio-inspired refers to the materials whose structure, property or function is said to mimic the natural or living matter.

The biomimetic approach is advantageous due to the improved functional properties. They are easy-to-use biomaterials which can be used for targeted drug delivery in cancer therapy and in ocular treatment

These materials possess an edge over the synthetically produced nano materials due to their cost efficiency, low toxicity, high biocompatibility and ease of synthesis.

# of SCIENTIA

A scientific club was set up by the Department of Pharmacy in January 2023. A range of pharmaceutically rewarding activities is a strong belief of the club that encourages students to understand and analyze the constantly evolving dynamics of university and industry. Gaining knowledge and information about the most changing sector in the world: PHARMACY could be made easier..

VISION

We strive to ensure that all Scientia club members and club students acquire the knowledge, skills, and behaviors necessary to become the future change makers of the pharmaceutical community and to create a brighter future for them

MISSION

As members of the Scientia Club, we shall work together to create a better environment for students in the field of science.

The club members came together and put up a bulletin board on few important days of the year.

Activities	Date
National Unity Day	31/10/2022
National Diabetes Day	14/11/2022

SNAP CLUB

Snap Club is a community where individuals express their gratitude for various aspects of their lives. Members of the club share what they are thankful for and encourage each other to focus on the positive aspects of their experiences. The club promotes positivity and an appreciation for the present moment. The club offers members a range of activities such as gratitude challenges, creative expression challenges, and gratitude journaling. The club also provides a safe and supportive space for members to find inspiration, understanding, and support. Snap Club is a great place for people to connect and share their heartfelt appreciation for life.

MIND MINERS CLUB

This club is a stage picked up by Dept. de Pharmaceutics in the year 2023. This club believes in providing openness and inclusion, intellectual freedom, continuous learning, creativity, innovation, collaboration, sustainability, and especially receration. In today's dynamic world, where people rely on digital information, books can still guide us our way through, keeping us updated.

VISION

To be welcoming, open and free community gathering place where all can reflect, learn, find recreation and be productive. Promoting idea of overall development, while collaborating other professional innovations

MISSION

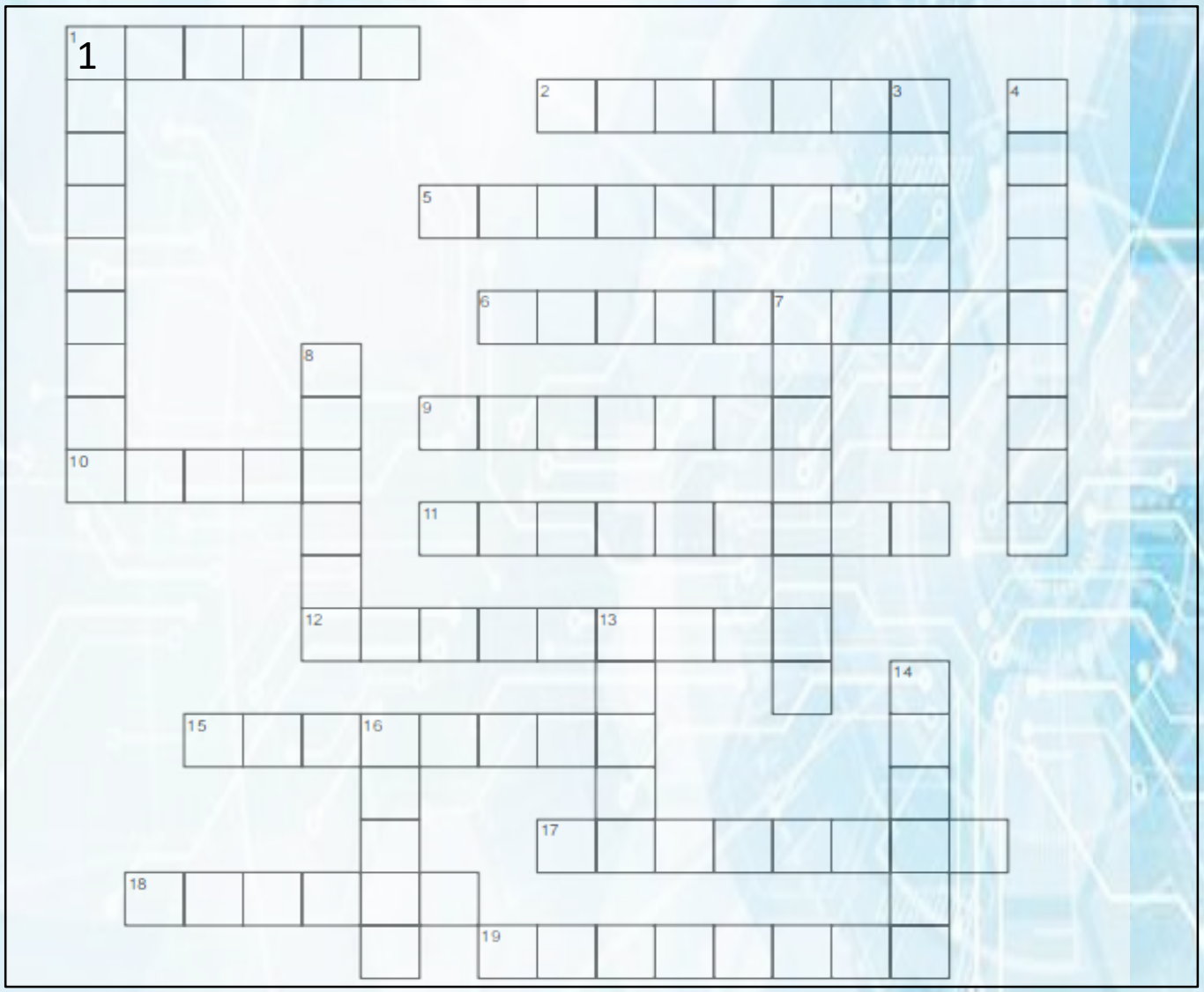
To connect the pharma community with ideas and information, to inspire imagination and love for reading, and to facilitate lifelong learning and personal and professional discovery

The club members collaborated to put together few books that would give a kick start for this club.

Sl.No	BOOK TITLE	AUTHOR/S
1	Time management	Brain Tracy
2	Think like Monk	Jay Shetty
3	The Buddha and his Teachings	Venerable Narada Mahathera
4	Beyond Good and Evil	Friedrich Nietzsche
5	The Science of Getting Rich	W.D. Wattles
6	Transform Your Habits	James Clear
7	Atomic Habits	James Clear
8	Inner Peace kit	Moira Hutchison
9	On the Decay of the Art of Lying	Mark Twain
10	The Law of Success	Napoleon Hill
11	Think and Grow Rich	Napoleon Hill
12	Power of Subconscious Mind	Joseph Murphy

WORD HUNT

Brand Name of Drugs 1-20



CLUE – Find 12 words related to Biopharmaceutics

Submit your answers to the Editorial team – prizes to be won
(sharoncaroline.ps.ph@msruas.ac.in)

ACROSS

1. What is the brand name for Sertraline

2. What is the brand name for Hydrocodone + APAP

5. What is the brand name for Metoprolol

6. What is the brand name for Metformin

9. What is the brand name for Atorvastatin

10. What is the brand name for Alprazolam

11. What is the brand name for Levothyroxine

12. What is the brand name for Hydrochlorothiazide

15. What is the brand name for Omeprazole

17. What is the brand name for Lisinopril

18. What is the brand name for Amoxicillin

19. What is the brand name for Atenolol

DOWN

1. What is the brand name for Azithromycin

3. What is the brand name for Amlodipine

4. What is the brand name for Amoxicillin + Clavulanate

7. What is the brand name for Oxycodone + APAP

8. What is the brand name for Esomeprazole

13. What is the brand name for Simvastatin

14. What is the brand name for Zolpidem

REPORT OF WEEKEND WORKSHOP ON PHARMACEUTICAL INDUSTRIAL ORIENTATION AND TRAINING

Drug Design and Development Centre, Faculty of Pharmacy, RUAS had inaugurated 5 weekends intensive **"Pharmaceutical Industry Orientation and Training Workshop"** for pharmacy, biotechnology and life science students starting from 10th September 2022 at Faculty of Pharmacy, Gnanagangothri Campus. 85 participants from pharmacy, chemistry and biotechnology background had joined this weekend course. This orientation workshop was organized and moderated by Dr.R.Deveswaran and Dr.Sandhya KV. The Orientation workshop had been planned for 5 weeks only on Saturdays till 8th October 2022. The session was inaugurated by Dr.Khalid Ahmed Khan, Asst. Drugs Controller, Govt. of Karnataka. Dr.Kuldeep K Raina, Vice-Chancellor and Dr.Om Prakash Kharbanda, Pro Vice-Chancellor, Health Sciences addressed the gathering.

The first day of the course was started by Dr.S.Shrinivasan, Pharmaceutical Consultant. Dr.S.Shrinivasan briefed the participants on "Introduction to Pharma industry" with respect to Global and Domestic. The second session was on Oppurtunities for students in Pharmaceutical Industry. In the afternoon Hands on training on HPLC, FT-IR, Lyophilizer and molecular docking and simulation software for participants is delivered by Dr.Lakshmi K Sundar, Dr.P.Parasuraman, Mr.Tanmoy Ghosh and Dr.A.R.Mahesh, Faculty of Pharmacy

In the second week of workshop, Mr.V.Kasi, Regulatory Professional, Novanordisk deliberated the participants on the topic "Regulatory Affairs – Global and domestic guidelines; opportunities in RA for graduates". In the 3rd week topics on "Pharmaceutical marketing and its opportunities" was discussed bt Mr.Sunil Chiplunkar, Vice-President – Marketing, Group Pharmaceuticals Ltd. In the afternoon session Dr.Nanajaraje Urs spoke on "Pharmacovigilance-Concepts and career opportunities".

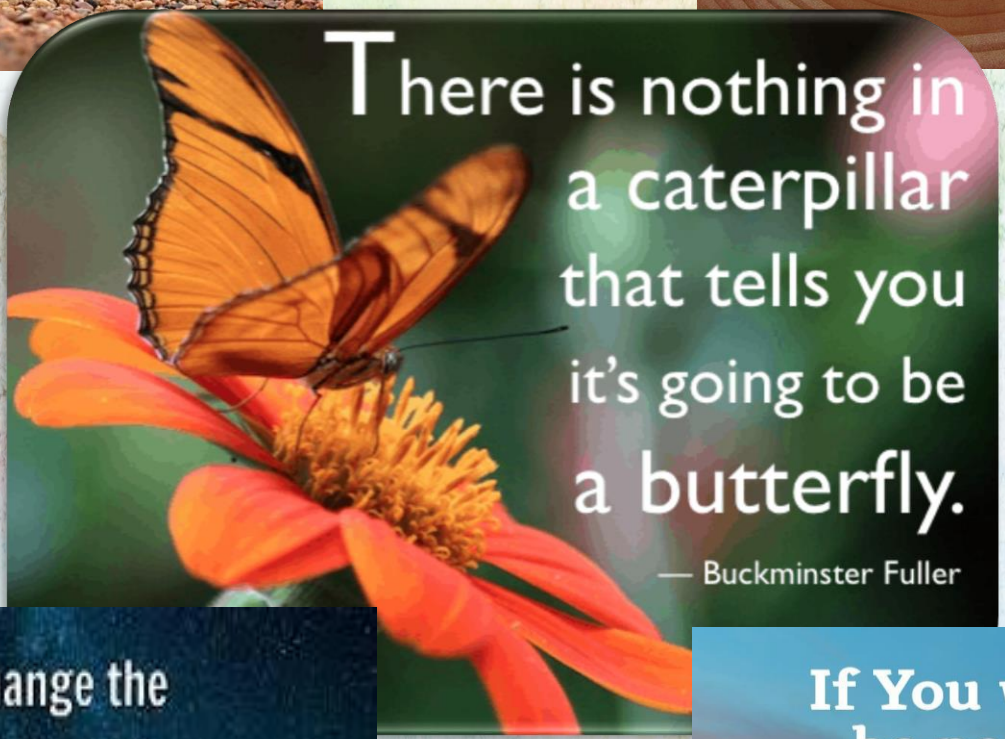
In the 4th week Mr.Ravi Angadi, Coprorate trainer elaborated the personality development skills. The session was very interactive During the afternoon Ms. Kalyani, Medreich, elaborated on softwares in RA In the 5th week The participants visited **Group Pharmaceuticals Malur** on 5th October. They have been exposed to GMP approved manufacturing facilities at the factory.

This session was followed by valedictory function where Dr.S.Bharath, Dean, FPH and Dr.Govid R Kadambi, Pro Vice-Chancellor-Research RUAS addressed the students. Dr.Sandhya KV, Associate Head-DDDC delivered the vote of thanks. This training and orientation programme was much appreciated by the participants. It has been effective in creating awareness about the industry requirements and various exciting career options.

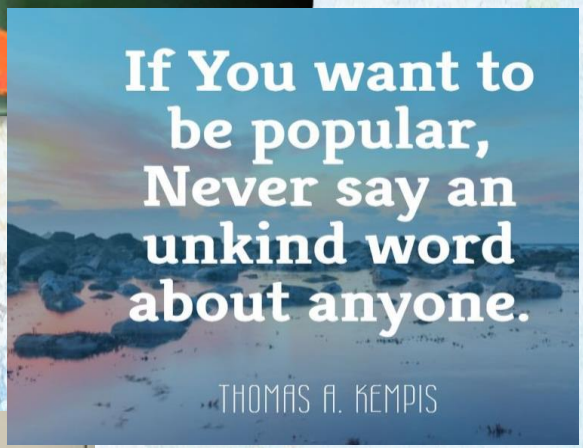
MINDUITION

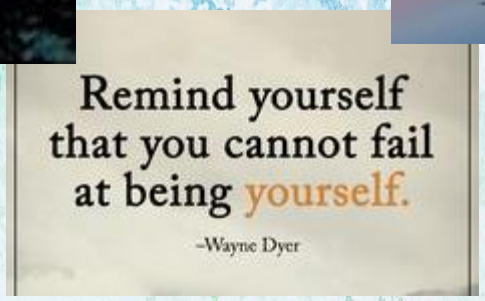

Life is much better
when you are living
in the present
moment.


"Time does
not change us.
It just unfolds us."
—MAX FRISCH


There is nothing in
a caterpillar
that tells you
it's going to be
a butterfly.
— Buckminster Fuller


If you change the
way you look at
things, the things
you look at change.
Wayne Dyer


If You want to
be popular,
Never say an
unkind word
about anyone.
THOMAS A. KEMPIS


Remind yourself
that you cannot fail
at being yourself.
-Wayne Dyer

SCINTILLA

FACULTY OF PHARMACY

(Approved by PCI and AICTE)

PROGRAMMES OFFERED

BACHELOR IN PHARMACY (B.PHARM)

4 years (8 Semesters) Degree Programme

MASTER IN PHARMACY (M.PHARM)

2 years Post Graduation Programme (4 Semesters)

Specializations: Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy, Pharmacology and Pharmacy Practice

DOCTOR IN PHARMACY (PHARM.D) Degree - 6 years Programme

Ph.D PROGRAMME - In all specializations (Full time/Part time)

IN HOUSE RESEARCH CENTRES

Drug Design and Development Center **(DDDC)**

Pharmacological Modeling and Simulation Center **(PMSC)**

Gnanagangotri Campus, M S Ramaiah Nagar,
New BEL Road, Bengaluru 560054

P 080 2360 2497/5283 | F 080 2360 8261