HAPPENINGS

A KUHS PUBLICATION ON RECENT ADVANCES

A SAMAGRAM INITIATIVE

Issue-2
January 2020

Message from Vice Chancellor

I am happy to note that the second issue of 'Happenings -A KUHS Publication on Recent Advances' is being brought out. This initiative has caught the fancy of academicians of the affiliated institutions of KUHS in a significant way as evidenced by the responses. The initiative, meant for strengthening the status of each stream of Health Science especially to assess what has happened in the past, and what is in store for us in the future, will definitely serve as an important outreach educational program of the University. I sincerely hope that this publication will be well received as the previous one.

Prof. [Dr.] Mohanan Kunnummal
Vice Chancellor, KUHS

CONTENTS

‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Allied Health Science
2. Speciality	Pathology, cytology and cytogenetics, stem cells
3. Date	9-10-2019
4. Title	Advances in regenerative medicine and tissue engineering
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
11. Suggested Structure of Article	1. Facing Sheet of the Article –attached the current page 2. Article on maximum TWO sides of an A4 Page - yes 3. Title of the Recent Advance Advances in regenerative medicine and tissue engineering 4. Source: review articles andpublications 5. Contributor’s Name (To be Published) : Dr Deepa R 6. A note on why it is relevant – included in the article as initial 2 paragraphs 7. Body of the article as 10 to 20 Bulleted Points - yes 8. References (2 to 3 nos.) – 2 relevant reference given at the end of write up

ADVANCES IN REGENERATIVE MEDICINE AND TISSUE ENGINEERING

Relevance

The scarcity of tissues and organs for transplantation, especially for patients with extreme wounds from accidents, wars, or natural disasters, where immediate treatment and care is required, have been identified as one of the major public health challenges. The major factors contributing to this issue is the traditional reliance on donated tissues and organs as well as immunological rejections of the donated organs. The restriction of endless supply of organs in such cases hampers the repair of destroyed organs and also hinders the progress in research on patho-physiology of various diseases.

One solution to this predicament is the advancement of laboratory-grown tissues, humanized animal organs, stem cell and bio-artificial organs through the emergence of "regenerative medicine" and "tissue engineering" used interchangeably by scientists and clinicians with appreciable overlap. This field has enormous potential to regenerate and replace diseased tissue with artificial organs ranging from simple cornea to complex structure of skin, heart, kidney, and liver.

- **Regenerative medicine** is a broad interdisciplinary field of science which deals with the tools that, repair, replace or regenerate, the lost, diseased or damaged organs. It involves various methods such as transplantation of stem cells, progenitor cells, tissues or *ex vivo*-fabricated body parts, or stimulating body's own repair process to heal or by use of stem cells or any cells as delivery-vehicles for therapeutic agents such as genes and cytokines.
- The term regenerative medicine was coined in 1999, by **Hastline** to blend knowledge from different fields such as stem cell biology, biomechanics prosthetics, nanotechnology, biochemistry, cell transplantation, bioengineering as well as tissue engineering. However the word regenerative medicine first appeared much before, in a document in 1992, authored by Leland Kaiser, listing different technologies of profound impact in the future.
- Whereas, **tissue engineering**, officially coined by National Science Foundation in 1988, was not popular, until the infamous picture of "**Vacanti mouse**" in 1997, which is considered historical in shaping up the principles of regenerative medicine and tissue engineering. Thus, the credit of popularizing the term tissue engineering through various publications is attributed to **Vacanti and Langer** in the late 1990s.
- Tissue engineering mainly requires three components; **cells, scaffolds and growth factors**. It involves the *de novo* synthesis and reconstitution of functional tissues and organs in the laboratory for regenerative medicine applications and has a more narrow focus compared to regenerative medicine but do not wholly encompass it.
- The most preferred cells source for any medical applications including tissue engineering is **autologous** (patient's own) cells followed by **allogenic** (from another individual) and **xenogenic** (animal) cells especially for treatment strategies.
- With the advent of stem cell therapy and cell transplantation, **adult stem cells** isolated from nearly all organs (for e.g. mesenchymal stem cells from bone marrow, adipose tissue stem

cells from fat tissue) whereas **embryonic stem**, isolated from blastocyte stage post-fertilization and induced pluripotent stem cells (**iPS** are adult mature cells genetically reprogrammed into embryonic stem cells-like state) have been successfully differentiated to different types of cells capable of treating bone, cartilage, muscle, blood, cardiovascular, nervous and gastrointestinal diseases, with specific culture protocols.

- **Scaffolds** used for tissue engineering provide structural support to the cells and act as matrix. These include synthetic polymer scaffolds, hydrogels based scaffolds, naturally occurring polymer scaffolds (collagen, elastin, chitosan, gelatin), hybrid scaffolds (containing polymeric and natural biomaterials) and decellularised extracellular matrix scaffolds (e.g. decellularised small intestine) after appropriate processing.
- The scaffold biomaterial may be incorporation with required **growth factors** (e.g. VEGF or vascular endothelial growth factors, PDGF or platelet derived growth factors, BMP or bone morphogenetic protein) or **cytokines** (e.g. interferon) to provide appropriate signaling clues for cells to develop and flourish in the new matrix.
- The dawn of various techniques in 3 D **bio-printing** (such as Laser-assisted, Micro-extrusion, Inkjet) revolutionized tissue engineering, as they played an important role in the precise placement of cells in the scaffold, helping in accurate fabrication of scaffolds. **Bio-reactors**, in which the artificial organs are grown and maintained, provide controlled microenvironments necessary for culture and storage of grafts or fabricated organs.
- **Organ on chip** are special types of artificial organs that enables building human organ specific microsystems mimicking the activities, mechanisms and physiological response of the entire organ or system including complex organs like lung, kidney, heart, bone and more. It has found applications in personalized medicine, drug screening and testing, modeling diseased organs enabling further research into the pathogenesis of various diseases including cancer, diabetes, stroke to name a few.
- Tissue engineered products continue to successfully get translated from bench to clinics thus benefitting numerous individuals. Worldwide a number of diseases being treated, the FDA (Food and Drug Administration), and the EMA (European Medicines Agency) have approved several **tissue engineered** and **stem cell therapies** ranging from medical devices to biopharmaceuticals for clinical applications. In India, the ICMR (Indian Council of Medical Research in collaboration with DBT (Department of Biotechnology) have laid down various guidelines for regulating the use and research of stem cells for regenerative medicine applications and have also initiated new activities in the field of biomedical and tissue engineering.
- The future of regenerative medicine and tissue engineering is definitely an upcoming trend with immense potential in treating a vast majority of diseases. Yet, it also presents various huge challenges, some of which include inadequate vascularization, integration, biocompatibility, lack of models to predict human response and immunological rejection, maintaining the functionality of complex organs like heart, liver and kidney, apart from the affordability, ethical and regulatory issues. The validation and optimization of **artificial organs**

and **organ chips** are long process and this field is still considered in its infancy, given its enormous possibilities in medical applications, requiring clinicians, scientists and engineers to work in close alliance.

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1.Stream	Paramedical
2.Speciality	Physiotherapy
3.Date	11/12/2019
4.Title	EFFICACY OF BREATHING EXERCISES IN COPD
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EFFICACY OF BREATHING EXERCISES IN COPD

- Chronic Obstructive Pulmonary Disease (COPD) is progressive disease and leading cause of morbidity and mortality world, globally, it is estimated that 3.17 million deaths were caused by the disease in 2015and the primary cause is tobacco smoking. The condition is non-reversible and the impact is not just on the lungs in that the symptoms reach far beyond just coughing and breathlessness .It can come with anxiety and steal quality of life very easily.
- So today why not spend some time with your patients encouraging them to give up smoking and take up exercise instead?
- Practice regularly; breathing exercises can help you to exert yourself less during daily activities.
- Pursed lip breathing- Best for performing strenuous activities, such as climbing stairs
- Coordinated breathing exercise is performed if the individual feeling anxious.
- Deep breathing-This exercise can be performed with other daily breathing exercises that for 10 minutes at a time, 3 to 4 times per day
- Huff cough- should be less tiring than a traditional cough
- Diaphragmatic breathing-This technique can be more complicated than the other exercises, diaphragmatic breathing exercise can reduce the oxygen cost and reduce the respiratory rate.
- According to the American academy of family physicians ,the patient with COPD who uses breathing exercises ,experience greater improvements in exercise capacity

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2456-2165

‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	DENTISTRY
2. Speciality	PERIODONTOLOGY
3. Date	10-10-2019
4. Title	Platelet Rich Fibrin in Periodontal Regeneration
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11. Suggested Structure of Article	1. Facing Sheet of the Article 2. Article on maximum TWO sides of an A4 Page 3. Title of the Recent Advance 4. Source: Original Article / Site / Book 5. Contributor’s Name (To be Published) 6. A note on why it is relevant. 7. Body of the article as 10 to 20 Bulleted Points 8. References (2 to 3 nos.)

PLATELET RICH FIBRIN IN PERIODONTAL REGENERATION Periodontitis is a chronic inflammatory disease that causes destruction of the attachment apparatus of tooth like gingival, cementum, , periodontal ligament and alveolar bone. It results in various osseous deformitiesof . The ultimate goal of periodontal therapy is to eliminate inflammatory process, prevent progression of periodontal disease and regenerate lost periodontal tissues. Several treatment options like open flap debridement, biologic and synthetic molecules, autogenous grafts, alloplastic grafts etc. have been used to increase periodontal healing and regeneration. The outcome of these treatment have been different and are not predictable . An emerging and promising clinical approach for augmenting wound healing and regeneration involves the use of growth factors. A recent innovation in the field of medicine/dentistry is the development of autologous Platelet Rich Fibrin (PRF) as a growth factor delivery system.

- Platelet rich fibrin is a second generation platelet concentrate developed by Choukroun et al[1]in 2005.
- PRF contain fibrin, platelets, leucocytes, growth factors and cytokines
- The combined properties of fibrin, platelets, leucocytes, growth factors and cytokines makes platelet rich fibrin a healing biomaterial with tremendous inherent potential for bone and soft tissue regeneration
- The PRF clot forms a strong natural fibrin matrix and shows a complex architecture as a healing matrix with unique mechanical properties which makes it distinct from other platelet concentrates.
- Preparation of PRF is very simple. No complicated equipments are required.
- For successful preparation of PRE speedy blood collection and immediate centrifugation (10 ml blood is centrifuged at 3000rpm for 10 minutes) is mandatory.
- In contrast to other platelet concentrate, no external additives like anticoagulant, bovine thrombin, calcium chloride are needed for its preparation.
- Only physiologic concentration of human autogenous thrombin is utilised for PRF formation.
- PRF promotes angiogenesis, immune control ,trapping of circulating stem cells and wound covering epithelization and promotes healing.

- Growth factors are key regulators of cell migration, attachment, proliferation, cell activity and differentiation in periodontal regeneration.
- PRF is a reservoir of platelet growth factors (PGF) and consists of Platelet derived growth factors (PDGF), Transforming growth factor β, Vascular endothelial growth factors etc.
- It helps in replication of mesenchymal stem cells, osteoblasts, endothelial cells and fibroblasts .
- Cell surface receptors for PGF are present on gingiva, periodontal ligament and cementum.
- Platelet-derived growth factor (PDGF) exerts a favorable effect on periodontal regeneration, as measured by gain in clinical attachment and radiographic bone defect fill in humans.
- Several studies have evaluated the effectiveness of PRF in periodontal osseous defects like infra bony defects, horizontal bone defects, furcation involvement etc. and have found a positive clinical and radiographic outcome[2,3,4].

RELEVANCE

PRF-is a healing biomaterial and it contains fibrin, platelets, leucocytes, growth factors /cytokines. It is effective in periodontal regeneration and produces more consistent and predictable results than other regenerative materials. It is easy to use, safe and cost effective and autolologous origin makes it safe.

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FACING SHEET OF ARTICLE

1. Stream	Dental
2. Speciality	Biochemistry and Oral Pathology and Microbiology
3. Date	30-10-2019
4. Title	Nutraceutical importance of bioactive molecules form natural resources.
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Original article
Nutraceutical importance of bioactive molecules form natural Resources.

- A steep rise in deep fungal infections has been observed for over 2 decades, not only in patients with compromised immunity but also in healthy population. *Candida* species are involved in most of the infections, especially *Candida albicans* comprising 40%-80% of the microbial flora of healthy individuals and responsible for causing 50%-90% of human candidiasis.
- Factors such as hormone imbalance, metabolic disorders, oral contraceptive use, invasive surgical instruments, age, sex, and poor oral hygiene may predispose a person to local and systemic *C albicans* infections, which degrades the host immunoglobulin and other defence protein.
- There is an increase in the resistance of pathogenic fungi to antifungal agents like polyenes and azoles and side effects of these chemicals should be minimized with newer antifungal agents with no or less side effects.
- In the recent years owing to its natural origin and fewer known side effects, herbal medicines are being used more frequently. Nutraceutical compounds are gaining much popularity as they have nutritional importance and pharmaceutical activities.
- The oils or secondary metabolites extracted from different parts of the plants have shown promising antimicrobial activity as they are rich in biologically active nutraceutical components.
- Recently around nine biologically active highly oxygenated stigmastane-type steroids have been isolated from *vernonia anthelmintica* and were examined on estrogen biosynthesis in human ovarian granulose like KGN cells there was increase in 17-beta estradiol biosynthesis, and Vernodalin, identified as the active compound, possesses antineoplastic properties and induces cell cycle arrest and apoptosis.
- Incorporation of oils with enriched bioactive molecules in the invasing surgical instruments is becoming an interesting technique. This is helping to arrest or kill microorganisms as well as releasing nutritional important biomolecules into the system.
- More recently essential oils extracted from plants have given promising results as anticancer agents.
- The phytosterols isolated from plant oils are widely used in nutraceutical products to prevent absorption of cholesterol.
- It was proved that increase in the concentration of phospholipids in oils along with bioactive molecules can act as antimicrobial agent and prevents the growth of candida species and also phospholipids acts as antioxidant and help to maintain normal membrane structure.
- In resent investigation different types of oils were incorporated in denture base resins
  and tissue conditioners in dentistry to prevent the formation of sessile community in the oral cavity to prevent infection and denture stomatitis.

- The study conducted on the six resistant candida species (clinical samples, obtained from Hong Kong University), the oils extracted from *Ocimum sanctum* and *Centratherum anthelminticum* have shown promising results.
- These studies clearly indicates that natural molecules have repeatedly proved their efficiency against resistant microorganisms, and also the bio active molecules have shown remarkable apoptosis-inducing effects on tumour cell lines by affecting both the extrinsic and intrinsic apoptosis pathways.
- India is rich in natural resources and we have rich knowledge about ayurveda and treatment. It is essential for us to extract bio active molecules from different medicinal plants and prove the efficiency of these molecules scientifically, so that overloading of toxic chemical can be avoided.

References

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Note: Why this article is relevant:

Natural molecules are lead molecules for so many synthetic drugs available, and most of the natural molecules are safe or very little side effects. Some of these natural molecules serve as essential components and pharmacological activity also. Instead of overloading our body with synthetic chemicals and their side effects, we can use the plant bioactive molecules. These molecules have proven their efficiency and safety too. Hence this is the time to explore Nutracautical molecules to be extracted purified and proved scientifically for the treatment of various ailments.

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FACING SHEET OF ARTICLE

1. Stream	Dentistry
2. Speciality	OMFS
3. Date	15 OCT 2019
4. Title	Endoscopic happenings in oral and maxillofacial surgery in the last decade
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ENDOSCOPIC HAPPENINGS IN ORAL AND MAXILLOFACIAL SURGERY IN THE LAST DECADE

Contributor: Dr.Nikhil Mathew Kurien

Many procedures of maxillofacial surgery like TMJ disorders, jaw pathologies, trauma and facialaesthetic surgeries can be diagnosed and treated with lesser rate of complications using endoscopictechniques. It also paves way for a shorter hospital stay.

- **TMJ ARTHROSCOPY**
  In endoscopic arthrocentesis and lavage, aggressive protein compounds resulting from inflammatory effusion can be washed out. Arthroscopic instruments can be used to remove further adhesions and loose bodies, to open cysts, to contour bones, to smoothen cartilage, and to treat the synovial membrane. As a result it turnsout to be a surgery with minimal scar and restoration of joint function.
- **ENDOSCOPE-ASSISTED TREATMENT OF CONDYLAR PROCESS FRACTURES**
  This is a minimally invasive technique that has been shown to achievegood functional results while reducing the risk of damaging facial nerve or visible scarring also reduced postoperative swelling and hence shorter recovery periods. Another note worthy thing is that this approach provides an excellent view through the small incisions made.
- **ENDOSCOPE ASSISTED TREATMENT OF ORBITAL FLOOR FRACTURES:**
  In difficult-to-access situations such as orbital floor fractures, endoscope-assisted treatment represents a useful alternative to open surgery. Minimally invasive access can reduce visible scar formation, which is particularly important because in this region, because of cosmetic reasons .For the complex procedures in post-traumatic midfacial and orbital reconstruction.Miniaturized retractors and scaled orbital floor spatulas allow the surgeon to optimally implement the required surgical steps.
- **SINUSCOPY AND ENDONASAL ENDOSCOPY**
  Maxillary sinus endoscopy is among the “classic” endoscopic procedures in oral and maxillofacial surgery. Endoscopes of diameters offer a view in all the directions which provides insights into the maxillary sinus anatomy and allow performance of more advanced surgical interventions.
- **ENDOSCOPY IN ORAL SURGERY IN IMPLANTOLOGY**
  Endoscope-assisted and endoscope-controlled surgical techniques are used in implantology . The endoscopic control of elevation and implantation allows safe, targeted, and optically assisted sinus floor elevation.
- **SALIVARY GLAND ENDOSCOPY(SAILENDOSCOPY)**
  As a minimally invasive alternative to open salivary gland surgery, sialendoscopy it allows examination and treatment of nearly the entire salivary gland system of the submandibular and parotid glands.
- **ENDOSCOPIC APICOECTOMY**
  Here the infected root tip can be resected even in the distal molar roots where visibility is a problem.

- **ENDOSCOPIC FACE LIFT**

  Minimally invasive forehead and temple lifting results in less noticeableaccess scars and protects the supraorbital neurovascular bundle.

- **TRANSNASAL ENDOSCOPIC PARTIAL MAXILLECTOMY (TEPM) –**

  Posterior tumor extension beyond the maxillary box leads to the invasion of complex areas, where achieving clear margins will be challenging.Endoscopic-assisted maxillectomy combines several refinements including the facilitated detachment of the maxilla from the skull base and precise delineation of the posterior and medial margins of resection.

- **ENDOSCOPE-ASSISTED RESECTION OF NONNEOPLASTIC SPACE-OCCUPYING LESION IN ORAL AND MAXILLOFACIAL AREAS(NSOL)**

  Subcapsular dissection may be sufficient for radical treatment of most of the NSOL, However in oral and maxillofacial surgery, operations on the face and submandibular areas of patients require a better cosmetic outcome than in other areas.

- **OSTEOPLASTIC APPROACH AND FUNCTIONAL ENDOSCOPIC SINUS SURGERY(FESS)**

  Fungus ball infections of maxillary sinus have an additional odontogenic etiology.It requires simultaneous treatment of dental orgin.It uses a combination of FESS and osteoplasty of maxillary alveolar bone.

- **CONCLUSION:**

  Many surgeons have reported the application of endoscope use in oral and maxillofacial region. Advantage of this over the conventional approach, includes reduced tissue damage, a smaller wound, fewer wound-related complications, and minimal postoperative scarring. And a shorter hospital stay. A good cosmetic result is the most satisfactory outcome to both patients and surgeons.

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FACING SHEET OF ARTICLE

1. Stream	Homoeopathy
2. Speciality	CASE TAKING AND REPERTORISATION
3. Date	10/10/2019
4. Title	Why online medical consultation
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
11. Suggested Structure of Article	Facing Sheet of the Article Article on maximum TWO sides of an A4 Page Title of the Recent Advance Source: Original Article / Site / Book Contributor's Name (To be Published) A note on why it is relevant. Body of the article as 10 to 20 Bulleted Points References (2 to 3 nos.)

Online Medical Consultation - A boom in recent time

Dr Mansoor Ali

New Generation doctors realized that it is not possible to survive with the limited number of patients from our local area. We need to come up with innovative and newer ways of reaching out to patients directly.

Indian scenario

1.2 billion mobile users in India – the second largest in the world In 2011 – 890 million smart phone users
in 2018 June – 500 million internet users across India
One trillion dollars digital payment market in India by 2023
By 2020 – 70% companies will use artificial intelligence
India to have 7.5 lakh public wifi spots by 2018
Govt starts Bharat Net phase 2, aims 100 % connectivity by 2020

Kerala matters

First complete digital state in India
Mobile penetration 115 % (India 91% only)
Declared internet as a fundamental right of people 5000 wifi spots across the state by 5 years

New gen doctors observed these facts and found how the world is earning through internet and technology and started a Digital Platform to their homoeopathic clinic and better than their counterpart.

It's challenging to start homoeopathic practice today, but if young doctors want to become successful, they need to start thinking of themselves in a different way – who can utilize technology far more cleverly than established doctors, in order to attract more patients.

More than one crore Indian people consulted Homoeopaths online last year, but remember the population of India is 1.25 billion, so enough opportunity in this filed if you have some idea and time to spend online.

Online homeopathy connectivity worldwide is more than in 150+ countries. Thousands of people around the globe are looking for a good Homoeopath Consultant.

Dr Rajesh Shah is a role model in this field – treating patients from 180 plus countries at Life Force, which is a World Record based on his vast experience of over 30 years. He may be the first homoeopathy doctors to start Online Medical practice in 1985. His name published in The Limca Book of Records 2003

Visit the excellent website of Dr Rajesh Shah : **http://www.askdrshah.com/**

My online consultation page : **www.drmansoorali.com**

WelcomeCure by Dr Jawahar Sha is an Online Consultation portal that succeeded within a short span of time with 100+ global panel of expert homoeopathy doctors.
Web link : https://www.welcomecure.com/
You can also create a website like this – and promote your practice.
Recent platforms: www.mydoczone.com
www.curofy.com
http://hogyvagy.com/
Hompath has designed a good mobile app that available at affordable price too http://www.similima.com/pocket-homoeopathic-clinic-at-affordable-price/

The communication between the Doctor and Patient is completed through various media like E- mail, Telephones, Chat, and Video Conferencing.
There is no time constraint; you can complete the case record at a time convenient to you. It gives you enough time to answer all the questions.

References

1. https://www.similima.com/how-to-setup-an-online-homoeopathy-consultationclinic/
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3. https://www.businessinsider.in/YouTube-now-has-over-1-8-billion-users-every-month-within- spitting-distance-of-Facebooks-2-billion/articleshow/64032773.cms
4. https://expandedramblings.com/index.php/paytm-statistics-facts/

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1. Stream	Homoeopathy
2. Speciality	MD(Hom)
3. Date	04/01/2020
4. Title	Hypertension-**A global burden and Homoeopathic intervention**
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
11. Suggested Structure of Article	1. Facing Sheet of the Article 2. Article on maximum TWO sides of an A4 Page 3. Title of the Recent Advance 4. Source: Original Article / Site / Book 5. Contributor’s Name (To be Published) 6. A note on why it is relevant. 7. Body of the article as 10 to 20 Bulleted Points 8. References (2 to 3 nos.)

Hypertension
A global burden and Homoeopathic intervention

- Hypertension - one of the challenges in public health recognised as the biggest contributor to global burden of disease. It significantly increases the risk of heart attack, stroke, kidney failure and blindness. It is one of the leading causes of premature death worldwide. Of the estimated 1.13 billion people who have hypertension, fewer than 1 in 5 have it under control. One of the global targets for non communicable diseases is to reduce the prevalence of hypertension by 25% by 2025. [1]
- Data from the World Health Organization identify Hypertension as the number one cause of mortality in the world and point to its major role in the global burden of disease. For these reasons, Hypertension has become a major issue in the health care agenda of many countries as well as an increasingly intense focus of interest in the medical community.[2]
- International data suggest that fewer than half of those with hypertension are aware of their condition. Raised blood pressure — Hypertension — causes approximately 9.4 million deaths each year worldwide, and many of those who die never knew they were affected. There are no symptoms and some only find out after suffering a heart attack or stroke, or are diagnosed with something else, such as heart or kidney disease. In India, it exerts substantial public health burden on cardiovascular health status and the health care system. The adult Hypertension prevalence has shown a drastic increase in the past three decades in urban as well as rural areas. It is estimated that 16% of Ischaemic Heart Disease, 21% of Peripheral Vascular Disease, 24% of Acute Myocardial Infarctions and 29% of strokes are attributed to hypertension[3]
- Global burden of disease study reported that Hypertension lead to 1.63million deaths in India in 2016 as compared to 0.78 million in 1990. Overall prevalence in India is 29.8% and slight increase in urban population compared to rural. The health system in India should focus on better hypertension screening and control to reduce cardiovascular morbidity and mortality.[4]
- In Kerala, where the epidemiological transition is more advanced than elsewhere in India situation is more serious. Recent studies conducted in Kerala concludes that prevalence of hypertension and pre hypertension is high and comparable to that reported by other studies and surveys in India[6]
- Since undiagnosed cases of hypertension is more, complication related to hypertension is increasing as majority are asymptomatic. Hypertension is directly responsible for 57% of all stroke death and 24% of all coronary artery disease death in India[2]
- Hypertension is now the most prevalent chronic disease in India. This stresses the need for its effective management and control and it highlights the huge impact it can have on the burden of Cardiovascular Diseases.[3]
- Hypertension detection, awareness, and its control are poor. More optimal management is required to address the growing global burden of cardio vascular morbidity and mortality. Several organizations and institutions have started campaign for screening, detection and more optimal management of the current global burden.
- Despite increased awareness, poor adherence to treatments for chronic diseases remains a global problem. As conventional pharmacological intervention is lengthier, adherence

issues are common in patients taking antihypertensive therapy and associated with increased risks of coronary and cerebrovascular events. Adherence to antihypertensive medications is the cornerstone for achieving hypertension control[5]

- Several categories of factors including demographic, socioeconomic, concomitant medical-behavioural conditions, therapy-related, healthcare team and system-related factors, and patient factors are associated with non adherence. Understanding the categories of factors contributing to non adherence is useful in managing nonadherence[5].
- Since non adherence to medication creating more uncontrolled hypertension cases and thereby complication related to it, it is time to think about more adherent therapy. An alternative method of management when it can effectively bring down the blood pressure to controlled level, make a lot of change in controlling the global burden.
- Homoeopathy is safe and simple system of medication which provide effective treatment of Hypertension and can make the patient more adherent to therapy. A population-based screening for the early detection and management of Hypertension can also be done as Homoeopathic institution-based studies including dispensariesin rural and urban areas. Apart from primary prevention by lifestyle modification, cases which require medication can be intervened with homoeopathic medicines.
- Observational studies have shown that, (case-study in Preventive Cardiology OP Govt. Homoeopathic Medical College, Trivandrum) Pre-hypertension cases not controlled with lifestyle modification can be better managed with Homoeopathic intervention. Also stage 1&11 hypertension can effectively be managed with Homoeopathic medication. Systematic Homoeopathic treatment can make a significant reduction in the percentage of diagnosed cases with uncontrolled blood pressure and a reduction in the percentage of CAD and stroke. Homoeopathic treatment is now accessible and affordable even to people of low economic status, and can play an effective role in the healthcare providing system to bring down the global burden under control.

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5.medicine(Baltimore)2017jan;96(4):e5641 Nonadherence to antihypertensive drugs
A systematic review and metaanalysis
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Sebastian NM,jeshma,Sheela P, Arya- dept of community medicine,MEScollege,perimthalmanna Feb2016

Why it is relevant

Since hypertension is recognised as the biggest contributor to the global burden of disease, detecting Hypertension early and taking measures to control it maybe a cost-effective way to reduce the Hypertension related disease burden. Hypertension is a preventable and treatable disease. Primary and secondary prevention can effectively be done by all health care providers. Since diagnosed cases need long term treatment, patient compliance is a common problem, and this stresses the need for a more adherent and cost-effective therapy. Since medication non adherence is common among patients under conventional anti-hypertensives it is time to think about an alternative. To achieve WHO's global target of 25% relative reduction in the prevalence of high blood pressure by 2025, and also to reduce the percentage of hypertensive complications like stroke and coronary artery disease, it has been found that Homoeopathy is a better alternative, and it is simple, safe and cost -effective treatment.

‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pharmacology
3. Date	October 2019
4. Title	Learning drug action in pharmacology using computer simulated experiments as an instructional tool.
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
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Learning Drug Action in Pharmacology using Computer Simulated Experiments as an instructional tool.

Contributors names (To be published)

Dr Serah Johnny, Ms. Nisha M, Ms. Jolly Varghese, Dr. Susan Mani, Dr. Anna Mathew

Body of article

- Animal experiments have long been an integral part of the pharmacology education in medical colleges in India. However the lack of ready availability of animals, cost of purchasingand maintaining them are major constraints in many institutions.
- In the first decade of the 21st century there were also restrictions on use of animals for experiments that lead to most of the teaching-learning of drug action in pharmacology being done through oral presentations with some use of media such as OHP, slides and videos.
- The guidelines by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) and the Medical Council of India (MCI) have suggested the 3 R's i.e. Replacement, Refinement and Reduction in animal experiments, with the fourth R added as an added measure, that is the Rehabilitation of these animals.
- It is difficult to convey the concepts of drug action using oral presentation alone and computer assisted learning through animal simulator software has come as a promising alternative as drug effects can be visualised. Learning can be enhanced using interactive computer assisted learning programs without the involvement of real experimental animals.
- Pemberton, Borrego and Cohen (2006) conducted a study on using interactive computer technology to enhance learning and found that the use of interactive computer technology

creates a powerful learning environment and intrinsically motivates students to learn and participate in classroom activities.

- The MCI guidelines notified through gazette notification No. MCI -34(41)/2013-Med./64022 states that 'for teaching pharmacology in UG curriculum, the required knowledge & skills should be imparted by using computer assisted modules.'
- As a computer simulated learning (CSL) tool, we used the software EP Dog version E 1.1.0 developed by Dr. R Raveendran, Professor, Department of Pharmacology, JIPMER, India. The aim of the session was to demonstrate and explain the effects of various drugs of the mean arterial pressure (MAP) and heart rate (HR) in a dog model.
- Many studies have shown that multimedia computer assisted learning is popular with students. Students not only find CSL interesting but they also found it was educationally beneficial. In a study undertaken in our department (yet to be published), we found that student feedbackon computer simulated learning (CSL) was very positive. Students found theimmediate response to the drug, the graphic input and the interactive mediumenhanced their learning of drug action and this was reflected in the knowledge test given 30 days after the CSL session.
- We have found that CSL helps to achieve a better theoretical understanding of the concepts of drug action as simulations mimic the actual experimental set up in the laboratory. When students use the CSL with the intention to learn, reflect and understand the drug action, it can become a deep learning approach where they understand the concepts and integrate it with their theory of drug action. This has been endorsed by better performance in their residual knowledge compared to teaching with oral presentation alone.

- Our institution has now set up a computer laboratory with 15 computers so that students can learn drug action in pairs during the practical classes. The student instils the drug in the simulated experiments reads the results and enters it in the record. Theinteractive programs can be repeated over any number of times without the use of animals.
- Computer simulated experiments have now become an integral component of the pharmacology curriculum in our medical school and has now been included in the pharmacology curriculum of MOSC medical college from 2018.

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FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pharmacology
3. Date	October 2019
4. Title	Liraglutide Approved for Glycemic Control in Children with Type 2 Diabetes Mellitus.
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Title: Liraglutide Approved for Glycemic Control in Children with Type 2 Diabetes Mellitus.

Source:

- Tamborlane WV, Fainberg U, Frimer-Larsen H, Hafez M, Hale PM, Jalaludin, MY et al for the Ellipse Trial Investigators. Liraglutide in Children and Adolescents with Type 2 Diabetes. N Engl J Med 2019;381:637-46.DOI: 10.1056/NEJMoa1903822.

Contributors Name: Dr. Anna Mathew (To be published)

Relevance

According to the World Health Organization, Type 2 Diabetes Mellitus (DM) is becoming increasingly more common in children and young adults. However, because the disease often goes undiagnosed and studies to assess newly occurring cases are complicated, there is very little data on its true incidence. The rising prevalence of overweight and obesity has been described as a global pandemic. Globally, prevalence of overweight and obesity combined has risen by 27.5% for adults and 47.1% for children between 1980 and 2013. At referral centres such as Lucknow and Chennai, the proportion of children with type 2 diabetes is reported as high as 12% and 26.7% respectively.

Liraglutide is a human glucagon-like peptide-1 (GLP-1) analog that was approved by the U.S. Food and Drug Administration (USFDA) in 2010, as an adjunct to diet and exercise to improve glycemic control in adults with Type 2 DM. This year (August 2019), liraglutide was approved by the USFDA for treatment of children 10 years or older with Type 2 DM, making it the first non-insulin drug approved to treat type 2 DM in children since metformin was approved in 2000. The decision was based on results from the global ELLIPSE trial, completed in over a decade in children and adolescents with type 2 DM.

Though not yet approved, several studies in patients with Type 1 DM in the last year or twowith liraglutide have also shown significant improvement of glycemic control and reduced incidence of hypoglycaemia.

Body of the article

- The increase in childhood obesity has driven an increasedincidence of type 2 DM in children and adolescents.Metformin is the regulatory-approved treatment of choice for young people with type 2 DM. However, rapid decline in beta-cell function combined with severe insulin resistance contributes to early loss of glycemic control with metformin monotherapy.Insulin is the only drug class approved for use in youth who do not respond to metformin monotherapy, though there are many agents approved for adults.
- The USFDA has approved liraglutide for use in children over 10 years and adolescents following the completion of the ELLIPSE Trial in which, 134 young people with Type 2 DM. Children between the ages of 10 to 17 years with a body-mass index greater than the 85th percentile and a glycated hemoglobin level between 7.0 and 1.0% were randomised to two group – one (66 participants) received liraglutide while the other (68 participants) received placebo. At the 26-week analysis of the primary efficacyend point, the mean glycated hemoglobin level had decreased by 0.64 % points with liraglutide and increased by 0.42 % points with placebo, for anestimated treatment difference of −1.06 % points ($P<0.001$). The differenceincreased to −1.30 % points by 52 weeks. The fasting plasma glucose level haddecreased at both time points in the liraglutide group but had increased in the placebogroup. The number of patients who reported adverse events was similar in the twogroups (56 [84.8%] with liraglutide and 55 [80.9%] with placebo), but the overall ratesof adverse events and gastrointestinal adverse events were higher with liraglutide.
- There have also been reports of clinical trials to study the efficacy and safety of liragutide in children with Type 1 DM.A 52-week randomized double-blinded placebo-controlled trial by Dandonna et al found that adding liraglutide to insulin regimens for patients with Type 1 DM helped to achieve better glycemic control and weight loss, without causing more incidents of hypoglycaemia..

- A systematic review and metaanalysis by Patoulias et al (2019) In patients with Type 1 DM, reported that liraglutide as adjunct to insulin, improves glycemic control, induces body weight loss and decreases exogenous insulin requirements and incidents of severe hypoglycemia.
- The findings from the randomized, double-blind, placebo-controlled, multicenterNewLira trial. showed that liraglutide preserves beta cell function in patients with newly diagnosed Type 1 DM. As reported by Medscape, once-daily liraglutide 1.8 mg as an adjunct to insulin therapy preserved postprandial insulin secretion and reduced insulin dose requirements after 52 weeks of treatment compared with placebo.
- Optimisation of glycemic control plays a key role in reduction of micro and macro vascular complications of DM and hence liraglutide has the potential to be included in the treatment of Type1 DM to improve glycemic control.

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FACING SHEET OF ARTICLE

1. Stream	Modern Medicine
2. Speciality	Pathology
3. Date	19-10-2019
4. Title	**ARTIFICIAL BLOOD**
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
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ARTIFICIAL BLOOD

Artificial blood is a product made to act as a substitute for red blood cells. Ideal blood substitute should be of low cost, easy availability, pathogen free, universal compatability, long shelf life, lack of toxicity, nonimmunogenic, nonantigenic, and noncarcinogenic.[1] It is designed for the purpose of transporting oxygen and carbon dioxide throughout the body. It is a good tool for the survival of the patient when blood loss is higher. It can be produced using synthetic production, chemical isolation, or recombinant biochemical technology. RBC substitute is of two types: perfluorocarbon and Hb-based substitutes.

Hb-based RBC substitutes:

Human Hb derived from expired RBC bags is the main source for the production of Hb-based RBC substitutes. Other sources include cord blood RBCs and animal Hb(bovine) and recombinant Hb. The Hb-based oxygen carriers (HBOCs) are divided into two groups: acellular and cellular HBOCs.

Acellular HBOCs: There are three categories which includes cross-linked HBOC, polymerized HBOC and conjugated HBOC. PEG can be the best polymer for conjugation. Other polymers like benzene, tetracarboxylate dextran, hydroxyethyl starch and albumin can be used for conjugation**.**

Cellular HBOCs*:* In cellular HBOCs, Hb is encapsulated in a cell-like structure. Encapsulation of Hb by a phospholipid layer (liposome-encapsulated Hb [LEH]) prolongs its half-life and shelf-life when compared to acellular products. Their small size enables it to enter the areas of body that are not accessible for RBCs.

Recombinant Hb: They are produced from hemoglobin harvested from E.coli bacteria strain. It has also been expressed in other bacterial systems, transgenic mouse and pig. Problems include low expression yields and expensive production processes and difficulties in obtaining desired purity.[2]

Perfluorochemical-based RBC substitutes:

Another substitute developed is Perflourochemical based. In this the hydrogen atoms are replaced by fluorine atoms. PFCs are insoluble in aqueous phase hence they should be

solubilized using an emulsifying agent[3]. Then can easily pass through the vessels due to their small size. But the ability to carry oxygen is much less than hemoglobin-based products. Complication like pulmonary reactions may occur due to complement activation by the emulsifying agent which can be prevented by steroid injections.

Although many important steps have been taken, no oxygen-carrying blood substitutes are approved for use by the US FDA. Side effects and short half-life are the two main reasons that they did not meet the criteria for being approved. This is an important challenge against formulation and application of promising and effective blood substitutes.

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FACING SHEET OF ARTICLE

1. Stream	Modern Medicine
2. Speciality	Pathology
3. Date	12-10-2019
4. Title	Micro fluidics- lab-on-a-chip (LoC)- a new diagnostic possibility
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Micro fluidics- lab-on-a-chip (LoC)- a new diagnostic possibility

Microfluidics describes the manipulation of fluids at the submillimetre scale inside hollow microfluidic channels. It is by nature highly interdisciplinary, combining elements of engineering, physics, chemistry, biology, and nanotechnology. Based on the intermingling of these fields, the semiconductor industry and the field of micro-electromechanical systems put forward lab-on-a-chip (LoC) technologies, which first allowed the microscale manipulation of fluids that are required for microfluidics. Lab-on-a-chip ideas were first proposed in the 1990s, and their application has expanded rapidly ever since.

One of the main ways in which microfluidics has been capitalised on by medical research is as a tool for drug delivery. Conventional ways of administering drugs for therapeutic purposes are mostly oral and intravenous delivery methods. These methods necessarily come with (often considerable) distances and physical boundaries between the entry point of the drug into the body and the unhealthy area of interest.

Over the last ten years a variety of microfluidic methods have been developed to synthesise, form and mass-produce micro- and nanoparticles, which can be used to deliver drugs in a localised and precise manner. This has greatly increased the efficacy of conventional delivery methods and has been found to be particularly useful in the fight against cancer.

For example, it has been shown conclusively that breast cancer cells can be effectively attacked by nanoparticles that are loaded with drugs which block blood vessel growth inside the tumour and attract an anti-tumour immune response. The nanoparticles are guided into the breast cancer cells by a using an antibody specific to a cancer growth promoting protein that is excessively produced in a subset of breast cancer cells.

On the cellular level, microfluidics allows investigating the effect of chemical compounds on cells *in vivo.* Devices such as microfluidic gradient generators have successfully been used to test how drugs affect cells in real time, while allowing the precise regulation of drug concentrations, at lower costs than conventional methods.

Microfluidics has also had a huge impact on diagnostic possibilities, especially since infectious diseases still present one of greatest challenges to science all around the globe. One stunning example of how microfluidics allows the development of new, more cost-effective procedures for the diagnosing of infectious diseases is the mChip, a cheap and portable device for blood testing. The mChip can detect an infection of HIV or syphilis within 15 minutes, at an accuracy of 99% for HIV and 94% for syphilis.

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FACING SHEET OF ARTICLE

1. Stream	Modern Medicine
2. Speciality	Pathology
3. Date	12-10-2019
4. Title	VIRTOPSY THE WAY FORWARD IN AUTOPSY
5. Name of Contributor	Dr. S Sankar & Dr Deepthi Mary Sobha(SR,Pathology,GMC,Kottayam)
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VIRTOPSY THE WAY FORWARD IN AUTOPSY

- The term Virtopsy came from virtual autopsy, which is a scalpel free procedure of autopsy carried out using modern medical and imaging technology with no need of dissection of the body or different organs.

Methods of Virtopsy:

- **Computed tomography**
  It is used for detection of foreign bodies, fractures, gas, and fluid accumulations such as blood. It also demonstrates calcifications and can be used in conjugation with post-mortem angiography.
- **Magnetic resonance imaging**
  It illustrates soft tissue injuries and pathologies clearly and also useful when examining living victims of assault, such as manual strangulation.
- **Post-mortem biopsy**
  This method uses a biopsy gun, to obtain of tissue and fluid samples samples of organs of interest or specific pathologies seen in CT or MRI. Image guided sampling with a dedicated robot has been introduced recently.
- **3D photogrammetry based optical surface scanning**
  True colour 3D surface reconstructions can be obtained. It is an accurate documentation that can document structures less than 1 mm in size.

Advantages:

- Virtopsy provides a fast and non-invasive visualization of region of interest with excellent accuracy regarding the size, volume, and orientation of damaged organ or foreign body.
- It provides contamination free sampling as there is no mutilation of dead bodies.
- It produces detailed 3D records that demonstrates the cause or manner of death with intact tissue and avoids human intervention.
- Less time consuming and better acceptance for the relatives of the diseased and also by the religious customs as incisions not are used.
- The digitally stored data is very precise and can be helpful in further investigation of cases.

Applications:

- Identification of deceased.
- MRI spectroscopy is helpful in detecting changes in metabolic activities in order to determine the death timing and is also helpful in detecting death due to electric shock.
- It is an easy method for identification in mass disaster cases where bodies are severely damaged.

- Three dimensional forensic facial reconstruction can be carried by virtopsy techniques and can be used for medicolegal purposes.

Emerging Applications of Virtopsy

- Robotic virtual autopsy is a multifunctional system that can perform automatic post-mortem and three dimensional surface scanning which qualitatively increase the improvement in the outcome of forensic investigations. The robotic virtual autopsy also helps in detecting the change in colour of tissue.
- Volume analysis software used in Virtopsy helps in accurate estimation of mass of internal organs.
- Post-mortem angiography technique is helpful in visualization of the cardiovascular system that includes infusion of contrast medium with the aid of peristaltic pump and contrast medium.

Conclusion

Virtopsy is a new development in the field of investigation of death, but it still has a long way to go to establish itself as an alternative to the conventional autopsy. In Indian scenario, it is not currently possible to provide these types of investigations due to financial reasons.

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DNA STRIP ASSAYS

- Molecular diagnostics and molecular pathology has gained significant momentum in the last few decades owing to its importance in diagnosing various disease processes. It employs an ever expanding array of special techniques to study genes, gene products, receptors, signaling pathways, cell cycle and the various mutations affecting them. DNA strip assay is a new step in this domain by which we can analyse a test sample for the presence of multiple mutations in a single step.It is used now for detecting a microbiological pathogen/its genotype(eg:hepatitis C virus genotyping), detection of Beta thalassemia mutations and for testing drug resistance in tuberculosis; but it has the potential to be used in mutation studies of many hereditary disorders,leukemias and various solid organ tumours.

- DNA strip assay involves polymerized chain reaction combined with reverse hybridization to allele-specific oligonucleotide probes immobilized on teststrips.[1] They are diagnostic assays for genotyping mutations and polymorphisms (SNPs, deletions, insertions).[2]

The procedure involves 6 steps-

1. DNA Isolation-involves isolation of genomic DNA from bodily fluids, tissue or cells.

2. In Vitro Amplification (PCR)-in this step, nucleic acids are selectively replicated. The amplicons are then chemically denatured, since detection on the DNA strip is done using single-stranded DNA.

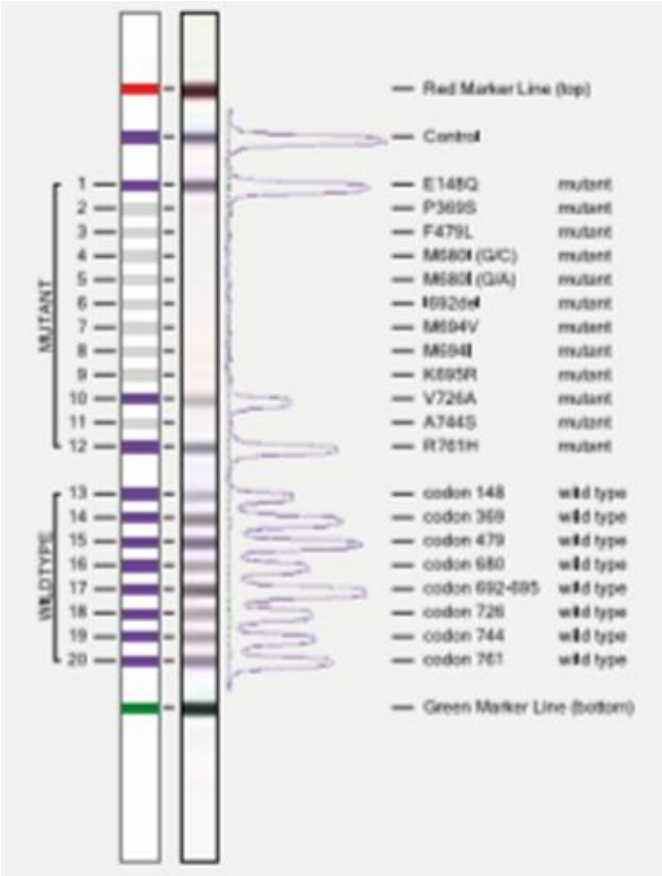
3. Hybridization in DNA strip- The DNA strip is coated with highly specific probes which are complementary to selectively amplified nucleic acid sequences. The single-stranded amplicon binds specifically to the analog probes during hybridization

4. Stringent Washes-non-specifically bound amplicons are removed in washing steps

5. Color Development-the specifically bound amplicon is marked with the enzyme alkaline phosphatase and is then made visible in a colorimetric

detection reaction.In this way , a specific banding pattern develops on the DNA strip.

6. Interpretation- Using a test-specific evaluation template, the test result can be read out quickly and clearly.[3]



In short, DNA strip assay is a relatively simple test which saves time and cost of doing multiple tests and it does not demand much expertise from a lab personnel. Selected coated strips for the mutations suspected can be used and analysed for therapeutic as well as prognostic implications.

Benefits with the DNA strip technology-

- Definite result: internal controls document the validity of the results and ensure accurate test execution.
- Low implementation costs: the technology does not require any costly equipment. Even small production runs can be efficiently processed at low costs.

- Can be automated for larger production runs: detection on the DNA strip can be done manually as well as automatically.
- Efficient processing: all DNA strip technology test systems can be combined with each other during processing. This permits joint execution of several human-genetic and microbiological parameters and helps in efficient routine diagnostic testing.

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Modern Medicine
2. Speciality	Pathology
3. Date	12-10-2019
4. Title	PDL-1 - THE RESURGENCE IN IMMUNOTHERAPY
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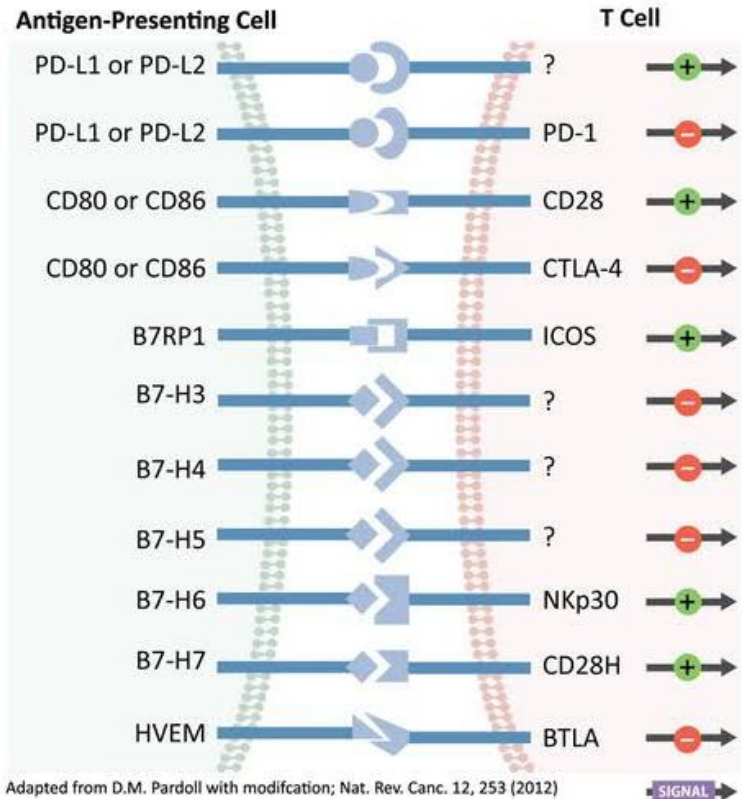
The backbone of treatment for many solid tumours involves radical surgeries and chemotherapy. But the extent of complications following these therapeutic modalities has always created heavy burden to the medical fraternity. This has led to the search for the development of novel strategies to combat advanced malignancies. Immunotherapy gained special attention in this setting.

The advent of immunotherapy has created a significant shift in the approach to cancer treatment. The use of monoclonal antibodies to block immune regulatory checkpoints has brought miraculous results. Leach et al were the first among many who proposed the use of immunomodulators in the treatment of cancer. In 1996, they were able to elicit effective tumour response by the inhibition of immune checkpoint Cytotoxic T lymphocyte associated protein-4 (CTLA-4). Many others have followed their footsteps and presently immunotherapy serves a main role in many cancer therapies.

The term “immune checkpoints” refers to a wide array of inhibitory pathways in our immune system which regulates self tolerance and physiological immune responses. Many tumours have the ability to make use of these checkpoint pathways as a means to escape immune surveillance.

Important immune checkpoints



Adapted from D.M. Pardoll with modifcation; Nat. Rev. Canc. 12, 253 (2012)

PD 1/PD-L1 signalling pathway is an important component of this group. It has been demonstrated that activation of PD 1/PD-L1 signalling negatively regulates T cell mediated immune response thereby help in evading immune surveillance. PD-L1 (also known as CD279/B7-H1) belong to the B7 family. The gene encoding PD-L1is located on chromosome 9p. It is a 33kDa glycoprotein with 290 amino acids. It is constitutively expressed on surface of immune cells and in some type of tumour cells as in Non small cell lung carcinoma. PD-L1 helps tumour cells to evade immune surveillance by transcriptional upregulation. Numerous transcriptional factors have been implicated in this setting including HIFalpha, STAT3 and NFkB.

Many studies show that upregulation of PDL1 is associated with a poor prognosis with respect to tumours like urothelial, renal cell, oesophageal, gastric, pancreatic, ovarian and hepatocellular carcinoma. But expression of PDL1 is associated with higher response rates to anti PD1/PDL1 antibodies among solid tumours. The role of PDL1 testing as a biomarker for response to antiPD/PDL1 antibodies therapy is yet not well defined. At least 500 clinical trials have been conducted targeting PD1 signalling. Around nine types of antibodies on at least 20 types of malignancies are under evaluation. Some of the common antibodies in this group include Atezolizumab, Avelumab, Pembrolizumab, Nivolumab and Durvalumab. Toxicity associated with these agents is low compared to other immunotherapeutic agents. At present, with FDA approved anti PDL1 trials are being done in Non small cell lung carcinoma, urothelial carcinoma, Merkel cell carcinoma, triple negative breast carcinoma and renal cell carcinoma.

In conclusion, the study of immune checkpoints and its inhibitors has opened a new avenue in the field of cancer therapy. Among these, anti PDL1 immunotherapy may benefit a whole lot of advanced cancer patients who are otherwise considered to have a fatal prognosis. Many ongoing researches also give special emphasis to this and many more agents will definitely be added to the bunch.

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FACING SHEET OF ARTICLE

1. Stream	MEDICINE
2. Speciality	PATHOLOGY
3. Date	14.10.2019
4. Title	MORPHOLOGY TO MOLECULAR PATHOLOGY “THE BOOM & BOON”
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Source : **Original Article**

Contributors Name : **Dr Sreeja Raju**

Why is this relevant : **Molecular pathology will be the basis of precision Medicine and has huge impact on patient Diagnosis and treatment.**

MORPHOLOGY TO MOLECULAR PATHOLOGY "THE BOOM & BOON"

- Pathology is the study of disease and this discipline is based on the age old concept of understanding the gross and microscopy.

- Morphology has always been the foundation of diagnosis. Its understanding is essential but not sufficient. Use of special stains and later immunohistochemistry aided in diagnosis. But with the roll-out of the ambitious genomic project and better insights to the molecular territory , molecular pathology is currently the heart of cutting edge medicine.

- Diagnosis by morphology alone is insufficient to diagnose a disease especially when molecular character plays a vital role in treatment.
- The purpose of molecular pathology is to understand the mechanism of disease by identifying molecular and pathway alterations.
- At the core of this still evolving discipline is the application of classical and novel techniques developed in biochemistry, cell biology, molecular biology, proteomics and genetics to the evaluation of the pathological process.

- A large number of molecular techniques are finding its way into routine practice and these molecular discoveries are changing the face of diagnosis.

- Molecular pathology now plays a key role in detecting , diagnosing and selecting treatment for patients .

- The concept of personalized medicine or precision medicine has emerged and the need of the hour is to embrace this radical change and adapt to the genomic era.

- The concept of precision medicine is based on the ability to target specific molecular alteration which has been the game changer. Our biggest jackpot was the discovery of TKI or tyrosine kinase inhibitor therapy – Imatinib which increased patient survival rate in chronic myeloid leukemia and gastrointestinal stromal tumors.

- Various molecular tools used include : FISH , RT -PCR, Sanger sequencing, Next Generation Sequencing , liquid biopsy- digital automated PCR, mass spectrometry, proteomics , DNA microarray.

- Some of the case scenarios routinely seen in our hospital include : detecting BCR-ABL translocation EGFR, ALK1 , ROS1 , PDL1 mutation study for Non-small cell lung carcinomas, specific mutation analysis for leukemia , CNS tumors , HER2neu FISH analysis for carcinoma breast, k-ras and n-ras mutation in carcinoma colon , MSI in carcinoma colon ,

- Cancer research has leaped tremendously over the last decade and the volume of data is overwhelming. Better understanding of oncogenes, tumor suppressor genes, genetic characterization of tumors has gained momentum by the development of Next Generation Sequencing.

- It is important to address this knowledge gap. Enhanced training programmes to sensitize and help in better understanding of how molecular pathology is becoming an integral part of daily routine practice is the need of the hour.

- How the pathologists are able to transit from a morphology based tissue diagnosis to a morpho-molecular level is a challenge.

- The future pathologist needs to combine morphological method with practical and theoretical knowledge in genetics, cell biology, biochemistry and bioinformatics. We need to be ready to embrace the molecular revolution that has already rolled out!

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'Happenings': A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Modern Medicine
1. Speciality	Anatomy
2. Date	
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TOPIC : HAPPENING ‘DNA’

1. ⟶ Newer techniques have been developed for isolation and sequencing of DNA.
2. ⟶ Scientists including doctors have taken up population studies of DNA.
3. ⟶ This has been done in different areas of the country by different groups of researchers.
4. ⟶ History traced by DNA is irrefutable
5. ⟶ This genetic history, in many places are contrary to popular belief.
6. ⟶ They are also dissimilar to history written in popular textbooks.
7. ⟶ As an example, there was no Aryan invasion as written in history text books.
8. ⟶ Instead, there was a gradual migration of farmers across the plains from West Asia and Europe.
9. ⟶ Also there was migration of sheep and cow herders across the vast plains to India.
10. ⟶ Some people also migrated across the seas to the South of India.
11. ⟶ They had different ways of worshipping God from local settlers.
12. ⟶ These studies have also led to isolation of candidate genes for a small number of disorders.
13. ⟶ Scientists and doctors are bound to discover many more candidate genes in the future.
14. ⟶ Eventually, medicines will be prescribed taking into account one’s genetic make-up.
15. ⟶ Many of the genetic diseases will also be treated using gene-therapy.
16. ⟶ Even in-utero gene replacement may become a possibility.
17. ⟶ We may also see the formation of designer babies and designer races.
18. ⟶ These ‘designed individuals’ will have many of the desired qualities and may be more hardy.
19. ⟶ Cloning and intrauterine surgeries may also become common.
20. ⟶ Formation of organs and organ systems may make organ donation a thing of the past.
21. ⟶ New organs may be ‘fitted’ as simply as machine parts.

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   Published in NATURE-Scientific reports/6:19166/DOI:10.1038/SREP 19166

   Published on 13 January 2016.

Happenings': A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pathology
3. Date	09-11-2019
4. Title	Cancer Immunotherapy - Past, Present, Future
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CANCER IMMUNOTHERAPY - PAST, PRESENT, FUTURE

Source: Original Article

Contributor's Name: Dr. P. V. Priya & Dr. S. Sankar

Immunotherapy or biologic therapy is a method of treatment of diseases that involves stimulation, suppression or desensitization of host immune system. It opens up the door for more treatment options and revolutionizes cancer care.

- History:

Dr William.B.Coley, an American bone surgeon is known as "the father of immunotherapy" who in 1891 succeeded in the management of an in-operable tonsillar malignancy by injecting heat-inactivated erysipelas germs (Coley's toxin). The importance of immunotherapy has been acknowledged by the Nobel Prize for physiology or medicine 2018, awarded to Professor James. P. Allison and Professor Tasaku Honjo who independently developed pioneering therapeutic approach for cancer treatment using inhibitor of CTLA-4 (cytotoxic T-lymphocyte associated protein 4) and PD-1/PD-L1 respectively.

- Immune system and malignancy

Paul Ehrlich first conceived the idea that tumor cells can be recognized as foreign and eliminated by immune system. Cell mediated immunity is the major anti-tumor mechanism in vivo and the cellular effectors are NK cells, CTLs and macrophages. However tumor cells can evade the immune surveillance in an immunocompetent host by 1. Selective growth and antigen negative variants, 2. Loss / reduced expression of MHC molecules 3. Activation of immune check points, 4. Secretion of immunosuppressive factors or 5. Induction of Tregs. The major challenge is to identify the critical immune evasion mechanisms which act in a particular tumor, preferably using sensitive and specific biomarker tests.

- Types of immunotherapy (IT)

1. Immune check point inhibitor therapy: Immune check points (ICP) are proteins that act as TCR co-signaling partner, and deliver either positive or "off" signal to T lymphocytes which are crucial for self tolerance. Important ICP which give "off" signals are CTLA-4 and PD-1(programmed death-1 receptor). Inhibitors of CTLA-4 and PD-1/PD-L1are useful in advanced solid tumors.
2. T cell transfer therapy: Host immune cells are capacitated in vitro so that they are able to attack tumor cells in vivo. Eg: tumor-infiltrating lymphocyte (TIL) therapy for metastatic melanoma and chimeric antigen receptor (CAR) T-cell therapy for refractory DLBCL.

3. Monoclonal antibody (MAB) therapy: MABs can be used to target tumor cells either alone (naked MAB), eg: anti-CD 20 MAB therapy for B-cell lymphoma or conjugated with other substances like immunotoxins or radioactive isotopes (conjugated MAB), eg: anti-CD 30 MAB therapy for Hodgkins lymphoma and systemic ALCL.
4. Cancer treatment vaccine therapy: Both autologous and allogenic vaccines are there. These can be whole tumor vaccines, neo and shared antigen vaccines, dendtric cell vaccines, DNA vaccines and anti-idiotype vaccine. Eg: dendtric cell vaccine Sipuleucel–T therapy for metastatic castrate resistant prostatic carcinoma.
5. Immune system modulator therapy: Different types of cytokines, hemopoietic growth factors, immunomodulatory drugs and BCG vaccine can help the host immune system to fight against cancer.

- Response to Immunothery

iRECIST (immunotherapy response evaluation criteria in solid tumors) recommends new standard terminologies to assess the response to IT, which are 1. Immune complete response. 2. Immune partial response. 3. Immune stable disease 4. Immune unconfirmed progressive disease and 5. Immune confirmed progressive disease.

Side effects of Immunotherapy

Common side effects are flu-like symptoms and skin rashes. Rare but life threatening side effects are cytokine release syndrome on CAR T-cell therapy, systemic capillary leak syndrome on TIL therapy, acute tumor lysis syndrome on MAB and Cancer treatment vaccine therapy.

- Biomarkers for immunotherapy

Biomarkers remain a critical missing link which challenges the process of patient selection for IT and tailoring the IT regimens. Biomarkers being mainly explored are 1.Serum soluble proteins like CRP and LDH, 2. Tumor-specific receptor expression patterns such as PD-1/ PD-LI expression, 3 Circulating tumor cells and immune cells 4. Tumor microenvironment factors like TIL,6. Host genomic factors such as TMB and MMR gene defect.

- Prerequisite for IT

A full understanding of tumor immune microenvironment is a prerequisite for IT, so a pathologist will help the multidisciplinary team to stratify cancer patients for IT by doing 1.Tumor diagnosis based on histomorphology and IHC, 2.Tumor staging based on the anatomic extent of disease, 3.Evaluation of prognostic markers. Eg: LVSI, grade of tumor etc, 4. Analysis of predictive markers of therapeutic importance. Eg: scoring of HER2 expression, 5. Molecular testing. Eg: assessment of MSI status of tumor and 6.Biomarker assessment. Eg: soluble PD-1, ct-DNA etc.

- Future vision

Immunotherapy of cancer is an effective but quite expensive method of treatment. Studies are going on to design a panel of reliable and feasible predictive biomarkers to 1. Select right patient for specific IT regimen, 2. Identify the possibility of hyperprogression, and 3. Differentiate between hyperprogression and pseudoprogression during IT.

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Happenings': A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pathology
3. Date	19-10-2019
4. Title	Whole slide imaging- empowering pathology diagnosis and precision
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11. Suggested Structure of Article	1. Facing Sheet of the Article 2. Article on maximum TWO sides of an A4 Page 3. Title of the Recent Advance 4. Source:Original Article / Site / Book 5. Contributor's Name (To be Published) 6. A note on why it is relevant. 7. Body of the article as 10 to 20 Bulleted Points 8. References (2 to 3 nos.)

Whole slide imaging- empowering pathology diagnosis and precision

Source: Original Article
Contributor's Name: Dr. Renu Thambi & Dr. S Sankar

Whole slide imaging (WSI) also known as digital pathology or virtual pathology is a recent technology in the arena of pathology. This was first described by Wetzel and Gilbertson in 1999. This new technology has significant impact on pathology workflow, reproducibility, dissemination of educational material, expansion of service to underprivileged areas and intra-institutional and inter-institutional collaboration.

- WSI involves high-speed, high-resolution digital acquisition of images of the entire stained tissue sections from glass slides to a digital format.
- The process of digitization includes 4 sequential parts: image acquisition (scanning), storage, editing, and display of images. WSI uses slide scanners that consist of 4 main components: light source, slide stage, objective lenses, and a high-resolution camera for image capture.
- The digital images are viewed by a pathologist on a computer monitor, where the image can be magnified and navigated spatially in much the same way as standard microscopy.
- These images can be utilized for creating a digital workflow that obviates the use of conventional bright field light microscopy.
- Various studies have documented that pathologic diagnoses rendered using digital images are comparable with (ie, noninferior to) diagnoses made by microscopy.
- Digital pathology images can be utilized for diagnosis by pathologists, documentation and it permits immediate file sharing for early collaboration. This is particularly important in places where there is a shortage of trained specialists.
- Newer diagnostic modalities like tissue microarrays and immunohistochemistry which require analysis and quantifications are made more accurate with image analysis. The availability of automatic calibrations and built in diagnostics provide robust and reliable results.
- **Advantages:** Other than in diagnostic pathology WSI has active roles in the following: Virtual slide archive helps in patient review and management which becomes easy and hassle free.
- Remote intra-operative consultation and telepathology.
- Replace of static images, multi-headed microscopes, and projection microscopes for presentation in multidisciplinary tumor boards which will improve the experience for both the presenter and the audience.

- Education -A standardized pathology education material will be made available to all trainees regardless of the size, type, and location of the training programs. Collections of carefully curated and organized cases can provide the core material for trainees to build knowledge and skills. Collections such as these can also be used for assessment of progressive improvement.
- Digital pathology association and virtual repositories made available by leading medical universities provide a vast range of learning material for trainees and practicing pathologists.
- WSI has significant role in Biotechnology and research where machine learning and artificial intelligence are key components.
- **Disadvantages:** Cost and complexities of implementation remains an obstacle to widespread adoption of this recent technology. Compared to routine microscopy there is need for additional equipment and staff, proper training of technical personnel, additional quality control steps, equipment and software maintenance, adequate information technology infrastructure and proper pathologist workstation setup.
- Laboratories and institutions need to validate the WSI systems that they implement.
- Future of WSI systems includes creation of 3 dimensional recreations of images.
- It is being observed that the WSI continues to evolve, and when it is incorporated with proper regulatory and validation considerations, this technology will undoubtedly begin to play a larger role in pathology. It is important for pathologists, technicians, researchers and trainees to stay informed about advances in the technology and new commercial products available.

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FACING SHEET OF ARTICLE

1. Stream	MEDICINE
2. Speciality	PATHOLOGY
3. Date	10.10.2019
4. Title	Role Of Immunohistochemistry In Detection Of Molecular Aberrations In Human Cancers And Thus In Delivering A Personalized Tailored Therapeutic Regiment.
5. Name of Contributor	Dr Lekha K Nair
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Title - Role of immune-histo-chemistry in detection of molecular aberrations in human cancers and thus in delivering a personalized tailored therapeutic regiment.

Molecular aberrations play an important role in development of human cancers. Numerous markers and proliferative pathways have been elucidated in many human malignancies. Pathologists are increasingly involved in the clinical and research aspects dealing with diagnostic, therapeutic and prognostic markers on human samples.

Immunohistochemistry (IHC) plays a pivotal role and acts as a potential surrogate for the study of molecular aberrations in human tumors (1).

Use of sensitive and specific antibodies helps in detection of mutational events, protein loss, and protein over expression, visualization of gene products, and localization of splice variant gene products by IHC methods

So it is a cost effective technique in approximating gene expression profiles in disease sub classification and risk stratification in various human malignancies.

In the era of personalized medicine, IHC is an emerging tool in the practice of targeted therapy and personalized medicine enhancing and complimenting other molecular techniques(2).Breast carcinoma is the first human malignancy treated by targeted therapy with anti Her2neu monoclonal antibodies and it began in 1990s.The expression of Her2neu can be detected and graded in tissues by IHC. Other example includes mismatch repair IHC acting as a predictive biomarker for both chemotherapy and targeted therapy in gastric carcinoma, Lynch syndrome and endometrial carcinoma.

Kit and PDGFR alpha mutations detected by IHC in GIST help in patient triage and hereditary screening and also in guiding therapeutic decision making.

AIk -1 expression in lymphomas and lung carcinoma can be detected by IHC and helps in targeted therapy.NAB-2 STAT6 fusion can be detected in solitary fibrous tumors and BRAF V600E mutation in melanoma, thyroid carcinoma and colorectal carcinomas. These help in diagnosis and specific targeted treatment. Technique of

IHC is simple and forms an attractive alternative to molecular studies, being cheap and fast within the ability of a competent pathologist. Thus IHC can replace DNA sequencing and gene expression profiling tests such as FISH, and enhance the efficiency and accuracy of biomarker testing. As we move on to the next decade, a good working knowledge of IHC is very important for a modern molecular pathologist, since pathologists form a crucial hub in patient care enabling them to deliver some of the highest impact in molecular and personalized medicine.

BULLET POINTS-

- Molecular aberrations play an important role in development of human cancers.
- Immunohistochemistry (IHC) can detect molecular aberrations in human tumors.
- It is a cost effective technique in finding out gene expression profiles, in disease sub classification and risk stratification in various human malignancies.
- IHC is an emerging tool in the practice of targeted therapy and personalized medicine.
- IHC enhances and compliments other molecular techniques.
- Examples include Her2neu in breast carcinoma, mismatch repair gene detection in gastric carcinoma, C kit and PDGFRA in GIST, Alk 1 in lymphomas and lung carcinoma, BRAF V600E in melanoma etc
- Technique of IHC is simple and is cheap.
- Thus IHC has a high impact in molecular and personalized medicine.

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'Happenings': A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pharmacology
3. Date	October 2019
4. Title	Advances in Oral Anti-coagulation treatment
5. Name of Contributor	Ms. Jolly Varghese & Dr. Anna Mathew
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances
11. Suggested Structure of Article	1. Facing sheet of the article 2. Article on maximum TWO sides of an A4 PAGE 3. Title of the recent Advance 4. Source: Original article / site/ Book 5. Contributors Name (To be published) 6. A Note on why it is relevant 7. Body of the article as 10 to 20 bulleted points 8. References (2-3 nos)

Title of the Recent Advance:Advances in Oral Anticoagulation Treatment

Source: Robertson L, Kesteven P, McCaslin JE. Oral direct thrombin inhibitors or oral factor Xa inhibitors for the treatment of deep vein thrombosis. Cochrane Database Syst Rev. 2015 Jun 30;(6):CD010956. doi: 10.1002/14651858.CD010956.pub2.

Contributors Name: (To be published) :Ms. Jolly Varghese, Dr. Anna Mathew

Relevance: The rising trend in cardiovascular diseases in our country has made anti-thrombotic medications more widely used. Heparin and its derivatives are available for parenteral use. Vitamin K antagonists areadministered orally but have an erratic pharmacokinetic profile, narrow margin of safety and require regular laboratory monitoring. Thrombin has an important role in thrombus formation through the conversion of fibrinogen to fibrin. Direct thrombin inhibitors (DTI) like bivalirudin and argotroban that bind thrombin directly are only administered parenterally. However, two forms of novel oral anticoagulants (NOACs) have been developed: DTI (dabigatran) andfactor Xa inhibitors (rivaroxaban, apixaban and endoxaban).

Dabigatran was approved by the United States Food and Drug Administration (US FDA) in 2010 for prevention of venous thromboembolism (VTE) following joint replacement surgery and atrial fibrillation. Novel oral direct Xainhibitorshave a predictable dose response relationship, do not require frequent monitoring, have few known drug interactions and a safer adverse effect profile.Rivaroxaban was approved for prevention and treatment of VTEin July 2011 andApixaban was approved for use in patients undergoing total knee or hip replacement surgeryby the European Commission in May 2011 and for use in patients with atrial fibrillation (AF) to prevent stroke by the US FDA in December 2012.

Warfarin has been the standard prophylactic oral anticoagulant for the past five decadesinspite of the problems of delayed onset of action, slow recovery on discontinuation, narrow therapeutic range, numerous drug interactions and the need for repeated laboratory monitoring and dose adjustment. These have been largely overcome by the oral direct factor Xa inhibitors.

Body of the article

- Dabigatran etexilate, a pro-drug which is hydrolysed after oral administration to dabigatran, binds to the catalytic fibrinogen-binding site of thrombin and directly inactivates it. It is approved for prevention of VTE following joint replacement surgery.
- Factor Xa inhibitors are novel drugs that bind directly to the active site of factor Xa to inhibit the generation of thrombin.Taken literally the 'xabans' are drugs which "ban" factor "Xa".They have the convenience of oral administration and more predictable pharmacokinetic and pharmacodynamic properties. They do not require laboratory monitoring and they have a fast and reliableonset of action, with no risk of heparin-induced thrombocytopenia.
- Apixaban is mainly metabolized by CYP3A4 enzyme, hence given cautiously with inhibitors and inducers of this enzyme to prevent drug interactions. It is also a substrate of P-glycoprotein, hence co-administration with the inhibitors of P-glycoprotein, like amiodarone, can increase the plasma concentration of apixaban. The excretion of apixaban is primarily through the hepatobiliary route (75%) and approximately 25% is excreted through kidneys.
- The usual dose of apixaban is 2.5 mg, twice daily for patients undergoing knee/hip replacement surgery. It is given as 5 mg preparation in patients with atrial fibrillation. The half-life is 12 hours and action starts approximately 3 hours after the dose is given.
- Rivaroxaban and apixaban have been found to be convenient, safe and effective in the prevention and treatment of VTEwithout any inadvertent increase in bleeding in patients with DVT. Apixaban was shown to have similar efficacy and less bleeding risk compared to low molecular weight heparin (LMWH) in patients with DVT.
- There were two major trials on which the FDA approval of apixaban in patients with atrial fibrillation was based.The ARISTOTLE trial studied patients with atrial fibrillation who received either apixaban or warfarin and found that apixaban had a superior efficacy and lesserbleedingrisks. In the AVERROEStrial,patients with atrial fibrillation not taking warfarin put on oral apixaban 5 mg BD had less risk of stroke or embolism compared to patients on aspirin 81-324 mg/day.
- In a phase-2, double-blinded, placebo-controlled study of apixaban with ongoing anti-platelet therapy of aspirin/clopidogrel, to prevent recurrencein patients with recent acute coronary syndrome (ACS), there was a reduction of ischemic events but an

increase in the risk of bleeding.Another study in patients with recent ACS (APPRAISE 2) also showed similar results.

- The main indications for use of apixaban are prevention of thrombotic complications in patientsundergoing hip/knee replacement and prevention of stroke and thromboembolism in patients with atrial fibrillation. Though there was a reduction in ischemic events in patients with ACS,the use of apixaban wasassociated with a higher incidence of major bleeding.
- The most common adverse event reported for apixaban, in most of the trials is bleeding. It must be used with care in patients with hepatic and renal dysfunction. Other adverse events reported with apixaban are hyper -sensitivity reactions, syncope, nausea, dizziness, etc. The use of factor Xa inhibitors is not recommended in pregnancy because these agents can easily cross the placental barrier due to their smaller size.
- Unlike protamine forheparin, there are no known antidotes for factor Xa inhibitors in the event of bleeding. Besides, these agents are highly protein bound and cannot be removed by dialysis. The duration of action of apixaban is 24 hours after the last dose is given. Prothrombin complex concentrates (PCCs) may prove useful in reversing their effects.

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Pharmacology
3. Date	October 2019
4. Title	Three New Drugs for Drug-resistant Tuberculosis after 40 years.
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances
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Title of the Recent Advance: Three New Drugs for Drug-resistant Tuberculosis after 40 years.

Source: Guidelines for the use of Delamanid in the Treatment of drug resistant Tuberculosis in India. Available at https://tbcindia.gov.in/showfile.php?lid=3343

Contributors Name: Ms. Nisha M, Dr. Anna Mathew (To be published)

Relevance

The World Health Organization (WHO) has ranked Tuberculosis among the top 10 causes of death globally. In 2015, it was estimated to have caused 10.4 million new cases and 1.4 million deaths all over the world. No new drugs for TB have come to the market for over 40 years despite the emergence of multidrug resistant tuberculosis (MDR-TB) and extensively drug resistant tuberculosis (XDR-TB)

In 2013, bedaquiline was the first new anti-TB drug with a novel mechanism of action to be approved by the United States Food and Drug Administration (USFDA) after more than 40 years. Delamanid was developed by a Japanese company, Otuka Holdings Inc. and approved for medical use in 2014 in Europe, Japan, and South Korea and it was also placed on the WHO list of essential medicines. This drug was approved by the Drug Controller General of India in August, 2017 and by the end of 2017, 62 countries including India reported having introduced bedaquiline and 42 countries reported having introduced delamanid, in an effort to improve the effectiveness of MDR-TB treatment regimens and attain the goal of "End TB" by 2030.Pretomanid, another nitroimidazole, related to Delamanid, was developed by TB Alliance, a not-for-profit organisationandapproved for medical use in the US in August 2019, to be administered together with bedaquiline and linezolid in MDR-TB and XDR-TB

Body of the article

- Bedaquiline, a diarylquinoline withactivity against drug-sensitive, as well as drug-resistant mycobacterial TB at a minimal inhibitory concentration (MIC) ranging from 0.002 to 0.06 µg/ml and with a MIC 50 of 0.03 µg/ml. Dormant *mycobacteria* possess residual ATP synthase enzymatic activity, necessary for their survival, which is effectively blocked by nanomolar concentrations of bedaquiline.It is administered orally and is used at a dose of 400 mgdaily for 2 weeks, followed by 200 mg thrice weekly.

- The "manid" suffix is used to group compounds with similar chemical structures - variously referred to as nitroimidazoles, nitroimidazooxazines or nitroimidazopyrans. They show potent in vitro and in vivo activity against drug-resistant strains of *Mycobacterium tuberculosis*by inhibition of mycolic acid biosynthesis, leading to defective cell wall formation and ultimately cell death. Delamanid is a dihydroimidazole prodrug which is activated by bio-reduction of the nitro group by an *M tuberculosis* specific nitroreductase enzyme. It has specific activity against mycobacteria with no action on other Gram positive or negative bacteria. Pretomanid – the third new TB drug approved in over half a century is a related drug and the three-drug regimen (BPaL) ie: bedaquiline + pretomanid + high-dose linezolid) has been approved for adult patients with XDR-TB, treatment-intolerant, or non-responsive multi-drug resistant pulmonary TB. Wen et al showed that the invitro potency of delamanid was much greater than pretomanid against MDR-TB and XDR-TB.
- Though relatively well tolerated there have been concerns regarding QT prolongation associated with the use of Delamanid. A novel nonsynonymous mutation within the fbiA gene (Glu249Lys) has been implicated in resistance to delamanid and pretomanid in *Mycobacterium tuberculosis.*
- WHO has now given five conditional recommendations for the use of delamanid in combination with an optimised anti-TB regimen.The conditions for delamanid use in individual patients include. i. careful selection of patients likely to benefit; ii. patient informed consent; iii. adherence to WHO recommendations in designing a longer MDR-TB regimen; iv. close monitoring of clinical treatment response; and v) active TB drug-safety monitoring and management (aDSM).
- Delamanid may be added to any WHO-recommended regimen in adults with pulmonary MDR-TB i. when an effective treatment regimen with four second-line drugs and pyrazinamide (Z) cannot be designed; ii. when there is documented evidence of resistance to any fluoroquinolone or second-line injectable drug in addition to multi drug resistance and iii. when there is higher risk for poor outcomes (eg. drug intolerance or contraindication, extensive or advanced disease.
- Delamanid has been introduced in seven states, including Kerala, under the RNTCP through conditional access. The criteria are adults (≥ 18 years) not eligible for shorter MDR-TB regimen because of resistance, contraindication or lack of tolerability. MDR-TB with resistance to any/all fluoroquinolone or any/all SLI, XDR-TB, Mixed pattern DR-TB

failing any DR-TB regimen or with extensive or advanced disease and others deemed at higher baseline risk for poor outcomes.

- Special caution issued for HIV+ patients, patients over 65 years of age, diabetes, hepatic or severe renal impairment or those with serum albumin <2.8 g/dL or those who use alcohol or substances.
- Delamanid is contraindicated in children under 6 years of age, breastfeeding and pregnant women, patients predisposed to cardiac arrhythmias or patients with known hypersensitivity.

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Microbiology
3. Date	10-10-2019
4. Title	Culturomics v/s Metagenomics
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10. Consent for Publication	I hereby declare to abide by the KUHS Rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent Advances.
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Culturomics v/s Metagenomics

- Comprehensive determination of the microbial composition of the gut microbiota and the relationships with health and disease are major challenges in the 21st century.
- In the last 20 years, however, multiple advanced techniques like 16S rRNA sequencing, metagenomics, transcriptomics, proteomics and gnotobiotics have emerged.
- The advent of molecular biology, followed by the emergence of various disciplines of the genomics, and most importantly metagenomics, brought about the sharp decline of conventional microbiology methods.
- Recent advances in science have proved that microorganisms exist and thrive in environments that were earlier thought uninhabitable.
- Since the majority of microbes are not culturable in the laboratory, microbiologists have been unable to see what organisms are functionally doing in an environment.
- Human biology can no longer concern itself only with human cells.
- The field of metagenomics is a young, vibrant field that has appropriated the tools used for standard genomics and applied them to the study of the entire communities of microbes—without the need to isolate and culture the individual microbial species.
- The emergence of metagenomics has resulted in the generation of vast data sets of microbial genes and pathways present in different body habitats.
- The profound differences between microbiomes in various body sites reveal how metagenomes contribute to tissue and organ function.
- Primary aim of metagenomics experiments is to identify which genes and metabolic pathways are present.
- Microbiomes at different body sites and functional metagenomics must be considered part of systems biology.
- Emergence of culturomics has a natural synergy with therapeutic and clinical genomic approaches so as to realize personalized medicine.
- One of the gridlocks of the traditional bacteriological culture methods has been recently overcome by advances in mass spectrometry (MS) techniques, which can accurately and rapidly identify microorganisms with matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF), allowing rapid screening of large numbers of colonies.
- Culturomics',is the method allowing the description of the microbial composition by high-throughput culture(2).
- This represents a completely new approach to the study of complex microbial ecosystems, such as the human intestinal tract, that:
- (i) has the potential to detect minority populations;
- (ii) is not restricted to eubacteria;

- (iii) provides strains that allow extensive characterization of new species and allows the study of interactions between different bacterial strains present in a given microbiota.
- Another additional advantage of using culture instead of molecular approaches is the additional information on the viability of detected microorganisms.
- Culturomics uses studies based on growth characters in artificial set of conditions whereas Metagenomics is a sequencing approach (using pyrosequencing or 3rd generation sequencing methods) and aims to construct a map based on the DNA studies.
- Culturomics allows a reintroduction of the culture-based phenotypic characterization into the 21st century research repertoire, bolstered by robust technology for automated and massive execution, but its potential is largely unappreciated at present. Explanation on the use of culturomics and its contrast to metagenomics is published by G. Greub(3).
- Depending on the specific brand of culturomics, the scope of applications may extend to medicine, agriculture, environmental sciences, pharmacomicrobiomics, and biotechnology innovation.
- Detailed and objective classification and identification of microbiota may soon be at hand through culturomics, thus enabling precision diagnosis toward truly personalized medicine.
- Culturomics may both widen the scope of microbiology and improve its contributions to diagnostics and personalized medicine, characterizing microbes and determining their associations with health and disease dynamics.

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'Happenings': A publication from KUHS on Recent Advance
FACING SHEET OF ARTICLE

1. Stream	Medicine
2. Speciality	Biochemistry
3. Date	28-10-2019
4. Title	Proteinuria in early detection of human leptospirosis
5. Name of Contributor	Thresiamma K.C (Dr. Sr. Thresiamma K.C.)
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10. Consent for Publication	I hereby declare to abide by the KUHS rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent advances.
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Proteinuria in early detection of human leptospirosis

Thresiamma K.C. Asha Biju, ReetikaChaurasia, Manjula Sritharan, Chithra Jayaprakash, Sunil Thomas, Eapen C.K.

- **Aim**

To develop a simple , cost effective, rapid test to diagnosis Leptospirosis

- **Back ground**

Leptospirosis is an infectious disease caused by spirochetes bacteria Leptospira spp.is reported from all over the world. As the clinical signs and symptoms of Leptospirosis often are nonspecific and diseases are early mistaken for other major infectious febrile illness. Thus laboratory test to confirm the clinical diagnosis is essential for optimal treatment and patient management.

- **Samples used for study**

Serum and urine samples were collected from clinically suspected cases of leptospirosis patients in MOSC medical college Kolenchery.

- **The gold standard**

For diagnosis is microscope agglutination test (MAT). (1)

- **Results**

It was interesting to note that immunoglobulins are present in the urine protein concentrate (precipitation using saturated ammonium sulphate) of patients with leptospirosis on the day of admission in the hospital, with urine albumin reports either positive or negative. Which was confirmed by Agar- gel electrophoresis, Immuno- electrophoresis, MAT (Microscopic Agglutination Test). By ELISA test it was noted that antibodies present in urine and serum were of both IgM and IgG class against the leptospiral antigens from three pathogenic serovars and one non-pathogenic serovars.(2)

The newly developed immune-spot test using urine protein concentrate compared with standard ELISA test for serum antibodies which is currently used for diagnosis using same antigen found to be in good correlation.

- **Conclusion**

Proteinuria is the most frequent abnormality noted in all patients at some stage of illness. This is the first report on the presence of immunoglobulins in urine samples, which were found to be of IgM and IgG classes.

The present attempt was aimed at developing a test which is simple, rapid, cost effective and easily accessible in most laboratories and also can detect Leptospirosis at the earliest. The immune-spot test which is developed in this study was found to be in good correlation with standard ELISA method for serum with which diagnosis is possible only after one week (5-8days hospitalization, WHO guide lines)(3). Immuno-spot test showed the presence of antibodies in urine which was collected on the day of admission when patients come with suspecting symptoms of the disease. Screening of large sample size and inclusion of other cases with fever, including viral flu, dengue and malaria are going on to validate this test as a useful diagnostic tool.

- **References:**

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'Happenings': A publication from KUHS on Recent Advance

FACING SHEET OF ARTICLE

1.	**Stream**	**Medicine**
2.	**Specialty**	**Biochemistry**
3.	**Date**	**28-10-2019**
4.	**Title**	Pathogen – specific leptospiral proteins in urine of patients with febrile illness aids in differential diagnosis of leptospirosis from dengue. **Original article-** ***European Journal clinical Microbiology& Infectious Diseases, published online 13 January2018***
5.	**Name of Contributor**	**Thresiamma K.C (Dr. Sr. Thresiamma K.C.)**
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10.	**Consent for publication**	**I hereby declare to abide by the KUHS rules regarding publication and agree that the article contributed by me may be published in the KUHS publication on Recent advances.**
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Pathogen – specific leptospiral proteins in urine of patients with febrile illness aids in differential diagnosis of leptospirosis from dengue.

R. Chaurasia, K.C Thresiamma, C.K. Eapen, B.J. Zachariah, R. Paul, M. Sritharan..

- **Aim:**

To detect the diagnostic potential of screening for pathogen- specific antigens in urine of patients with leptospiral infected or co-infection with dengue fever. It can above a non-massive method of disease diagnosis.

- **Back ground :**

Leptospirosis in zoonotic disease commonly seen in tropical regions during monsoon seasons. The organisms preferentially reside and multiply in the proximal convoluted tubules of the kidney and are periodically shed in urine of the infected hosts. In human, who are often accidental hosts, the disease in acute and usually self limiting, but can develop into the form called Weil's syndrome involving, the lungs, liver and kidneys. In this study the focus is on the differential diagnosis of leptospirosis from dengue fever, a vector – borne viral infection globally and in India. There are several reports on the co- incidence of these two diseases(1). It is often difficult to diagnose due to overlapping clinical symptoms and lack of economically viable, early detectable and easy to perform laboratory tests. As a continuation of previous study(2),here reporting the detection of leptospiral antigens LipL32, LipL41, HbpA and sphingomyelinase in the urine of MAT-positive leptospirosis patients and discuss their diagnostic significance in the light of their absence in patients with dengue fever..

- **Samples used for study**

Serum and urine samples were collected from patients clinically suspected cases of leptospirosis. The study group included patients at MOSC Medical college Hospital in Kolenchery, Kerala. They were subjected to routine clinical examination and laboratory testing of both urine and blood.

Cell-free whole cell soniates for ELISA and western blotting were prepared from the pathogens *L. interrogans* serovars Lai and Pomona, *L. borgpetersenii* serovar Hardjo- bovis and the non pathogen *L. biflexa* serovar Andamana.

- **Methods performed**

MAT assay, screening of serum – IgM- specific- anti-leptospiral antibodies by ELISA, detection of leptospiral antigen by ELISA using antibodies against LipL32, Lip41, Flal and Sph2163, hemin- binding protein Hbp A, rSph CD 210 and r Sph4. SDS-PAGE and western blotting detection of LipL 32,HbpA and sphingomyelinase in patent's urine samples., Western blot analysis of whole cell sonicates of *Leptospira* spp. with serum and urine of leptospirosis patients were done in Department of Animal Biology, School of Life Sciences, University of Hyderabad. Approximate molecular mass and nature of antigens were studied by UVP Vision works LS image Acquisition and analysis software and MALDI-TOF-MS/MS(matrix-assisted

laser desorption/ionization time-of–flight tandem mass spectrometry) respectively (Sandor Life Sciences Pvt. Ltd. Hyderabad, India).

- **Results**

MAT-assay showed that Lai and Pomona were emerged as the major infecting serovars with Hardjo-bovis, Celledoni, Tarassovi, Australis and Bangkinang being the other serovars. Elevated levels of IgM – specific serum anti-leptospiral antibodies in leptospiral positive patient have seen by MAT assay

A notable and differentiating feature was that none of the leptospiral antigen were detected in dengue patients but were present at high levels in patients with leptospirosis. This observation is of clinical significance and relevance to diagnosis of leptospirosis. Western blotting of leptospiral whole cell sonicates with serum and urinary antibodies of patients with leptospirosis showed that strongly reacting bands that were seen predominantly in the pathogens. The pathogenic leptospiral proteins were of approximate molecular masses 102, 58,50,41,16,and 10 kDa respectively. Upon subjecting to MALDI-TOF MS/MS analysis they were identified as biotin—requiring enzyme (LA2432), acyl CoA dehydrogenase (LA2639), serine hydroxyl methyl-transferase (LA1409), argino-succinate synthase (LA4165), ferritin-like protein (LA3598) and the molecular chaperone GroEs (LA2654), respectively.

- **Conclusion**

The salient outcome of this study is the correlation of the presence of pathogen –specific leptospiral proteins in the urine of leptospirosis patients with MAT positivity and high titres of circulating IgM- specific anti-leptospiral antibodies The leptospiral proteins LipL32,LipL41,Fla1,HbpA and sphingo-myelianase(s),expressed only by pathogenic *Leptospira* spp., were excreted in the urine of leptospirosis patients and were absent in dengue patients, reflecting their potential in the differential diagnosis of leptospirosis from dengue. Though the functional role of the protein remains a mystery despite its abundance its potential as a diagnostic antigen is well known(3). Complementing its diagnostic potential this study highlights the detection of the protein in the urine of leptospirosis patients both by ELISA and Western blotting. The study highlights the diagnostic potential of leptospiral proteins in the urine of patients.

- **References**

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1	Stream	Nursing
2	Speciality	Medical Surgical Nursing
3	Date	21/10/2019
4	Title	VIRTUAL NURSING AVATARS
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VIRTUAL NURSING AVATARS

- Advances in computer software have provided interactive tools that perform many of the duties once in the domain of nursing profession, sometimes referred to as "Virtual Nursing Avatars" the duties delegated to this technology include facilitating check-ins for patients and coaching patients as they make lifestyle changes. Researchers continue to develop computer applications for virtual nurse avatars.
- Literature suggest that nurse avatar intention can be successful as tools for health interventions
- In treating patients with chronic pain and depression(2015)found that subjects who interacted with an avatar self reported 100% compliance with the avatar's suggestions to reduce stress and 89% compliance with the avatar's healthy eating suggestions 44% of the subject indicated that they would prefer interaction with an avatar over interaction with a clinician.
- Virtual nurse avatars can successfully perform discharge duties in hospital such as reviewing care plans and medication.
- In this study (2014) researchers used two different avatar models; one avatar appeared as a Caucasian female the other avatar appeared as an African female. Researchers found a correlation between perceived patient similarities to the avatar and patient satisfaction. Moreover among all patients who answered satisfactions questions 36.3% indicated a preference for the avatar over professional staff 24% indicated a preference of a nurse.
- Extreme models suggest that human nurses might one day be replaced fully by a combination of virtual nursing avatars and robots powered by computer technology
- Researchers from Northeastern University are presently working with buston medical centre on a five year project that uses virtual nurse avatars to assist with hospital discharge. The goal of project is to reduce re-admissions due to poor communication and better understand factors that lead to patient readmission.
- Future of nursing avatar technology:-A virtual nurse avatar based service called SENSELY has launched its own project with a tool named MOLLY.
- Molly has been delegated the tasks of facilitating patient check-ins with care providers
- Molly also available as a smart phone app,It has three diamentional animated features and behavioural repertoire that include subtle behaviours such as blinking and nodding. Molly reporting any symptoms they may have experienced. The virtual nurse will alert the patient's doctor about any anomalies which the doctor can then follow up with via video consultation by organising a specialist visit.
- Nursing will be impacted as new Artificial Intelligence technologies assume some tasks performed by nurses today. Technology will change how nurses spend time delivering patient care, but the need for nurses will remain. Nursing experience, knowledge, and skills will transition to learning new ways of thinking about and

processing information—the nurse will become the information integrator, health coach, and deliverer of human caring, supported by Artificial Intelligence technologies, not replaced by them.

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3	Date	19/10/2019
4	Title	LUCAS
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LUCAS

A common problem during manual CPR is that the chest does not always recoil because of an increase in chest wall compliance. Although other CPR devices provide consistent compression depth and rate, the LUCAS (***Lund University Cardiopulmonary Assist System***) device, because of its integrated suction cup, is the only automated device that assists the decompression phase by drawing up on the chest and returning it to neutral.

Lund University Cardiopulmonary Assist System (LUCAS) device has been shown to improve quality of chest compressions increase ETCO2 levels as well as being able to sustain life saving circulation during prolonged resuscitation attempts. LUCAS has been studied extensively shown to be safe and effective and to save patients that would otherwise have been considered futile.

IMPROVING OPERATIONAL EFFECIENCIES

With the LUCAS device, fatigue, individual variations or psychological factors are removed from CPR and there is no longer a need for switching the CPR provides every two minutes. It provides high quality and safer chest compression in situations such as patient movement and transportation during prolonged CPR or in cath lab.

VALUES

- QUALITY OF CPR
  - ✓ Consistent quality of chest compressions during resuscitation attempts
  - ✓ Create life sustaining perfusion of the brain and heart of the patient
  - ✓ Create good neurological outcomes
- BRIDGE TO CARE
  - ✓ Extended CPR
  - ✓ High quality CPR during transport
  - ✓ Treatment of underlying causes such as myocardial infarction, pulmonary embolism and accidental hypothermia.
- OPERATIONAL EFFECIENCIES
  - ✓ Freeing up hands and reducing chaos around patient

- ✓ Calming down the scene and buying time to make decisions
- ✓ Providing CPR guidance and data for feedback

- SAFETY
  - ✓ During ambulance, helicopter in hospital transportation
  - ✓ Reducing x-ray exposure of CPR providers in cath lab
  - ✓ During physically demanding work of providing CPR in award physical conditions

DIFFERENT MODELS

1. LUCAS 1
   First generation of LUCAS. The device was launched in 2003. It was driven by compressed air whereas the later generations are driven by battery.
2. LUCAS 2
   Launched in 2009, battery operated
3. LUCAS 3,VERSION 3.0
   Third generation LUCAS device, it allows new insights through easy wireless access to device data.
4. LUCAS 3, VERSION 3.1
   Newest version of LUCAS allows for configuration to meet local protocols creates seamless post event reporting and makes the device easier to own and maintain.
   Where a cardiac arrest patient needs to be navigated with on-going CPR, such as from mountains, from football stadium, through stairs, in an ambulance or helicopter or through busy hospital corridors it is difficult for rescuer to provide effective chest compression during movement. There we can utilize the LUCAS.

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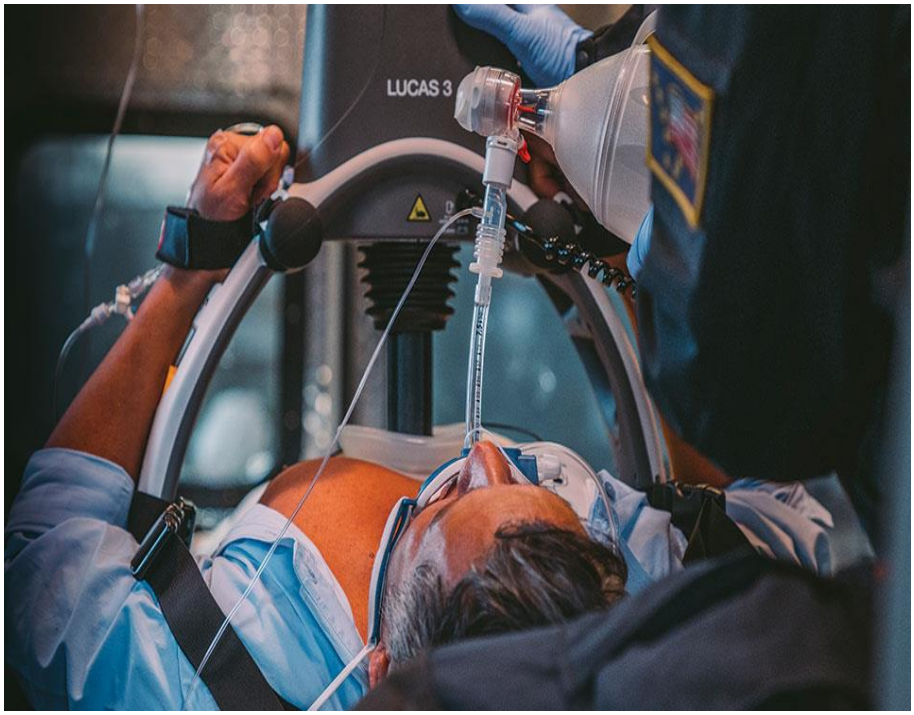
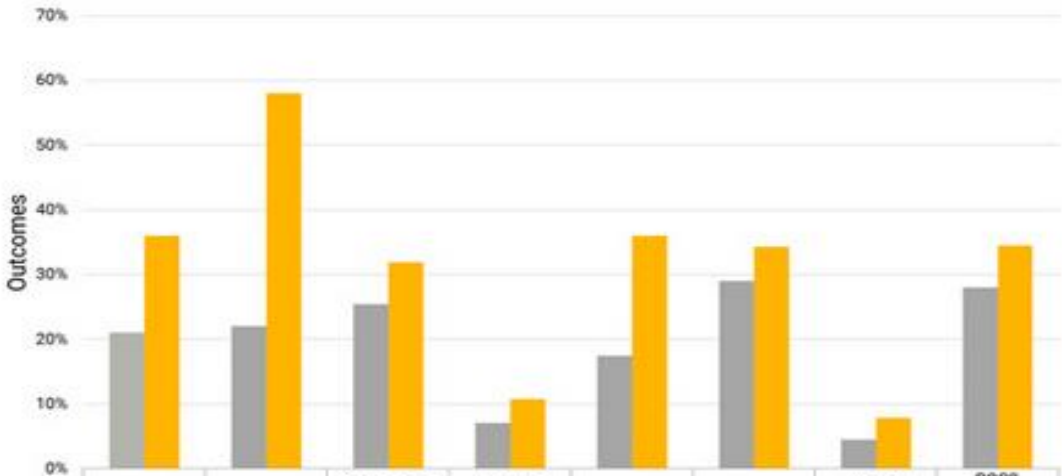


Before and after implementation of LUCAS in EMS organizations

Some in combination with additional activities to improve the system of care*



	Stable ROSC p<0.002 Saussy et al. 2010*	ROSC Maule, 2007	Admission to hosp p<0.0001 Axelsson et al. 2013*	1 month survival p=0.002 Axelsson et al. 2013*	Short term survival Pepe et al. 2016*	ROSC p=0.003 Sporer et al. 2017*	CPC 1-2 at hosp disch p=0.001 Sporer et al. 2017*	ROSC (as treated analysis) p=0.042 Anantharaman et al. 2017
Before	21%	22%	25%	7%	17%	29%	5%	28%
After	36%	58%	32%	11%	36%	34%	8%	35%

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1. Stream	NURSING
2. Speciality	Mental Health Nursing
3. Date	21/10/2019
4. Title	The mental health care act 2017- Rights of mentally ill patients - Nurses perspectives
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THE MENTAL HEALTH CARE ACT, 2017

The mental health care act 2017 was passed on 7th April 2017 and came in force from 29th May 2018. This Act superseded the previously existing Mental health Act, 1987. The mental health care act 2017 is an act to provide for mental health care and services for persons with mental illness and to protect, promote and fulfil the rights of such persons during delivery of mental healthcare and services and for matters connected therewith or incidental thereto.

RIGHTS OF PERSONS WITH MENTAL ILLNESS

The mental health care act 2017 aims to safe guard the rights of the people with mental illness. Chapter 5 "Rights of persons with mental illness" is the corner stone of this legislation.Nurses are having an important role in the protection of rights of clients.

- Right to access mental health care
- Right to community living
- Right to protection from cruel inhuman and degrading treatment
- Right to equality and non-discrimination
- Right to information
- Right to confidentiality
- Right to access medical records
- Right to personal contacts and communication
- Right to legal aid
- Right to make complaints about deficiencies in provision of services

RIGHTS OF PERSONS WITH MENTAL ILLNESS NURSES PERSPECTIVE

Persons with mental illness are considered as one of the most vulnerable group in the society. Many unacceptable conditions are still existing in dealing with mentally ill persons. Mentally ill persons are least capable of protecting their rights because of their illness itself. It is the responsibility of the health care provider to protect the human rights. In most of the situations nurses have to take an advocate role in protecting the rights of mentally ill persons. Thus Mental Health Care Act 2017 and Chapter 5 becomes a promising legislation concerned with nursing field.

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4. Title	Recent advances in Advanced Nursing Skills
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Recent Advances in Advanced Nursing Skills

- Changes in professional practice require a constant updating in knowledge, attitude and skill.
- Nurses are the largest part of the professional health workforce and achieving universal health coverage globally.
- There is a demand for big expansion in the health workforce .Work forces is changing as needs change.
- Disappearance of traditional models and greater emphasis on disease prevention and health promotion.
- Training a technology enabled nursing work force and assuring ongoing competency.

Some of the recent advances in advanced nursing skills are;

- **Telemedicine :** For counseling patients over the phone , teach isolated communities and treat patients when transportation issues occurs due to illness .Through telemedicine nurses can monitor a patient's oxygen level, heart rate, respiration and blood glucose and can instruct the patient how to dress wound or treat minor burns.
- **3Dprinting:** Explaining complicated medical language with 3D printing. An exact model of body parts and organs can serve as an invaluable tool for enhancing communications between patients and the care givers who serve them.
- **Portable diagnostics:** The appearance of pocket sized, user friendly and portable diagnostic devices make it easier and faster for nurses to care for a patient. Portable ultrasonography can reduce the frequency of urinary catheterization; help for insertion of peripheral IV lines and saves time.
- **Drawing blood with technology:** Innovative blood- drawing robots like Veebot is comfortable, safe and less painful.
- **Genetics and Genomics:** Genetic and genomic element allows patient and provider to take the necessary steps in order to reduce risk for many health problems.
- **Point-of-Care Technology :** Accessing patient records, X-rays, medication information and even obtaining a second opinion from another health care professional, can all be done directly from the bedside .Utilizing a wireless network and computer, nurses in many hospitals can now access and receive a wide array of information right from the patient's room.
- **The portable electrical defibrillator :** It is the only effective therapy for cardiac arrest caused by ventricular fibrillation or pulse less ventricular tachycardia.
- **Electronic Health Care Records (EHR):** Help health care providers to access critical patient information from multiple providers 24 Hrs a day, allowing better co-ordinate care.
- **Electronic Lift Systems, Smart Beds and Computerized Staff Schedules:** Electronic lift systems operated by remote control and other wireless technologies have greatly reduced injury and stress for both patients and nurses. Smart beds, such as those developed by Hill-Rom, work in conjunction with other point-of-care technology to obtain and analyze patient information such as weight, temperature and head and neck elevation. New staff scheduling systems improves efficiency by enabling nurses to set up coverage and even schedule their shifts remotely.

- **Nursing Informatics and Computer Technology:** Nurses use tablets to access information, and portable computers are at the bedside. Charts are continuously updated in real time which improve patient outcomes and the delivery of appropriate, timely care .
- **Drug management technologies:** High-tech systems of medication retrieval and delivery, such as bar coding and verification, have greatly reduced the potential for dangerous error. Infusion equipment advances have made the delivery of slow-administer drugs much easier, with computerized machines able to control dosages and rates
- **High fidelity simulation:** It has become more integrated in to the education of nurses, preparing them for emergency situations such as cardiac arrest.
- Nursing professionals for aging population.
- Focus on inter disciplinary care.
- Nursing quality research initiative (NQRI) and Evidence based practice(EBP).
- **Video conferencing:** The ability to interact with nursing professionals throughout the world.
- Technology enabled nursing workforce and assuring ongoing competency.

It is important to balance human element and humanity with technological advancement.

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RECENT ADVANCES IN PSYCHIATRY- 2010 -2019

HAPPENINGS--- COMMUNITY MENTAL HEALTH IN INDIA

- Presently, the DMHP has been implemented in 241 districts of the country, and it is proposed to expand it to more districts. Currently, the emphasis is on a judicious balance between various components of the mental health care delivery system with clearly specified budgetary allocations. A plan for integration of NMHP with National Rural Health Mission (later renamed as the National Health Mission) was also developed. Following the implementation of NMHP and DMHP, there has been a significant improvement in human resource development. The public awareness has also increased enormously due to community-based mental health care, and the trained mental health professionals working in remote areas in the private sector as well as due to a massive effort by professionals to address the general public with modern mental health information. The Indian Council of Medical Research severe mental morbidity demonstration project showed that about 20% of people with mental disorders could be brought into care with this approach. However, the population covered was very small in comparison to the national need

- Another important development in community psychiatry in India is the increasing role of voluntary organizations in developing small-size locally relevant community-based psychiatric care facilities such as day care centers, vocational training centers, sheltered workshops, half-way homes, and long stay homes.

- Recently, for the first time in India, a mobile tele psychiatry unit commissioned by Schizophrenia Research Foundation (SCARF) and supported by the Tata Educational Trust was initiated in 2011. The program includes a bus with teleconferencing facilities, a computer for data storage, and a large television (TV) fixed at its rear. The TV is used for awareness programs in the villages. The bus moves from village to village accessing persons with mental illness. After the psychiatric consultation through linking with Chennai SCARF office, the medicines are given from the pharmacy located on the bus. There have also been developments in telepsychiatry-based services at other places in the country including the All India Institute of Medical Sciences, New Delhi, and the Postgraduate Institute of Medical Education and Research, Chandigarh. Feasibility of linking mental health services in distant locations to the central place has also been studied at Chandigarh

- The Community Care for People with Schizophrenia in India (COPSI) study examined the clinical effectiveness of a collaborative community-based care for people with schizophrenia and their caregivers. The intervention was delivered by community health workers who had at least 10 years of schooling and good interpersonal skills. These workers were systematically trained over 6 weeks and assessed for competence.

- NMHP and DMHP have envisioned a decentralized community-based approach to the problem of the mental health gap, which aim at the adequate provision of services in the periphery to promote early detection and treatment of mental illness in the community itself with facilities of outpatient as well as indoor treatment and

appropriate follow-up measures. However, the MHA with its stringent licensing protocol and focus on legal issues is not in keeping with the goals of the NMHP.

- The United Nations Conventions on the Rights of Persons with Disabilities (UNCRPD) was adopted by the UN General Assembly in December 2006. The purpose was to promote, protect, and ensure the full and equal enjoyment of all human rights and fundamental freedom by all persons with disabilities and to promote respect for their inherent dignity. India signed and ratified the UNCRPD in 2006. The first draft was circulated in February 2010 and a revised draft in April 2010. A modified draft was submitted to the MOHFW in March, 2011. The new MHCB is longer than the existing MHA, and has 16 chapters and 136 clauses. As per this Bill, unmodified electroconvulsive therapy (ECT) is going to be banned. In many parts of our country, still direct ECT is practiced, as the anesthetists are not available at many places even in the district hospitals. Research has also shown that the risk of muscular and skeletal injuries with direct ECT may be overstated. The risk of injury can potentially be modified by administering a sedative drug (diazepam) before the procedure as diazepam acts as a muscle relaxant.

- To further build the DMHP and increase the accessibility of minimum and essential mental health services, the MoHFW and its public health institutes have collaborated with Asia Australia Mental Health (AAMH) on innovative community mental health development project. The project was began in 2011 with the aims to develop locally sustainable best possible community mental health models and which can be practiced at local district, state, and national level. Four pilot sites were identified for this project and activities were focused on developing local capacity to prevent, treat, and rehabilitate people with mental disorders through integrating mental health care into public health. The project collaborates with international partners under a formal agreement with technical expertise provided by The University of Melbourne (AAMH)

- **Satellite clinics (or community outreach clinics)** Considering the point prevalence of mental disorders to be 58.2/1000 population and the huge treatment gap. The need for such services cannot be underestimated. It is expected that if the services are brought close the doorstep of patients, the utilization of the services will be better. Keeping the need of service in the background, some teaching hospitals in India have established outpatient treatment services to reach patients who cannot reach hospital-based facilities. Such services are provided by professionals from the teaching hospitals who have the additional responsibility of teaching, clinical care of patients in the hospitals and research.
  In addition to early diagnosis and treatment of common mental disorders in the community, the other advantage is that patients who are stable can be seen in satellite clinics after discharge from the tertiary care hospital facilities, thus reducing the workload on the tertiary hospitals at the same time benefiting the client in terms of reduced travel expenses and reduced wait period for consultation. A closely knit community also helps to provide reliable information on the prevalent social and cultural beliefs which are relevant for the diagnosis and management of mental health problems. Such clinics also provide a framework for primary prevention of

mental disorders. There is also an opportunity to understand the reasons for the treatment gap and how to handle such disorders.

- **Community de-addiction camps** Camp approach has been a popular method in India and other developing countries to reach out to patients in the community. Apart from the COCs and indoor camps, the department is also organizing 1-day OPD camps at least once in a month in different villages of Chandigarh with the purpose to create awareness, enrollment in treatment, and subsequent follow-ups.

- **Home-based detoxification** In spite of regular COCs and annual community de-addiction camps and 1-day OPD camps by the department, a substantial number of patients do not seek services from these places after the initial assessment and enrolment.

- **Electronic health records for integrated mental health care** Mental health care is known to be poorly integrated into many health systems and could benefit from improved information sharing facilitated by electronic health records. A scoping review have been implemented. A comprehensive literature search is planned, and the results beings planned for publication in late 2019. The finding from this scoping review have the potential to inform the development of a conceptual framework to guide empirical research in mental health contexts.

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4. Title	**IMPACTS OF SELFIE**
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IMPACTS OF SELFIE

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Little Lourdes College of Nursing, Kidangoor
Source - Original article

Today the word selfie has become so immersed in daily use vocabularies of young generation. Selfie craze has gone too far. Now, it is the time of creating and breaking records of selfies. People usually take selfies at marriages, parties, social gatherings, even at offices and educational institutions in various posses include duck face or lips pose, discrete pouting etc. There are positive and negative impacts on taking selfies.

POSITIVE IMPACTS

- **Boosts Confidence :** When people take selfie and post it on social media they get likes and shares. It makes them feel good about themselves. People who generally don't express themselves can express their emotions through it. Introvert people find to difficult to interact with others, but selfies give them a chance to express themselves without leaving their comfort zone.
- **Capturing the Moment :** By taking selfies people can take photos quickly without the assistance of a photographer or digital camera. So people can capture more moments in their life.
- **Perfect Picture :** Previously people used to curse people if the picture does not come well. With this technology, one can take a perfect picture as he or she is seeing himself or herself how the picture will look and then can take the picture.
- **A person taking Picture is also in Frame** : In the past, if one wanted to take picture of whole family then one person of the family will always be absent from that picture as he or she use to take that picture or to call a photographer to take the photo. But with selfies the whole family can come in one picture and hence no one feels left out with the advent of selfies.

NEGATIVE IMPACTS

- **Psychological effect** : Studies shows that selfies have psychological effect on people. Those who frequently post their selfies on social media, become conscious about likes and comments and if they do not receive desired response, their self esteem is damaged and self confidence is shattered which ultimately results depression.
- **Experience vs photo** : People take selfies at railway station, restaurant in the park or any other scenic or not scenic place. It is clear that there is big impact on teenagers' brain to enjoy photo rather than the experience.
- **Competition** : There is unspoken competition between friends to post a selfie which gets more likes. Peer pressure makes them to do risky things to stay ahead of the competition.
- **Exploitation**: The mobile companies all over the world are coming up with new marketing strategy in which they are marketing the mobile with an additional feature of powerful selfie

cameras and due to it, they are pricing those mobiles very high. In simple words, it has become a new tool for the companies to exploit the mindset of consumers by selling mobiles at exorbitant prices in the name of the selfie.

- **Depicts loneliness** : An argument against selfies is that it shows how human beings are becoming isolated by the day as they now do not have one friend or family member to take their picture. In simple words, it shows that individual no longer have families or friends with them as they have no time for such relations rather they have time only for themselves and result of this loneliness has led to the innovation of selfie.
- **Risk to life** : There are hundreds of deaths reported because of selfies. People go to dangerous places like cliffs, sea, building tops etc. to take a selfie can cause death.
- **Selfie deaths in india** : Out of 127 selfie-deaths around the world from March 2014-September 2016, a whopping 76 deaths while taking selfies were reported in India, according to 'Me, Myself and my Killfie: Characterizing and Preventing Selfie Deaths' a collaborative study by researchers from Carnegie Mellon University and Indraprastha Institute of Information Technology Delhi. The study showed that Pakistan had nine selfie-deaths, followed by the United States.

  According to the study, almost 90% selfie-deaths in India happened near water or on the train tracks, while around the world, the most deaths happened while posing for a selfie from terrifying heights, including mountains, cliffs and building ledges. Further, the study showed that about 75% of deaths due to taking dangerous selfies were male and nearly 70% of those were under the age of 24.

'NO SELFIE ZONES' AT DANGEROUS PLACES: The state governments have been notified by the Tourism Ministry to mark 'no-selfie zones' at certain popular tourist attractions. As most deaths take place near water fronts and these are in abundance in Mumbai, the government has listed 16 sites as selfie-free zones with a number of them around waterfronts such as Juhu and Dadar beach fronts, Chowpatty, Marine Drive etc.

CONCLUSION : Taking selfies is not wrong, but is imperative that the person should not be addicted and take control over our senses. It is better to enjoy those moments that would never come again instead of taking hundreds of selfies.

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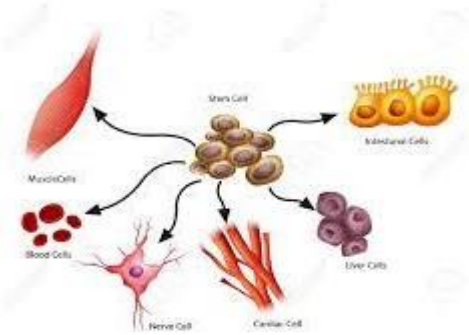
11. Resource	Original Article / Site / Book: Recent Advances and Future Trends in Obstetrics and Gynaecology Tabassum Parvez, Cimona Lyn Saldanha Department of Gynecology & Obstetrics, SKIMS, Srinagar, Jammu and Kashmir, India, JIMSA July-September 2012 Vol. 25 No. 3, Page no: 156.

STEM CELL THERAPY

Stem Cell technology has taken the world by storm. The potential benefits are innumerable and newer uses are coming on over the horizon. Patient awareness campaigns are underway and baby's cord blood is need to harvest these stem cells a relatively easy means of cell procurement. Stem cell therapy will be a cornucopia of benefits to humanity, virtually unlimited in its future potential. That future begins now.

1. **What are stem cells**: Stem cells are the body's raw materials — cells from which all other cells with specialized functions are generated.



Stem cells: The body's master cells

2. **Properties:** There are two properties
    - Self-renewal: the ability to go through numerous cycles of cell division while maintaining the undifferentiated state.
    - Potency: the capacity to differentiate into specialized cell types.
3. **Stem Cell Therapy (SCT)** is the treatment of various disorders, non-serious to life threatening, by using stem cells.
4. **Uses:** It has already shown promise in treating over 75 diseases like the following:
    - Cardiac repair
    - Treatment of type II Diabetes Mellitus
    - Treatment of neurological injury like- brain injury, Alzheimer's Disease Huntington's Disease, Amyotrophic Lateral Sclerosis
    - Malignancies

- Regenerative medicine- of the joint, tissue or organ
- Gene Therapy

5. **Advantages:** Stem cell treatments may lower symptoms of the disease or condition that is being treated. The lowering of symptoms may allow patients to reduce the drug intake of the disease or condition.
6. **Disadvantages:** Stem cell treatments may require immunosuppression, Pluripotency in certain stem cells could also make it difficult to obtain a specific cell type. It is also difficult to obtain the exact cell type needed, because not all cells in a population differentiate uniformly. Undifferentiated cells can create tissues other than desired types, some stem cells form tumors after transplantation, pluripotency is linked to tumor formation especially in embryonic stem cells, fetal proper stem cells, induced pluripotent stem cells.
7. **Upcoming uses:** Diseases and conditions where stem cell treatment is being investigated, Diabetes, Rheumatoid arthritis, Parkinson's disease, Alzheimer's disease, Osteoarthritis, Stroke and traumatic brain injury repair, Learning disability due to congenital disorder Spinal cord injury repair, Heart infarction ,Anti-cancer treatments ,Baldness reversal, Replace missing teeth ,Repair hearing ,Restore vision and repair damage to the cornea, Amyotrophic lateral sclerosis, Crohn's disease ,Wound healing, Male infertility.

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‘Happenings’: A Publication from KUHS on Recent Advances

1. Stream	Nursing
2. Speciality	Mental Health Nursing
3. Date	16-10-2019
4. Title	INFLUENCE OF INEFFECTIVE PARENTING ON BEHAVIOURAL PROBLEMS AMONG ADOLESCENCE
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INFLUENCE OF INEFFECTIVE PARENTING ON BEHAVIOURAL PROBLEMS AMONG ADOLESCENCE

JAIN JACOB **ORIGINAL ARTICLE**

Adolescence is a fascinating period in the life of an individual. They have significant energy, drive with abundant innovative ideas. The future productivity of any nation is fully depending on adolescence. Hence, it is essential that healthy development of adolescent needs to be carried out in a positive manner. In recent years, substantial gains have been made in our understanding of the influence of parenting behaviours and styles on adolescent emotional and behavioural attitude. Empirical work focusing on the associations between parenting and adolescent outcomes is important because the influence of parenting during adolescence continues to affect behaviours into adulthood. Additionally, there has been considerable attention paid to the mechanisms that shape parenting those then influence adolescent outcomes. Let us discuss some behavioural disorders especially occurs during the adolescent age.

- **Oppositional Defiant Disorder-** is a childhood disorder that is defined by a pattern of hostile, disobedient, and defiant behaviours directed at adults or other authority figures. **ODD** is also characterized by the individual become easily angered, annoyed or irritate, frequent temper tantrum, argues frequently with adults, refuses to obey rules and low self esteem

- **Conduct Disorder-** is a mental disorder diagnosed in adolescence that presents itself through a repetitive and persistent pattern of behaviour in which the basic rights of others or major age-appropriate norms are violated. These behaviours are often referred to as "antisocial behaviours." This disorder is characterized by frequent refusal to obey parents / authority, repeated truancy, tendency to use drugs etc.

- **Masturbation-** Adolescence experience sexual excitement and erection of penis or clitoris followed by relief during masturbation. It contributes in developing sense of mastery over sexual impulse and helps the adolescents to capacitate and prepare for heterosexual relations. In case of excessive masturbation, the child needs special attention, facilitates for recreation and diversion, sex education and counselling.

- **Substance Abuse-** Substance abuse or drug abuse is a threatening social problem of adolescent's age group. It is periodic or chronic intoxication by repeated intake of habit forming agent. The abused agents are mainly tobacco, alcohol, sleeping pill, tranquilizers, mood elevators, stimulants, opiates etc.

- **Juvenile Delinquency-** Juvenile delinquency means indulgence in an offence by a child in the form of premeditated, purposeful unlawful activities done habitually and repeatedly. Usually these children belong to broken family or emotionally disturbed family.

- **Anorexia Nervosa -** Anorexia Nervosa is an eating disorder occurs most often in adolescent girls. The affected adolescent girls' practices vigorous exercise for weight reduction or induced vomiting by stimulating gag reflex to remain slim. The affected individual is

characterised by under nutrition, marked weight loss, bizarre food intake patterns, dryness of skin, hypothermia etc.

Positive parenting strategies for adolescence

- **Parent-Teen Relationship**
- Pay close attention, but respect your teen's privacy
- Compliment your child often, and make sure the praise is genuine.
- Respect your child's concerns
- Never criticize your child
- **Developing Opportunities for Communication**
- Build structure.
- Seize the moment
- Eliminate distractions
- **Disciplining Teens**

• Don't overreact.
• Be clear about the rules.
• Listen before you act.

- **Setting Limits**
- **Resolving Conflict with Teens**
- Determine the underlying cause of the conflict.
- Pay attention to your child

CONCLUSION

Parent–child relationships are among the most important relationships for adolescents. Adolescence is a period of rapid biological, cognitive, and neurological changes which have a salient impact on psychosocial functioning and relationships During adolescence, parent–child relationships are thought to become more equal, interdependent, and reciprocal changes that co-occur with a temporary decrease in the quality of the relationship and an increase in conflict .Indeed, adolescents report that their parents are less supportive in early to middle adolescence, and they gradually perceive their parents as less powerful and controlling over the course of adolescence

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1. Stream	Nursing
2. Speciality	Medical Surgical Nursing
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4. Title	COMPUTER VISION SYNDROME: A DILEMMA AMONG COMPUTER USERS
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COMPUTER VISION SYNDROME: A DILEMMA AMONG COMPUTER USERS

Sheba Elsan Mathew, Lecturer, Little Lourdes College of Nursing, Kidangoor

Original article

INTRODUCTION

Computers have become an essential part of life. Every one, in one or other situation, gets the need to use computer. Since the advent of games, various computer programmes, the use of computers extended to such an extent, that various jobs are now based solely on use of computers. Here the person's job demands the use of computer for more than 7 hours a day. Since the computer is involved with vision and eyes, it has some effect on eye and surrounding muscles. Studies indicate that 50 percent to 90 percent of computer users suffer from symptoms of Computer Vision Syndrome.

DEFINITION

Computer vision syndrome (**CVS**) is a condition resulting from focusing the eyes on a computer or other display device for protracted, uninterrupted periods of time and the eye muscles being unable to recover from the strain due to a lack of adequate sleep Computer Vision Syndrome is also referred to as Digital Eye Strain, describes a group of eye and vision – related problems that result from prolonged computer, tablet ,e-reader and cell phone use.

ETIOLOGY

Computer Vision Syndrome affects 75% of the people who work on computers,most markedly those who work for more than 3 to 4 hours with computers,mobiles ,tablets and e-reader. This may be caused by poor lighting, glare on a digital screen, improper viewing distances, poor seating posture, uncorrected vision problems, uncorrected spectacle power, decreased blinking rate (normal blinking rate :15-20 blinks/ min), poor work setup, job nature and stress

SYMPTOMS

- The most common symptoms associated with Computer vision syndrome (CVS) is eye strain, headaches, blurred vision, dry eyes, neck, backache and shoulder pain.

DIAGNOSIS

Computer vision syndrome can be diagnosed through a comprehensive patient history and eye examination including visual acuity measurements to assess the extent to which vision may be affected.

TREATMENT

- **Eye care :**Eye glasses or contact lenses prescribed for computer users experience problems with eye focusing or eye coordination.
- **Lenses** are prescribed to meet the unique visual demands of computer viewing may be needed. special lens designs ,lens powers or coatings may help to maximize visual abilities and comfort.

Simple exercises for computer users

- **Eye rotations:** Move your eye balls 10 times in the clockwise direction, and then 10 times in the anti-clockwise direction.
- **Blinking:** Simply blink rapidly 15-20 times. This should sufficiently activate the tear-secretion glands and lubricate the eyes.
- **Eyes sidewards movement:** Look straight ahead. Without moving your head, move your eyes from left to right, and the left again. Repeat 10 times.
- **Neck rolls:** Move your neck 10 times in the clockwise direction, and then 10 times in the anti-clockwise direction.
- **Neck sidewards movement:** Move your neck 10 times, from left-right-left.
- **Location of computer screen**: The computer screen should be 15- 20 degrees below eye level (about 4 or 5 inches) as measured from the centre of the screen and 20-28 inches from the eyes.
- **Reference materials**: Should be located above the key board and below the monitor otherwise a document holder can be used beside the monitor.
- **Lighting**: Position the computer to avoid glare (especially from overhead lighting or windows).
- **Anti-glare screens**: If there is no way to minimize glare from light sources,consider using a screen glare filter .These filters decrease the amount of light reflected from the screen.
- **Seating position**: Chair should be comfortably padded and confirm to the body.Chair's height should be adjusted so that your feet rest flat on the floor.Your wrists should not rest on the keyboard when typing.
- **Rest breaks** :To prevent eye strain, try to rest your eyes when using computer for long periods. Rest your eyes for 15 minutes after 2 hours for continuous computer use. For every 20 minutes of computer viewing ,look in to the distance for 20 minutes to allow your eyes a chance to focus.
- **Blinking:** To minimize chance of developing dry eye when using a computer ,make an effort to blink frequently. Blinking keeps the front surface of our eye moist.

CONCLUSION

Poor visual function is the principal difficulty. It will increase mental stress level. These lead to reduced effective working hour and frequent absence from work. There is also increase risk of errors, less time for personal care and reversal. All these ultimately lead to Reduced Productivity. So, creating public awareness about healthy use of computer is essential to prevent this visual disorder.

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‘Happenings’: A Publication from KUHS on Recent Advances

FACING SHEET OF ARTICLE

1. Stream	Nursing
2. Speciality	Community Health Nursing
3. Date	14-10-2019
4. Title	**‘MITTAYI PROGRAMME’- adding sweetness to life of patients with juvenile diabetes**
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‘MITTAYI PROGRAMME’- adding sweetness to life of patients with juvenile diabetes

Ms. Treesa Kuruvilla, Senior Lecturer, Community Health Nursing Department, Little Lourdes College of Nursing, Kidangoor, Kottayam

Source: Original article

About ‘MITTAYI’ PROGRAMME:

'Mittayi' is a unique initiative by the Govt. of Kerala to provide a comprehensive care to the children/adolescents with Type-1 diabetes, in the state. 'Mittayi' meaning 'sweets' envisaging to provide a comprehensive care & support to the juvenile diabetics, so that their blood sugars are managed effectively without curbing sweets completely. This project came into action from May 2018. Lifelong management of Type-1 diabetes is challenging for the patient, family and the treating doctors and warrants comprehensive diagnostic, treatment and team based facilities and care. Adding to this, majority of the children's with type 1diabetes in the state are from a poor socio-economic background. The complexity and longevity of management of Type-1 diabetes demands that all the population affected with Type-1 diabetes needs to be brought in to the social safety network[1].

For this the Kerala Social Security Mission, Under Social Justice Department with technical assistance from Health And Family Welfare department initiated a comprehensive social support project for children and adolescents with type 1 diabetes mellitus- and named it as MITTAYI. The ultimate objective of 'Mittayi' is to provide comprehensive care and support to all the children/adolescents with T1DM with inadequate means to support their treatment and care.

Within last one year about Rs. 5 crore has been spend under this project, including medicines and other diagnostic measures. Medical equipments including 10,040 insulin cartridge, 42,000 glucometer strips, 9,000 urine ketone strips, 435 glucometers, 1,384 insulin pens and 3 insulin pumps have been distributed free of cost to the beneficiaries. Even though the programme started as a pilot project in the state wide Government Medical College Hospitals, this year the Government of Kerala is planning to start 9 satellite centres in various other districts of the state. In the state 1,100 beneficiaries have already registered under this programme[2].

Scope of ‘MITTAYI’ PROGRAMME

- Early identification of Type 1 Diabetes Mellitus,
- Awareness creation in this regard for health care personnel, social workers, parents, teachers and public.
- Strengthening institutional mechanism for efficient and effective clinical and laboratory diagnosis of T1DM
- Providing free and comprehensive treatment, monitoring (clinical and home monitoring) and follow up of T1DM, using the most appropriate technology as it evolves time to time.
- Providing free and comprehensive treatment for complications of T1DM for children and adolescents, including acute and chronic conditions.

- Systematic and scientific nutritional management and monitoring[1].

Beneficiaries:

- Child/adolescent should be below the age of 18 years.
- The annual family income of the applicant should be below Rs.2 lakhs
- The applicant/parent should be a permanent resident of Kerala
- The child/adolescent should be certified by an empanelled doctor (under the scheme) regarding the diagnosis of T1DM and recommended therapy schedule under the project.
- Parents of the child/adolescent should be ready to sign an informed consent before beginning the therapy.
- Parents of the child/adolescent should be ready to undergo mandatory training including residential diabetes camps[1].

Components under 'MITTAYI PROGRAMME'

- Insulin pen with cartridge are preferred for children and adolescent.
- Insulin Pump shall be provided only if it's absolutely indicated, like in cases with "brittle diabetes".
- Only after getting the approval from the secretary social justice department Self-monitoring of blood glucose (SMBG) by parents/ caregivers is done with glucometers.
- All the beneficiaries will be provided with a glucometer if they don't have that.
- Continuous glucose monitoring systems (CGMS) measures interstitial glucose and comprise of a glucose sensor, glucose monitor or reader and a display device or software. As part of this project CGMS are preferred over conventional glucometers.
- The pediatrician enrolled at that specific Type-1 diabetes center's set as part of the project will be taking care of these beneficiaries along with Trained Nurse and dietician
- There are camps for children to teach them how and when to use or monitor their insulin without parental help.
- As psychological stress may have a negative effect on diabetes, a number of measures have been recommended including: exercising, taking up a new hobby, or joining a charity among others[1].

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   https://www.mathrubhumi.com › Health › News

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2. Speciality	Community Health Nursing
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4. Title	Middle Level Health Workers Programme (MLHP)
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TITLE: MIDDLE LEVEL HEALTH PROVIDER PROGRAMME (MLHP) AND COMMUNITY HEALTH NURSING SPECIALISED NURSES

SOURCE: SITE

CONTRIBUTORS NAME: SALINA S

THE RELEVANCE OF THE ARTICLE: With the invention of term MLHP, nurses are in key position to hold the title, as the present curricula of BSc nursing is rendering 320 hrs of practical training for graduate nurses at community health experience.

Millennium development goals and advance towards Universal Health Coverage requires addressing issues like critical shortages, maldistribution, retention and performance gaps of human resources for health. Middle level Health Workers are according WHO(2001) , "front-line health workers in the community who are not doctors, but who have been trained to diagnose and treat common health problems, to manage emergencies, to refer appropriately, and to transfer the seriously ill or injured for further care." In developing colu8ntries, they are increasingly being used to render services autonomously especially in the rural and remote areas. Specialized nurses spend 4-5 years in training and may or may not perform some of same tasks as doctors[1].

With reference to the notification issued by Indian Nursing Council (F.No. 22-206/CPCH/2019-INC), it has been decided to integrate MLHP IN Basic BSc Nursing curriculum[2].

'The Indian experience of creating these categories has been fraught with hesitation and hurdles. Even the National Health Policy (NHP) of 2017 recognizes this need, but progress has been slow and contentious. Chhattisgarh initiated a three-year graduate training programme (Diploma in Modern and Holistic Medicine) for creating a cadre of rural medical assistants. They were shown to be as capable as doctors in delivering some of the primary care services. Despite several name changes, the conflict between medical professionals and the aspirations of the new graduates resulted in an identity crisis that finally led to closure of the programme. Assam is the only state where such a course is presently run (Diploma in Medicine and Rural Health Course). On the other hand, the category of Physician Assistants (PAs) has taken root in some southern states and West Bengal, through a 4-year graduate course run by universities. They mostly perform duties under the supervision of doctors in hospitals but have the potential for delivering preventive and promotive services in primary care settings' (Hindustan Times Aug 13 2019)[3].

What can be done now?

- Policies are needed to define at national and sub-national levels the appropriate skills mix of cadres that include Middle Level Health Workers (MLHWs), together with identification of their roles, taking into consideration demands from the community level and the country's changing disease patterns[1]

• Policy actions and investment decisions are needed to improve and scale up the training, licensing, certification and re-certification, assignment of responsibilities, supportive supervision, quality of care assessment, and monitoring and evaluation of MLHWs. Policies should be designed on the basis of good available evidence and then be adequately implemented at scale[1]

- For the nursing workforce in particular, there is a need to set up explicit entry requirements to nursing colleges, improve training content and quality, as well as licensing and accreditation requirements. Particular attention should be paid to the private sector and to rural and remote areas, where the quality of training and continuous education needs more clear and sustained actions[1]
- Theme-focused workshops on existing MLHW programs should be conducted to facilitate more interaction, generate quality output, and in the long run facilitate follow-up meetings to provide technical support and guidance for MLHW programs, including operational research[1].
- The integration of necessary topics in BSc Nursing curriculum and university certification of the additional qualification

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4. Title	**Menstrual blood banking : “Best out of waste”**
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Menstrual blood banking : “Best out of waste”

Mrs. Santy John, Assistant Professor, Little Lourdes College of Nursing , Kidangoor

Source- Original article

Menstrual stem cell banking provides women with a unique opportunity to collect and preserve vital stem cells that can be harvested from the body’s menstrual blood. The stem cells are unique because, in spite of being adult cells, they have many properties similar to bone marrow and embryonic cells. Research shows that besides the potential use of these cells by the donor, these cells can possibly be used to benefit other family members who are genetically related to the donor, such as parent or a child.

- The primitive cell also known as stem cells are miraculous cells that can regenerate into various organs such as the heart, bones, muscles and nervous system
- Menstrual blood banking is the process of banking menstrual blood for cell therapy.
- Launched in the world: 2007, by Cryo cell and in India in March 8, 2011, by Life cell International
- The lining of uterus contain a number of mesenchymal cell and high concentration of growth factors which sheds along with the blood and tissues
- The stem cells multiply rapidly and can grow into neural cardiac cartilage tissue as well as fat and bone.
- A menstrual stem cell has been utilized in various cosmetic and regenerative procedures with astounding success.
- These cells are autologous and risk free, increases its application in the field of regenerative medicine, plastic surgery and cosmetology manifold.
- The stem cells in the menstrual blood have a success rate 100 times higher than stem cells from human bone marrow.
- The main goal of mesenchymal stem cell therapy is to treat leukemia with hematopoietic stem cell transplantation.
- Higher potentiality , high proliferative properties and purity are the qualities of the mesenchymal stem cells
- The collection of menstrual blood is painless harmless simple easy and with no complication and low risk of rejection.
- Whilst an Umbilical cord and Cord Blood can only be stored once, menstrual blood can be preserved at any age and multiple times.
- An estimate of 9,000 tons of sanitary waste (432 million pads) is generated annually in India and it takes 500 to 800 years to decompose.

- The cup is the perfect solution with minimal environmental impact which lasts for up to five years with care and cleaning, so it's pretty much a zero-waste period, good for the planet, and great value for money
- A medical grade silicon conical cup is inserted into the vagina on the heaviest flow day to collect 10-20 ml within 3 hours.
- A collection of about 10 to 15 ml of menstrual fluid could easily yield between 10 million to 100 million Mesenchymal Stem cells.
- Even an insufficient original quantity can also be processed, cultured and suitably amplified before commencement of therapy.
- It is then mailed back for processing and storage
- To retain its potency and viability for indefinite period the stem cells are harvested and stored in liquid nitrogen at sub zero (-196^0C)
- In future it aimed to treat Alzheimer's, Atherosclerosis, Diabetes, Heart disease, IBD, Parkinsonism and Arthritis.

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Innovative Ed Techniques

Shine Thomas, Associate Professor, MIMS College of Nursing, Malappuram

Innovations in educational experiences are based on the creativity of teachers who can make teaching and learning interesting, enjoyable and attainable. They can become change agents by being creative in thinking and approach. It is a challenge for a teacher to achieve each student's attention, and to create a classroom more innovative and vibrant. There are various innovative Educational techniques to beat this challenge.

- **Create a simulated Classroom Environment**: It is a combination of Visuals, Hands-on activities, Multi-modal means of learning, Opportunities for higher-order thinking/questioning, Exciting and stimulating teachers. When a classroom is well-decorated with academic inputs, it makes thinking and learning process superior and encouraging.
- **Creative methods of Teaching**: Brainstorming sessions will stimulate young minds and generate their interest by encouraging multiple brains to focus on one idea. Teacher has to think in different ways to cultivate their creative ideas. This can be done by encouraging and giving freedom to discover different ideas which will enrich their critical thinking ability, problem-solving skills and blossom their imagination.
- **Real Life Experience**: Teachers can add real-world experiences in their lessons as it will enrich classroom learning with life skills.
- **Outdoor education**: Organization of field trips that are relevant to the lessons enhances learning by doing as the students will find it fresh and exciting. It also helps both teacher and student to get to know each other.
- **Role Playing**: It help them to explore realistic situations by interacting each other which leads to development of interpersonal skills among learners.
- **Designing the interactive lessons with support of technology**: The technological enriched lessons makes teaching lively and long-lasting and increases students' willingness to learn. Interactive whiteboards or mobile devices can be used to display images and videos, which helps students visualize new academic concepts.
- **Mind-set**: Attitude of a teacher will surely change the mind-set and mood of learner's further leads to overall classroom learning environment. Students would like to follow the dedicated and committed teachers .Teaching must be a passion for the teachers.
- **Self-Reflection**: Self-reflection is concerned with a way of self-analysis by the teachers while using instructional strategies.
- **Flipped Classroom Model**: The main attraction of 21st century classroom is flipped classroom model. In this model, teaching and classroom events are in reverse order. Before coming to classes, students are given homework or task and they can view lecture material in form of pdfs and video. In class, teacher and students would take part in various activities concerned with reflection and observation of the prescribed

lecture. This would also lead to peer-to-peer learning, group discussions, self-directed learning.

- **Jigsaw technique**: It is a communicative learning activity in which each member of a group has different pieces of information that they must share.
- **Inquiry-based instruction**: It inspires the students to think for themselves and to become an independent learner.
- **Cooperative learning:** It creates a place for all types of Learners. Extroverts are more comfortable in social interaction get energy and enthusiasm where introverts magnify their energy from silent zone and to think and reflect alone. Extroverts can complete some projects alone, and introverts can choose to collaborate, both of these ways of teaching are critical to meet the needs of different learner segments.
- **Use Problem-Finding**: Problem discovery can be done by assist students to look at the surroundings by exploring gaps to fill using problem findings. From this strategy, students can be equipped with the skill of critical thinking, creative expressions and problem solving.
- **Puzzles and Games**: When lessons are introduced through games and puzzles, it helps learner to think critically, and creatively.
- **Generate a feeling of personal connection**: For educational innovations, it is necessary for a teacher to connect with his learner and current trends of education.
- **Flexible Learning Environments**: Learning spaces should be not rigid but flexible which support one to one teaching, collaboration, critical and independent thinking and group discussions.
- **Let Students Take Risks and Fail**. : Students need to experience failure to learn. Learners should be challenged with real world problems to tackle and let them fail and to try again which will increase their confidence.

Conclusion: Teachers, who provide activities that best engage, inspire and sustains students' love for learning are more prone to put in their best efforts, enjoy the process and find the positive results.

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FACING SHEET OF ARTICLE

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HEREDITARY HEMOCHROMATOSIS/ CELTIC DISEASE

DEFINITIION: Hereditary Hemochromatosis is inherited in an autosomal recessive or autosomal dominant manner depending on which type a person has. Hemochromatosis types 1,2 and 3 are inherited in an autosomal recessive manner. This means that people with these types of hemochromatosis have a genetic change (mutation or pathogenic variant) in both copies of a gene causing hemochromatosis in each cell of the human body. It is seen among Celtic Nations so called Celtic disease.It is a disorder in which the body can build up too much iron in the skin, heart, liver, pancreas, pituitary gland and joints. Too much iron is toxic to the body and over time the high levels of iron can damage tissues and organs and lead to Cirrhosis, Hepatocellular carcinoma (liver cancer),Heart problems, Arthritis (Joint pain) and Diabetes

PREVALENCE: In United States; about 1in 300 non-Hispanic whites has hereditary hemochromatosis, with lower rates among races and ethnicities. Men are more likely to develop complications and often at an earlier age. An estimated 9%(about 1 in10) of men with hereditary hemochromatosis will develop severe liver diseases.

SK Sharma Sangram Mangudkar et al conducted a study on Non HFE related hereditary haemochromatosis which showed that transferrin saturation values above 50% are reported to be 98% specific for C282Y homozygosity in Caucasians

RL Geetha BR Vani et al conducted a study on hereditary hemochromatosis in an Indian origin which a rare case report that the patient with icterus, fever of acute onset with reduced appetite and tiredness and diagnosed by transferrin saturation, serum ferritin levels and mutation analysis of HFE.

CAUSES: The cause of hemochromatosis depends on whether a person has a hereditary form, an acquired form or neonatal form. Hereditary hemochromatosis is caused by genetic disorder changes (mutations or pathogenic variants) in any of several genes.

Hemochromatosis type 1: is caused by pathogenic variants in the HFE gene

Hemochromatosis type 2 is caused by pathogenic variants in the HFE 2 gene (HJV) or HAMP Genes.

Hemochromatosis type 3 is caused by pathogenic variants in the SLC40A1gene

Hemochromatosis type 5 is caused by pathogenic variants in the FTH1gene.

Genetic Inheritance: Actually we inherit one copy of every gene from our mother and the other from our father. The parents of a person with hemochromatosis types 1,2or3 are each expected to have one changed copy of the gene causing hemochromatosis. People with one changed copy of a gene are known as carriers. Carriers typically do not have signs or symptoms of hemochromatosis. When two carriers of an autosomal recessive trait of hemochromatosis have children,; each child has a

- 25% chances to have hemochromatosis
- 50%chances to be a carrier like each parent
- 25%chances to have two working copies of the genes causing hemochromatosis meaning the child is unaffected and is not a carrier

  Hemochromatosis type 4 and 5 are inherited in an autosomal dominant manner. People with these types of hemochromatosis have one changed copy of the SLC40A1GENE or FTH1gene.In most cases people with these types of hemochromatosis inherit the genetic change from a parent who also has the disease. When a person with an autosomal dominant type of hemochromatosis has children, each child has a
- 50% to inherit hemochromatosis
- 50%chance to be unaffected.

Acquired hemochromatosis is not inherited and is not thought to run in families. Neonatal hemochromatosis is thought to run in families; but the exact cause of is not well understood.

CLINICAL MANIFESTATIONS: Feeling of tiredness or weakness, Weight loss, Joint pain, Bronze or grey skin colour, Abdominal pain, Lack of energy, Heart flutters, Memory fog, Loss of sex drive

DIAGNOSIS: Transferin Saturation Testing and Genetic Screening Of Newborn, Routine Iron Testing

MANAGEMENT FOR HEMOCHROMATOSIS: The goals of treating hemochromatosis include; reducing the amount of iron from the body to normal levels.

Phlebotomy, Iron chelation therapy, Dietary changes, Treatment for complications.

PREVENTION OF COMPLICATIONS FROM HEREDITARY HEMOCHROMATOSIS: Firstly lower the amount of iron in the body, Earlier the diagnosis lower the seriousness of complications of hemochromatosis, if hemochromatosis is diagnosed, regularly scheduled blood removal is the most effective way to lower the amount of iron in the body.-Annual blood test to check the level of iron in the body, Liver biopsy to check for cirrhosis- Iron chelation therapy-if removal of blood from the body is not done which involves medicine taken either orally or injected to lower the amount of iron in the body, Dietary changes such as avoiding multivitamins, Vitamin C supplements and iron supplements which can increase iron throughout the human body, No alcohol use. Steps to prevent infections including not eating uncooked fish, shell fish and getting recommended vaccinations including those against hepatitis A and B

CONCLUSION: It is a rare disease seen in Europeans, Non-Hispanic Whites and Caucasians which cause severe liver diseases. Earlier the diagnosis and treatment better their life. In hepatic cellular carcinoma which is rare case and a complication of hereditary hemochromatosis; we can increase the life expectancy by doing the same.

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Pharmaceutical Biotechnology

Pharmaceutical biotechnology is a relatively new and growing field in which the principles of biotechnology are applied for the drug discovery. The rapid growth in biopharmaceuticals and techniques in biotechnology to modern medicine and life sciences have created increased demand for pharmacist and pharmaceutical scientist in drug discovery. The majority of pharmaceuticals available in market are bioformulations, which include antibodies, rDNA, nucleic acid products, monoclonal antibodies, recombinant proteins, vaccines etc. Such bioformulations are developed through several stages which include: understanding the principles underlying health and disease; the fundamental molecular mechanisms governing the function of related biomolecules; synthesis and purification of the molecules; determining the product shelf life, stability, toxicity and immunogenicity; drug delivery systems; patenting; and clinical trials. The future of pharmaceuticals belongs to protein based therapeutics. The design of a stable therapeutic protein requires a thorough knowledge about protein structure and its interaction, which stabilises the structure necessary to initiate its therapeutic activity. The knowledge of protein structure needs the biotechnology knowledge to understand its function. The areas covered under pharmaceutical biotechnology include rDNA Technology, Protein Engineering & Processing, Basic Molecular Biology, Animal Tissue Engineering, Genomics, Proteomics, Gene Therapy, Fermentation Technology, Nanobiotechnology, Synthetic Biotechnology, Drug Delivery and Targeting, Molecular Pharmaceuticals & Molecular Pharmacology etc.

The Pharmaceutical Biotechnology background will help to get placed in Pharmaceutical Industry in R&D, production of biopharmaceuticals where there is a need of expert who are trained in areas of rDNA**/**Protein Engineering**/**Fermentation Technology. The knowledge of pharmaceutical biotechnology helps to get placed in Quality control**/**Assurance Department of biopharmaceutical Industry and also in Academics.

The biotechnology based products include production of human insulin from E Coli bacteria by recombinant DNA technology. A variety of antibiotics are also produced by fermentation technology from various microbial species, which include Penicillin, cephalosporins, streptomyces, chloramphenicol etc. The two types of hemophilia namely, hemophilia A (the deficient or abnormal element is Factor VIII or antihemophilic factor A) and hemophilia B

(the deficient or abnormal element is Factor IX or antihemophilic Factor B) are the two blood clotting factors produced by recombinant techniques. Interleukins are molecules that act as leukocytes messengers, for example IL-2 recombinant interleukin produced by E.Coli has received approval from FDA and used for treating renal cell cancer. The recombinant interferons (potent cytokines that act against viruses and against uncontrolled proliferation of cells) are produced by biotechnological means. Recombinant dornase alpha an enzyme produced by CHO cells, are used for treating patients with cystic fibrosis, a genetic disorder marked by excessive mucous secretions and frequent lung infections. The vaccine produced by biotechnological principle include Hepatitis B vaccine, DNA vaccine, Human Papilloma virus vaccine (HPV), Recombinant protein vaccine, Live Vector vaccine, RNA vaccine, Edible vaccines, etc.

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PHARMACEUTICS

Pharmaceutics- The science of design and manufacture of dosage forms- encompasses all the scientific principles and technologies applied, whereby a drug is converted in to a dosage form.

Development of suitable dosage forms holds a crucial phase in patient care as it is essential to achieve therapeutic objectives such as safe, efficient and reproducible administration of drugs in a convenient manner to the patient. It's also necessary to keep the drug molecules safe and stable throughout the shelf life.

Pharmaceutics is the most diverse branch in pharmaceutical sciences and covers topics right from physicochemical properties of drugs and excipients, their possible interactions, design and development of formulations, through advent of Novel Drug Delivery Systems (NDDS), industrial scale manufacture of dosage forms and Stability studies. It also includes science of physiological fate of drug after its administration (Bio Pharmaceutics & Pharmacokinetics). Furthermore it imparts a scientific knowledge on the regulatory affairs pertaining to manufacture and marketing of pharmaceutical products.

Physical pharmacy, subject that deals with the physicochemical properties and interactions of materials, provides a thorough understanding of behavior of formulation components in the solid, liquid and gaseous states. This knowledge is fundamental in making right decisions on selection of appropriate formulation: solid, liquid or gaseous formulation.

Design and development of successful pharmaceutical formulations require expertise in various fields including handling of mathematical models, technical knowhow, and physiological interactions. Emergence of New Drug Delivery Systems with enhanced efficacy and specific therapeutic objectives have opened up a plethora of opportunities in the field of Pharmaceutics. Design of dosage forms with modified drug release pattern and improved safety could made drug therapy more effective and devoid of adverse drug reactions.

Targeted delivery of potent drugs using sophisticated delivery systems such as anticancer drug loaded nanoparticles and liposomes could limit the menace of diseases like cancer to a great

extent. There are lot of opportunities exists for professionals in pharmaceutics in the subject area of novel and targeted drug delivery.

The fate of drugs after administration is mainly governed by their interaction with the physiologic system. The response of such interactions leads to Absorption, Distribution, Metabolism and Excretion (ADME) of drugs. The scientific principles and factors involved in these processes are dealt with in Biopharmaceutics & Pharmacokinetics. These facts enable the formulation scientist to anticipate and modify the dosage form accordingly, to fulfill therapeutic objectives.

Industrial manufacture of pharmaceutical products necessitates knowledge on Good Manufacturing Practice (GMP), Standard Operating Procedures (SOPs), Unit Operations, Material handling and management, and Quality Control. Various subjects included in pharmaceutics imparts knowledge on these aspects as well as their inter relations.

In India approval of drugs, manufacture, conduct of clinical trials, control over quality etc are regulated by the provisions of Drugs and Cosmetics Act 1940 and rules 1945. In addition, the legal provisions of other countries are also to be complied with for export purpose of drugs and cosmetics. Hence a thorough knowledge of regulatory affairs and guidelines laid down by the regulatory authorities such as The Central Drugs Standard and Control Organization (CDSCO), World Health Organization (WHO) and Federal Drug Administration (FDA) is mandatory to practice in manufacture of pharmaceutical products. Study of Pharmaceutics enable the candidate to become competent in these thrust areas.

Marketing of products is considered a science and an art. Making a product pharmaceutically elegant needs knowledge about properties and selection of packaging materials and proper design. Design of containers, labels and packaging are important factors that decide the success of a product. Packaging also influences the stability of pharmaceuticals. Longer shelf life also provides an extra edge in the competitive market. Information in all these facets will be helpful for the successful marketing of the products. Learning Pharmaceutics gives an added advantage to the professionals practicing in these subject areas.

The science of dosage forms expands into and accommodates developments in various other facets of science as well. Advent of nanotechnology, gene therapy and 3D printing has added momentum to its fast progress. A professional in Pharmaceutics could easily grab a job or opt for a specialization in any of this vast number of opportunities.

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PHARMACOGNOSY

Pharmacognosy is the study of medicines from natural sources .It is defined as the study of the physical, chemical and biological properties of drug substances of natural origin as well as the search for new drugs from natural sources.

The word "Pharmacognosy "derives from the Greek words *Pharmakon* (drug) and *gnosis* (knowledge).The term Pharmacognosy was used for the first time by the Austrian physician Schmidt in 1811.Originally- during the 19thcentury-pharmacognosy was used to define the branchof medicine which dealt with the drugs in their crude or unprepared form. A crude drug means a dried unprepared natural material of plant, animal or mineral origin, which is used for medicine. The term "Pharmakognosie "and its discipline developed in German speaking areas of Europe, which is a synonym of *Drogenkunde* (science of crude drugs).

Pharmacognosy is interdisciplinary, drawing from a broad spectrum of biological and even socio-scientific subjects; botany, ethanobotany, marine biology, microbiology, herbal medicine, Phytochemistry, pharmacology, pharmaceutics, clinical pharmacy and pharmacy practice related to the evaluation and clinical uses of medicines from natural sources, as well as their implications in healthcare management and public health.

Different fields within todays Pharmacognosy include

- Medical ethanobotany

  Study of the traditional uses of plants in the society.
- Ethno pharmacology

Study of the bio pharmacological evaluation of traditionally used b natural drugs.

- Phytotherapy

  Study of effect of extracts from medicinal plant.
- Phytochemistry

  Studying the chemical composition of living organism. It is also closely connected to the process of finding new drug candidates from natural sources.

Pharmacognosy has become an essential domain of modern pharmaceutical sciences as high-tech science of natural medicines. In the contemporary context, the systematic study

of natural medicine in terms of purity, potency, consistency and safety have become the major issue in Pharmacognosy. Most of the present day drug discovering have been increasingly adopting traditional medicine based approaches to increase result and to address safety concerns. Clinical Pharmacognosy, Analytical Pharmacognosy and Industrial Pharmacognosyhave been established as the specialized and professional branches of Pharmacognosy to meet the contemporary advancement in the field of Pharmacognosy. Furthermore, molecular Pharmacognosy, Genomic Pharmacognosy and metabolomicPharmacognosyhave been considered as the promising approaches of Pharmacognosy research to accommodate future demands in molecular biology, biotechnology and analytical chemistry of natural medicines from medicinal plants.

Now a days cultivation, collection, authentication, identification, quality assessment biochemical, biological and molecular studies of natural drugs are being considered as the main aspect of pharmacognosy. As a result, the modern curriculum of pharmaceutical sciences has undergone substantial changes and pharmacognosy has become one of the core streams of pharmaceutical research and education.

Another area which has opened new perspective in pharmacognosy is biotechnology. When plant cell biotechnology emerged as a new possibility for the production of plant secondary metabolites in the mid-seventies, the pharmacognosists eagerly moved into this field. The aim was the production of known pharmaceuticals by means of plant cell cultures. Besides the enormous possibilities of biotechnological production of pharmaceuticals using microbial, plant, insect or mammalian cells, biotechnology also offers genetic engineering as an important new technology.

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Recent Advances in Pharmacology

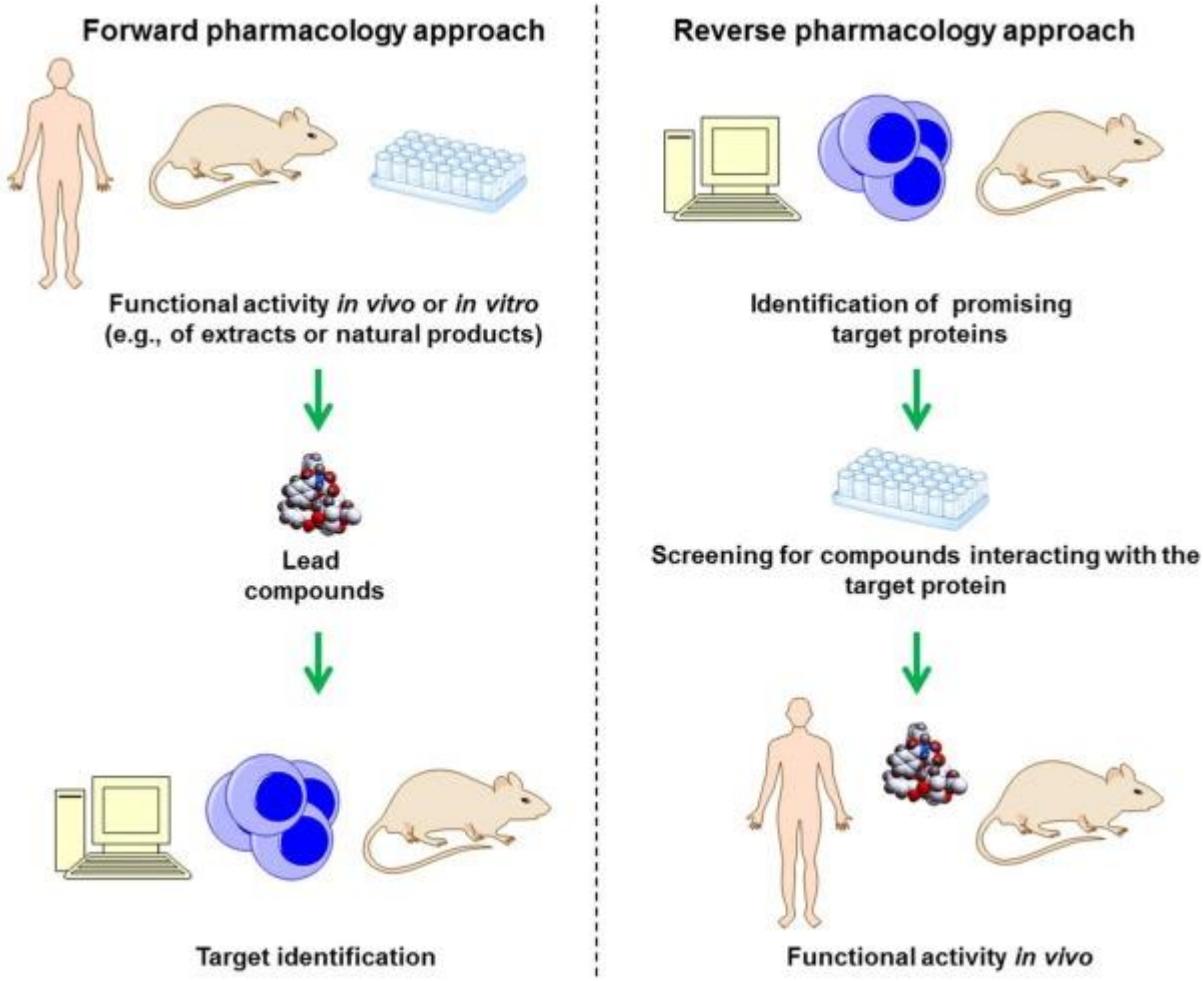
Though the term Pharmacology can be simply defined as the branch of medicine concerned with the uses, effects, and modes of action of drugs the tremendous development in technology and science have produced a remarkable change in this field . It has become an innovative field of study in search of novel therapeutic

Strategies from the inputs of the different field of science

The international **Human Genome Project (HGP**) which began on October 1990 to identify the complete and accurate sequence of the 3 billion DNA base pairs that make up the human genome and to find all of the estimated 20,000 to 25,000 human genes developed new paths to treat, cure, or even prevent the thousands of diseases that afflict humankind.

1. After the sequencing of the human genome which allowed rapid cloning and synthesis of large quantities of purified proteins the conventional time consuming methods of drug development (Forward approach) have paved way for the **Target based drug delivery** or **Reverse Pharmacology** where the in vivo activity of the lead compound is performed in the final stage of drug development.

The information technology made several advancements in the field of structural biology that allow visualization of molecular contacts between pharmacological probes and their protein targets. This provided many innovative options, both to enhance model of new ligands and better recognize their molecular mechanisms, for speeding up the discovery process.



Developments in the field of cellular and molecular biology reveal deeper understanding into pathophysiology of disease so creating opportunities for innovation and discovery.

2.After the Human Genome Project, the innumerable applications of Pharmacogenomics in individualization of treatment has become a possibility. **Pharmacogenomics** involves the application of genomics technologies such as gene sequencing, statistical genetics and gene expression analysis to drugs in clinical development and trials. Since many diseases develop as a result of a network of genes failing to perform correctly, Pharmacogenomics can identify the genes or loci which are involved in determining the responsiveness to a given drug. In this way,

genetic characterization of patient populations is becoming an integral part of the drug discovery and development process.

2. Pharmacogenetics or the study of genetic basis for variations in drug response can be applied for better therapeutic strategies.

3. With the tremendous increase in computer technologies, compared to the past, the Pharmacovigilence or the pharmacological science relating to the *collection, detection, assessment, monitoring, and prevention* of adverse effects with various Pharmacological products have taken momentum to prevent the costly adverse effects of drugs

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Pharmacy Practice

Plethora of pharmacy and clinical pharmacy programs which have been launched in India with a mission to produce qualified pharmacists to cater the demands of ever increasing population of our country. The service of clinical pharmacist is now available in few multi-specialty hospitals throughout Kerala.

The health sector in developed countries benefits courses of PharmD and M Pharm Pharmacy practice by providing various pharmaceutical services like Pharmacotherapeutics, Clinical Research, Pharmacology, Pharmacoepidemiology, Pharmacovigilance and Pharmacoeconomics.- Clinical Pharmacists are committed in ensuring that ordinary people are provided with these services in our state. Today,the pharmacists are involved in surplus amount of activities including the research and innovation, manufacture of quality medicines, providing primary and community health care ,supporting and educating fellow pharmacists etc;which indicates the prominence of pharmacists and highlights the progress between yesterdays and today's pharmacist.

1) **Clinical Pharmacy services is beneficial in public health sector.**

The Clinical Pharmacy services in Kerala are now available only to a few percentages of financially sound individuals. Clinical pharmacy services can ensure that ordinary people receive the most modern medical facilities, in all public sector hospitals.

2) **Clinical Pharmacist in private hospitals and possibilities of clinical pharmacist in government hospitals.**

In developed countries, Clinical Pharmacists plays a significant role in various pharmaceutical health services like helping a doctor prescribe medicine, avoiding unnecessary consumption of medicines, controlling side-effects, monitoring the use of antibiotics, educating the patient about the prescribed medicine and also monitoring the consumption of medicines by the masses. Few of the private hospitals and Hi-Tech super specialty hospitals in Kerala have been able to elevate the standard and quality of clinical pharmacy to the level mentioned above. Clinical pharmacists are instrumental in setting up similar services to ordinary people at government hospitals.

3) **The structure and syllabus of the PharmD and Mpharm(pharmacy practice) course are essential for research which would be useful for the people.**

In foreign countries, clinical pharmacy completely stands close with the general medical science and it works alongside the Research & Development department in pharmaceutical industries. Studies on various topics related to the advanced and ongoing community help departments and continuing education programme are a part of the six year course. The course offers one year practice in clerkship and internship that provides the students to excel research methodology and clinical research during the study period. Additionally the students are exposed to numerous

opportunities in research and publications within these six years. ThusPharmD students and Mpharm students can continue their professional attitude in the respective department they handle. For instance, PharmD professionals have around hundreds of research papers in community and clinical sectors to their need. Thus, the intellectual and excellent performance of the former are useful in the public health sector.

4) **Pharmacovigilance: A field of advanced science.**

In most of the developed countries like USA, the mortality rate due to drugs accounts to four times that of accidents. The unfair use of medicines and its side effects is likely to cause death. Our country has not yet gained strength either to find appropriate reasons for the former cause or methods for their surveillance; hence such figures are not available to us. Teaching of pharmacovigilance is one of those essential activities that are required, if we are to move forward with the objective of detection, evaluation and prevention of adverse drug reactions on patients and populations. Pharmacovigilance insists for the safe and rational therapy making an essential check point for regulatory utilization and movement of drugs. Clinical pharmacy professionals with their improved clinical knowledge and skills ,have an extended role in reporting spontaneous adverse drug reactions and thus hinder medicine related errors.

5) **The pharmaceutical sector also renders incremental chances for the effectiveness of clinical pharmacist.**

The six year PharmD course and the two year PG Mpharm Pharmacy practice, makes the students proficient in various subjects- Pharmacovigilance which outlines the drug use and its side effects, pharmacoeconomics which help to choose the appropriate drugs economically and pharmacoepedemiology, which deals with the prevalence and extend of drug use in addition to clinical research, manufacturing, procurement and rational use of drugs. Clinical pharmacy services can be ensured in the handling of medical matters in the field of public drug policies, Essential Drug List, Drug Formulary and Health Insurance transparently. It would be beneficial for the public if these services are made available in the government hospitals.

6) **Clinical Pharmacy services can be availed in the implementation of pharmaceutical drug policies.**

In this age of various diseases and the increasing number of medicines for them, it is essential in Kerala to improve the public health and to develop a flawless and loft policy for the use of drugs, which can be achieved through inclusive participation of pharmacy sector educators. Thus Kerala will be the first state to formulate the pharmaceutical drug policies in India with the objective to curb unwanted drug use. Additionally, clinical pharmacy services can be assured in central government schemes such as generic sales outlet (prathanmathri janoushadhi yojana), Pharmapark etc.

7) **Clinical pharmacy services can be applicable in the advanced and innovative community pharmacies.**

The introduction of different schemes on clinical pharmacy, similar to that of most of the developed foreign nations services, in the expanding community pharmacies in our country seems to be helpful for the general public. This includes **Drug Information Centers-** to help and assist the general public and health care professionals with information on drug and its use, provide them with right quality drugs and **Patient Counselling Centers –**where the patients or the care takers would receive advice and assistance on the disease ,drug use and lifestyle modifications .

All these services will be overseen by the competent and efficient clinical pharmacist, thus raising the heath care system in our country to international standards.

8) **Services of clinical pharmacist can be utilized in Primary Health Care (PHC) and Pain & Palliative Care**

Clinical pharmacist finds their immense role to be played in public healthcare especially in aspects of vaccination and rational use of drugs at PHC and CHC level. It is certain that clinical pharmacists' role extents from clearance of uncertainties related to drugs in hospitals/home care to effective patient counselling, DIC services, ADR reporting. Clinical pharmacists can also be enrolled in the newly revised pain and palliative policy wherein their help and empathetic attitude would add to the betterment of the society and medical profession.

9) **Clinical pharmacists can be advantageous in providing continuing medical education.**

It should be taken into account that clinical pharmacy professionals has got an eminent role in bestowing continuing medical education concerning medication safety, medication management, medicinal utilization methods among health and drug inspectors, Asha workers and other health care professionals. Clinical pharmacy professionals play an inevitable role in the health care system and maintain an attitude of integrity and dignity with other health care professionals. The health care team is deficient without the clinical pharmacist.

10) **Excellent health for all, at low cost, flawlessly**

The cost of the medicine prescribed is the main expenditure for an ordinary man during a health situation. A majority of these expenses can be controlled with help of the pharmacist. Pharm D professionals will help to ensure that the patients are treated at adequate expenses. Clinical pharmacist should also be held accountable, along with doctors for the medicines prescribed to a patient. As a result of this, the monopoly of pharmaceutical companies can be chained.

It is noteworthy to say that many multispecialty hospitals in Kerala has absorbed clinical pharmacist to a great extent, but many are still vehement and apprehension is still in the air.

The state of Kerala, which is known for formulating and implementing effective policies in the public health sector, should set an example for the clinical pharmacy services through complete support. . Creating a better future for pharmacist is a requirement that needs to be met and the liability solely rely on the hands of the budding pharmacists across India.Upliftment of the Pharmacy profession in India is the need of the hour and exerting good leadership to bring the pharmacy profession to greater levels will improve the standards of Pharmacists.

‘Happenings’: A Publication from KUHS on Recent Advances

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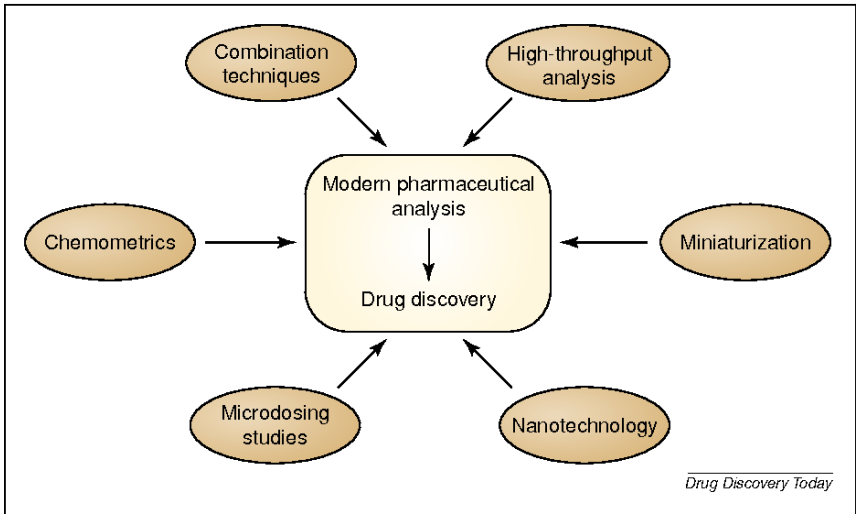
Recent Advances in Pharmaceutical Analysis

Traditionally, Pharmaceutical analysis is referred to the chemical analysis of drug molecules. However, over the years, modern pharmaceutical analysis has evolved beyond this to encompass combination techniques, high-throughput technologies, chemometrics, microdosing studies, miniaturization and nanotechnology.



Pharmaceutical analysis methods are traditionally and commonly applied to the chemical analysis of drug molecules. However, in the last two decades, modern pharmaceutical analysis has evolved enormously, capitalizing on **combination techniques**, **high-throughput technologies, chemometrics, and most recently miniaturization and nanotechnology.**

The combination of various techniques allows the modern pharmaceutical analyst to exploit the virtues of each technique and, in turn, to improve the overall quality of analysis. Indeed, modern analytical techniques and methods offer the possibility of increasing the amount of information received from individual analysis, with reduced cost, analysis time, and sample volumes.The combination techniques include **Chromatography** and **Spectroscopy**and the type of information obtained from them are very different.Chromatography is a separation method and spectroscopy is a technique which yields a 'fingerprint' of molecules. **LC-MS** is a technique routinely used in sample analysis that combines **liquid chromatography (LC)** with **mass spectrometry (MS**). Extremely sensitive modern MS has helped **LC-MS** replace several immunoassays. **LC-MS** has helped

improve the efficiency of drug discovery due to its excellent sensitivity and specificity. The technique can be combined with stable isotope dilution for precise and reproducible assay.**LC-MS** is widely used in the determination of pharmaceutical compounds and especially in the separation of optically active drugs

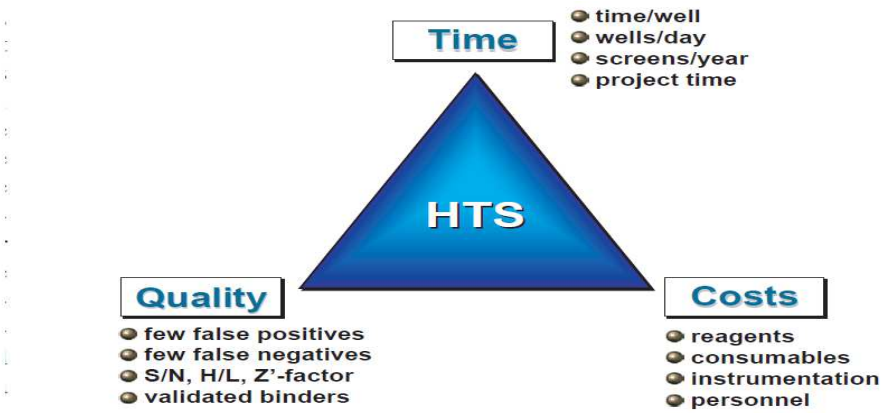
Detection, isolation, and purification of drug metabolites is another major application of **LC-MS**, as they are chemically or thermally labile, and need liquid chromatography for separation. Characterization of components in a crude mixture of natural products such as complex lipids, alkaloids, and hydroxylated or unsaturated fatty acids has been achieved using LC-MS.

LC-NMR combines two techniques - liquid chromatography **(LC)** and nuclear magnetic resonance **(NMR).** It involves a HPLC separation followed by the detection of separated components by UV or other methods and ultimately NMR analysis. **LC-NMR** is a powerful analytical tool used to resolve complex mixtures. The coupling of LC separation with NMR characterization has been employed in a wide range of applications.LC-NMR is also combined with other techniques such as two-dimensional NMR measurements **(LC-2D NMR),** mass spectroscopy or MS **(LC-NMR/MS)** and solid phase extraction or SPE **(LC-SPE-NMR)** to give rise to a whole new range of separation and characterization applications that have a high sensitivity. LC-NMR/MS provides insights into the mass and fragmentation of different components in a sample while the **LC-SPE-NMR** system helps in full structural elucidation of the sample components.

Gas chromatography–mass spectrometry (GC-MS) is a hybrid analytical technique that couples the separation capabilities of GC with the detection properties of MS to provide a higher efficiency of sample analyses. While GC can separate volatile components in a sample, MS helps fragment the components and identify them on the basis of their mass**.GC-MS** provides enhanced sample identification, higher sensitivity, an increased range of analyzable samples, and faster results, which enable a whole new range of applications for GC-MS in several areas.

GC-MS is used in screening tests for the detection of several congenital metabolic diseases. It detects trace levels of compounds present in the urine of patients with genetic metabolic disorders. It can also detect the presence of oils in ointments, creams, and lotions In the pharmaceutical industry, **GC-MS** is used in research and development, production, and quality control. It is used in identification of impurities in active pharmaceutical ingredients. In medicinal chemistry, **GC-MS** is used in the synthesis and characterization of compounds .

High-throughput technologies are having an increasingly important role in early-stage drug development, providing a fast qualitative and quantitative characterization of thousand compounds evaluated in the frame of preclinical and clinical ADME (Absorption, Distribution, Metabolism, Excretion) studies.It is useful for discovering ligands for receptors, enzymes ion channels or other pharmacological targets or pharmacologically profiling a cellular or biochemical pathway of interest . These assays are performed in automation friendly microliter plates with a 96,384 or 1536 well format. The assay is highly sensitive, highly automated, and is having high speed. The detection methods include chromatographic as well as spectroscopic methods . The high throughput screening methods can be summarised using the following diagram .



The primary focus of **chemometrics** involves the use of mathematical or software procedures in particular, both to develop **analytical** methods and to **analyse** the signals and results obtained. The principal component analysis (PCA) and projections to latent structures (PLS) are two chemometric methods applied in the domain of computer-aided drug discovery, and which prove particularly successful in early stage preclinical research as

a fast computational and analytical tool for screening the increasing numbers of potential drug candidates. • Chemometrics helps in achieving the results of chemical signals (chromatograms, kinetic curves, titration curves, or in other formats with the wavelength, or frequency) obtained from analytical measurements in the form of the digital vector. • Signal noise ratio in proper design have been found before the results were incorporated Since, the conventional methods are not able to resolve the tedious overlapping of the drugs spectra. Chemometrics assisted multipurpose methods are used to resolve such heavy data.

Recently, the interest in miniaturization technology has grown rapidly, particularly in the pharmaceutical industry where it has been fuelled by the need to speed-up the analysis in high-throughput screening applications. Research in this area is particularly focused on “lab-on-a-chip” nanotechnology because of the potential to identify, study, and evaluate new drug entities. Nanotechnology will have an increasingly important role in the development of commercial analytical and preparative tools. Sample preparation miniaturization is one of the latest trends in analytical chemistry. The development of new sample preparation procedures is closely linked to the new on-chip microfluidic devices. These microchips have proven to offer new advantages over traditional methodologies, such as a decrease in reagent volume, organic solvent and sample volume. It also reduces the analysis time and offers very high extraction efficiencies when working under double flow conditions or good enrichment factors when working under stationary conditions. These microchips systems have been employed using two different extraction techniques: liquid phase micro extraction and electro membrane. The parameters that affect both extractions are the composition of the sample and the acceptor phase, the flow of the acceptor and donor phase, the organic solvent used as a liquid membrane supported and the extraction time

Modern analytical chemistry plays a vital role in pharmaceutical sciences. It provides identification and quantification data supporting drug discovery, purity of drug substances during its synthesis, pharmacokinetic studies, drug stability, elucidation of the drug metabolic pathways, drug-protein interactions, etc. New methodologies, state-of-the art instrumentation and materials, automated systems - offering precise and accurate analytical data – have become an important prerequisite in this field. Furthermore, chemometrics is a useful tool for the optimization of method parameters and also to identify and minimize the sources of variability that may lead to poor method robustness.

Basic Tenets of KUHS

- Always Go by Rule Book
- Observe Sanctity of Examinations
- Be Student Friendly at all times
- Acknowledge the Right to be Heard
- Always Give Respect and Take Respect