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

Volume 4
Issue 3

Jul-Sep
2023

SCINTILLA

QUARTERLY E-NEWS LETTER

DEPARTMENT OF PHARMACEUTICS

https://pharmacy.msruas.ac.in/departments/department-of-pharmaceutics

SCINTILLA

Volume 4 Issue 3 Jul-Sep 2023

EDITORIAL

Dear Readers !!!

Hope this message finds you all in good spirits.

The third issue of Scintilla 2023, which highlights the department's achievements in the previous quarter, is ready to be released.

To start with, Scintilla on behalf of all the well wishers extends a hearty congratulation to Dr.Tanmoy Ghosh for his successful Ph.D defense and complying with the RUAS Ph.D norms. We wish him a great future filled with more opportunities.

The scintilla team wishes to express its gratitude to Mr. Ravi Angadi of Attitude Plus for letting us to publish one more of his articles in support of students, particularly Pharm.D. students.

The newsletter captures the manifold activities and achievements of all the stake holders of the department and also proactiveness of the students in contributing the articles on trending topics for the benefit of the readers.

As usual, I send my best wishes to the strong and vivacious scintilla team for all of their tireless and laudable work to make it incredibly alluring and alluring. A special thank you to Ms. Nikita .S for taking on the full burden of designing and releasing the current edition.

I eagerly anticipate the worthwhile submissions for the upcoming issues, and I also encourage you to express your thoughts and suggestions with the scintilla team whenever it is convenient for you to do so. Do not forget! Without your insightful criticism and supportive words, the Scintilla e-newsletter would not be what it is today.

Do keep in mind the saying, "When the student is ready, the MASTER appears."

Keep Reading..... Keep Leading .... Keep Growing

Do stay positive in all the possible ways, better days are ahead.

Until the next issue, sparkles of joy, peace, and health.

Dr. S. Bharath
Chief Editor

For any further queries and suggestions contact :

Ms NIKITHA S

nikithas.ps.ph@msruas.ac.in

080-23608942

Volume 4
Issue 3
Jul-Sep
2023

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

Faculty of Pharmacy
RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Volume 4 Issue 3 Jul-Sep 2023

SCINTILLA

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Team @ Infoceutics

Dr BHARATH S
Dean & Professor

Dr B V BASAVARAJ
HoD & Professor

Dr.DEVESHWARAN
Professor

Dr. SANDYA KV
Assistant Professor

Dr. SINDHU ABRAHAM
Assistant Professor

Dr. SHARON CAROLINE FURTADO
Assistant Professor

Mrs. SHWETHA K
Assistant Professor

Dr. TANMOY GHOSH
Assistant Professor

Dr. ASWATHI R HEDGE
Assistant Professor

Ms. NIKITHA S
Assistant Professor

Department Pride

Workshops/ Seminars attended

- **Dr B V Basavaraj** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Mr Tanmoy Ghosh** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Dr Sandya K V** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Dr Sindhu Abraham** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Dr Sharon CF** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Dr Aswathi R Hegde** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Mrs Shwetha K** has attended Teaching, Research and Empowering (TReE) Faculty Development Program 20-24 Feb 2023
- **Ms Nikitha S** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Sharon CF** Grant Writing Workshop 'Grant (Proposal) Development
- **Mrs Shwetha K** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Ms. Nikitha S** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Tanmoy Ghosh** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program

Department Pride

Workshops/ Seminars attended

- **Mr Tanmoy Ghosh** has attended e-Faculty Development Program "EFFECTIVE RESEARCH PROPOSAL AND MANUSCRIPT WRITING" Under the aegis of Internal Quality Assurance Cell (IQAC) @MSGCOPER, Nashik during Thrusday 23rd to 25th March 2023
- **Dr B V Basavaraj** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Sharon CF** Grant Writing Workshop 'Grant (Proposal) Development
- **Mrs Shwetha K** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Ms. Nikitha S** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Tanmoy Ghosh** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Aswathi R Hegdhe** has attended Professional Development Workshop on Digital Creativity Skils as a part of Adobe Academic Essentials program
- **Dr Sharon CF** attended Grant Writing Workshop 'Grant (Proposal) Development'
- **Dr B V Basavaraj** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Deveshwaran** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Sandhya K V** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Sharon CF** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023

Department Pride

Workshops/ Seminars attended

- **Dr Sindhu Abraham** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Ms Nikitha S** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Aswathi R Hegdhe** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Tanmoy Ghosh** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Mrs Shwetha K** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr Sandhya K V** has attended the Teachers' Skills Empowerment Lecture Series on the topic "Giving Effective Feedback" held on May 11 (Online Mode), 2023
- **Dr B V Basavaraj** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023
- **Ms. Nikitha S** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023
- **Dr Sharon CF** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023
- **Mrs Shwetha K** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023
- **Dr Tanmoy Ghosh** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023
- **Dr Sandya K V** has attended the Teachers' Skills Empowerment Lecture Series on the topic " How To Engage Learner in a Classroom?" held on June 22 (Online Mode), 2023

Awards and Accolodes

The Department of Pharmaceutics, Faculty of Pharmacy, MS Ramaiah University of Applied Sciences, Bengaluru, is happy to inform that our full-time Ph.D. scholar, Mrs. Jithu Jerin James, has received research funding under the Women Scientists Scheme- A (WOS-A) for Research in Basic and Applied Sciences (Ref No.: DST/WOS-A/LS-393/2021) from DST, Govt. of India. The title of the research is " Repurposed drug loaded MOF-nanoparticles targeting aGPCR against breast cancer metastasis"

AWARDS AND ACCOLODES

RAMAIAH UNIVERSITY OF APPLIED SCIENCES

FACULTY OF PHARMACY

DEPT.OF PHARMACEUTICS

AWARD OF INDIAN PATENT

congrats!

You did it, So proud of you! My wishes are you keep smiling and keep shining bright in your life always. Great achievement. Congratulations!

DR.SINDHU ABRAHAM
ASST.PROFESSOR

PATENT NO.433784

NANO CALCIUM FORTIFICATION TO AUGMENT NUTRITIONAL VALUE

06/06/2023

AWARDS AND ACCOLODES

Congratulations!

On completing your Ph.D and
May this be the stepping stone for high level professional success

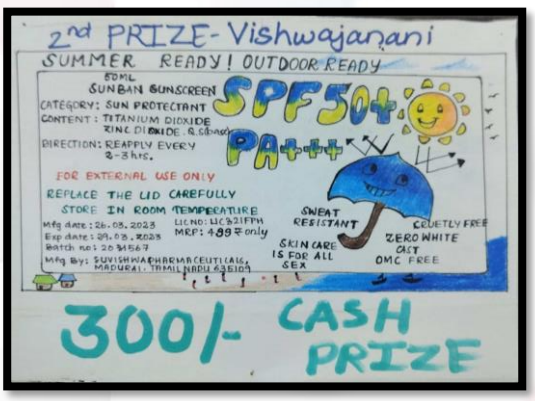
Dr.Tanmoy Ghosh

Assistant Professor

Development of CMCh/Gelatin cross-linked scaffolds embedded with Vitamin E for Wound Healing

Long time ago, people who sacrificed their sleep, family, food, laughter and other's joys of life were called **SAINTS**
now they are called **Ph.D Holders**

AWARDS AND ACCOLODES



Forthcoming Events

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 Guest Lecture on

"Artificial Intelligence in Regulatory Affair"

Mr. Rishav Kumar Jain , completed master's in Pharmaceutical science and bachelor degree from Faculty of Pharmacy, Ramaiah University of Applied Sciences, Bangalore. He has 16 months experience in OSD as Production executive and 6 months sterile, R&D department. And have been currently doing dossier submissions for Regulatory markets.

Rishav Kumar Jain
Executive ,Regulatory Affair in Micro lab limited, 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: 12th Aug, 2023, 3:00 pm onwards
Venue: Classroom –

Convener
Dr. S. Bharath
Dean, FPH, RUAS

Chief Co-ordinator
Dr. Basavaraj BV
Prof & Head-Department of Pharmaceutics
Mob: 9880238650
basavaraj.ps.ph@msruas.ac.in

Co-ordinator
Dr. Sharon Furtado
Asst. Prof, Department of Pharmaceutics
Mobile:9880051542
sharoncaroline.ps.ph@msruas.ac.in

Forthcoming Events

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 Guest Lecture on

Novel Manufacturing Application Tools In Pharma Sector

Dr. Geetha Thanga Mariappan

Research and Development of formulations - CRO Led team of scientists working on formulation development of solid orals/semisolids/liquids and soft gel capsules Development and scale-up of conventional drug delivery systems like immediate release and modified release tablets, capsules for NCEs and generics, powder for suspension, liquid filled hard gelatin capsules etc. Novel drug delivery systems like micro-emulsions, nanosuspensions, liposomes, niosomes, solid-lipid nanoparticles and floating beads etc. Biopharmaceutical and bioequivalence aspects of dosage forms as well as sample size determination and data review of bioequivalence studies in humans. Development of preclinical efficacy and toxicology formulations.

CAPEX plan, proposals for projects, managing Clients across US, UK, Europe and Worldwide

Dr. Geetha Thanga Mariappan
Techno Commercial Director & CEO at Dipon Research International - DiponEd BioIntelligence- CRS | Co-founder, DiponEd Bio- CRS

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

Convener
Dr. S. Bharath
Dean, FPH, RUAS

Chief Co-ordinator
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Co-ordinator
Dr. Sharon Furtado
Asst. Prof, Department of Pharmaceutics
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Forthcoming Events

RAMAIAH UNIVERSITY OF APPLIED SCIENCES | FACULTY OF PHARMACY

Celebrating 30 Glorious Years (1992 - 2022)

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

Department of Pharmaceutics

organizing One day National Level Symposium on

"Novel Drug Delivery Technologies for Maintenance of Oral and GI Health"

Upcoming

SSS, Heritage Block

About the seminar: Changes occurring in the oral cavity associated with systemic diseases, including gastrointestinal disease, have been long recognized. This seminar focusses on the various formulations of probiotics used for the prevention and treatment of various health conditions and diseases such as gastrointestinal infections, inflammatory bowel disease, lactose intolerance, cystic fibrosis, various cancers, reduction of antibiotic side effects, in oral health such as prevention of dental caries, periodontal diseases and oral malodour.

Guest Speakers

Dr. Nagaraju Rakesh
Professor and Head
Oral medicine and Radiology
Faculty of Dental Sciences, RUAS

Dr. Sangamesh Puranik
Founder and CEO
Masanga Laboratories Pvt. Ltd.
Bengaluru

Dr. Avinash B
Professor and Head
Medical Gastroenterology and Hepatology
MS Ramaiah Memorial Hospital

Mr. Uday Kumar
Director
Mystical Biotech Pvt. Ltd.
Bengaluru

Dr. Kumaraswamy M V
Principal Scientist
Apollo Biosciences
Bengaluru

For more details contact:

Dr. Sandhya K V
sandhya.ps.ph@msruas.ac.in

Dr. Basavaraj B V
basavaraj.ps.ph@msruas.ac.in

Invited Guest Article

Pharmaceutical clinical research companies in India, their size, and growth rate

Mr. Ravikumar Angadi
Founder and Director
Attitude Plus Corporate Solutions
NLP Master Practitioner, Sales Mastery Trainer, Mind Performance and Behavioural Change Coach

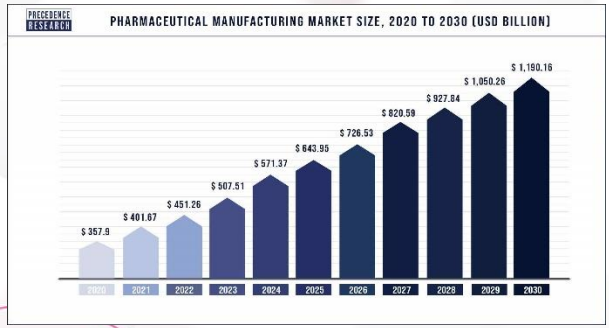
Market size: The pharmaceutical clinical research market in India was valued at USD 1.5 billion in 2020, according to a report by ResearchAndMarkets. This is a significant increase from the market size of USD 1.1 billion in 2015.

Growth rate: The pharmaceutical clinical research market in India is expected to grow at a CAGR of around 8% during the forecast period of 2021-2026, according to a report by Mordor Intelligence. This growth is driven by factors such as a large patient pool, lower cost of clinical trials compared to developed countries, a favorable regulatory environment, and the presence of a skilled workforce.

Patient pool: India has a large patient pool, with a population of over 1.3 billion people. This provides a significant opportunity for pharmaceutical companies to conduct clinical trials in India, as they can recruit a large number of patients for their studies.

Cost advantage: Clinical trials in India are generally less expensive than in developed countries, which provides a significant cost advantage for pharmaceutical companies. According to a report by McKinsey, the cost of conducting a Phase III clinical trial in India is around 60% lower than in the US.

Skilled workforce: India has a large pool of skilled professionals in the field of clinical research, including clinical research associates, project managers, and regulatory experts. This provides a significant advantage for pharmaceutical companies, as they can access a skilled workforce at a lower cost than in developed countries.



Regulatory environment: The regulatory environment for clinical research in India has improved significantly in recent years, with the establishment of organizations such as the Central Drugs Standard Control Organization (CDSCO) and the Ethics Committees. This has helped to create a favorable environment for the growth of the pharmaceutical clinical research market in India.

Overall, the pharmaceutical clinical research market in India is poised for significant growth in the coming years, driven by a large patient pool, lower cost of clinical trials, a favorable regulatory environment, and the presence of a skilled workforce.

Clininvent Research: Clininvent Research is a leading clinical research organization (CRO) in India that offers a wide range of clinical research services to pharmaceutical and biotechnology companies. The company has a team of experienced professionals and a network of clinical trial sites across India. The size of the company is not publicly available, but it has been growing at a steady pace over the years.

.

Clininvent Research: Clininvent Research has a team of over 250 professionals, including clinical research associates, project managers, data managers, and medical writers. The company has experience in conducting clinical trials across various therapeutic areas, including oncology, neurology, and cardiology.

Parexel: Parexel has a team of over 2,000 professionals in India, including clinical research associates, project managers, and regulatory experts. The company has experience in conducting clinical trials across various therapeutic areas, including oncology, infectious diseases, and neuroscience.

Parexel is a global biopharmaceutical services company that offers a wide range of clinical research services, including clinical trial management, regulatory consulting, and patient recruitment. The company has a strong presence in India, with offices in Bangalore, Hyderabad, and Mumbai. Parexel has been growing steadily in India, driven by the increasing demand for clinical research services.

IQVIA: IQVIA is a leading provider of data, analytics, and consulting services to the life sciences industry. The company also offers clinical research services to pharmaceutical and biotechnology companies. IQVIA has a strong presence in India, with offices in several cities, including Bangalore, Hyderabad, and Mumbai. The company has been growing steadily in India, driven by the increasing demand for clinical research services.

IQVIA has a team of over 4,000 professionals in India, including clinical research associates, project managers, and data managers. The company has experience in conducting clinical trials across various therapeutic areas, including oncology, respiratory, and infectious diseases.

Covance: Covance is a global CRO that offers a wide range of clinical research services to pharmaceutical and biotechnology companies. The company has a strong presence in India, with offices in several cities, including Bangalore, Hyderabad, and Mumbai. Covance has been growing steadily in India, driven by the increasing demand for clinical research services.

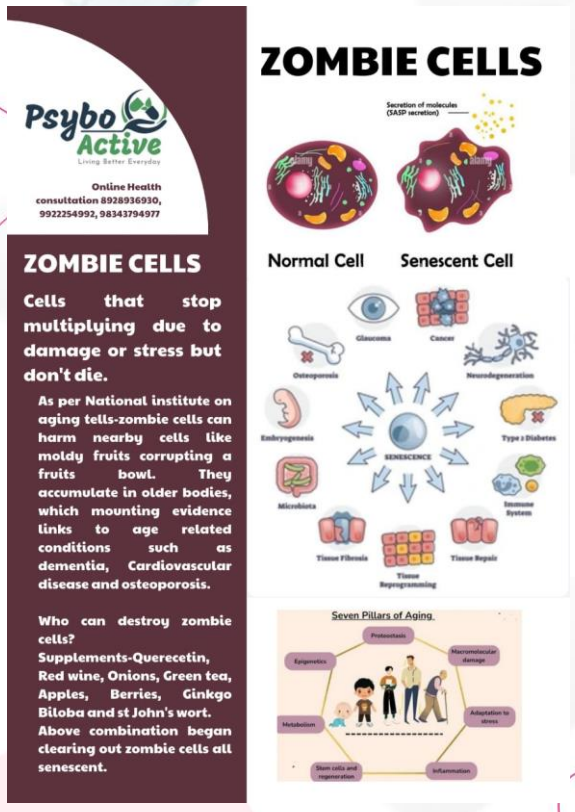
Covance has a team of over 1,000 professionals in India, including clinical research associates, project managers, and data managers. The company has experience in conducting clinical trials across various therapeutic areas, including oncology, neuroscience, and immunology.

Veeda Clinical Research: Veeda Clinical Research is a full-service CRO that offers a wide range of clinical research services to pharmaceutical and biotechnology companies. The company has a strong presence in India, with offices in Ahmedabad, Mumbai, and New Delhi. Veeda Clinical Research has experience in conducting clinical trials across various therapeutic areas, including cardiology, oncology, and respiratory diseases.

Novotech: Novotech is a leading Asia-Pacific CRO that offers a wide range of clinical research services to pharmaceutical and biotechnology companies. The company has a strong presence in India, with offices in Bangalore and Hyderabad. Novotech has experience in conducting clinical trials across various therapeutic areas, including oncology, respiratory diseases, and neurology.

SIRO Clinpharm: SIRO Clinpharm is a global CRO that provides clinical research services to pharmaceutical and biotechnology companies. The company has a strong presence in India, with offices in Mumbai, Pune, and Hyderabad. SIRO Clinpharm has experience in conducting clinical trials across various therapeutic areas, including oncology, cardiology, and infectious diseases.

GVK BIO: GVK BIO is a global CRO that provides a wide range of services, including drug discovery and development, clinical research, and contract manufacturing. The company has a strong presence in India, with offices in Hyderabad and Bangalore. GVK BIO has experience in conducting clinical trials across various therapeutic areas, including oncology, cardiology, and immunology.



Ministry of Health Govt. of India has prohibited 14 Fixed Dose Combination (FDC) vide notification dated 2nd June 2023

1. Nimesulide + Paracetamol dispersible tablet
2. Amoxicillin + Bromhexine
3. Pholcodine + Promethazine
4. Chlorpheniramine maleate+ Ammonium chloride+ Menthol
5. Chlorpheniramine maleate+Codeine Syrup
6. Ammonium chloride + Bromhexine + Dextromethorphan
7. Bromhexine + Dextromethorphan+ Ammonium Chloride + Menthol
8. Dextromethorphan + Chlorpheniramine + Guaiphenesin + Ammonium Chloride
9. Paracetamol + Bromhexine + Phenylephrine + Chlorpheniramine+ Guaiphenesin
10. Salbutamol + Bromhexine
11. Chlorpheniramine + Codeine phosphate + Menthol syrup
12. Phenytoin + Phenobarbitone sodium
13. Ammonium chloride + Sodium Citrate + Chlorpheniramine maleate + Menthol Syrup

Magnetic Nanoparticles as MRI Contrast Agents

Mr. Akshith
M.Pharm Sem II
Dept. of Pharmaceutics

Magnetic Resonance Imaging (MRI) is one of the most powerful techniques in medical imaging, due to its noninvasiveness and radiation-free nature. Compared with other clinical imaging techniques, MRI presents several advantages associated with image flexibility and high spatial resolution, good contrast in soft tissues and also the ability to provide information related to blood circulation and blood vessels. On the other hand, its major disadvantage is the low sensitivity, However, in recent decades, several types of contrast agents have been developed to improve the MRI sensitivity and enhance the information present in the images, namely by using magnetic ions and magnetic nanoparticles (NPs)

Contrast agents based on Gadolinium (III), so called Gd (III)-based (GBCAs), are among the most widely used contrast agents in MRI. About 40% of MRI scans are performed with GBCAs, and, in the case of neuro MRI exams, GBCAs are used about 60% of the time. However, GBCAs have raised various toxicity concerns associated with systemic fibrosis.

Magnetic Properties

The main advantages of NPs are associated with their high surface-to-volume ratios. Through several studies, it has been stated that the saturation value of magnetization builds up linearly with particle's dimensions, until it achieves a bulk value. On the other hand, the shape of the particle affects the magnetic properties, and the correlation between magnetization (M) and geometry remains a subject of study for biomedical applications. Regarding the magnetic properties, NPs are usually designed as paramagnetic, diamagnetic, ferromagnetic, ferrimagnetic and antiferromagnetic

Magnetic nanoparticles as MRI contrast agents

When a strong magnetic field is applied to a sample (in clinical diagnosis, magnetic fields of 1.5 or 3 T are usually used), the magnetic field aligns the magnetic moments of protons in the sample, producing an equilibrium magnetization along the longitudinal axis. A RF pulse, at a resonant frequency (5–100 MHz) capable of transferring energy to protons, can then rotate their magnetic moments away from the longitudinal axis, in phase, to an angle called the flip angle.

For strong T_2 contrast effects, it is desirable for nanoparticles to have large magnetization values. Under an external magnetic field, magnetic nanoparticles are magnetized, and they subsequently generate induced magnetic fields, which cause local magnetic perturbations. Because the precession frequency (ω_0) of the water proton is determined by the strength of the external magnetic field, this inhomogeneity of the magnetic field causes proton nuclear spins to precess at different frequencies. Consequently, the dephasing process of the proton nuclear spins is accelerated with a faster T_2 relaxation process.

Methods

Iron Oxide Nanoparticles

NPs are spherical nanostructures with a size between 1 and 100 nm, making them comparable to biomolecules. Furthermore, they present unique physical and chemical properties which arise from the fact that a great proportion of their atoms is present on the Nano architecture surface. These distinct attributes, along with their reduced size, have made these Nano formations a widely studied material in biomedicine, particularly as diagnostic, therapeutic tools. Nevertheless, only a few elements can be used for such applications due to toxicity problems. Within this context, iron oxide NPs have demonstrated great potential, especially as MRI contrast agents, since they possess low toxicity, biodegradability, chemical stability under physiological conditions, and a fast response when an external magnetic field is applied.

Another approach was considered by Basly et al. Here, the authors covalently bonded hydrophilic PEGylated Dendron's to SPIONs, using a phosphonate anchor (Figure1). The dendritic molecules were selected because they were discrete and monodisperse entities, not only exhibiting adjustable characteristics, but also permitting distinct as well as reproducible poly functionalization to be made at their periphery. On the other hand, the phosphonate coupling agent was chosen since it provided a strong binding, stabilized suspension within water at a physiological pH, and conserved the magnetic properties of the nanostructures

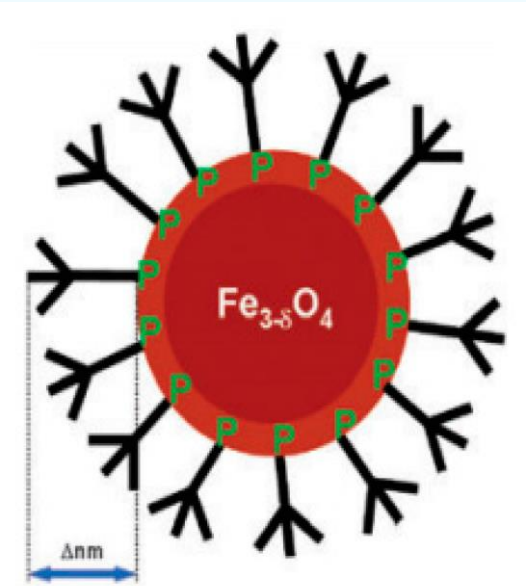


Figure 1. Illustration representing a hydrophilic pegylated dendrons covalently bonded to an iron oxide nanoparticle via a phosphonate anchor.

Synthetic Antiferromagnetic Nanostructures

More recently, the use of antiferromagnetic nanoarchitectures as T_1 contrast agents has also been studied by various researchers. For example, Na et al. synthesized antiferromagnetic MnO nanoparticles, presenting dimensions from 7 until 25 nm and possessing a PEG-phospholipid casing

Here, the relaxivity associated with these spherical nano formations was evaluated in a 3.0 T human clinical scanner. Additionally, their suitability as in vivo MRI contrast agent was assessed in a mouse. It was observed that these NPs were feasible T_1 contrast agents, demonstrating no significant toxic effects at concentrations under 0.82 mM in eight human cell lines comprising various tissues. Moreover, through their combination with a tumor-specific antibody, the authors were able to selectively enhance the contrast in T_1-weighted MRI on with breast cancer cells situated in a mouse metastatic brain tumor, into which the nanoparticles with functional groups were intravenously administered

Magnetic nanoparticles for multi-modal imaging

Magnetic nanoparticle-based multi-modal imaging can be categorized into two different approaches

One utilizes magnetic nanoparticles conjugated with secondary imaging components.These nanoparticles are designed to induce adequate signals in multiple imaging modalities, which can have the desired high spatial resolution (e.g., MRI) and sensitivity (e.g., optical, PET, or SPECT). When these signals are combined in a complementary manner, the biological targets can be imaged with high accuracy. The other approach uses the inherent magnetic properties of magnetic nanoparticles as a source of multi-modal imaging signals without additional imaging moieties. With the advance of several new imaging techniques (e.g., MPI, MMUS, and MPA), which can directly visualize nanoparticles, the location of the magnetic nanoparticles can be determined.

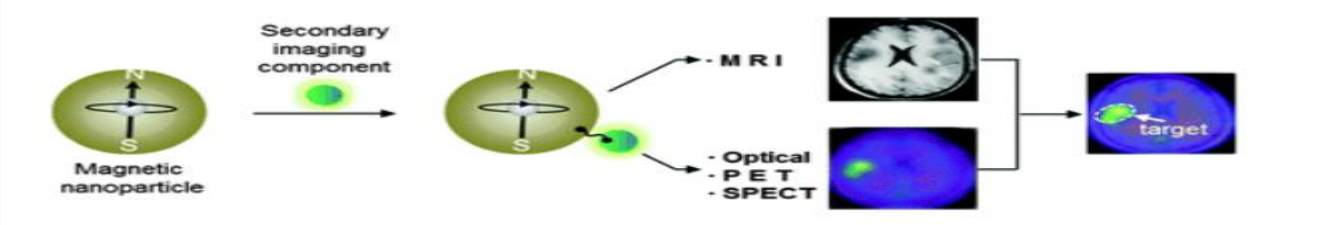
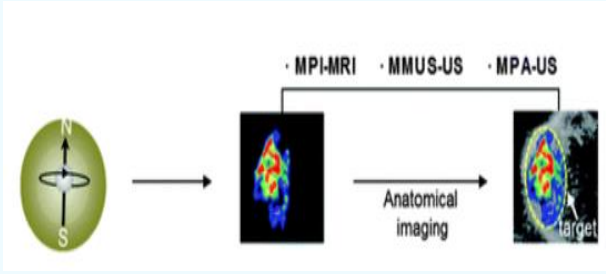


Figure 2(a) Magnetic nanoparticles combined with secondary imaging component (e.g., fluorescent tag or radioisotope) can generate imaging signals for multiple imaging modalities. These complementary signals allow the enhanced imaging accuracy of targets.



(b) Magnetic nanoparticles are first located with non-traditional imaging techniques such as MPI, MMUS, or MPA. Subsequently, in combination of anatomy information provided by either MRI or US, nanoparticle imaging agents can visualize biological targets in the region of interest.

Magnetic nanoparticle-assisted multi-modal ultrasound imaging

Ultrasound (US) imaging is one of the most widely used biomedical imaging techniques in clinical practice, such as angiography, echocardiography, and metastatic tumor detection. US has several advantages, including real-time imaging capability, high resolution, reasonable penetration depth, cost effectiveness, and portability. However, conventional US has a drawback due to its limited sensitivity. US contrast agents, such as liposomes, perfluorocarbon droplets, and microbubbles, have been examined, but their contrast enhancement effects are still insufficient to clearly detect subtle biological differences in pathology. Recent reports suggest that the sensitivity of US can also be improved by magnetic nanoparticles.

This magnetic nanoparticle-assisted multi-modal US imaging is promising for visualizing biological events at the cellular and molecular level in real time. Two representative multi-modal US imaging techniques have been introduced: (i) magneto-motive ultrasound (MMUS)–US and (ii) magneto-photoacoustic (MPA)–US.

T_1–T_2 dual-mode MRI contrast agents

Conventional nanoparticle MRI contrast agents typically serve as single-mode contrast agents, generating either bright (T_1) or dark (T_2) signal enhancement. Frequently, even with the use of contrast agents several issues still need to be addressed to achieve the desired image quality. To overcome such ambiguities and accurately interpret the MRI images, T_1–T_2 dual-mode contrast agents have been introduced

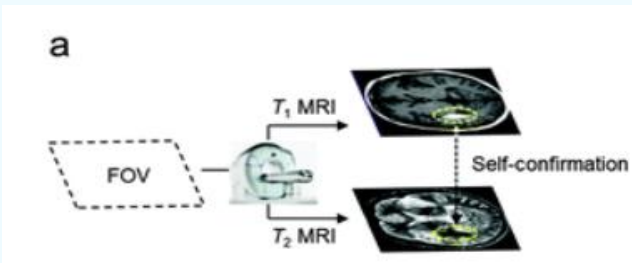
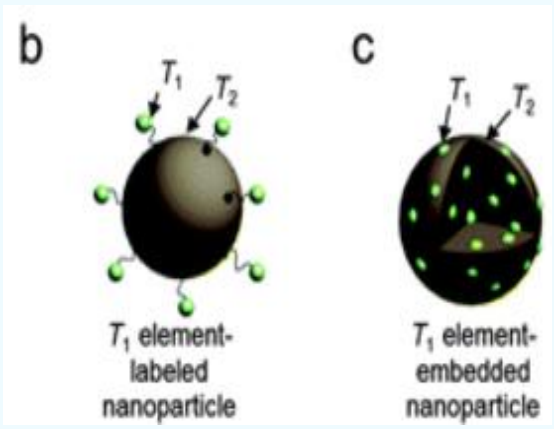


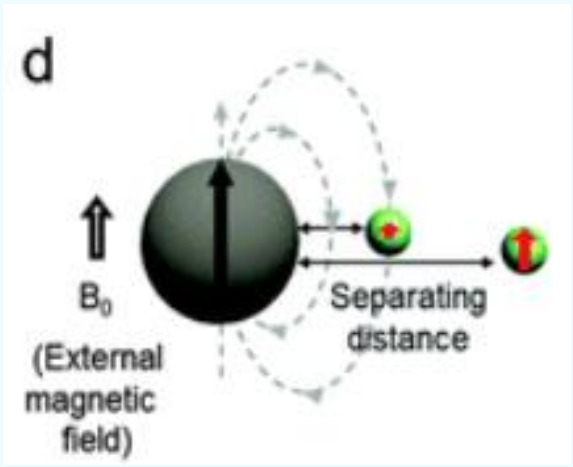
Fig. 3 Basics of T_1–T_2 MRI dual-modal imaging. **(a)** Conceptual sketch of dual-modal MRI. Two images from T_1 and T_2 scans of a field-of-view (FOV) are obtained using an MRI instrument. The T_1–T_2 dual-mode contrast agents provide simultaneously bright (T_1) and dark (T_2) contrast effects in the respective scans. An overlay of the concurrently high T_1 and T_2 signals can help distinguish biological targets from the surroundings

These dual-mode contrast agents provide complementary T_1-weighted and T_2-weighted MRI images that enable self-confirmation of the signals from the contrast agents (figure 3).

These multi-mode MRI contrast agents are designed for a single instrument and have some advantages. For example, there are no discrepancies in the penetration depth between T_1 and T_2 images and no image mismatch issues which can occasionally occur when moving a sample between different imaging instruments. These characteristics of T_1–T_2 dual-mode contrast agents can be achieved by exploiting the



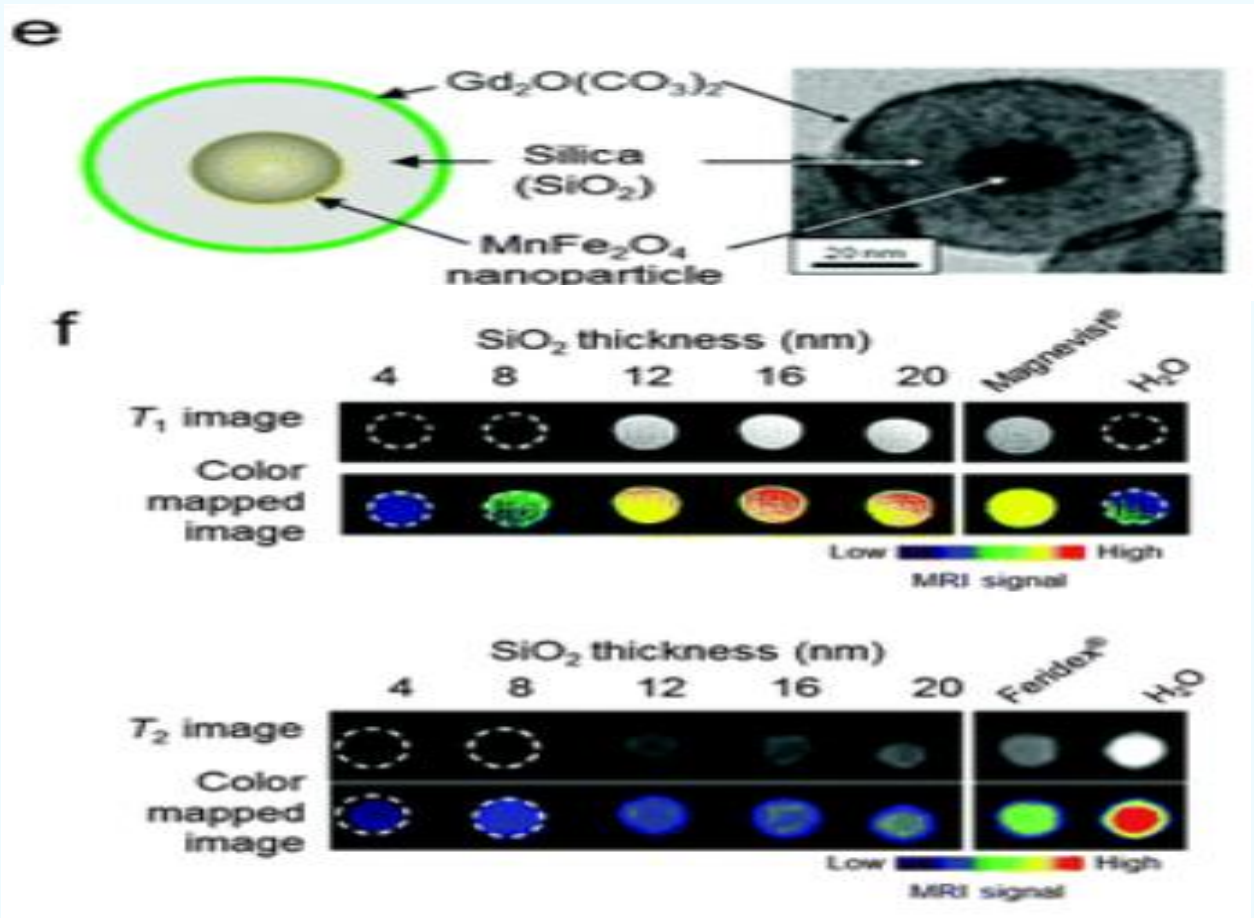
b,c: An overlay of the concurrently high T_1 and T_2 signals can help distinguish biological targets from the surroundings. **(b and c)** Schematic illustrations of the two types of conjugated T_1–T_2 dual-mode contrast agents



d) Distance dependent magnetic coupling between T_1 and T_2 elements. The magnetic spins of the T_1 element are perturbed by the T_2 element-induced magnetic field when two elements are located in close proximity

Conjugated T_1–T_2 dual-mode contrast agents. A simple way to construct T_1–T_2 dual-mode contrast agents is the direct conjugation of T_1 elements (e.g., Gd- or Mn-based chelates) and T_2 elements (e.g., metal ferrite magnetic nanoparticles). To date, two different cases of conjugated T_1–T_2 systems have been reported.

One is constructed by labeling T_1 signaling elements on magnetic nanoparticles (fig.3b). Gd–DTPA (Magnevist®), a representative Gd chelate-based T_1 MRI contrast agent, is covalently attached to dopamine-coated iron oxide nanoparticles via isothiourea (SCN) linkage chemistry. The resultant Gd-labeled magnetite nanoparticles show both T_1 and T_2 contrast effects with an r_1 value of 11.17 mM^{-1} s^{-1} (Gd) and an r_2 value of 30.32 mM^{-1} s^{-1} (Fe), generating T_1–T_2 dual-mode MRI images in vivo.



(e) The magnetically decoupled core–shell type T_1–T_2 dual-mode contrast agents (DMCAs) and the corresponding TEM image. **(f)** T_1 and T_2 MRI images of T_1–T_2 DMCAs with different thicknesses of the separating SiO_2 layer.

Advantages and Applications

High Contrast: Magnetic nanoparticles can provide a higher contrast compared to traditional MRI contrast agents, allowing for better visualization of tissues and improved diagnostic accuracy.

Targeted Imaging: Magnetic nanoparticles can be modified with ligands or antibodies to specifically target certain tissues or cells, enabling targeted imaging and diagnosis of diseases.

- **Theranostic Applications:** Magnetic nanoparticles can serve dual purposes by acting as both contrast agents and therapeutic agents. They can be loaded with drugs or therapeutic agents and guided to specific sites for targeted therapy.
- **Long Blood Half-Life:** Magnetic nanoparticles can have a longer blood half-life compared to traditional contrast agents, allowing for prolonged imaging time.
- **Reduced Toxicity:** With appropriate surface coating and functionalization, magnetic nanoparticles can exhibit reduced toxicity.

RARE EXPENSIVE COFFEE TYPES

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Coffee is one of the most popular and widely consumed beverages in the world. Coffee got its name from the Arabian Peninsula, where coffee beans were first cultivated. The word "coffee" is thought to come from the Arabic word for wine, confirming that coffee was once considered an intoxicating beverage

The Coffee trees are pruned short to conserve their energy and aid in harvesting, but can grow to more than 30 feet (9 meters) high. Each tree is covered with green, waxy leaves growing opposite each other in pairs. Coffee cherries grow along the branches. Because it grows in a continuous cycle, it's not unusual to see flowers, green fruit and ripe fruit simultaneously on a single tree. Coffee contains caffeine, a natural stimulant that can enhance alertness and reduce fatigue. It is known for its distinct taste, often described as bitter or acidic, but can also have subtle notes of sweetness, fruitiness, or chocolate, depending on the variety and brewing method. Different regions and growing conditions contribute to the unique flavors found in coffees from around the world. Coffee is a fruit - Despite it being called a 'bean', coffee is actually a fruit. The 'beans' grow on a bush and are found in the centre of a berry, known as a coffee cherry.

Fig 1 : Coffee Varieties

TIMELINE OF COFFEE:	
6th Century	Coffee is believed to have been discovered in Ethiopia
9th Century	Coffee cultivation and trade begins in Arabia
13th Century	Coffee drinking becomes popular in Egypt and Syria
16th Century	Coffee reaches Europe, initially meeting with skepticism
17th Century	Coffee become widely consumed in Europe and entered the Americas
18th Century	Coffee houses become popular social gathering places in Europe
19th Century	Coffee plantations increases in Latin America and Africa
20th Century	Instant Coffee is invented, making coffee consumption even more convenient.

Esmeralda Special Geisha

The Esmeralda Special Geisha is made from the Geisha (or Gesha) coffee variety, which originated in Ethiopia and gained popularity for its unique and captivating taste. The Geisha plants at Hacienda La Esmeralda were initially planted as an experiment, but they produced coffee beans with extraordinary qualities that quickly gained international recognition.

The flavor profile of Esmeralda Special Geisha is often described as complex, delicate, and highly aromatic. Due to its exceptional taste and limited availability, Esmeralda Special Geisha is considered one of the most expensive and exclusive coffees in the world.

Process of Esmeralda Special Geisha

The process of producing Esmeralda Special Geisha coffee involves several key steps to ensure the preservation and enhancement of its unique flavors. Here is a general overview of the process:

Cultivation: Esmeralda Special Geisha coffee is grown on the Hacienda La Esmeralda estate in Boquete, Panama. In coffee development process, climate & soil condition will play vital role.

Harvesting: The coffee cherries are hand-picked and they should choose only the ripest cherries, ensuring that only the highest-quality beans are harvested. After harvesting, the coffee cherries go for some processing method.

Fig2: **Esmeralda Special Geisha plant**

Fig 3 : Esmeralda Special Geish coffee bean

Two common processing methods used for Esmeralda Special Geisha are:

Washed Process: In this method, the outer skin and pulp of the coffee cherries are removed through pulping. The beans are then fermented in water for a specific period to remove any remaining fruit residue. After fermentation, the beans are thoroughly washed and then dried.

Natural Process: The whole coffee cherries are carefully spread out to dry, usually on raised beds. The cherries are dried with their skin intact, allowing the beans to absorb flavors from the fruit. This process takes longer than the washed method and requires careful monitoring to prevent over-fermentation.

Drying: The washed beans are spread out to dry in a carefully controlled environment. They can be dried on raised beds or using mechanical dryers. This step is crucial to achieve the desired moisture content of around 10-12%

Sorting and Quality Control: The cherries undergo sorting to remove any damaged or under ripe cherries, ensuring only the highest quality ones proceed to the next

Milling: The sorted beans are milled to remove the parchment layer that encases the green coffee beans.

Sorting (Again): After milling, the beans undergo another round of sorting to remove any remaining defects or impurities.

Packaging: The processed Esmeralda Special Geisha coffee beans are carefully packaged to preserve their freshness and flavor. They are often packaged in airtight bags or containers to protect them from exposure to moisture, air, and light

Health benefits of Esmeralda Special Geisha:

Antioxidant-rich: Like other coffee varieties, Esmeralda Special Geisha coffee contains antioxidants, such as chlorogenic acid and polyphenols. These compounds help combat oxidative stress and may contribute to overall health and well-being.

Physical performance: Caffeine has been shown to enhance physical performance and endurance. Drinking Esmeralda Special Geisha coffee before exercise may help improve stamina and reduce fatigue.

Kopi Luwak coffee price starts at $160 per pound and reaches up to $600 for the most expensive types.

Fig 4: Civet Cat

1. Kopi Luwak

The origin of kopi Luwak is closely connected to the history of coffee production in Indonesia. Popularly known as civet coffee, this is arguably the most expensive coffee in the world, but also quite possibly the most disgusting one.

Kopi Luwak coffee that consists of partially digested coffee cherries, which have been eaten and defecated by the Asian palm civet (Paradoxurus hermaphroditus).

Process of Kopi Luwak:

Harvesting:

The process starts with the palm civet selectively eating the ripest coffee cherries from coffee plantations. The civets are attracted to the sweet pulp surrounding the coffee beans.

Digestion and Fermentation: The Coffee beans undergo the process of digestion inside of civet digestive system.

Defecation: The civet excretes the coffee beans along with its feces. The beans are usually found intact, although they may have undergone some changes due to the digestion and fermentation process

Collection: The collected feces are carefully inspected, and the coffee beans are separated from the fecal matter. They washed thoroughly and cleaned to remove the impurities.

Drying: After washing, the coffee beans are dried either by sunlight or through mechanical drying methods.

Roasting: The dried beans undergo the roasting process to develop the desired flavor and aroma. Roasting also helps to kill any remaining bacteria or contaminants.

Grinding and Brewing: Once roasted, the coffee beans are ground and brewed like regular coffee. The resulting coffee is typically brewed using methods such as drip brewing, French press, or espresso.

Health benefits of Kopi Luwak

1. Antioxidant properties: Coffee, in general, contains antioxidants that can help protect the body against damage caused by free radicals. However, the specific antioxidant content of Kopi Luwak coffee may not differ significantly from regular coffee.

2. Mental alertness and focus: Like other coffee varieties, Kopi Luwak coffee contains caffeine, which can provide a temporary boost in mental alertness and improve focus and cognitive performance.

3. Potential mood enhancement: Coffee consumption has been associated with a lower risk of depression and improved mood in some individuals. While Kopi Luwak coffee may have similar effects, it's important to note that individual responses can vary

Faculty of Pharmacy
RAMAIAH UNIVERSITY OF APPLIED SCIENCES

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SCINTILLA

3D BIO PRINTING

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Three-dimensional (3D) bioprinting is the use of methods similar to 3D printing to mix cells, growth factors, and/or biomaterials to create biomedical parts, frequently with the goal of mimicking the properties of natural tissue. Typically, 3D bioprinting uses a layer-by-layer technique to deposit substances known as bio-inks to produce tissue-like structures that are subsequently used in many medical and tissue engineering sectors. The process of building a three-dimensional object from a CAD model or digital 3D model is known as additive manufacturing, or 3D printing. It can be done via a variety of techniques in which material is placed together (such polymers, liquids, or powder grains being fused), often layer by layer, and then deposition, joining, or solidification are all controlled by computers.

Since the 1980s, the concept of bioprinting tissues and organs has been amazing and very promising. The first commercial 3D printers and bioprinters were created in the late 1980s, and research and development are still ongoing.

Computer Aided Design (CAD) technology is a prerequisite for 3D printing, and CAD tools are used to convert digital images into 3D structures. Then, 3D printers and bioprinters can create 3D structures at the microscale and even the nanoscale with greater flexibility and efficiencyIn the past 20 years, this concept has evolved to include printing biological structures as bioprinting, and a number of bioprinting techniques have been developed, including stereolithography, extrusion, inkjet, laser, and droplet-based techniques for tissue and tissue substitutes, and they have been used in settings ranging from lab benches to clinical settings.

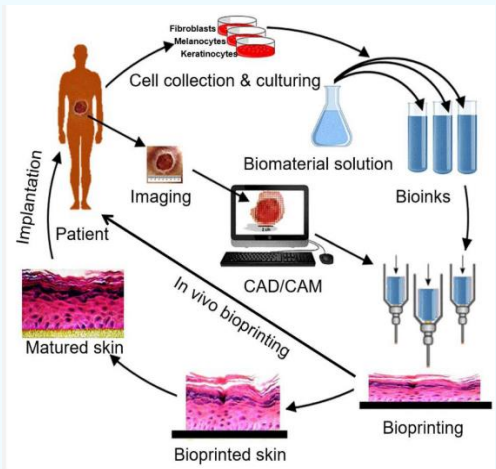


Figure 1: - The 3D Bioprinting Process of Skin Tissue

Information and Methods Of 3D Bioprinting:

Despite the fact that all bioprinting techniques yield comparable results, they can nonetheless be divided into different groups according to how they distribute the printing. The three basic categories for bioprinting techniques are extrusion-based [mm], droplet/inkjet-based, and laser-based. As the industry has grown, commercial 3D bioprinter manufacturers have assessed the characteristics that make up the best bioprinting process. Industry experts claim that the ideal bioprinter should have the following qualities: a high degree of motion freedom, high resolution and accuracy, high-speed motion, simultaneous dispersion of multiple bioinks, ease of use, a reasonable size, an easy sterilisation process, the ability to be fully autonomous, a reasonable cost, and versatility. As previously indicated, the printing process is automated by computers using a variety of languages, including AutoCAD, G-Code, and LabVIEW. The building of the structure using bioinks and the verification and validation of the tissues using imaging methods like microscopy are the last steps

Bio Printing of Skin Tissue: -

The epidermis and dermis make up the majority of the human skin's structure, with subcutaneous tissue making up the third region. Such a structure protects the body from UV ray exposure, keeps skin from drying out, and serves as a barrier to keep toxins, infections, and other harmful substances out of the body. The immune system's initial line of defence is also referred to as the skin.

The majority of the keratinocytes that make up the epidermis' upper layer are organised in keratinized stratified squamous epithelium. The epidermis develops from the inside out, with mature cells at the surface and growing keratinocytes in the basal layer at the bottom. The basement membrane serves to separate the epidermis from the dermis. In the stratum corneum, the proliferative cells differentiate in a stepwise fashion, with the more recent, undifferentiated cells at the bottom and the terminally differentiated cells towards the outside. Melanin is a pigment released by melanocytes that serves as protection against UV radiation.

Dermal papillae, which protrude through the epidermis and create ridges that leave fingerprints when perspiring, are found in the upper papillary dermis, which is composed of loose connective tissue.

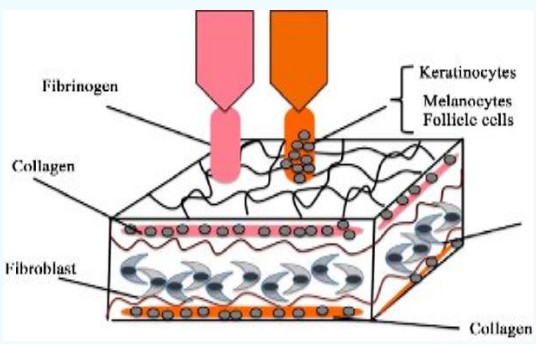


Figure 2: - Skin Bioprinting for Functional Skin

The development of a skin construct in a laboratory assumes significant significance due to the skin's resilience and vitality. Artificial skin grafting, which can serve as a bandage for burn and wound healing, was one of the first innovations in this sector.

3D Bioprinting of skin tissue: - Pre-processing:

For the successful production of 3D skin tissues, cell selection, material selection, and pre-design of the process are essential before the printing process of skin tissue. The sections that follow are meant to introduce:

1) the cells necessary to produce an in-vitro skin equivalent successfully.

2) acceptable materials for skin equivalent preparation; and

3) pre-design strategies such as imaging techniques, blueprint modelling approaches, and toolpath planning design methods.

Bioprinting in three dimensions: -

The processing stage simulates the actual 3D bioprinting of skin tissue, which creates a 3D tissue construct by layer-by-layer patterning of cell-rich bioinks. The most widely utilised bioprinting methods for creating skin tissue include extrusion bioprinting, droplet-based bioprinting, and bioprinting with laser assistance.

Maturation of skin tissue after processing: -

In order to create completely functional biomimetic skin, the printed skin component must undergo post-processing. It promotes the growth and differentiation of keratinocytes, which has a significant impact on the structural and mechanical characteristics of printed skin tissues.

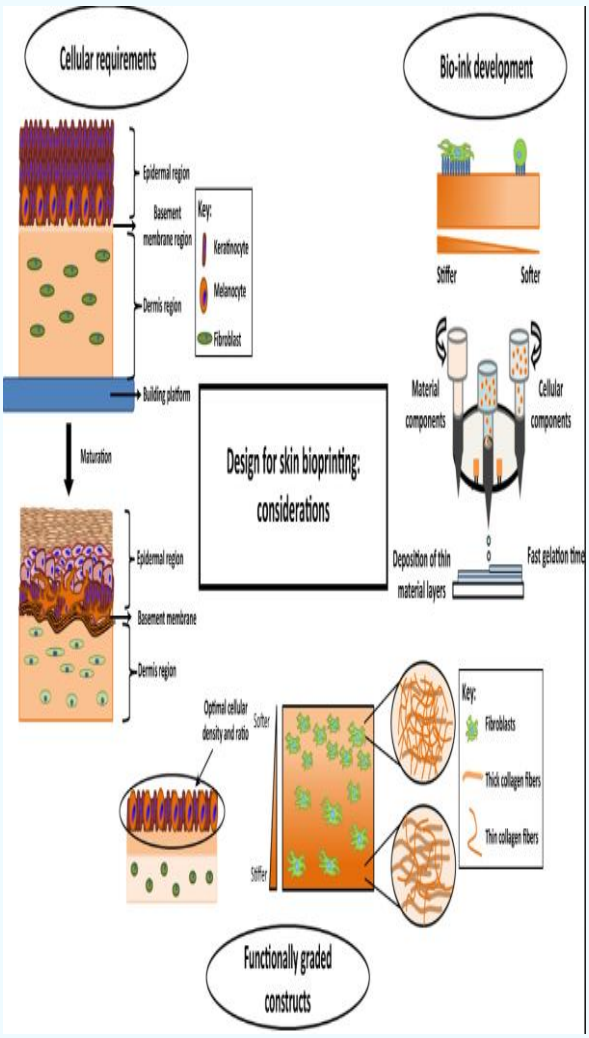


Figure 3: Design for Skin Bio printing Considerations

3D bioprinting's potential for tissue regeneration in the future: -

A promising component of the future of individualised and regenerative medicine is the use of bio fabricated scaffolds on which cells are grown, even though the promise of 3D printed organs is still decades away.

In reality, there are multiple steps in the 3D bioprinting process from the beginning to the end. Pre-printing, bioprinting, and post-printing are three categories that they fall under. Sub steps are listed in this process.

To guarantee that the cells are of the right quality, the pre-printing stage is crucial. Bioink, bioprinters, and the bioprinting process are stages in the bioprinting process that are influenced by physical-chemical, biological, and other process-based characteristics. Bio printed materials are moved to bioreactors as a part of the post-printing stage as a result of the bioprinting procedure.

At this point, stimulation is necessary to induce tissue maturation, and biosensors can assess the functionality, stiffness, and stability of produced tissue and organs. Using this technology, significant tissues including bone, skin, and heart tissue have already been created and transplanted. Complex processes, such as cultivation in hydrogels, spheroids, membranes, 3D porous scaffolds, and 3D fibrous scaffolds, are completed in the formation of a 3D bio-printed model from 2D cell culture.

Dental applications, the creation of tissue and organ models, the production of medical devices, the creation of anatomical models, and drug formulations are all examples of 3D bioprinting in medical settings. By creating patient-specific treatments by simulating in vitro models of cancer more closely, 3D bioprinting is thought to be a technique that can help cancer patients with their problems. The quantity of papers for medical 3D printing technology shows that it is still developing quickly.

Steps In Bio printing		
Pre-printing Stage	Bioprinting Stage	Post Printing Stage
Tissue biopsy	Bioink	Nutrient/oxygen supply
Stem cell differentiation/expansion	Bio printer	Stimulation

Microcarriers, hydrogels, cell aggregates, and decellularized matrix components are identified as the four different kinds of bio-inks. Bio-inks should have specific qualities, such as viscoelasticity, flexibility, thermoresponsivity, shear-thinning, and self-healing, due to the chosen bioprinting method.

Typically, bio-inks that don't contain living cells are used to provide scaffold for cell culture. Various hydrogels are common scaffold materials.

As a modified matrix and 3D environment for the typical growth of functional tissues, hydrogel-based networks can also be used.

The use of hydrogels in extrusion bioprinting is crucial since they typically exhibit non-Newtonian, shear thinning behaviour and are generally biocompatible.

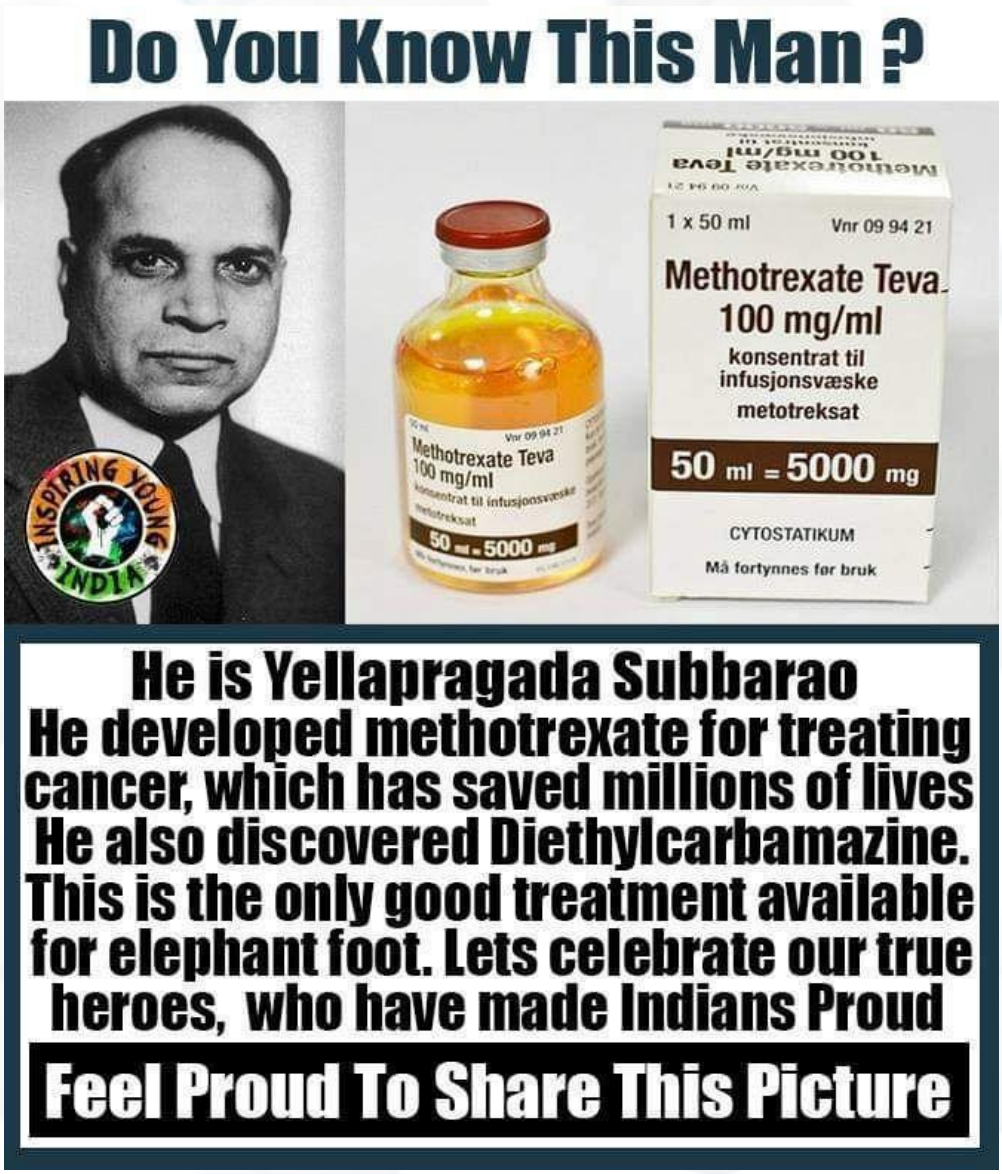
Most common bioinks and their applications: -	
Bioinks	Cell/Tissue Type
Alginate	Chondrocyte, cartilage
Collagen	Hepatocytes
Fibrin	Skeletal Muscle, Neural Tissues
Hyaluronic acid	Fibroblasts, bone cells
Poly(ethylene glycol)-PEG	Fibroblasts, cartilage
Gelatin	Bone, cartilage

Conclusion: -

In the past ten years, three-dimensional (3D) printing of biological structures has received a lot of interest, and applications in regenerative medicine have already begun. Although this technology is still in its early stages of development, it has enormous potential for use in biomedical applications such as tissue engineering, medication administration, and the production of cells, tissues, and organs. The 3D bioprinting of living tissues or organs continues to encounter considerable obstacles, such as unstable cellular behaviour and greater complexity when compared to non-biological printing processes, despite the rise in articles, patents, and research in this area. Researchers must collaborate in multidisciplinary teams including engineers, biomedical scientists, fundamental scientists, and medical practitioners in order to overcome these difficulties.

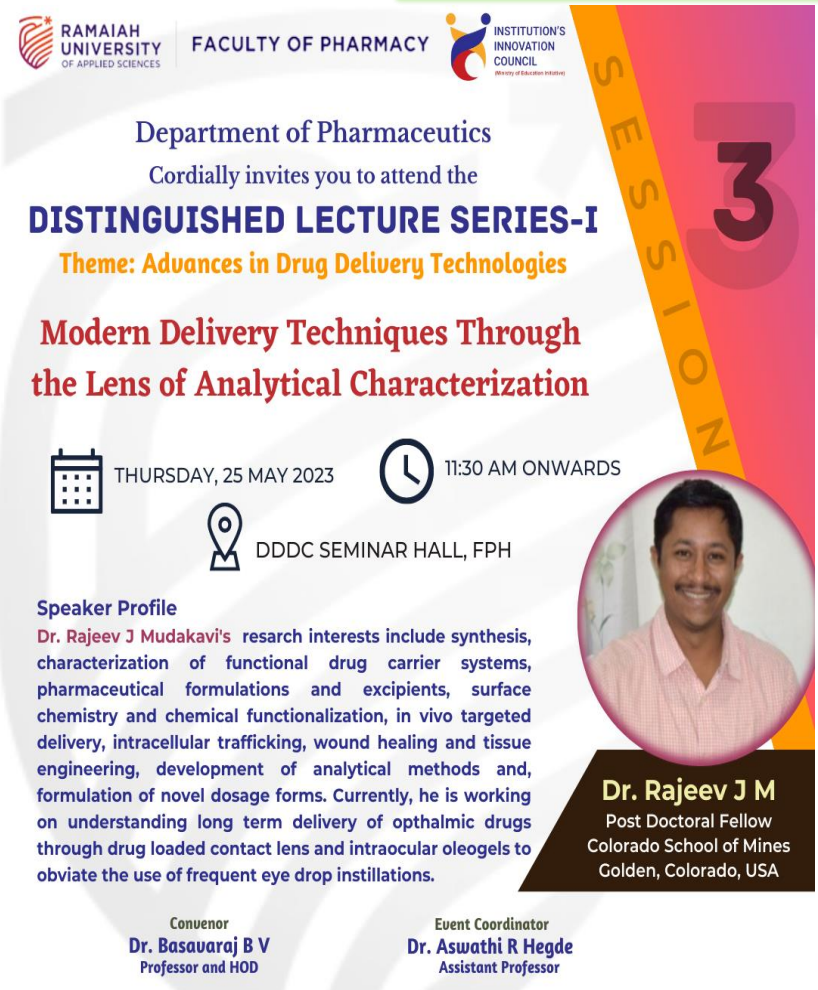
In situ bioprinting, also referred to as printing cells and biomaterials directly onto or within a patient, is one of the most significant issues associated with 3D bioprinting. In order to employ 3D printers in industry, hospitals, and academics, however, bioprinting technology must still be improved with regard to ethical concerns and relevant laws. Before implementing created prototypes into commercial use, new regulations must be made.

Future research is anticipated to concentrate on improving 3D printing materials in terms of biocompatibility, mechanical characteristics, in situ bio printability, and sustainability of printed cells, tissues, and organs via vascularization process. The key barriers to the development of large, fully functional tissues and organs are the preservation of cell viability, vascularization, and cell migration. For the realisation of in vivo applications of 3D bioprinting, particularly vascularization must be established as it is connected to the nutrient diffusion process. Additionally, novel bioinks were continuously being developed for use as cutting-edge scaffolds or in original cell and tissue applications. With these upgrades, 3D bioprinting technology will represent a paradigm shift in medical practise.



Department Buzz

Distinguished Lecture Series - I



Department of Pharmaceutics at Faculty of Pharmacy, Ramaiah University of Applied Sciences is committed to keeping up with the rapidly changing scientific environment in order to develop efficient drug delivery systems. Resonating with this idea, we are organizing a Distinguished Lecture Series comprising of eminent speakers with accomplished research experience in formulation development and drug delivery research and drug delivery research.

In this context, we had seminar on the topic "*Modern Delivery Techniques Through the lens of Analytica Characterization*" by **Dr. Rajeev J Mudakavi, Post Doctoral Fellow, Colorado School of Mines, Golden, Colorado, USA on Thursday, 25 May 2023 at DDDC Seminar Hall, Faculty of Pharmacy, Ramaiah University of Applied Sciences, Bengaluru**.

An alumnus of FPH, Dr Rajeev is an avid researcher. In the seminar, he spoke on the importance of antibiotic resistance and the development of engineered drug loaded particulate systems to target intracellular bacteria such as *Salmonella* and *M. tuberculosis* through pulmonary and oral routes. He emphasized the prospects of using meaningful analytical characterization techniques for assessing the developed nanoformulations. He also went on to discuss the development of long-term delivery of ophthalmic drugs through drug loaded contact lens and intraocular oleogels to obviate the use of frequent eye drop instillations.

Department of Pharmaceutics, Faculty of Pharmacy, MSRUAS would like to thank the Guest speaker as well as all the participants who joined this session. PG students, research scholars and Faculty members participated in the event.

Department Buzz

Value Added Course:

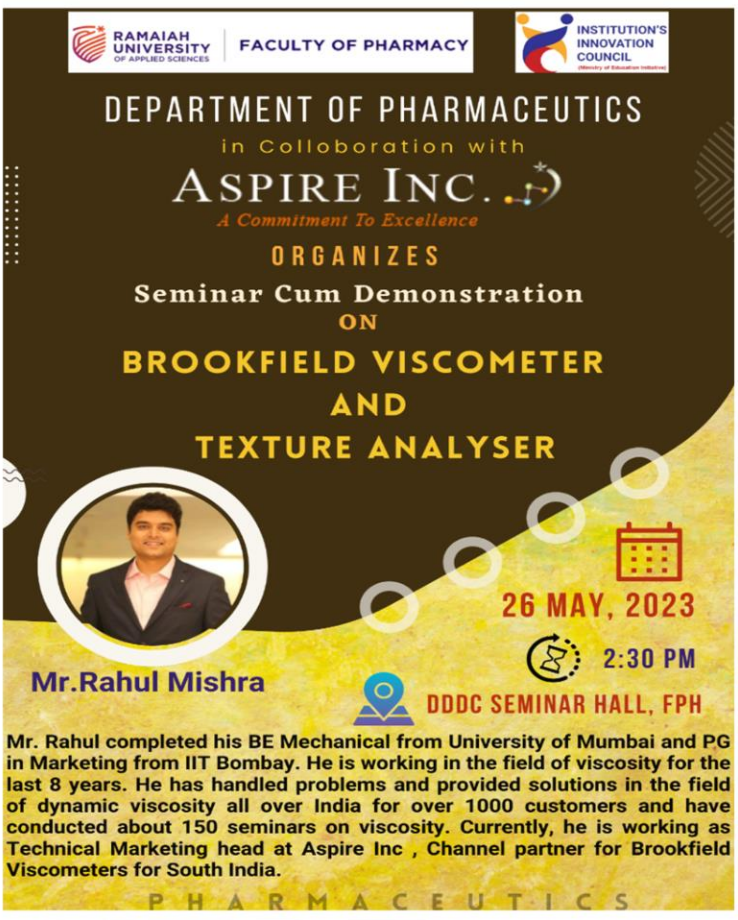
Seminar Cum Demonstration On Brookfield Viscometer

Department of Pharmaceutics at Faculty of Pharmacy, Ramaiah University of Applied Sciences in collaboration with Aspire Inc., Bengaluru organized a seminar cum demonstration on Brookfield Viscometer and Texture Analyzer at DDDC Seminar Hall, Faculty of Pharmacy, RUAS, Bengaluru.

The speaker for the event was **Mr. Rahul Mishra**, Technical Marketing Head, Aspire Inc., and Channel partner for Brookfield Viscometers for South India. Mr. Rahul introduced the concept of rheology and the various parameters to determine the flow of liquids and semisolids. He further discussed the construction and working of various viscometers and particularly the Brookfield viscometer. He also explained the working of texture analyzer.

The seminar was followed by a demonstration of the Brookfield viscometer offered by Aspire Inc. where students were given hands-on experience of using the viscometer.

Department of Pharmaceutics, Faculty of Pharmacy, MSRUAS would like to thank the Guest speaker for delivering this seminar cum demonstration. PG students, research scholars and Faculty members from Department of Pharmaceutics participated in the event.



Department Buzz

Value Added Course:

"Contemporary approaches to Pharmaceutical Marketing"

The goal of modern marketing goes beyond only acquiring new clients. To build a more sustainable business model, today's marketing methods also involve cultivating client loyalty and a sense of brand dedication. To introduce undergraduate students to the current practices followed by the marketing departments of various industries, the Department of Pharmaceutics at FPH conducted a 30-hour value-added course on the topic "Contemporary approaches to Pharmaceutical Marketing". 37 students B. Pharm-8th Semester attended the sessions held between 31st March to 14th June 2023.

The inaugural session was conducted by Mr. Mukesh Jain, Regional Manager of Novo Nordisk India Pvt. Ltd on the topic "The Evolving world of Pharma Marketing". Mr. Mukesh spoke in length about the ever changing facets and future probabilities in Pharma marketing.

DEPARTMENT BUZZ

ON ACCOUNT OF NATIONAL TECHNOLOGY DAY DEPARTMENT OF PHARMACEUTICS PRESENTED

PHARMA PACK

Department Buzz

Department Buzz

Ethnic Day

Department Buzz

INDUSTRIAL VISIT

For over 70 years, Bioplus has served the pharmaceutical industry with high quality products, service, and technology. While continuing to build our global partnerships in Contract Manufacturing and EU / ANZ pharma generic pharmaceuticals, they are increasingly focused on utilizing our advanced skill set in Biotechnology. Today they are a late-stage clinical phase company with 2 programs for large global unmet needs both of which are Clinical phase 3 ready. Bioplus intention is to partner with leading companies regionally or globally to optimize product market access. They also have a rich pipeline of pre-clinical programs.

Bioplus expect the next 5 years to be of significant growth as our global block buster Novel therapeutics come to market. Bioplus continue to invest substantially in R&D and Clinical Development with supporting CAPEX in Capacity and Capability expansion. Bioplus are scientifically curious, focused on our targeted clinical development and are enjoying the journey to learn more and contribute to the health and well being of all global citizens.

WORD HUNT

Crossword Puzzle

Across

2. We have parts without the person

3. Phlebotomists love to find them!

5. The department that likes both red and white

10. Pocket purse of hemoglobin

14. Round and round it goes

16. Has wings

19. Lab person in the know

20. Component of blood

21. When you need it, we make sure it's right for you

22. Not your average Q-tip!

24. A little 'buggy' department

25. You get the point

26. What we don't do, someone else will

Down

1. Point of one end, plunger on the other

4. Chocolate, Yellow or Black?

6. Not a 'Vampire'

7. The pee patch

8. All the better to see you

9. Our color is blue!

11. A little Lab gift

12. Right now!

13. Not a type of TV

15. Stop the germ spread

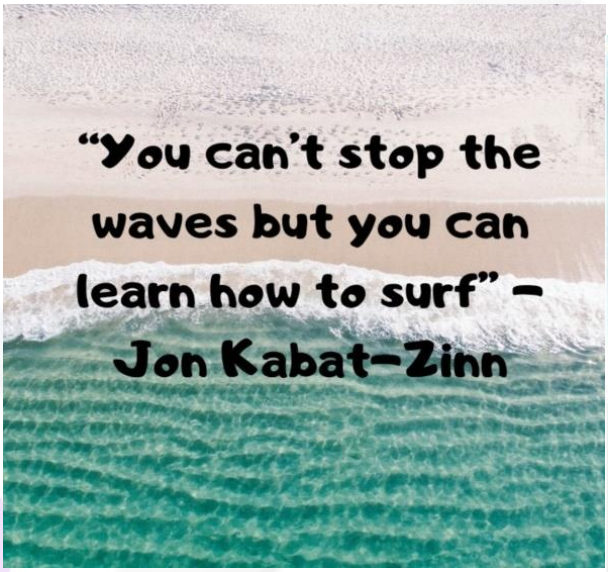
17. Yes, we can read wht the Doctor wrote on it...usually!

18. Some Lab garbage

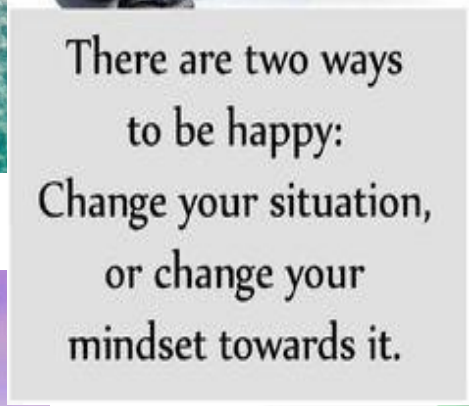
23. Can't live without it

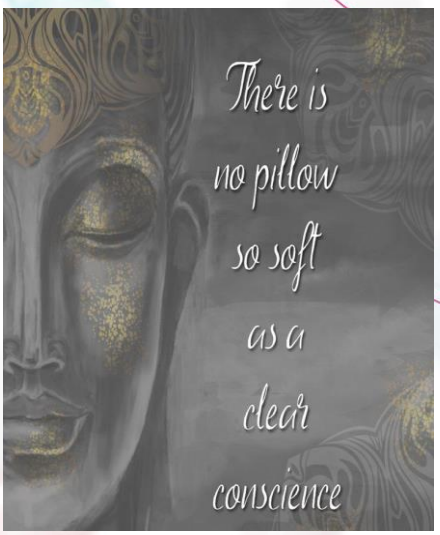
"You are braver than you believe, stronger than you seem and smarter than you think."
— A.A Milne

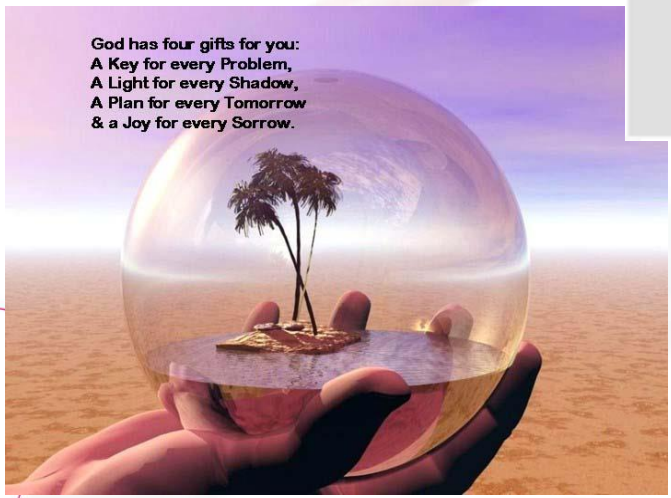
MINDUITION

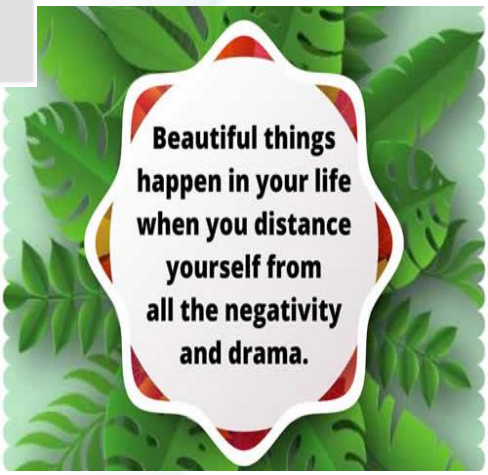

"You can't stop the waves but you can learn how to surf" - Jon Kabat-Zinn


Buddha's Teaching & Science


There are two ways to be happy:
Change your situation, or change your mindset towards it.


There is no pillow so soft as a clear conscience


God has four gifts for you:
A Key for every Problem,
A Light for every Shadow,
A Plan for every Tomorrow
& a Joy for every Sorrow.


Beautiful things happen in your life when you distance yourself from all the negativity and drama.


be wild and Beautiful
it's all in your hands


Let Good Thoughts Rise

EVERYONE WANTS TO EAT BUT FEW ARE WILLING TO HUNT

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RAMAIAH UNIVERSITY OF APPLIED SCIENCES

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