

18th Anniversary India-Japan Fest
BICON 2023



**Biyani International Conference
on**

Nurturing Academic Entrepreneurs with Industrial Partnerships

26th–30th November, 2023



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DAY-1

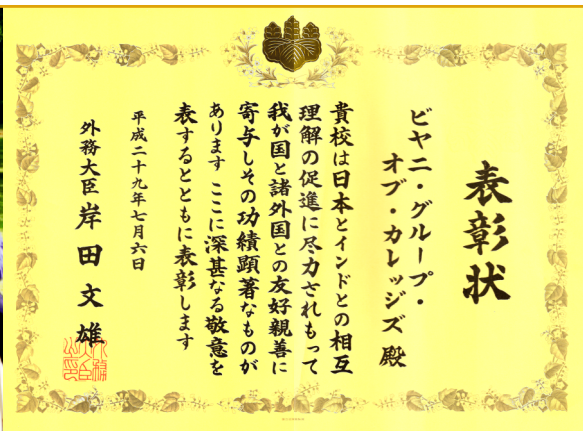
Advancing Cancer Care through Futuristic Technologies in Industry

Organised & Sponsored by :



BIYANI GROUP OF COLLEGES

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Sector No. 3, Vidhyadhar Nagar, Jaipur, Rajasthan (India)*



Minister for Foreign Affairs of Japan extends his deepest regards to **Biyani Group of Colleges** in recognition of its distinguished services in promoting mutual relationship between Japan and India.
— **Fumio Kishida**, Minister for Foreign Affairs of Japan

The 18th Anniversary India-Japan Fest in Pinkcity of India

BICON-2023



NURTURING ACADEMIC ENTREPRENEURS WITH INDUSTRIAL PARTNERSHIPS



Proceeding of the Conference
DEPT. OF SCIENCE, NURSING AND PHARMACY
Advancing Cancer Care through Futuristic Technologies
in Industry

ISBN: 978-93-83343-41-6



Organized by:
BIYANI GROUP OF COLLEGES
Jaipur, India

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All papers of the present proceeding were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers's recommendation were positive.

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- Dr. Dheeraj Chitara
- Dr. Vidhi Sharma

Designed by:

- Mr. Nilesh Sharma
- Mr. Surendra Mathur

Welcome to India-Japan Fest in Pinkcity of India!

This year we are celebrating the 18th Anniversary of India-Japan Fest at Biyani Group of Colleges, Jaipur. Since, the first conference in 2006, it has become an annual feature of our institution and has continued to grow. The institution is leaving no stone unturned in encouraging the spirit of research and innovation and strengthening the bilateral academic relationship between India and Japan. Every year, this event receives an increasing number of participants from both the countries, India and Japan, and we continue to evolve, adapt, and develop new collaborative programs between various institutions in India and Japan.

Biyani Group of Colleges is organizing this mega event in collaboration with partner institutes from Japan including Japan Advanced Institute of Science and Technology, Akita Prefectural University, Saitama University, and Kyushu University.

The theme of BICON 2023 is Nurturing Academic Entrepreneurs with Industrial Partnerships guided by different departments including Science, Pharmacy, Nursing, Commerce & Management, Information Technology, Social Science, Law, and Education based on a multidisciplinary-to-interdisciplinary approach.

BICON2023 introduce new partner relationships and foster a symbiotic interaction with academic institutes in Japan and India including Kwansei Gakuin University in Japan; Jai Narain Vyas University, Jodhpur; Metro M.A.S Heart Care & Multi-speciality Hospital, Jaipur; Bhagwan Mahaveer Cancer Hospital & Research Centre, Jaipur; Apply Board; ICSI; ISDC; Rajyoga Education & Research Foundation, Mount Abu.

BICON2023 also introduce new partner relationships with Japanese industries including Kaiho Industry; Sugino Machine Ltd.; InPro Japan; Setolas Holdings Inc.; Innovation Door LLC; Photovoltaic Foundry Pte. Ltd.; and Indian industries including DOITC; iSTART; Pearson VUE; Jaipur Buzz; Paisa on Demand; Dainik Bhasker; ICT Academy; Doordarshan; MY FM; Sach Bedhadak; Jan TV; Somani Industries; Jaipur Rugs; Sidbi. These partnership fosters an all-encompassing approach to knowledge development and innovation by addressing real-world difficulties in addition to academic advancements. This creates impact that goes beyond the event itself and influences the direction of research and industry practices as long as academics and industry continue to engage.

BICON 2023 has decided to call for an Abstract to be published in the conference proceedings with ISBNs. The Organizing Committee is vitalizing with reviewing all abstracts to accommodate the growing number of paper submissions. In a rigorous and time-consuming

review process, the committee members worked hard to ensure the continued high quality of accepted abstract or paper. There are 56 invited talks (10 Japan + 46 India) in BICON 2023.

The months of planning, hard work and team effort by dedicated staff have culminated into the success of this event for which we would like to thank the management committee who trusted us to organize this conference and contributed significant funds to support the event. We would also like to thank the Organizing Committee and the reviewers for their excellent work in reviewing the abstracts as well as their valuable input and advice. We would also like to express our sincere thanks to all the dedicated BICON-Team members for their active role and support in all aspects of this conference from collecting abstracts, assisting in coordination, helping to plan the agenda, recruiting sponsors, and assisting in organizing the conference. I want to thank all the conveners of each symposium: Dr. Rambir Singh (Pharmacy), Ms. Jishu B. George (Nursing), Ms. Kanchan Sharma (Science), Dr. Poonam Sharma (Information Technology), Dr. Shikha Dugar (Commerce & Management), Dr. Shipra Gupta (Education), Ms. Malti Saxena (Humanities), Ms. Kusum Saini (Law) and Graphic designer Mr. Nilesh Sharma for editing the conference proceeding in the last running moments and beautifully designing the brochure and other conference materials.

Finally, we want to express our sincere thanks to all the invited speakers, offline and online, who have joined us from India, Japan, and other countries, for taking out time from their busy schedules to participate in this conference. It has been a great pleasure to interact with them and receive their interest in collaborating in the future.

The venue of this conference is located in Pink City Jaipur and we have tried to promote a sense of the local culture and various Indian Cuisine to the attendees during this conference. We hope that this conference is intellectually stimulating, enjoyable, professionally satisfying, and memorable for all the attendees.

With warmest regards,

	Dr. Manish Biyani Organizing Chair • Director (Research & Development), Biyani Group of Colleges, India • Professor (Research), JAIST, Japan		Dr. Neha Pandey Conference Convener Principal, Biyani Girls College, Jaipur
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Prof. Alpana Kateja
Vice-Chancellor



University of Rajasthan
JLN Marg, Jaipur – 302004 (Raj.)
Phone: 0141-2707863, 2256501
Email: vc@uniraj.ac.in/ vcunorj@gmail.com



MESSAGE

I am indeed happy to know about efforts put in by Biyani Group of Colleges, Jaipur in organizing 18th Biyani International Conference (BICON-2023) during November 26-30, 2023.

The theme of the conference “Nurturing Academic Entrepreneurs with Industrial Partnerships” is relevant and pertinent in current scenario. Rajasthan has been benefitted from the special relationship between India and Japan. Since a long time, Rajasthan and Japan have collaborated in both education and industry, and this relationship will continue to grow in the future years.

I am confident that this conference would give an excellent forum to Academicians, Researchers and Industry Professional from India and Japan.

I wish the conference the very best.

A handwritten signature in black ink, appearing to read 'Alpana Kateja'.

(Prof. Alpana Kateja)

Jai Narain Vyas University, Jodhpur 342 011 India

PROF. KANHAIYA LAL SHRIVASTAVA

Ph.D., M.Tech. (Applied Geology), FGSI (Bangaluru)
FAGID (Brazil), FEEIU (Germany) FIAPG (Italy)

Vice Chancellor



Phone : 0291-2432947 (O)

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**Res. : Vice-Chancellor's Bungalow,
Residency Road, Jodhpur 342 011 India**



MESSAGE

I am glad to know that the 18th Biyani International Conference (BICON-2023) is being organised on November 26-30, 2023 on the theme "Nurturing Academic Entrepreneurs with Industrial Partnerships".

The theme of the conference will encourage collaboration between Industry and Academia by using futuristic pedagogies and practices in teaching, learning and assessment, as well as deeper engagement between higher education and the industrial ecosystem.

Academicians, industrialists, scientists, and research scholars will have the opportunity to exchange their expertise, build new strategies, and analyse recent advancements in their respective sectors at this four-day conference.

I am sure that the conference through its outcomes will strengthen the knowledge and foster both the Societies-Industry as well as Academia

I extend my best wishes for the BICON-2023 success.

(Prof. Kanhaiya Lal Shrivastava)

Resl. : 504 FF, Umaid Heritage, Umaid Palace Hill, Jodhpur - 342011 India, Mob.: +91-94141-32094, +91-94145-78924, Email: klsgeology@yahoo.co.in

'Excellence in Science and Technology' Awardee, ISCA/Gol

'Bharat Ratan APJ Abdul Kalam Gold Medal' Awardee

'Decree of Merit' Awardee, IBC, Cambridge U.K.

'Special Recognition' Awardee, Atlanta, USA

Chairman & Head (Former), Department of Geology

Jai Narain Vyas University, Jodhpur

President, Earth System Science, ISC Association (2015)

President, JNV University Teachers Assoc.(1997) (AIFUCTO)

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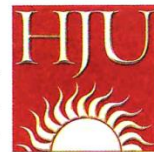
Jai Narain Vyas University, Jodhpur

President, Earth System Science, ISC Association (2015)

President, JNV University Teachers Assoc.(1997) (AIFUCTO)

Prof. Sudhi Rajiv
Vice-Chancellor

हरिदेव जोशी
पत्रकारिता और जनसंचार
विश्वविद्यालय



HARIDEV JOSHI UNIVERSITY
OF JOURNALISM AND
MASS COMMUNICATION

S.No. F()VC/HJU/2023/5671

Date: 30th November, 2023

Dr. Dhyan Singh Gothwal
Dean Administration
Biyani Group of Colleges
Vidhyadhar Nagar, Jaipur

Dear Mr.

I am happy and delighted to receive an invitation for the eighteenth India-Japan International Conference organized by Biyani Group of Colleges, Jaipur from the 26th to the 30th of November, 2023.

It shall provide an opportunity for interaction between two cultures by "Nurturing Academic Entrepreneurs with Industrial Partnerships". The subjects for discussions and deliberations are of great importance and would be addressed by eminent experts. It will improve the over all qualities and virtues in the youth - the future of India.

I wish the conference every success.

(Professor Sudhi Rajiv)

Vice Chancellor

Haridev Joshi University of Journalism
and Mass Communication, Jaipur &
Dr. Bhimrao Ambedkar Law University, Jaipur

राजीव गांधी विद्याभवन | Rajiv Gandhi Vidya Bhawan
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RAJASTHAN TECHNICAL UNIVERSITY, KOTA

राजस्थान तकनीकी विश्वविद्यालय, कोटा



Message

I am glad to know that Biyani Group of Colleges, Jaipur in organizing 18th Biyani International Conference (BICON-2023) on November 26-30, 2023.

The theme of the conference “Nurturing Academic Entrepreneurs with Industrial Partnerships” is very much relevant to budding engineers, managers and industrialists. The association of speakers from Japan in the conference is commendable. For a long time, Rajasthan and Japan have collaborated in both education and industry and such activities shall help growing this relationship in the future.

I am confident that this conference shall provide an excellent forum for the students, academicians and industrialists of both the countries to explore the Academia Industry Interface Model.

I wish the conference all the success.

Prof (Dr.) Dharendra Mathur

Naveen Jain, IAS

नवीन जैन, आई.ए.एस.



Secretary to Government
School Education, Language, Library
And Panchayati Raj (Elementary Education),
Government of Rajasthan
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पंचायतीराज (प्रारम्भिक शिक्षा) विभाग
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Jaipur, Dated: 20-11-2023

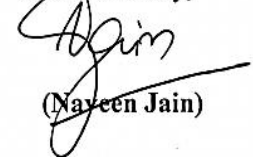
Message

I am elated to learn about the 18th India-Japan Bilateral conference on "Nurturing Academic Entrepreneurs with Industrial Partnership" from 26th to 30th November, 2023 at Biyani Girls College, Jaipur. I am optimistic about the results to be generated when leading academicians, industrialists, scientists and research scholars will assemble and disseminate their learnings.

I am hopeful that it will pave the way in providing an unparalleled platform for many ground breaking possibilities in the field of innovative ideas and prototypes.

My sincere and best wishes for the endeavour!

Yours sincerely,


(Naveen Jain)

DR. VATHSALA MANI

Academician



It provides me an immense pleasure to find out that Biyani Group of Colleges is organizing an Indo-Japanese conference BICON-2023. The conference is going to enlighten so many young minds and feed them with knowledge and new experiences. Along with this the conference is going to establish even more cordial relationships With japan

I would like to congratulate the organizers for choosing such unique and appropriate themes. I would like to wish them all the best and they are going to perform a commendable task by organizing such an intellectual event Which is going to be remembered for it's academic contribution.



(Dr. Vathsala Mani)

FROM THE CONVENER'S DESK

It gives me great pleasure to extend to you all a warm welcome on behalf of Department of Science and Nursing, Biyani Girls' College. We are grateful to all the speakers, delegates, organizers and guests, who have accepted our invitation to participate in the BICON 2023.

It is an opportune time for you to renew contacts and discuss opportunities of mutual interest with delegates from both Japan and India bilaterally.

It is gratifying to note that the agenda of the Seminar covers a wide range of very interesting items relating to higher education frontiers in India and Japan, and resulting opportunities for both countries.

No matter how much we can do by ourselves on the national level, whether it be research or development, it is never enough. In a spirit of true cooperation, we in Asia, and particularly in Japan and India, are proud of nurturing past and present civilizations and cultures. We must join in an action-oriented effort to recognize and capitalize on the bilateral opportunities in the higher education sector in both countries.

The utter sincerity and dedication of the management, the teaching faculty, non-teaching staff and the students at Biyani Girls' College have brought this event to fruition. It is an outcome of the hard work and persistent efforts of all our colleagues. We hope that their efforts shine through, and all the delegates and participants have a fulfilling and rewarding experience here, that carries forward long after the event itself is over. Once again, a very warm welcome to you all.



Ms. Kanchan Sharma
(Dept. of Science)
Convener, Day-1



Ms. Jishu B. George
(Dept. of Nursing)
Convener, Day-1



Dr. Rambir Singh
(Dept. of Pharmacy)
Convener, Day-1

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- Mr. Ramesh Kumar Sharma

PROGRAMME AT A GLANCE

Date: November 26, 2023; Sunday (Day-1)

Theme: Advancing Cancer Care through Futuristic Technologies in Industry

Standard Time	Schedule
Inaugural Session, 08:00 AM-10:40 AM	
08:00 AM-08:30 AM	Registration
08:30 AM-09:00 AM	Flag Ceremony
09:00 AM-09:10 AM	Gathering of the Audience to Utsav Auditorium
09:10 AM-09:25 AM	Lighting of the Lamp by Dignitaries
09:25 AM-09:40 AM	Welcome address by Organizing Chair- BICON-2023 Prof. Manish BIYANI Director (Research & Development) Biyani Group of Colleges, INDIA
09:40 AM-09:50 AM	Inaugural Address by Chief Guest Prof. Alpna KATEJA Vice-chancellor, University of Rajasthan
09:50 AM-10:10 AM	Keynote Speaker - 1 Dr. Prasanna VENKATRAMAN Dy. Director, Cancer Research Institute, ACTREC, Mumbai
10:10 AM-10:30 AM	Keynote Speaker - 2 Prof. Koji TODAKA, MD, PhD Director, Center for Clinical and Translational Research, Kyushu University Hospital, Japan
10:30 AM-10:35 AM	Address by Director, Academics Prof. Dr. Sanjay BIYANI Biyani Group of Colleges, Jaipur, Rajasthan, INDIA
10:35 AM-11:00 AM	High Tea with Snacks

Cancer Symposium 2.0, 11:00 AM - 1:00 PM	
Chair: Ms. Kanchan Sharma	
11:10 AM -11:30 AM	Speaker - 1 Prof. Shinsuke FUJIWARA, PhD Dean, School of Biological and Environmental Sciences, Kwansei-Gakuin University, Japan
11:30 AM-11:50 AM	Speaker - 2 Dr. Swapnil U RANE MD, Professor of Pathology, Tata Memorial Centre, Mumbai, India
11:50 AM-12:10 AM	Speaker - 3 Dr. Madhu BIYANI Kanazawa University, Japan
12:10 AM-12:30 AM	Speaker - 4 Prof. Kaori YASUDA (Online) Toyama Prefectural University, Japan
12:30 AM-12:50 AM (16:00-16:20 JST)	Speaker - 5 Dr. Prakash Singh SHEKHAWAT Hemato Oncologist, Bhagwan Mahaveer Cancer Hospital, Jaipur, India
12:50 AM-01:00 PM	Vote of Thanks (Group Photo & Memento Distribution)
01:00 PM-02:30 PM	Lunch Break and Poster Presentation
Special Session on Industry & Entrepreneurship, 02:30 PM- 04:00 PM	
Chair: Ms. Jishu George	
02:30 AM-02:45 PM	Industry Expert Talk - 1 Mr. Vivek SWAROOP Managing Director, Kisuma Asia Pte. Ltd., Singapore
02:45 AM-03:00 PM	Industry Expert Talk - 2 Mr. Rupesh BHARGAVA CCO, Yash Raj Biotech, Mumbai, India

03:00 PM-03:15 PM	Industry Expert Talk - 3 Ms. Ishita MALLICK Associate Scientific Manager, Innoplexus, Pune, India
03:15 PM-03:30 PM	Start Up Talk - 1 Mr. Abhishek GARG Owner, Milsun Pharmachem, Jaipur
03:30 PM-03:45 PM	Start Up Talk - 2 Mr. Akshay PANDITA A-Nutral, Gurugram
03:45 PM-04:10 PM	Panel discussion and Q/A session
04:10 PM-04:15 PM	Memento Distribution & Group Photo
04:15 PM-04:30 PM	<i>High Tea with Snacks</i>
Oral Presentations, 04:30 PM-06:00 PM	
Judge: Dr. Taravati Choudhary & Dr. Vishnu Sharma	
04:30 PM-05:40 PM	Total 8 Young Oral Presentations (10 min. to each paper with Q & A)
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Invited Lecture 1

Visualizing Protein Interactions in Cancer as Social Networks- Harnessing the Fundamental Principles for Translational Research



Prasanna Venkatraman

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Research Interests:

Proteasome Assembly, Structure and Function; Chaperones and their domain motif Interaction; Protein Interaction network and their role and relevance in Cancer; Targeting Protein Interfaces

Education & Professional Career:

1998	Ph.D., Biochemistry and Biophysics, Molecular Biophysics Unit, Indian Institute of Science, Bangalore, India
2004 – 2005	Senior Research Scientist, University of Massachusetts, Worcester
2000 – 2004	Post-Doctoral Research Fellow at Harvard Medical School, Boston
1998 – 2000	Post-Doctoral Research Fellow at University of California, San Francisco

Major Publications:

1. PSMD9 Chaperone Interaction Network Regulates Protein Homeostasis FEBS JOURNAL 04 September 2023 <https://doi.org/10.1111/febs.16948>
2. A druggable pocket on PSMD10^{Gankyrin} that can accommodate an interface peptide and doxorubicin. European Journal of Pharmacology, 915, 174718 (2022). <https://doi.org/10.1016/j.ejphar.2021.174718>
3. PSMD9 ribosomal protein network maintains nucleolar architecture and WT p53 levels, Biochemical and Biophysical Research Communications <https://doi.org/10.1016/j.bbrc.2021.05.004>
4. A Novel Determinant of PSMD9 PDZ Binding Guides the Evolution of the First Generation of Super Binding Peptides. Biochemistry, 2019, 58, 32, 3422-3433. <https://doi.org/10.1021/acs.biochem.9b00308>.

Abstract

Visualizing Protein Interactions in Cancer as Social Networks- Harnessing the Fundamental Principles for Translational Research

Prasanna Venkatraman

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Abstract

One of the most interesting aspect of research is the opportunity and the ability to propose a hypothesis, test it in a defined system, visualize it in a larger context and ultimately ask if this can be a unifying principle underlying biological function. It will be an icing on the cake if such a unifying principle can also be useful in translating these findings to a prototype that can be used for interfering with disease like cancer. In this talk, I will describe one such example by which communication is established in cancer cells using very small ‘motifs’ or signatures and how this is used to make a network of communication connecting many proteins and other molecules in cells. This is much like the social networks that many of us are familiar with. Depending on who is connected to who, we can identify one or two nodal persons capable to bring together many communities in a network. Information flows through some important connections and this is very vital to hold the community together or disrupt it. Similarly, I will describe our research on

important protein molecules that are responsible for establishing networks and how this network is rewired in a cancer cell when the protein levels are altered. I will show you how the core network uses some guiding principles that are universal across organisms. Towards the end I will show how the architecture of the network can be manipulated by devising strategies that can kill or disable the cancer cells.

Keywords: Network, Cancer, Motifs, Protein Interaction, Inhibitor



Invited Lecture 2

The importance of Academic Research Organizations in the era of medical product open innovation



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Research Interest:

Research in regulatory science, clinical trial methodology, designing clinical trials. Survey research on the difference in medical product regulation by Regulatory Agencies overseas. Clinical research in cardiology, especially cardiac function, and heart failure.

Education & Professional Career:

1979-1985	M.D. and B.A., School of Medicine, Kyushu University, Fukuoka, Japan
1985-1990	Cardiologist and Researcher, Research Institute of Angiocardiology, School of Medicine, Kyushu University
1990-1992	Staff Cardiologist, Affiliated hospitals with Kyushu University, Saga and Iizuka
1993-1997	Post-doc Research Fellow, Division of Circulatory Physiology, Columbia University, New York, USA
1997	Ph.D. (Dr of Medical Science), Kyushu University
1997-2002	Staff Cardiologist, Kyushu University Hospital, affiliated hospitals, Fukuoka, and National Cardiovascular Center, Suita, Osaka

2002-2004	Medical Reviewer, Pharmaceuticals and Medical Devices Evaluation Center, Ministry of Health, Labour and Welfare, Japan (later reorganized into PMDA, Pharmaceuticals and Medical Devices Agency)
2004-2012	Assistant Professor, Research Associate Professor, Department of Cardiovascular Medicine, Kyushu University
2012-2019	Associate Professor, Center for Clinical and Translational Research, Kyushu University Hospital
2019	Professor in the same Center
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Major Publications:

- Hosokawa K, Watanabe H, Taniguchi Y, Ikeda N, Inami T, Yasuda S, Murohara T, Hatano M, Tamura Y, Yamashita J, Tatsumi K, TSUJINO I, Kobayakawa Y, Adachi S, Yaoita N, Minatsuki S, Todaka K, Fukuda K, Tsutsui H, and Abe K. A Multicenter, Single-Blind, Randomized, Warfarin-Controlled Trial of Edoxaban in Patients with Chronic Thromboembolic Pulmonary Hypertension: KABUKI Trial. *Circulation*. 2023 In press
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Abstract

The importance of Academic Research Organizations in the era of medical product open innovation

Koji Todaka

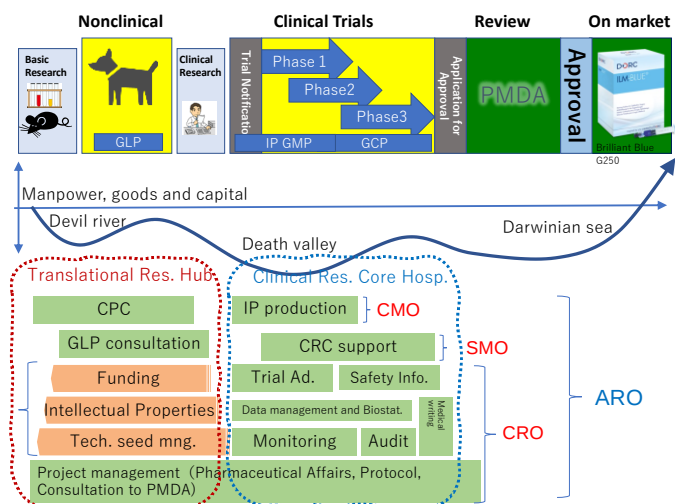
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Abstract

In 2007, the Japanese government began establishing academic research organizations (AROs) at several universities in order to overcome the situation in Japan, where promising basic research results had not led to the practical application of new drugs. At the same time, an R&D method in which AROs incubate inventions from academia to some extent and then license them out to pharmaceutical companies is becoming a global trend. The majority of new drugs approved by the US FDA from 1998 to 2007 were discoveries made in academia. In Japan as well, results are beginning to emerge, with 23 cases being approved over the three-year period from 2020 to 2022

through a system of investigator-initiated clinical trials for approval purpose, which is rare in the world. From the beginning, Kyushu University received support from the Ministry of Education and the Ministry of Health through the Translational Research Hub Project and Clinical Research Core Hospital Project, respectively, and has been developing an ARO staffed by around 100 experts. We have a system in place to cover every step to mature basic research into new drugs (intellectual property, pharmaceutical affairs, toxicology, engineering, CMC [chemistry, manufacturing and control], project management, data management, biostatistics, trial quality control, IT, ethics, regulatory science) within the university. Although there are many development targets for incurable and rare diseases that are difficult for pharmaceutical and medical device companies to reach and also to make a profit, the morale of the staff is high in delivering new treatments to bedside, which leads to gathering talented people and efficient development. Examples of approved products include alveolar bone fillers and staining materials for eye surgery, which have become de facto standard products and are used around the world. We also have new drug development technologies that have a wide range of applications, including the production of protein preparations by introducing genes into special silkworms that have been cultivated in the Faculty of Agriculture for over 100 years, and technology that allows even larger molecules of 500 Da or more to penetrate into the body through normal skin.

We are actively working on international contributions, and especially in Asia. We are conducting joint research and development with local academia to resolve unmet medical needs such as infectious diseases, which are caused by regionally specific circumstances. Your country's CDSCO have a reference country rule that simplifies domestic evaluations by referring to approvals in Japan, which can hopefully be utilized. We hope that the introduction of our university's activities in this lecture will lead to joint development and international clinical trials with academia in your country.



Keywords: unmet medical needs, translational research, reference country



Invited Lecture 3

Efficient Agmatine Production in *Aspergillus oryzae* through Solid-State Cultivation



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Research Interest:

Enzymology, Molecular Genetics, Archaea, Filamentous Fungi

Education & Professional Career:

1985-1990	M.S. and Ph.D. Hiroshima University (Microbiology)
1990-1992	Nihon Shokuhin Kako Co Ltd. (Protein Engineering of CGTase)
1992-1994	Research Associate, University of Illinois at Chicago, College of Medicine (Cystic fibrosis)
1994-2001	Asst. Prof in Osaka University (Application of KOD polymerase)
2001-2002	Asso. Prof in Osaka University (Cold adaptation of thermophiles)
2002-2006	Asso. Prof in Kwansei-Gakuin University (Environmental Microbiology)
2006	Prof. in Kwansei-Gakuin University (Biological roles of polyamines)
2020	Dean of School of School of Biological and Environmental Sciences

Major Publications:

1. Juma, K.M. et al.: Recombinase polymerase amplification using novel thermostable strand-displacing DNA polymerases from *Aeribacillus pallidus* and *Geobacillus zalihae*. J.Biosci.Bioeng. S1389-1723(23)00026-9. (2023)
2. Shimakawa,G. et al: Immobilization of a Broad Range of Polypeptides on the Frustule of the Diatom *Thalassiosira pseudonana*, Appl.Environ.Microbiol., 88, 1-11 (2022)
3. Fukuda,W. et al.: Substrate specificity of an aminopropyltransferase and the biosynthesis pathway of polyamines in the hyperthermophilic crenarchaeon *Pyrobaculum calidifontis*. Catalysts. 12, 567, 1-13 (2022)
4. Ishi,Y. et al.: Leucine-responsive regulatory protein in acetic acid bacteria is stable and functions at a wide range of intracellular pH levels. J.Bacteriol. 203, e00162-21 (2021)
5. Akasaka,N. and Fujiwara,S. The therapeutic and nutraceutical potential of agmatine, and its enhanced production using *Aspergillus oryzae*. Amino Acids 52, 181-197 (2020)

Abstract

Efficient Agmatine Production in *Aspergillus oryzae* through Solid-State Cultivation

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Agmatine, a natural polyamine synthesized from arginine-by-arginine decarboxylase, was first discovered in 1910. Its physiological significance remained unclear for over a century. Recent findings have revealed agmatine's role as an endogenous ligand for α 2-adrenergic and imidazoline receptors in the mammalian brain, suggesting its potential as a therapeutic agent for various central nervous system-related diseases. Numerous preclinical and clinical studies conducted in the past two decades have demonstrated its versatile functions in modulating various molecular targets, including neurotransmission, nitric oxide synthesis, glucose metabolism, polyamine metabolism, and carnitine biosynthesis. These findings indicate the potential for agmatine in therapeutic applications and as a nutraceutical to enhance the quality of life(1,2). Although mammals have low enzymatic activity of arginine decarboxylase, the enzyme responsible for agmatine production from arginine, it is suggested that a significant portion of agmatine comes from dietary sources and gut microbiota. Intriguingly, certain fermented foods produced by *Aspergillus oryzae* contain substantial agmatine, despite the absence of L-arginine decarboxylase (ADC) orthologs in the *A. oryzae*

genome. This raised the question of how efficient agmatine production is achieved. Our research has shown that *A. oryzae*'s solid-state cultivation leads to significantly higher ADC activity than submerged culture conditions, particularly at a low pH of 3.0 and 30°C(3). These findings suggest that the efficient production of agmatine is facilitated by a yet unidentified low pH-dependent ADC induced during the solid-state cultivation of *A. oryzae*(4). Recent progress in this field includes the purification and identification of natural ADC from *A. oryzae* hyphae obtained during solid-state cultivation. This ADC exhibited the characteristic features of pyruvyl-dependent decarboxylases in its amino acid sequence. Furthermore, a recombinant form of this ADC expressed in *Escherichia coli* cells displayed the same low pH-dependent ADC activity observed in its natural counterpart. These discoveries shed light on the mechanisms behind agmatine production and could have implications for its sustainable production and applications in various fields.

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Keywords: agmatine, arginine decarboxylase, *Aspergillus oryzae*, polyamine



Invited lecture 4

Digital & Computational Pathology – Transforming Cancer Care through AI/ML



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Education & Professional Career:

2010	M.D. Pathology, D.N.B. Pathology, PGIMER, Chandigarh
2012	PDCC Renal & Transplantation Pathology, PGIMER, Chandigarh
2014	MRes (Translational Cancer Medicine), King's College London
2015	Fellowship in Oncopathology, Tata Memorial Centre, HBNI.
2022	FRC Path (Histopathology), Royal College of Pathologists
2015-2019	Assistant Professor & Pathologist, Tata Memorial Centre
2019-2022	Associate Professor & Pathologist, Tata Memorial Centre
2022-present	Professor & Pathologist, Tata Memorial Centre

Scientific Activities:

2010 -2012	Senior Resident, Pathology, PGIMER, Chandigarh
2012 - 2015	Fellow in Pathology, Tata Memorial Centre.

Research Interests:

1. I am the PI of a Computational Pathology Laboratory at Tata Memorial Centre and also the Cancer Imaging Biobank Project, which aims to collate timeline pathology and radiology images of cancer patients linked to their clinical information, tests and outcome data. We aim

to build, train and validate AI/ML/DL algorithms that are relevant in clinical practice and work towards deployment

2. I look at Head Neck Cancer and urological cancers as a part of my diagnostic interests. I am particularly interested in using computational pathology to find patterns in timeline pathology that can be used in predicting response to therapy and predicting outcomes.
3. I also do molecular pathology and am interested in finding the molecular basis of cancer and correlating it with the morphological patterns on the glass slide especially those that can be investigated by computational pathology.
4. I am interested in using Data Science in solving daily problems in Healthcare. I lead the development of a Level 6 Synoptic Reporting Platform at Tata Memorial Centre.

Publications:

1. RK Gupta, S Nandgaonkar, NC Kurian, S Rane, A Sethi. EGFR Mutation Prediction of Lung Biopsy Images using Deep Learning. arXiv preprint arXiv:2208.12506, 2022
2. Anand, D., Yashashwi, K., Kumar, N., Rane, S., Gann, P. H., Sethi, A. (2021). Weakly supervised learning on unannotated H&E-stained slides predicts BRAF mutation in thyroid cancer with high accuracy. The Journal of Pathology. <https://doi.org/10.1002/path.5773>
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Abstract

Digital & Computational Pathology – Transforming Cancer Care through AI/ML

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Abstract :

Computational Pathology is an interdisciplinary field, focusing on the use of computational tools to transform pathology as a branch. It is fueled by the availability of large-scale multi-dimensional

datasets primarily in the form of whole slide images linked to clinical information including treatment data, outcomes, genomic data and others. Computational pathology uses machine learning and deep learning algorithms to look at patterns that may not be visible to the human eye. Accurate prediction of genomic mutations^{1,2,3} from histology images not only offers us ways and means to reduce costs and turn-around-times for healthcare delivery. Further the ability of computational pathology to predict response/benefit⁴ to therapy not only promises personalized medicine, but also guides further investigations into the molecular mechanisms of response to therapy. Computational pathology is also moving towards interpretable AI where patterns recognizable by the human mind can be built into risk stratification scores that are interpretable by the clinicians. Patients can be risk stratified into those likely to recur early following a particular therapy and those likely to have long term response/disease free status⁵.

AI/ML/DL algorithms are affected by several pre-analytical variables, such as slide quality, image quality, processing artefacts, staining variations, interlaboratory variations in addition to true biological variables such as ethnic differences and tumor heterogeneity. Several tools are being built to detect, segment, and quantify artefacts on the digitized slide^{6,7,8} which are important supporting tools for introducing AI/ML/DL algorithms for clinical use. Cautious AI⁹ tools are also essential for making the AI algorithms more robust and reliable for use in the clinics and to test their generalizability.

Large volumes of data are required to facilitate rapid testing and training of new algorithms. It is well known that AI algorithms trained on one population may not work equally well on another population due to a number of variables related to ethnic, epidemiological, laboratory, biological and other factors. To test any new algorithm and to train algorithms which work on your populations, data representative of your population is essential. Cancer Imaging Biobank (CAIB)¹⁰ is one such project which is aggregating pathology WSI and radiology images along with their linked clinical, treatment and outcome information from 4 organizations from India. CAIB currently has >10000 pathology WSI images and radiology DICOM studies of head neck and lung cancer with a plan to expand the project to other cancers in due course.

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Invited lecture 5

Immunotherapy and Biotechnology: Industry Innovations Driving Immune-Driven Cancer Treatments



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Research Interest:

Childhood cancer and bone marrow transplant

Education & Professional Career:

2001-2006	MBBS
2010-2013	MD
2016-2018	Postdoctoral fellowship
2018-2021	DM (Clinical Hematology)
2021-2023	Assistant Professor, NIMS University
2023(March) onwards	BMCHRC

Major Publications:

1. Telemedicine in hematology; long-term implications of a short-term experience during COVID-19 pandemic

2. COVID-19 Pandemic: Insights into Molecular Mechanisms Leading to Sex-based Differences in Patient Outcomes Running Title: Molecular Mechanisms for Sex-based Differences in COVID-19
3. Bone infarct (osteonecrosis) as late side effect of steroid in acute lymphoblastic leukemia survivor
4. Myeloid sarcoma: experience from a hematology care centre of Eastern India
5. Indian Society of Hematology and Blood Transfusion (ISHBT) Consensus Document on Hematological Practice During COVID-19 Pandemic encountered in caring for hematology patients during the COVID-19 pandemic in India
6. Host Vulnerability Factors Affecting Patient Outcomes in COVID-19: An Update
7. Hemarthrosis in hemoglobin E beta thalassemia: a rare clinical scenario
8. Care in crisis: management of hematology patients during COVID-19 Pandemic
9. Institutional Sensitivity Pattern Guides Initial Antimicrobial Selection in Febrile Neutropenia; Sharing Experience from a Hemato-Oncology Care Center in India.
10. Molecular Mechanisms for Sex-based Differences in Patient Outcomes in COVID-19: A Systematic Review
11. Azacitidine Causing Generalized Skin Rash: A Rare Side Effect
12. Pathogenesis Guided Therapeutic Management of COVID-19: An Immunological Perspective
13. Clinicopathological Characteristics and Outcome in Patients of Primary CNS Lymphoma Treated with Modified De-Angelis Protocol: An Audit
14. Acute Promyelocytic Leukemia: A Decade Long Experience with Evolving Treatment Strategies
15. Profile of Autoimmune Haemolytic Anaemia: Analysis of 10 Years Data from a Hematology Center in Eastern India
16. Chapter in Medicine API 2021 book titled “Approach to a case of polycythemia- More blood may be bad...”
17. Chapter in API textbook of medicine 12th edn. on Nutritional Anemia
18. Chapter in API Medicine Update on “Revisiting pancytopenia”-releasing May 2023 Presentations at conferences

Abstract

**Immunotherapy and Biotechnology: Industry Innovations
Driving Immune-Driven Cancer Treatments**

Dr Prakash Singh Shekhawat

BMCHRC, Jaipur

Abstract

Immune system is a surveillance system of our body that constantly patrolling for the abnormal cells. Despite of this , cancer cells are tricky and notorious —they have various mechanism to hide from the immune check. They may evade detection or dampen the immune response. Immunotherapy steps in to break this evasion tactic.

Checkpoint inhibitors are the other upgrades in the armarium, which unleash the immune system by blocking the brakes that cancer cells exploit to avoid an attack.

Currently the genetically engineering T cells (a type of immune cell) are also available and they can better target and destroy cancer cells.

Thus immunotherapy so promising is its ability to create a lasting impact. Unlike traditional treatments, it can train the immune system to remember and recognize cancer cells, providing long-term protection without the side effects related to chemotherapy.

one-size-fits-all solution, is yet not true for all .Immunotherapy paving its way as a personalised approach and research is ongoing to refine and expand its applications. But immunotherapy is undoubtedly a shining beacon of hope in the world of oncology.

Keywords: Immunotherapy, CAR T cell, Precision oncology



Invited lecture 6

Nanoscale imaging of dynamic binding of aptamer molecules to cancer-targeting proteins by high-speed atomic force microscopy



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Research Interest:

Molecular Biology, Aptamer technology, Drug discovery

Education & Professional Career:

2007-2009	Researcher in Saitama Bio Project, Saitama University
2009-2011	PhD in Engineering, Saitama University
2014-2019	Researcher, JAIST and BioDevice Co, Ltd, Ishikawa Prefecture
2019-2020	Post-doctoral fellow, Toyama Prefecture University
2020-Present	Assistant Professor, Nano Life Science Institute, Kanazawa University

Major Publications:

1. Biyani M, Yasuda K, Isogai Y, Okamoto Y, Weilin W, Kodera N, Flechsig H, Sakaki T, Nakajima M, Biyani M, Novel DNA Aptamer for CYP24A1 Inhibition with Enhanced Antiproliferative Activity in Cancer Cells, ACS Appl. Mater. & Interfaces, refereed, 14, 18064-18078, 2022.

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Abstract

Nanoscale imaging of dynamic binding of aptamer molecules to cancer-targeting proteins by high-speed atomic force microscopy

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Aptamers are single-stranded oligonucleotides that fold into defined architectures and bind to targets such as proteins with high affinity and specificity [1]. Due to their low molecular weight, low/no immunogenicity, and versatility to manipulate for improved stability and target efficacy, they attracted much attention in cancer diagnosis and treatment. However, a deeper insight into conformational dynamics and the search for the most atomistically stable aptamer-target complexes are prerequisites for the development of aptamers as lead candidates for the development of targeted drugs against cancer. Numerous experimental methods have been developed to understand biomolecular interactions on a structural and dynamic level [2]. Among them, high-speed atomic force microscopy (HS-AFM) has emerged as a leading technology to directly observe the structural dynamics and dynamic processes of biological molecules in physiological solutions [3].

In our studies, we analyzed the dynamic binding interactions between aptamers and proteins by HS-AFM. The HS-AFM movies characterized the aptamer-protein dynamic complex binding at the nanoscale level. In addition, nanoscale-level observations were further evaluated by the molecular docking interpretation at the atomic level [4]. In this talk, I will present our recent imaging studies of dynamic complexes between aptamers and proteins using HS-AFM in combination with molecular docking in the development of aptamers as anticancer agents.

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4. Biyani et al. ACS Appl. Mater. & Interfaces, (2022)

Keywords: Aptamers, HS-AFM, Molecular docking



Invited lecture 7

Development of *in vitro* and *in vivo* evaluation systems for vitamin D analogs and their application to drug discovery



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Research Interest:

Biochemistry, Drug metabolism, Metabolism and molecular mechanism of vitamin D and its analogs

Education & Professional Career:

2002-2004	M.S. in Engineering, Kyoto University
2004-2005	Government Employee, Fukui Prefectural Government
2005-2008	Researcher, Research Institution of Innovative Technology for the Earth
2008-2013	Researcher, Toyama Prefectural University (2013, Ph.D, in Engineering)
2013-2016	Post-doctoral fellow, Toyama Prefectural University
2016-2019	Assistant Professor, Toyama Prefectural University
2019-2022	Junior Associate Professor, Toyama Prefectural University
2023-Now	Associate Professor, Toyama Prefectural University

Major Publications:

1. Kise S, Yasuda K, Sakaki T et al., Functional analysis of vitamin D receptor (VDR) using adenovirus vector. *J Steroid Biochem Mol Biol.*, 26:106275.(2023)

2. Yogo Y, Yasuda K, Sakaki T et al., Metabolism of non-steroidal anti-inflammatory drugs (NSAIDs) by *Streptomyces griseolus* CYP105A1 and its variants. *Drug Metab Pharmacokinet.*, 45:100455. (2022)
3. Yasuda K, Sakaki T et al., Elucidation of metabolic pathways of 25-hydroxyvitamin D3 mediated by CYP24A1 and CYP3A using *Cyp24a1* knockout rats generated by CRISPR/Cas9 system *J. Biol. Chem.*, 296: 100668 (2021)
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Abstract

Development of *in vitro* and *in vivo* evaluation systems for vitamin D analogs and their application to drug discovery

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Vitamin D3 is metabolized to 25-hydroxyvitamin D3 (25D3) by CYP2R1 and CYP27A1 in the liver, and further metabolized by CYP27B1 in the kidney to 1 α ,25-dihydroxyvitamin D3 (1,25D3). 1,25D3 has biological effects by binding to the vitamin D receptor (VDR) as a ligand, while both 25D3 and 1,25D3 are sequentially metabolized to inactive metabolites by CYP24A1. Vitamin D analogs with high VDR affinity and resistance to CYP24A1-mediated metabolism could be good therapeutic agents.

So far, we have constructed the following original systems and attempted to evaluate vitamin D analogs. (1) VDR-affinity evaluation system using chimeric protein consisting of split luciferase and VDR [1]. (2) Metabolic prediction system using a recombinant human CYP24A1 expressed in *E. coli* [2]. (3) CYP24A1 KO rats were generated using genome editing method [3]. (4) Metabolism prediction system using a human CYP24A1-expressing adenovirus vector.

Since the CYP24A1-dependent metabolic profile of vitamin D analogs differs between rats and humans, accurate prediction of metabolism of vitamin D analogs in human is difficult from metabolic studies using rats. So, in addition to the above evaluation systems, we are in the process

of establishment of a rat models expressing human CYP24A1 by infection of human CYP24A1-expressing adenovirus vector to CYP24A1-KO rats.

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2. Yasuda et al., *Int. J. Mol. Sci.* 22, 11839 (2021)
3. Yasuda et al., *J. Biol. Chem.*, 296, 100668 (2021)

Keywords: Vitamin D, Drug metabolism



CONTRIBUTED PAPERS

Abstract

Regenerative medicine and tissue engineering: Industry's breakthroughs in cancer rehabilitation

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Abstract

Introduction

The development of cancer involves sustained chronic proliferation of cancer cells, which leads to the formation of hyper-vasculature and defective vascular architecture. Such architecture enables nanomaterials to diffuse easily from blood vessels and accumulate within and around the tumour, which is defined as the enhanced permeability and retention (EPR) effect.

The advent of Regenerative medicine and tissue engineering has revolutionized the treatment of various disorders like cancer. Tissue engineering helps develop promising in vitro and in vivo models, such as spheroids, organoids, and organ-on-a-chip for studying cancer biology and evaluating the safety and effectiveness of novel antitumor drugs. Moreover, drug delivery systems that use scaffolds and stem cells enable sustained and localized release of antitumor drugs. Scaffolds and stem cells could also be utilized in cancer immunotherapy and in healing wounds caused by the resection of tumours. Advancements in tissue engineering and regenerative medicine may provide therapeutic approaches to treat tumours effectively.

Methodology

The function of regenerative therapies, including growth factor administration, mesenchymal stem cell therapy, platelet-rich plasma, hematopoietic stem cell transplantation and Musculoskeletal repair, and cognitive rehabilitation.

Result

This also delves into the idea of personalized medicine in the context of regenerative medicine, with a focus on patient-specific treatments that make use of the patient's own cells to improve recovery results. It also covered the possibility of using immunomodulation to strengthen the immune system's function in preventing cancer and healing from the adverse effects of therapy. To sum up, it underscores the remarkable potential of regenerative medicine to transform the field of cancer

rehabilitation. Regenerative medicine stands to benefit from interdisciplinary cooperation and the advancement of evidence-based research.

Conclusion

Intricate interactions between treatments and how they affect different tissues and organs, cancer rehabilitation presents special difficulties. With an emphasis on tissue repair, regeneration, and functional recovery, the field of regenerative medicine has emerged as a creative solution to these problems.

Keywords: Tissue engineering, Regenerative medicines, Stem cells, Cancer rehabilitation



Advancements and Challenges of Smart Hydrogels in Tissue Engineering and Regenerative Medicine

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Abstract

The field of regenerative medicine, driven by advancements in bioengineering, possesses significant potential to revolutionize the results of medical treatments. This comprehensive overview examines the many methodologies utilized in tissue engineering and the construction of functional structures within the field of regenerative medicine. The primary objective is to effectively reinstate, preserve, and rejuvenate deteriorated tissues and organs, thereby heralding a transformative epoch in the field of healthcare. At the core of these solutions lies the incorporation of biomimetic materials, cells, and bioactive chemicals, which together constitute a triad that coordinates tissue regeneration and functions as therapeutic systems. Hydrogels have developed as prominent entities within this domain, establishing themselves as prevalent tissue engineering scaffolds throughout the preceding two decades. Hydrogels have become crucial instruments in the field of regenerative medicine due to their distinctive capability to uphold a distinct three-dimensional structure, offer mechanical support, and imitate the characteristics of the original extracellular matrix. The high water content of hydrogels is a crucial characteristic that significantly contributes to their efficacy in tissue engineering. This property not only permits a distinct 3D structure but also produces an optimum environment for

cell survival, closely replicating real tissues. The utilization of hydrogel systems has been crucial in aiding the immobilization of cells and enabling the controlled release of growth factors, hence enhancing their importance in the process of tissue regeneration. The present review commences with a succinct examination of the fundamental characteristics, composition, and techniques employed in the production and manufacturing of intelligent hydrogels. This study explores the structural complexities that contribute to the intelligent and versatile nature of hydrogels, rendering them suitable for a wide range of applications in the field of tissue engineering. The discourse thereafter expands to encompass the various uses of intelligent hydrogels, spanning from the healing of wounds to the regeneration of organs, so highlighting their multifaceted nature and significant influence within the field of regenerative medicine. This study also investigates the changing terrain of smart hydrogel synthesis and fabrication methods, emphasizing new progressions that improve their effectiveness and suitability. Additionally, the research underscores the significance of comprehending the biological reactions to smart hydrogels, guaranteeing their compatibility with living organisms and mitigating any possible detrimental consequences. The review article examines the future prospects of smart hydrogels in the field of tissue engineering, considering developing technology, novel applications, and prospective advancements that may occur in the near future. The purpose of this prospective viewpoint is to provide guidance to researchers, doctors, and practitioners on effectively utilizing the complete capabilities of smart hydrogels for the advancement and customization of regenerative therapies. In summary, this review offers a thorough examination of the characteristics, production methods, practical uses, and prospective advancements of intelligent hydrogels within the field of tissue engineering. This study is a significant resource for individuals interested in comprehending, contributing to, and innovating within the dynamic and quickly growing field of regenerative medicine, by emphasizing the crucial role it plays in this area.

Keywords: Regenerative Medicine, Tissue Engineering, Hydrogels, Bioengineering Advances



Extraction of natural dye from *Tradescantia pallida*, *Beta vulgaris*, *Tagetes erecta*, *Tagetes Patula* & its fastning tests

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Abstract

In recent years due to biodegradability and high environmental compatibility, natural dyes have attracted a lot of attention when it comes to dyeing fabrics. The specialists claim that natural dyes have a great deal of potential and may even be able to readily replace synthetic ones in some applications. The extraction of dyes from *Tradescantia pallida*, *Beta vulgaris*, *Tagetes erecta*, *Tagetes Patula* and the effects of various mordanting techniques and its fastning test are all covered in this study. From an environmental standpoint, swapping out synthetic dyes for natural ones creates new opportunities for markets and employment in addition to lowering risk and pollution. Different types of fibres will be used for example synthetic wool, cotton and silk. After dyeing the fibre its fastning test will be carried.

Introduction

Natural dyes are organic and obtained from materials found in nature. In comparison to synthetic colors, natural dyes are typically more environmentally friendly, biodegradable, less poisonous, and less allergic. Natural colors are biodegradable, Therefore when they are drained into water bodies, they don't disrupt the aquatic ecosystem. Since natural dyes have a tendency to fade quickly, Properties to the fabric dye fixative are used, this can be in the form of starch, seaweed, Alum (hydrated double sulfate salt), table salt, vinegar. Fabrics dyed with natural dye are more delicate and have to be handled with care, it should not be dried directly in sunlight. *Tradescantia pallida*, *Beta vulgaris*, *Tagetes erecta*, *Tagetes Patula* are used to extract natural dyes.

Methodology

1. Sample collection: Purple Heart-The sample was collected from Biyani group of girls colleges, Jaipur. Beetroot-The sample was brought from nearby *sabzi mandi* of Jaipur Flowers-The sample was brought from nearby flower vendor

2. Drying of Flowers: Flowers were dried after washing

3. Making Extract:

A. Purple Heart: Leaves of Purple Heart were taken from campus. The leaves were washed properly. 50g of leaves was taken in the 100ml of Acetone:Ethanol:dH₂O in the ration 1:1:2 i.e, 25ml of Acetone, 25ml of Ethanol and 50ml of dH₂O . It was kept on hot plate for one hour along with adding water if required.

- B. Beetroot:** 100g of beetroot was taken in Ethanol:Acetone:dH₂O in ratio 1:1:2. That is 25ml of Acetone 25ml of Ethanol 50ml of dH₂O. It was heated on hot plate for 1hr with adding dH₂O if required.
- C. Flower extract:** 25g of dried flower powder in Ethanol:Acetone:dH₂O in ratio 1:1:2. That is 25ml of Acetone 25ml of Ethanol 50ml of dH₂O. It was heated on hot plate for 1hr with adding dH₂O if required
- 4. Filtration of extract:** Extract was filtered using Whatman filter paper and the filtrate was collected in beaker.
- 5. Dyeing of threads/ fabrics:** The fabric is kept in the dye for 2-4 hrs. It is removed from dye and kept in sunlight for 1 hr let it dry completely
- 6. Mordanting of threads:** Mordants and dH₂O was taken in ratio 1:40, i.e 1g of mordant with 40ml of distilled water. The threads were kept in it for 1-2 hrs. Later the threads were removed and kept for drying.

Result and Discussion

1. Dyeing of threads by *Tradescantia pallida*:

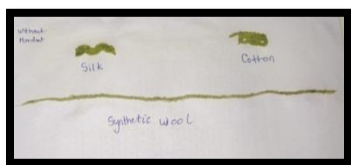


FIG 1: Without Mordant



FIG 2: With Mordant K₂Cr₂O₇



FIG 3: With mordant FeSO₄

The colour obtained without mordant is Green.(shown in fig 1).

The colour obtained with mordant K₂Cr₂O₇ is yellow (shown in fig 2).

The colour obtained with mordant FeSO₄ is brown (shown in fig 3).

2. Dyeing process by *Beta vulgaris*:

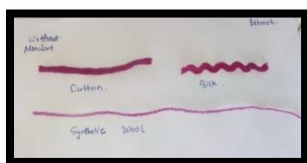


FIG 4: Without mordant

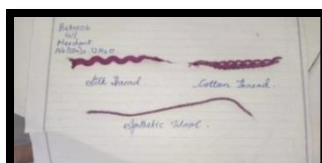


FIG 5: With mordant Alk(SO₄).12H₂O

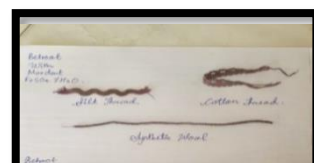


FIG 6: With mordant FeSO₄.7H₂O

The color obtained without mordant is Pink (shown in fig 4).

The color obtained with mordant $\text{AlK}(\text{SO}_4) \cdot 12\text{H}_2\text{O}$ is Dark pink (shown in fig 5).

The color obtained with mordant FeSO_4 is brown (shown in fig 6).

3. Dyeing process with *Targetes patella*:

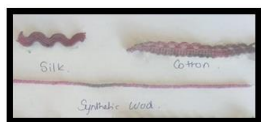


FIG 7: Without mordant

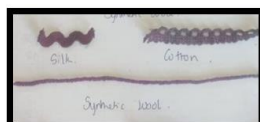


FIG 8: With Mordant $\text{AlKSO}_4 \cdot 12\text{H}_2\text{O}$

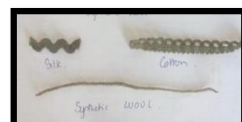


FIG 9: With Mordant $\text{K}_2\text{Cr}_2\text{O}_7$

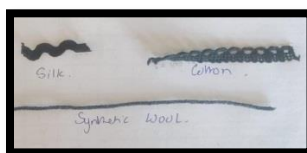


FIG 10: With Mordant $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

The color obtained without mordant is pink (shown in fig 7).

The color obtained with mordant $\text{AlK}(\text{SO}_4) \cdot 12\text{H}_2\text{O}$ is Pinkish Purple (shown in fig 8).

The color obtained with mordant $\text{K}_2\text{Cr}_2\text{O}_7$ is Green (shown in fig 9)

The color obtained with mordant FeSO_4 is blue (shown in fig 10).

4. Dyeing process with: *Targetes erecta*



FIG 11: Without Mordant



FIG 12: With Mordant $\text{Alk}(\text{SO}_4) \cdot 12\text{H}_2\text{O}$



FIG 13: With Mordant $\text{K}_2\text{Cr}_2\text{O}_7$



FIG 14: With Mordant $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$

The color obtained without mordant is Yellow (shown in fig 11).

The color obtained with mordant $\text{AlK}(\text{SO}_4) \cdot 12\text{H}_2\text{O}$ is Dark yellow (shown in fig 12).

The color obtained with mordant $\text{K}_2\text{Cr}_2\text{O}_7$ is Bright yellow (shown in fig 13)

The color obtained with mordant FeSO_4 is brown (shown in fig 14).

Conclusions :

In this report, many natural Dye were extracted. In conclusion, natural dyes offer a host of benefits for human use. Most significantly, they are better for the environment and our health.

Keywords: extraction, natural dyes, Removal of the dye molecule, dyeing threads, mordants, Fixing Dye.

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Biogenic Synthesis, Characterization of ZnONPs using *Elaeagnus Latifolia* and their Biological Assay

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Abstract

Nanotechnology a emerging area in have wide applications in biomedical, electronics and agriculture involves to fabricated materials at nanoscale level having the size ranging 1-100nm. Nanoparticles draw more attention due to its distinguish chemical, physical and biological characteristic. Green approach of synthesizing nanoparticles come to light as an alternative to conventional approach, due to presence of bio-active constituents in plants act as stabilizing as well as capping agents and enhance the rate of reduction and stabilization of synthesized nanoparticles. Herein we report the biohenic synthesis of ZnO NPs using *Elaeagnus Latifolia* the obtained materials characterized using UV-vis spectroscopy, FTIR, X-ray diffraction, field emission scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM). The photocatalytic activity of ZnONPs nanoparticles were investigate by degradation of methyl blue under UV radiation and also antibacterial activity against S.aureus, S. paratyphi, V.Cholerae and E.coli were screened.

Methodology

In a 250 mL conical flask, 15 ml of *Elaeagnus Latifolia* were heated at 50°C for 10 min then 85 ml of 1mM zinc acetate solution was added dropwise with continuous stirring for 6 hrs. The reaction mixture turned yellowish and a cream-colored precipitate of zinc hydroxide was formed. Then centrifuged at 10,000 rpm for 10 minutes. The reduction of Zn^{2+} to Zn^0 was confirmed by change in colour of the solution from light yellow to cream.

Result and Discussion

The spectral studies (UV-vis, FTIR, XRD, FE-SEM & TEM) favour the formation of ZnONPs using the extract *Elaeagnus Latifolia*. The bioactive moieties in extract *Elaeagnus Latifolia* act as bioreducing, stabilizing and capping agent and enhance the potential of biogenic ZnONPs.

Conclusions

In this study, ZnONPs were synthesized using extract *Elaeagnus Latifolia* as reducing and stabilizing agent. The extract *Elaeagnus Latifolia* determined to play an effective role as reducing agent in controlling the size of particles. The spectral technique employed here is very simple,

inexpensive and eco-friendly. The spectral evidences of techniques like UV-vis, FTIR, XRD, SEM and TEM favour the structure, size, and crystallinity of Zn nanoparticles showing that ZnONPs may be promising possibility for wide range of applications.

Keywords: Green synthesis; ZnONPs, *Elaeagnus Latifolia*, photocatalytic activity, antimicrobial activity.



Application of nanotechnology in cancer diagnosis and therapy

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Abstract

Cancer is the leading cause of death and poor quality of life worldwide. Although several strategies have been proposed to reduce death, reduce chronic pain, and improve quality of life, there is still a gap in the adequacy of these cancer therapies. Early detection of cancer cells and application of drugs with high specificity to reduce toxicity are essential steps to ensure optimal cancer treatment. Due to increased systemic toxicity and resistance to conventional tools for cancer diagnosis and treatment, other strategies including nanotechnology are being used to improve diagnosis and mitigate the severity of the disease. Over the years, nanotechnology-based immunotherapeutic agents have been used for several types of cancer to reduce the invasiveness of cancer cells while preserving healthy cells at the target site. Nanomaterials including carbon nanotubes, polymeric micelles, and liposomes have been used in anticancer drug design, where they have demonstrated significant pharmacokinetic and pharmacodynamic advantages in cancer diagnosis and treatment. In this review, we outline commonly used nanomaterials that are used in cancer diagnosis and treatment. We have highlighted the suitability of these nanomaterials for cancer treatment based on their physicochemical and biological properties. We further reviewed the challenges associated with various nanomaterials that limit their use and prevent their translatability to the clinical setting in certain types of cancer.

Keywords: nanomaterials, nanotechnology, cancer, diagnosis, treatment

Introduction

Cancer is a leading cause of death and a global health burden. By 2018, there will be an estimated 18.1 million new cancer cases and 9.6 million cancer-related deaths. Cancer is a disease characterized by uncontrolled cell proliferation that spreads from the initial focus to other parts of

the body and causes death. For these reasons, it is crucial to ensure earlier detection and treatment of cancer to reduce disease spread and mortality. Among the widely used strategies in cancer research today is nanotechnology. Nanotechnology has led to several promising results with its applications in cancer diagnosis and treatment, including drug delivery, gene therapy, detection and diagnosis, drug delivery, biomarker mapping, targeted therapy, and molecular imaging. Several studies have investigated different forms of nanomaterials, such as liposomes, polymers, molecules, and antibodies, concluding that combining these nanomaterials in cancer drug design can achieve a balance between increasing efficacy and decreasing drug toxicity. However, due to the potential toxicity of nanomaterials, there is still a long way to go before they are readily accepted in the clinic for cancer treatment. With the rapid development of nanotechnology, this article will review its application in cancer diagnosis and treatment, focusing on its advantages and limitations during use (Figure 1).

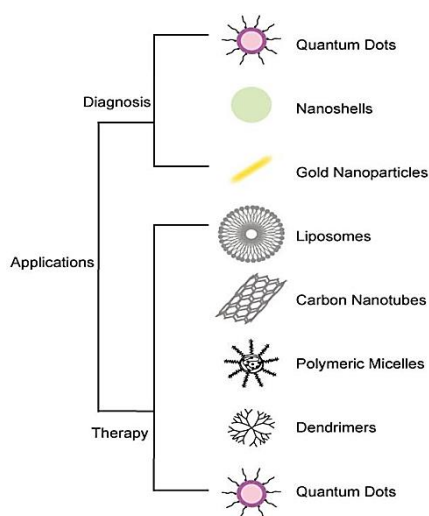


Figure 1. Application of nanomaterials in cancer diagnosis and therapy.

Methodology

In current research, nanotechnology can validate cancer imaging at the tissue, cellular and molecular levels. We used some spatial and temporal techniques based on nanotechnology that can help to accurately track living cells and monitor dynamic cellular events in tumors. Quantum dots that emit fluorescence in the near-infrared spectrum (ie, 700-1000 nanometers) have been designed to be more suitable for imaging colorectal cancer, liver cancer, pancreatic cancer, and lymphoma. A second near-infrared (NIR) window (NIR-ii, 900-1700 nm) with greater depth of tissue penetration, higher spatial and temporal resolution has also been developed to aid in cancer imaging.

We have used nano-carriers such as liposomes, micelles, dendritic macromolecules, quantum dots and carbon nanotubes to treat cancer.

Results and discussion

Nanoshells

Another commonly used nanotechnology application is the use of nanoshells. Nanoshells are dielectric cores between 10 and 300 nanometers in size, usually made of silicon and coated with a thin metal shell (usually gold). These nanoshells work by converting plasma-mediated electrical energy into light energy and can be flexibly optically tuned using UV-infrared emission/absorption fields. Nanoshells are desirable because their imaging lacks heavy metal toxicity[28], although their use is limited by their large size.

Colloidal gold nanoparticles

Gold nanoparticles (AuNPs) are good contrast agents because of their small size, good biocompatibility, and high atomic number. Research shows that AuNPs work in both active and passive ways to target cells. The principle of passive targeting is guided by the collection of gold nanoparticles to improve imaging due to the tension permeability (EPR) effect in tumor tissues. Active targeting, on the other hand, is mediated by conjugating AuNPs with tumor-specific drugs, such as EGFR monoclonal antibodies, to achieve active targeting of AuNPs to tumor cells (Figure 2).

Nanotechnology tools for cancer treatment

The development of nanotechnology is based on the use of small molecular structures and particles as tools for drug delivery. Nanocarriers such as liposomes, micelles, dendritic macromolecules, quantum dots, and carbon nanotubes are widely used in cancer therapy.

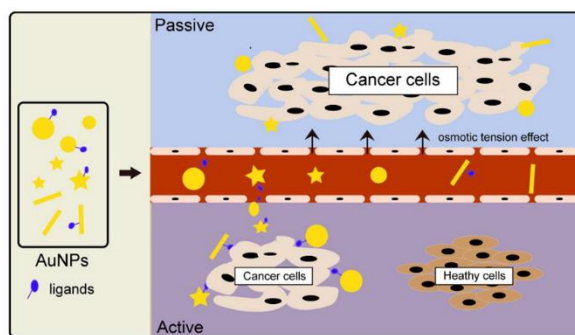


Figure 2. Different types of gold nanoparticles (different sizes, morphologies and ligands)

Accumulate in tumor tissues through the effect of osmotic tension (referred to as passive targeting) or localize to specific cancer cells through ligand-receptor binding (referred to as active targeting).

Liposomes

Liposomes are one of the most studied nanomaterials, which are nanospheres composed of a natural or synthesized phospholipid bilayer membrane and aqueous phase cores[51]. Due to the amphiphilicity of phospholipids, liposomes form spontaneously[51], allowing hydrophilic drugs to preferentially remain in the monolayer liposome, while hydrophobic ones form in front of the multilamellar liposome.

Carbon Nanotubes

Carbon nanotubes also have a property that allows them to absorb light from the near-infrared (NIR) region, which causes the nanotubes to heat up by the thermal effect and therefore can target tumor cells. Natural forms of carbon nanotubes promote non-invasive penetration of biofilms and are considered highly competent carriers for the transport of various drug molecules into living cells.

Conclusion and future directions

Nanotechnology has shown great promise in cancer treatment over the years. Nanomaterials, with their improved pharmacokinetic and pharmacodynamic properties, have contributed to the improvement of cancer diagnosis and treatment. Nanotechnology enables the targeted delivery of drugs to affected organs with minimal systemic toxicity due to their specificity. However, as with other therapeutic options, nanotechnology is not completely free of toxicity, and its use presents several problems, including systemic and certain organ toxicity, causing failures in their clinical applications. Given the limitations of nanotechnology, further advances need to be made to improve drug delivery, maximize efficacy while minimizing downsides. By improving the interactions between the physicochemical properties of the nanomaterials used, safer and more effective derivatives for diagnosis and treatment can be made available for cancer treatment.

□□□

Advancements and Challenges in Hip Replacement Technology: A Comprehensive Review

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Abstract

The total joint replacement operation stands as a significant advancement in orthopedic implant surgery. This review aims to comprehensively assess, describe, elucidate, and consolidate pertinent information from essential and past reports concerning the physical, mechanical, and tribological behavior of diverse composite materials employed in hip joint replacement applications. Encompassing a multidisciplinary approach, this research delves into various subjects, particularly focusing on biomaterials, specifically bio-ceramic materials, and their mechanical and wear responses. Numerous researchers have demonstrated their commitment to formulating and innovating novel hip implant composites, investigating their biocompatibility within simulated body fluid environments. The selection of hip implant materials hinges on two primary criteria: the restoration of function and the attainment of aesthetic characteristics. Other crucial considerations include biocompatibility, physical properties, mechanical properties, tribological properties, cost-effectiveness, and availability. This chapter provides an extensive review of hip replacement technology, injectable biomaterials, design requirements, and differentiation between physical and mechanical properties, offering a comprehensive overview of the efficacy for each system.

The underlying purpose of this literature review is to furnish foundational knowledge on the issues and challenges to be addressed in this thesis and underscore the significance of the present study. By exploring the advancements and challenges in hip replacement technology, this review aims to contribute to the broader understanding of orthopedic implant surgery, providing a thorough foundation for further research and innovation in the field.

Keywords: Orthopedic implant surgery, Hip joint replacement, Composite materials, Biomaterials, Mechanical, properties, Biocompatibility exploration



Tunable diode laser absorption spectroscopy for gas sensing

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Abstract

Gas sensing plays an important role in the real time world. Detection of Various harmful gases like methane, carbon- dioxide and nitrogen dioxide which affects life, gas-detection helps in pollution control and industrial monitoring.

The various conventional methods of gas detection such as gas chromatographer, pellistor and electrochemical gas sensors but due to their disadvantages such as slow response, low sensitivity and large size, they are not good choices for large scale gas detection.

Absorption spectroscopy, is a technique for real time measurements to extract gas parameters such as temperature, pressure, mole fraction, using rotational, vibrational lines of gases. When light passes through a medium some part of it gets absorbed and the output intensity of the light is measured on the detector. On the basis of the obtained absorption profile, various parameters are measured. In this project various measurements with tunable diode laser absorption spectroscopy are explored.

In this project I focussed on the TDLS system, in which we pass a tuned laser light through the gas that is being targeted. The photodetector measures the intensity of light at each wavelength. The intensity of light changes with the wavelength due to the current ramp input to the laser. On the output of the photodetector, a ramp-like signal with the absorption line on it is obtained. By comparing the absorption profile with the acquired gas signal, gas parameters such as mole fraction and pressure are extracted.

Keywords: TDLS and Current ramp

□□□

Developing Polyherbal Silver Nanoparticles showing antifungal properties

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Abstract

A comprehensive exploration of polyherbal nanoparticles derived from medicinal plants, showcasing potent antifungal properties. The synthesis of nanoparticles involves the strategic combination of diverse plant extracts known for their medicinal efficacy. The study encompasses the fabrication process, physicochemical characterization, and evaluation of antifungal activity against various fungal strains. The polyherbal nanoparticles exhibit significant antifungal efficacy, demonstrating a promising alternative to synthetic antifungal agents. Detailed analyses of particle size, morphology, and composition contribute to a thorough understanding of the nanomaterial's characteristics. The research findings suggest the potential application of these polyherbal nanoparticles in developing effective and sustainable antifungal therapeutics. This study underscores the importance of harnessing the natural antimicrobial potential of medicinal plants through nanotechnology, offering a novel approach to combat fungal infections. The results pave the way for further research and development in the utilization of polyherbal nanoparticles as safe and efficient antifungal agents for diverse applications in healthcare and biotechnology.

Keywords: Nanotechnology, antifungal, antimicrobial, polyherbal nanoparticles



Nurturing Academic Entrepreneurs Nanotechnology and Targeted Delivery

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Abstract

Nanotechnology was defined by the [National Nanotechnology Initiative](#) as the manipulation of matter with at least one dimension sized from 1 to 100 [nanometers](#) (nm). At this scale, commonly known as the nanoscale, [surface area](#) and [quantum mechanical](#) effects become important in describing properties of matter. The definition of nanotechnology is inclusive of all types of research and technologies that deal with these special properties. It is therefore common to see the plural form "nanotechnologies" as well as "nanoscale technologies" to refer to the broad range of research and applications whose common trait is size. An earlier description of nanotechnology referred to the particular technological goal of precisely manipulating atoms and molecules for fabrication of macroscale products, also now referred to as [molecular nanotechnology](#). Nanotechnology as defined by size is naturally broad, including fields of science as diverse as [surface science](#), [organic chemistry](#), [molecular biology](#), [semiconductor physics](#), [energy storage](#), [engineering](#), [microfabrication](#), and [molecular engineering](#). The associated research and applications are equally diverse, ranging from extensions of conventional [device physics](#) to completely new approaches based upon [molecular self-assembly](#), from developing [new materials](#) with dimensions on the nanoscale to [direct control of matter on the atomic scale](#).

Keywords : Nanotechnology, [Surface area](#), [Surface science](#), [Organic Chemistry](#), [Molecular biology](#)

Introduction:

Nanotechnology is defined as the study and use of structures between 1 nanometer and 100 nanometers in size. To get an idea of how small this is, we would need to take eight hundred 100 nanometer particles together to match the width of a human hair.

Introduction to Nanotechnology: Looking at Nanoparticles

Scientists have been studying and experimenting with nanoparticles for centuries, but their work has been hampered by the inability to see the structure of nanoparticles. Recently, in the last few decades, the development of microscopes capable of viewing particles as small as atoms has helped scientists see these tiny nanoparticles.

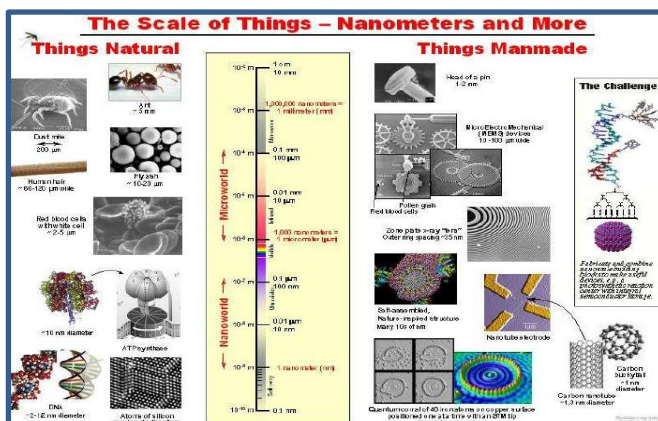


Fig. 1

Nanotechnology is used to create structures and devices that have increased properties and functions due to reduced size. The substance exhibits unusual physical and chemical properties due to the increase in volume ratio and surface area as the particles become smaller in size. This effect is called the quantum size effect. This means that the properties of materials at the nanoscale can be very different from those that exist at the larger scale. Scientists design and build devices and take advantage of the properties of matter by changing shape and size at the nanoscale with wide-ranging effects. In which there are many fields like medicine, electronics, military applications, computing, space science. Due to the continuous efforts of scientists and engineers during the last few years, there has been immense use and development of nanotechnology in various fields like food technology, water purification, agriculture, energy storage, cosmetics, automobiles, clothing manufacturing materials etc. The concept of nanotechnology first came into existence in a speech titled "There's Plenty of Room at the Bottom" given by physicist Richard Feynman at an American Physical Society meeting at Caltech on December 29, 1959. The term "nanotechnology" was defined by Professor Norio Taniguchi of Tokyo Science University in a 1974 paper as "nanotechnology" primarily involves processing, separation, consolidation, and deformation. material by an atom or a molecule."

Nanoparticles and nanoscale materials can be classified into 4 types based on the materials:-

1. **Carbon-based nanomaterials:** Depending on the type, these nanomaterials contain carbon. Carbon-based nanomaterials include fullerenes, CNTs, graphene and its derivatives, graphene oxide, nano-diamonds, and carbon-based quantum dots. Graphene is the most researched nanomaterial in recent decades.
2. **Inorganic-based nanomaterials:** Generally these are metal and metal oxide nanoparticles and nanoscale materials. Inorganic-based nanomaterials include precipitation, electrospinning, sol-gel techniques and CVD, superparamagnetic iron oxide NPs, paramagnetic.

3. **Organic-based nanomaterials:** Organic nanomaterials include dendrimers, micelles, liposomes, ferritin. Most organic nanomaterials exist naturally while some are produced by chemical means.
4. **Composite-based nanomaterials :** Composite based NMs are multiform structures where there is 1 phase at the nano-scale that will either combine the nanoparticles with other nanoparticles that are attached to larger materials or more complex frameworks, nanocomposites can be divided into four types;-
 - a. Ceramic-matrix nanocomposites consisting of one component metal and the other component either nitride, boride, silicide.
 - b. Metal-matrix nanocomposite consisting predominantly of CNT metalmatrix nanocomposites.
 - c. Polymer-matrix nanocomposites.
 - d. Magnetic nanocomposites.

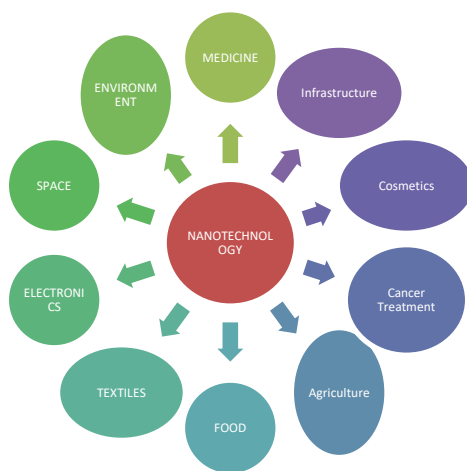


Fig-2

1. Medicine:

Nanomedicine, the application of nanotechnology in medicine, enables precise solutions for disease prevention, diagnosis, and treatment. This includes new imaging tools like improved MRIs; lab-on-a-chip technologies for rapid testing in a doctor's office; novel gene sequencing technologies; nanoparticles that can help deliver medication directly to cancer cells, minimizing damage to healthy tissue; and graphene nanoribbons to help repair spinal cord injuries. Manipulation of drugs, active compounds and devices at nanometer scale, allows to control and alter the essential properties and bioactivity of the ingredients. Thus, they allow to control the solubility of drugs, controlled

release, and targeted drug delivery . The scientific and scientific analysis areas have utilized the exclusive qualities of nanomaterials for various programs (e.g., comparison providers for mobile picture and therapeutics for the treatment cancer). Conditions such as biomedical nanotechnology, bio nanotechnology, and nanomedicine are used to explain this Multiple area. Features can be included to nanomaterials by interfacing them with scientific elements or component

2. Environmental Protection:

Nanotechnology can help in developing green technologies that can minimize environmental pollution. Nanotechnology-enabled sensors and solutions are now able to detect and identify chemical or biological agents in the air, water, and soil with much higher sensitivity than ever before. Substance catalysis and purification methods are two popular illustrations where nanotechnology already performs a part. The functions provide novel components with designed functions and chemical properties: for example, nanoparticles with a unique chemical around (ligands), or particular visual qualities. In this feeling, chemical makeup is indeed a primary nanoscience. In a short-term viewpoint, chemical makeup will provide novel “nanomaterials” and in the long run, excellent procedures such as “self-assembly” will allow time and energy protecting methods. Thus, chemical makeup types a platform for nanotechnology offering tailor-made elements, polymers etc, as well as groups and nanoparticles. A smartphone extension has been developed to help firefighters monitor air quality around fires [1]. For environmental treatment, different implementations of nanotechnology have been successfully implemented at the laboratory scale. However, mostly these applications need confirmation of their

3. Space:

Nanotechnology may hold the key to making space flight more practical. Advancements in nanomaterials make lightweight solar sails and a cable for the space elevator possible. By significantly reducing the amount of rocket fuel required, these advances could lower the cost of reaching orbit and traveling in space. In addition, new materials combined with Nano-sensors and nanorobots could improve the performance of spaceships, spacesuits, and the equipment used to explore planets and moons, making nanotechnology an important part of the ‘final frontier’fectiveness and safety in the field.

4. Electronics :

Nanotechnology in electronics allows for faster, smaller, and more powerful handheld devices. It also allows for new display technologies. These products are more conductive nanomaterials, data storage, quantum computing. It also provides printable and flexible electronics and magnetic nanoparticles for data storage. Nanoelectronics uses nanotechnology in electronic components. There are various applications such as computing and electronic devices. Devices such as Flash memory chips, antimicrobial and antibacterial coatings for mouse, keyboard. Also, mobile phone castings are good examples of nanoelectronics.

5. Textiles :

Nanotechnology also has real commercial potential for the textile industry. This is mainly due to the fact that conventional methods used to impart different properties to fabrics often do not lead to permanent effects and will lose their functions after laundering or wearing. Nanotechnology can provide high durability for fabrics because nanoparticles have a large surface area-to-volume ratio and high surface energy, thus presenting better affinity for fabrics and leading to an increase in the durability of the function. In addition, a coating of nanoparticles on fabrics will not affect their breathability or hand feel. Nanotechnology in manufacturing composite fibers include the following topics-

- Carbon nano fibers and carbon nano particles
- Clay Nano particles
- Metal Oxide Nano particles
- Carbon nano tubes
- Nano cellular foam structures

6. Food :

Recent innovations in nanotechnology have transformed a number of scientific and industrial areas including the food industry. Applications of nanotechnology have emerged with increasing need of nanoparticle uses in various fields of food science and food microbiology, including food processing, food packaging, functional food development, food safety, detection of foodborne pathogens, and shelf-life extension of food and/or food products. This review summarizes the potential of nanoparticles for their uses in the food industry in order to provide consumers a safe and contamination free food and to ensure the consumer acceptability of the food with enhanced functional properties. Aspects of application of nanotechnology in relation to increasing in food nutrition and organoleptic properties of foods have also been discussed briefly along with a few insights on safety issues and regulatory concerns on nano-processed food products.

7. Agriculture :

Nanotechnology is one of the promising technologies that could improve agricultural productivity via nano fertilizers, use of efficient herbicides and pesticides, soil feature regulation, wastewater management, and pathogen detection. It is equally beneficial for industrial food processing with enhanced food production with excellent market value, elevated nutritional and sensing property, improved safety, and better antimicrobial protection. Nanotechnology can also reduce post-farming losses by increasing the shelf life with the aid of nanoparticles.

8. Cancer Treatment :

Nanomaterials including carbon nanotubes, polymeric micelles and liposomes have been used in cancer drug design where they have shown considerable pharmacokinetic and pharmacodynamic benefits in cancer diagnosis and treatment. In this review, we outline the commonly used

nanomaterials which are employed in cancer diagnosis and therapy. We have highlighted the suitability of these nanomaterials for cancer management based on their physicochemical and biological properties.

9. Cosmetics :

The applications of [nanotechnology](#) and [nanomaterials](#) can be found in many cosmetic products including moisturisers, hair care products, make up and sunscreen. In cosmetics, nanoparticles are used for various purposes, including to enhance the delivery of active ingredients, improve the appearance and feel of products, and provide sun protection.

For example, nanoparticles can be used to create more effective sunscreens by allowing for higher levels of active ingredients to be delivered to the skin while still remaining transparent. They can also be used to improve the texture and appearance of cosmetics, such as makeup and skin care products, by providing a smoother, more even application.

10. Infrastructure :

Nanotechnology has great potential to improve the construction industry. nanotechnology can enhance traditional construction materials such as concrete, steel, glass, coatings, and wood. reducing production and maintenance costs and achieving sustainable construction is possible through nanotechnology applications.

Conclusion :

Nanoscience refers to the science & discipline and Nano technology refers the applied part of it including the engineering to control, manipulate and structure the matter at an unimaginably small scale: Nano scale. Nanotechnology has changed the living of people and develop the society in various way. The benefits of nanotechnology use are numerous and this technology offer lot of possibilities in different fields. Nanotechnology may offer us a wide variety of proficiencies and these may be utilized in reasonable and thoughtful way. Furthermore, nanotechnology and nanomaterials is a swiftly growing area of research where new properties of materials on the Nano-scale can be utilized for the benefit of industrial and a number of capable developments exist that can potentially modify the service life and life-cycle cost of construction infrastructure to make a new world in future.

□□□

***In Silico* interaction of Rapid-acting insulins with different stomach enzymes**

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Abstract

Diabetes mellitus, a prevalent chronic metabolic disorder characterized by elevated blood glucose levels, impacts a significant portion of the global population. In India alone, an estimated 101 million individuals contend with diabetes. Type 2 diabetes, featuring insulin resistance and impaired insulin secretion, introduces complex disruptions in glucose metabolism. Insulin, a pivotal hormone synthesized by pancreatic beta cells, orchestrates key physiological processes, including glucose uptake, suppression of hepatic glucose production, and promotion of glycogen synthesis. Dysregulation of insulin function leads to hyperglycemia, a hallmark of diabetes. Current diabetes management approaches involve insulin replacement therapy, oral hypoglycemic agents, and lifestyle modifications. Advancements in insulin delivery technologies strive to improve treatment adherence and optimize glycemic control. Despite the widespread availability of insulin injections, drawbacks such as persistent pain at the injection site, weak pulse, coughing, wheezing, and shortness of breath persist. This investigation explores the potential conversion of rapid-acting insulin into tablet form by examining its interaction with stomach enzymes, with the aim of alleviating the discomfort associated with injection-based insulin administration.

Methodology

Molecular docking is employed to model the atomic-level interaction between rapid-acting insulin and stomach enzymes. Autodock Vina predicts the binding of small molecules and drug candidates to receptors, while SWISS ADME serves as a valuable tool in drug discovery and medicinal chemistry contexts. Additionally, the Drug Lipinski rule of five aids in predicting the oral bioavailability of biologically active molecules.

Results

The study reveals that rapid-acting insulin demonstrates favourable interactions with stomach enzymes, particularly with notable efficacy observed in its interactions with pepsin and peptidase. This encouraging outcome suggests the potential formulation of rapid-acting insulin in tablet form, providing a viable alternative to conventional injection-based delivery.

Conclusions

The positive interactions observed between rapid-acting insulin and stomach enzymes pave the way for future advancements in tablet-based insulin administration, offering a prospect for improved patient comfort and treatment adherence.

Keywords: Diabetes mellitus, Rapid-acting insulin, *in-silico*, digestive enzymes



Fabrication and characterization of ZnO Nanoparticles for the development of a new electrochemical glucose biosensor

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Abstract

The aim of this study was to synthesize and characterize Zinc Oxide nanoparticles (ZnO NPs) prepared by an aqueous precipitation method. In this study, we employed zinc nitrate $\text{Zn}(\text{NO}_3)_2$ as a precursor and potassium hydroxide KOH as a precipitating agent to synthesize ZnO nanoparticles respectively. The synthesized ZnO nanoparticles were characterized by XRD, SEM techniques. The XRD pattern reveals the formation of phase pure hexagonal ZnO NPs. The lattice parameters calculated from the XRD pattern are $a=3.253 \text{ \AA}$, $b=3.253 \text{ \AA}$, and $c=5.209 \text{ \AA}$. Applying the Scherrer formula, the average crystalline size of ZnONPs is estimated to be about 30 nm. The SEM images depict the granular nature of the ZnO NPs. There is formation of large clusters of the ZnO NPs having oval and or spherical shape. The formation of such large clusters happens most likely due to the agglomeration of the individual NPs as they precipitate out of the solution. These ZnO nanoparticles can be utilized in glucose biosensors to enhance the electron conducting and catalyze the oxidation of hydrogen peroxide produce. The propose glucose biosensor exhibit low detection limit and high sensitivity to glucose concentration change.

Keywords: Nanoparticle, ZnO, Glucose biosensor



Synthesis, Spectroscopic Characterization, Applications, Structural Studies on Metal Complexes with Semicarbazone and Thiosemicarbazone Derivatives

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Abstract

A carbonyl or thiocarbonyl molecule reacts with semicarbazide or thiosemicarbazide to produce derivatives of semicarbazone and thiosemicarbazone. A hydrazone intermediate is created during the reaction, and this intermediate reacts with metal ions to create metal complexes. The newly synthesized complexes were characterized on the basis of elemental analysis, ¹H-NMR, and IR spectroscopy. Due to numerous uses in areas such as catalysis, medicinal chemistry, and materials science, metal complexes have attracted a lot of attention. Antimicrobial screening reflected that all these compounds are biologically active.

Keywords: Semicarbazone, hydrazone.



Advances in Fluid-Structure Interaction Modeling for Biomechanical Systems: A Comprehensive Review

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Abstract

Recent strides in biomechanics owe much to Fluid-Structure Interaction (FSI) modeling, enhancing our grasp of physiological processes and shaping medical technology. This study assesses recent FSI advances in biomechanics, stressing the role of mathematical modeling in deciphering complex physiological phenomena. The paper opens with an overview of FSI in biomechanical research,

noting its presence in various biological systems like blood circulation, lung air exchange, and soft tissue movements. Mathematical models play a crucial role in simulating and analyzing fluid-structure interactions in the human body, advancing our understanding of physiological processes.

The review explores FSI in cardiovascular biomechanics, highlighting research on blood flow dynamics, arterial deformations, and fluid forces on vascular structures. Summarizing various studies, it underscores FSI's role in enhancing medical interventions and cardiovascular device development. Advanced mathematical models reveal intricate biomechanical details, advancing tailored therapy and rehabilitation. The paper also discusses FSI in soft robotics and prosthetics, particularly flexible strain sensors. Bio-inspired robotic systems, replicating biological tissues properties using mathematical models, hold promise for adaptive prosthetics, improving limb-loss patients' well-being. This comprehensive examination underscores how FSI modeling shapes biomechanical research, exploring mathematical modeling, computational methods, and applications in cardiovascular, musculoskeletal, and soft robotics biomechanics. In conclusion, FSI modeling transforms biomechanical research, advancing understanding and catalyzing innovations in medical technologies, laying a strong foundation for future breakthroughs.

Keywords: *Biomechanics, Fluid-Structure Interaction (FSI), Mathematical Modeling, Cardiovascular Biomechanics, Musculoskeletal Biomechanics, Soft Robotics and Prosthetics.*



Groundbreaking approach in cancer therapeutics through the development of a novel nanoparticle mediated delivery system

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Abstract

Cancer remains a formidable challenge in the field of medicine, necessitating continuous advancements in therapeutic delivery systems to enhance treatment efficacy while minimizing systemic toxicity. This abstract introduces a groundbreaking approach in cancer therapeutics through the development of a novel nanoparticle-mediated delivery system. This innovative strategy aims to revolutionize the current landscape of cancer treatment by providing precise and targeted delivery of therapeutic agents to cancerous cells. The proposed delivery system utilizes

advanced nanoparticles engineered with a multifaceted design to overcome the limitations of conventional drug delivery methods. These nanoparticles exhibit unique properties, including size uniformity, surface modification for enhanced targeting, and the ability to encapsulate a diverse range of therapeutic payloads. This approach leverages the principles of nanotechnology to achieve unprecedented precision in drug delivery, allowing for tailored treatments based on the specific characteristics of individual tumours. One key feature of this novel system is its ability to navigate the complex biological barriers within the body, such as the blood-brain barrier and extracellular matrix, which often impede the effective delivery of therapeutic agents to their intended targets. The engineered nanoparticles possess inherent capabilities to overcome these obstacles, ensuring the efficient and targeted delivery of therapeutic payloads directly to cancer cells while minimizing collateral damage to healthy tissues. Furthermore, the nanoparticle-mediated delivery system incorporates real-time imaging and diagnostic functionalities. This integration allows for the monitoring of drug release and therapeutic responses, enabling clinicians to adapt treatment regimens based on the dynamic nature of the disease. The inclusion of imaging components not only facilitates accurate assessment of treatment efficacy but also provides valuable insights into the tumour microenvironment, guiding personalized therapeutic strategies. In addition to its precision and adaptability, the proposed delivery system addresses concerns related to systemic toxicity commonly associated with traditional cancer treatments. By selectively targeting cancer cells, the nanoparticles minimize exposure to healthy tissues, mitigating adverse side effects and improving overall patient quality of life during the course of treatment. The development of this innovative delivery system also opens avenues for synergistic combination therapies. The nanoparticles can be tailored to simultaneously deliver multiple therapeutic agents, exploiting synergies between different treatment modalities. This combinatorial approach holds great promise for overcoming drug resistance and enhancing treatment outcomes, particularly in cases of aggressive or recurrent cancers. The nanoparticle-mediated delivery system represents a paradigm shift in cancer therapeutics. Its unique combination of precision, adaptability, and reduced systemic toxicity positions it as a frontrunner in the quest for more effective and personalized cancer treatment.

Keywords: Nanotechnology, tumour microenvironment, drug resistance, systematic toxicity reduction targeted drug delivery



Redefining Supportive Care and Rehabilitation in Cancer

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Abstract

Digital therapeutics, defined as evidence-based therapeutic interventions driven by high-quality software programs, are increasingly recognized as invaluable tools in cancer care. These interventions extend far beyond the traditional scope of treatment, embracing a holistic approach that addresses the multifaceted challenges faced by cancer patients. From symptom management to psychosocial support, digital therapeutics offer a tailored and dynamic framework for personalized care.

One of the key strengths of digital therapeutics lies in their ability to provide continuous support and rehabilitation, transcending the limitations of time and physical constraints. Mobile applications, virtual reality experiences, and wearable devices are among the diverse array of digital tools contributing to this paradigm shift. These tools empower patients to actively participate in their care, fostering a sense of agency and control over their health journey.

In the realm of supportive care, digital therapeutics offer innovative solutions for symptom tracking, medication management, and remote monitoring. Real-time data collection enables healthcare professionals to make informed decisions, leading to more timely and targeted interventions. Moreover, these interventions extend beyond the clinical setting, permeating the daily lives of patients and seamlessly integrating into their routines.

Psychosocial support, often a neglected aspect of cancer care, receives a renewed focus through digital therapeutics. Virtual support groups, cognitive behavioural therapy modules, and mindfulness applications cater to the emotional and psychological needs of patients, fostering a sense of community and resilience. The digital realm becomes a sanctuary where patients can find solace, connect with others facing similar challenges, and access resources that enhance their mental well-being.

Rehabilitation, a crucial phase in the cancer journey, witnesses a revolution propelled by digital therapeutics. Tailored exercise programs, rehabilitation apps, and virtual physical therapy sessions empower patients to regain their strength and functionality at their own pace. The accessibility and flexibility afforded by these digital interventions break down barriers to rehabilitation, ensuring that all patients, irrespective of geographical location or socioeconomic status, can benefit.

As digital therapeutics redefine the landscape of cancer care, they also reshape the healthcare ecosystem. The integration of these interventions necessitates collaborative efforts among healthcare providers, technology developers, and regulatory bodies. Establishing robust frameworks for data security, evidence generation, and interoperability becomes paramount to ensure the seamless incorporation of digital therapeutics into mainstream cancer care.

Methodology

The methodology employed in this study involved a comprehensive review of existing literature, focusing on research articles, clinical trials, and case studies related to the integration of digital therapeutics in cancer care. Searches were conducted in major scientific databases, including PubMed, IEEE Xplore, and ScienceDirect, using keywords such as "digital therapeutics," "cancer care," "supportive care," and "rehabilitation." The inclusion criteria encompassed studies published between 2010 and 2022, ensuring relevance to recent advancements in digital therapeutic applications.

Result and discussion

Rehabilitation recommendations in oncology guidelines have not been characterized and may provide insight to improve the integration of rehabilitation into oncology care. This report was developed as a part of the World Health Organization (WHO) Rehabilitation 2030 initiative to identify rehabilitation-specific recommendations in guidelines for oncology care. A systematic review of guidelines was conducted. Only guidelines published in English, for adults with cancer, providing recommendations for rehabilitation referral and assessment or interventions between 2009 and 2019 were included. 13840 articles were identified. After duplicates and applied filters, 4897 articles were screened. 69 guidelines were identified with rehabilitation-specific recommendations. Thirty-seven of the 69 guidelines endorsed referral to rehabilitation services but provided no specific recommendations regarding assessment or interventions. Thirty-two of the 69 guidelines met the full inclusion criteria and were assessed using the AGREE II tool.

Conclusions

In conclusion, digital therapeutics emerged as a powerful force in redefining supportive care and rehabilitation in cancer. Their capacity to personalize interventions, foster patient engagement, and transcend traditional boundaries positions them as integral components of comprehensive cancer care. As the digital era unfolds, the synergy between healthcare and technology holds the promise of not only improving clinical outcomes but also enhancing the overall well-being of individuals navigating the complexities of cancer.

Keywords: Rehabilitation, Cancer Care, Digital Therapeutics, Patient Engagement, Psychosocial Support



Appliances of Gold nanoparticle in Nanotechnology

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Abstract

Nanotechnology is the study of matter on nano scale range between usually 10-100 nanometer. Nanotechnology mainly related to the formation of nanoparticle and uses of their in different field. Gold nanoparticle formerly known in biology, physics, and in chemistry due to their uncommon electrical, optical properties. We use nanotechnology in different field because of their mechanical, electrical, optical and magnetic properties. We use nanotechnology in the different field -: nanotechnology use in the formation of biosensor, medicine, in solar cells, in paper batteries, in the information technology, in electronics, in food industry etc. Among all metal nanoparticle gold nanoparticle are most important nanoparticle because gold nanoparticle has uncommon properties. Gold nanoparticle use in electronic, in cancer therapy, as catalyst. Gold is malleable, delicate and transition metal which is rare chemically active element. It used as a valuable metal in jewellery. Color of gold is yellow while colloidal solution of gold nanoparticle wine red. Gold nanoparticles have physical, chemical, optical, and electronic properties which makes them more useful. Au particle is most stable metal nanoparticle. They use due to their stability and optical properties. Optical properties of gold nanoparticles are governed by the morphology. Gold nanoparticles is nontoxic in nature. Gold nanoparticle is the chemically inert type nanoparticle. Optical property like Plasmon resonance is exhibited by the gold nanoparticle. Surface Plasmon resonance is a feature of gold nanoparticle. Gold nanoparticles have greater biocompatibility. Au nanoparticle is less invasive. Au nanoparticles are less toxic to human beings. Au nanoparticle can form by simple and fast method. Au nanoparticle is eco-friendly that's why in all metal nanoparticles gold nanoparticle mostly uses.

Keywords: Gold, Nanoparticle, Optical, Plasmon, Biocompatibility



Bio mimic synthesis of silver nanoparticles and their antimicrobial efficacy

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Abstract

An efficient protocol for synthesis of silver nanoparticles (AgNPs) using the combination of aqueous extract of *Tinospora cordifolia* leaves and 5 mM silver nitrate (AgNO₃) solution was developed. This study revealed that bioactive compounds present in the extract function as stabilizing and capping agent for AgNPs. scanning electron microscope and transmission electron microscope studies confirm the structure and surface morphology of the AgNPs. The size of synthesized AgNPs was in the range of 30–50 nm having spherical morphology. The crystalline nature of NPs was defined by the X-ray diffraction pattern. The AgNPs were found to be toxic against pathogenic bacteria such as *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853), and *Staphylococcus aureus* (ATCC 29213) and against plant pathogenic fungi *Fusarium oxysporum* (MTCC 8608) and *Sclerotinia sclerotiorum* (MTCC 8785). The use of AgNPs as antibacterial and antifungal agent is advantageous over other methods for control of pathogenic microorganisms, and it can be of great importance in developing novel drugs for curing many lethal diseases.

Keywords: *Tinospora cordifolia* leaves, silver nanoparticles, Antimicrobial



In-Vitro Phytochemical, Antioxidant and Antimicrobial activity of leaf extract of Cannabis Sativa

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Abstract

This study investigates the phytochemical composition, antioxidant potential, and antimicrobial activity of *Cannabis sativa* in vitro. The plant extract was subjected to qualitative phytochemical

analyses, revealing the presence of various secondary metabolites, including cannabinoids, terpenoids, and flavonoids.

The antioxidant activity was assessed using assays, such as DPPH and demonstrating a significant radical scavenging capacity. Moreover, the study evaluates the antimicrobial potential against a range of pathogenic microorganism, including bacteria Results indicate promising inhibitory effects, suggesting the therapeutic potential of *Cannabis sativa* in combating microbial infections.

This research contributes to the understanding of the medicinal properties of *Cannabis sativa*, emphasizing its potential as a source of natural antioxidants and antimicrobial agents. Further investigations are warranted to elucidate the underlying mechanisms and explore its applications in pharmaceutical and healthcare industries.

Introduction

Cannabis sativa L. (Cannabaceae) is one of the oldest medicinal plants used by humans. *Cannabis sativa* is the most common type of cannabis plant used as marijuana, although there are other forms of cannabis including *Cannabis indica* and *Cannabis ruderalis*. *Marijuana* is primarily smoked or ingested orally when used for its psychoactive effects.

The cannabis preparations are derived from the female plant of *Cannabis sativa*. *Marijuana* consists of the dried flowering tops and leaves; hashish consists of dried cannabis resin and compressed flowers. *Marijuana* and hashish are commonly smoked but it can be also eaten or used in a tea form¹

The herbs continue to have a religious association in India, and during religious ceremonies Hindu devotees offered Cannabis to Shiva (God). The Cannabis has very long history of medicinal uses. One of the world's oldest cultivated plants is Cannabis sativa. The plant is native to India and Persia, but over the last 6000 years, it has been cultivated in nearly all temperate and tropical countries of the world and is likely to be one of the oldest non-food crops known. The name 'hemp' is a term most commonly used in connection with the Cannabis sativa plant C. sativa has been cultivated throughout recorded history, used as a source of industrial fiber, seed oil, food, recreation, religious and spiritual moods and medicine. Each part of the plant is

harvested differently, depending on the purpose of its use. The species was first classified by Carl Linnaeus in 1753. The word sativa means "things that are cultivated."

Collection of plant materials

Fresh leaves of Cannabis Sativa plant were collected from the region of Jammu and Kashmir .The plants leaves were identified by the department of biotechnology University of Rajasthan .The plant leaves were shade dried until all the water molecules get evaporated and well dried for grinding, the plant leaves were grinded well by using mechanical blender into fine powder and transferred into air tight container with proper labeling for future use.

Preparation of plant extract

The dried and powdered leaves were measured for the leaf extract preparation. The 20gm of leaf powder were dissolved in the 100ml of distilled water and heated on a hot plate for maximum 3hours .After the three hours of heating it was filtered and kept in incubator for incubation process .Till it forms sticky leaf extract. The leaf extract is used for phytochemical test which insures the presence of leaf metabolites, with the help of leaf extract phytochemical tests were performed such as alkaloid terpenes and flavonoids, etc.

Result and Discussion

QUALITATIVE ANALYSIS PLANT: CANNABIS SATIVA

CONSTITUENT	TEST	RESULT
Alkaloid test	Mayer's test	(+)
	Wager's test	(+)
	Dragendroff's test	(+)
	Hager's test	(+)
Saponin test	Foam test	(+)
	Frothing test	(+)
Flavanoid test	Lead acetate test	(+)
	Alkaline test	(+)
Phenol and Terpens test	Liberman test	(+)
Protein test	Million test	(+)
	Ninhydrin test	(-)
	Biuretttest	(-)
	Xanthoprotein test	(+)
Carbohydrate test	Molish test	(+)
	Barford test	(-)
	Benedict test	(-)
	Fehling test	(-)
Phytosterol test	Salkowkis test	(+)
	Liberman test	(-)
Cardiac glycosides	Keller Killiani test	(+)

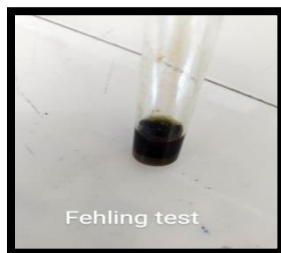
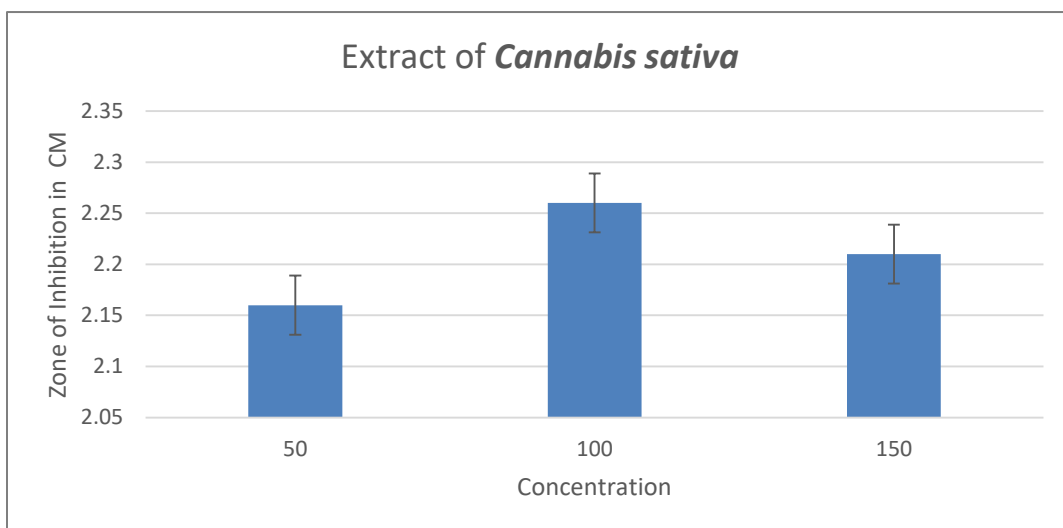


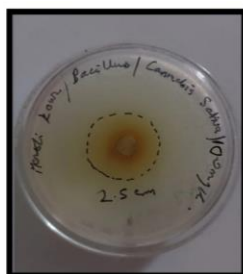
Table 1: Antibacterial activity of leaf extracts of *Cannabis sativa*

MICROORGANISM	Zone of inhibition (cm)		
	50 mg/ml	100 mg/ml	150 mg/ml
<i>Bacillus</i>	2.3 ±0.01	2.26±0.02	2.21±0.01

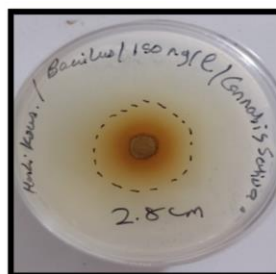




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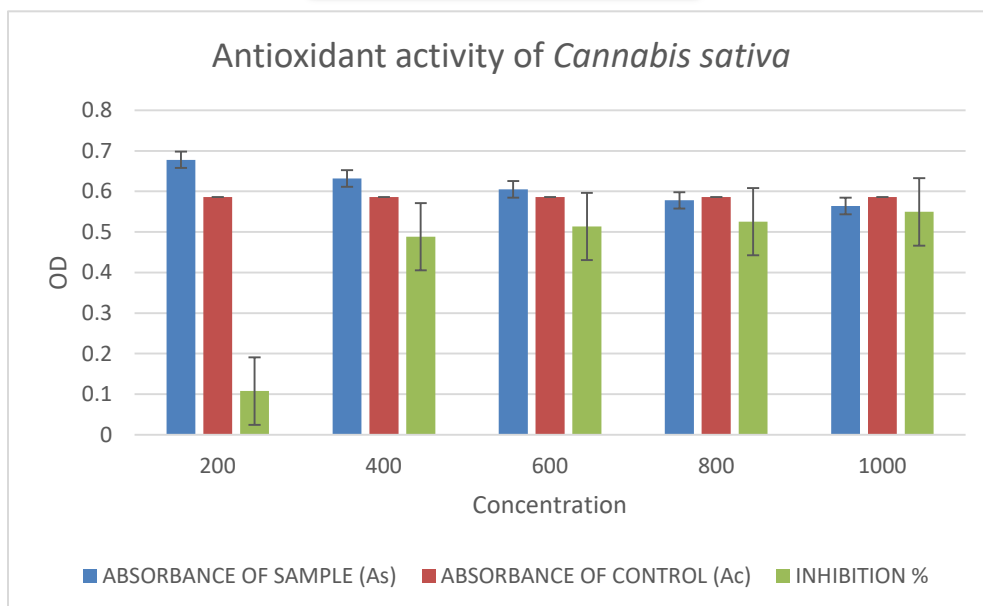


DOSE: 100 uL



DOSE: 150 uL

ANTIOXIDANT ACTIVITY :



CONCENTRATION OF THE SAMPLE	ABSORBANCE OF SAMPLE(As)	ABSORBANCE OF CONTROL (Ac)	INHIBITION %
200uL	0.523	0.586	10.7509%
400uL	0.3	0.586	48.8055%
600uL	0.285	0.586	51.3652%
800uL	0.278	0.586	52.5597%
1000uL	0.264	0.586	54.9488%

Conclusions

In conclusion, this study reveals that the Cannabis sativa contains several chemical compounds such as cannabinoids, such as tetrahydrocannabinol as well as terpenes and flavonoids. These active phytochemical compounds present in cannabis are responsible for the 'high' associated with its use. Thus, these phytochemicals have therapeutic benefits for a range of conditions such as epilepsy, anxiety and chronic pain. Cannabis sativa has been shown to have antimicrobial properties against *Bacillus* bacterium, which means it is effective in inhibiting microorganisms such as bacteria. The studies also revealed that cannabis extract may be effective in reducing oxidative stress in a range of conditions.

Keywords: Cannabis, antioxidant, antimicrobial, phytochemical activities, sensitivity of Cannabis

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Value of Herb-based Cookies as a Supplementary Nutraceuticals Diabetes Care

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Abstract

The rapid growth of the 21st century has brought about significant transformations in the lifestyles of humans, leading to a widespread prevalence of chronic diseases such as diabetes mellitus on a worldwide scale. Diabetes mellitus is a metabolic disorder characterized by abnormally high amounts of glucose in the bloodstream. The onset of Diabetes is often linked to a concurrent occurrence of impaired β cell activity in the pancreas and insulin resistance in several target organs, including the liver, muscle, and adipocytes. In the context of insulin resistance, healthy β cells respond by augmenting insulin production as a compensatory mechanism. However, the inability of this compensatory mechanism to adequately address insulin resistance results in the development of glucose intolerance. After the onset of hyperglycemia, there is a decline in β -cell activity and an exacerbation of insulin resistance, which is referred to as glucose toxicity. Traditionally, the treatment of diabetes entails the administration of different prescriptions of metformin supplements in the form of allopathic drugs. Nevertheless, the longer anti-diabetic medications have shown a wide range of adverse effects or dose-level resistance, including symptoms such as diarrhea, nausea, vomiting, heartburn, and the occurrence of lactic acidosis.

However, in conjunction with conventional medications, dietary habits are a key factor in the management of diabetes. Most individuals eat cookies for breakfast, snacks, and while they're just hanging around to keep from becoming too hungry. In contrast to conventional high-carbohydrate and sugary diet, the cookies incorporating herbs are good nutritious refreshment alternative for individuals with diabetes or those aiming to sustain optimal blood sugar levels. These are abundant in fiber, protein, and significant herbs to aid the regulation of blood sugar. The primary constituents included in diabetic-friendly cookies are chickpea flour and multiple herb spices, such as stevia, bitter melon, tulsi, fenugreek, aloe vera, turmeric, cumin, and coriander. The present review addresses alternative Nutraceutical Care supplements with capable lower carbohydrate content and desirable sensory characteristics, to effectively regulate blood glucose levels.

Keywords: Hyperglycemia; Diabetes; Diet; Herbal Cookies; Nutraceutical Care



A Study to Evaluate Effectiveness of Bibliotherapy on Test Anxiety Reduction among Adolescents in Selected High Schools at Jaipur, Rajasthan

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Abstract

Teenagers, the interim stage of development between childhood and adulthood, represents the time during which a person experiences a variety of changes and encounters a number of emotional issue. Bibliotherapy helps the children in developing confidence and self-esteem. It attempts to normalize a child's world by offering coping skills and reducing their feelings of isolation, reinforcing creativity, and problem solving. Anxiety during examination can interface with further learning and it can affect badly on memory of the students. Anxiety causes poor academic performance. Decreased academic performance affects the society also. Hence, it is important to provide psychological support and proper intervention in order to improve the academic performance of students thus the productivity of the Nation. Bibliotherapy has been shown to be effective in the treatment. The study aimed to assess the level of test anxiety, to evaluate the effectiveness of bibliotherapy on test anxiety reduction among adolescents in selected high schools and to find out the association between test anxiety among adolescents in selected high schools with their selected socio demographic variables.

Methodology

The research approach adopted for this study is an evaluation approach. Pre-experimental one-group pre-test post-test design was used to assess the effectiveness of Bibliotherapy on test anxiety reduction among adolescents. The investigator utilized convenience sampling for the selected of the subjects. A sample of 30 adolescents was selected. The tool used for data collection was the modified west side test anxiety self-assessment scale and it is organized into two sections: Socio-demographic data containing 8 items; age, sex, type of family, religion, Area of Residence, parent education, support to study. Modified West Side test anxiety self-assessment scale. The collected data was gathered, analyzed and interpreted in terms of the objectives of the study.

Results

The results showed that there was a significant difference between the mean post-test anxiety score and pre-test test anxiety score. These scores were demonstrated by using 't' test. The analysis of mean and SD of the knowledge scores in pre-test and post-test revealed that the overall pre-test and post-test mean text anxiety score of adolescents shows that the result that the mean pre-test anxiety score was 83.75%. Further, the mean post test anxiety score is obtained as 47.5%. Paired 't' test was done to assess the significance of bibliotherapy on test anxiety reduction and it was found to be $t =$

29.33*, $p < 0.01$. Hence, it can be concluded that the bibliotherapy has an influence in test anxiety reduction among adolescents. Further, it is found that there is significant association between the sex and the pretest anxiety score (chi square value = 4.615, $p < 0.05$). The overall pre-test and post-test mean text anxiety score of adolescents shows the mean pre-test anxiety score was found 83.75%. Further, the mean post-test anxiety score is obtained as 47.5%. Paired 't' test was done.

Conclusion

It can be concluded that the bibliotherapy has an influence in test anxiety reduction among adolescents. Bibliotherapy is effective in reducing test anxiety among adolescents. This can be extended to nursing education and nursing practice.

Keywords: Bibliotherapy, adolescents, stress, anxiety



Biodiversity deprivation and its influence on society

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Abstract

All levels of biological structure, from macromolecules within cells to biomes, contribute to the enormous diversity (or heterogeneity) found in our biosphere. Earth's rich ecosystem diversity is one of its greatest strengths. Biodiversity is "the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part," as defined by the Resolution on Biological Diversity. This reflects the wide range of organismal, ecological diversity, and genetics available on Earth, which is supported by the more than 9 million species of life (bacteria, fungi, animals, plants, and protists) that share the planet with humans. The health of Earth's ecosystem depends on the intricate interactions of its many diverse species. But in the last few decades, we've seen a dramatic deterioration in the number of species and the range of those that remained. Humanity's disruptive activities on the Earth's environment are killing off more species, genes, and biological features than ever before.

Keywords: Biodiversity, Species, Ecosystem, Society.



Challenges of Artificial Intelligence in Pathology and Radiology: A Review

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Abstract

Artificial intelligence (AI) in the real-time world has brought about significant changes in the fields of pathology and radiology, particularly in the area of diagnostic accuracy. Although AI has enormous potential for enhancing the precision and effectiveness of diagnosis, it also presents an array of challenges. This paper deals with the diagnostic challenges posed by AI in the areas of data quality, generalization, interpretability, and hardware limitations. The paper focuses on the ethical and regulatory implications of AI in diagnostic settings, including issues of bias and transparency. It offers potential solutions to address these challenges, such as standardization of AI algorithms, data sharing initiatives, saliency mapping, adversarial training of algorithms, cloud computing, edge computing, hybrid approaches, and increased collaboration between human experts and AI systems. Overall, this review highlights the critical importance of addressing the diagnostic challenges of AI in pathology and radiology to make sure AI is able to achieve its potential to enhance patient care.

Keywords: Artificial intelligence, Diagnostic challenges, Algorithms, Cloud computing.

Introduction

The role of artificial intelligence (AI) in pathology and radiology is rapidly expanding and promises to revolutionize patient care in the coming years. Radiology was relatively quick to adopt AI whereas pathology (specifically surgical pathology) only recently began utilizing AI. Pathology and radiology form the core of cancer diagnosis. Radiology locates unusual lesions and provides information on the clinical stage and any probable comorbidities linked with it, whereas pathology establishes particular histologic and molecular characteristics of tissues. Pathology and radiology form an innovative diagnostic tool, on combination with genetics, forms the integrated diagnosis. Demand for deep integrated workflows between radiology and pathology has recently increased, owing primarily to technological advances in computational sciences that enable meaningful integration of these diagnostic specialties. In the field of AI, significant development has occurred in studies that focus on the strategic aspects of challenges, acceptance, and consensus to advance and incorporate technology in the field of health. They range from reducing workload to instrumentation quality control (QC). The potential of feature recognition, automatic recognition, and QC, along with the drawbacks and associated issues, are of interest to these researchers.

The application of AI to medical imaging, encompassing yet not confined to image processing and interpretation, constitutes one of the most potential areas of health-care innovation. AI systems, in particular deep learning, have made great progress in image recognition and classification, offering excellent diagnostic accuracy for a variety of disorders(10)

Applications of AI in Pathology and Radiology

AI algorithms is being used in radiology and pathology of chronic diseases like cancer. It analyze large volumes of medical data, including medical images and patient records, to identify patterns and make predictions.

Diagnostic applications

Computer vision algorithms can extract multiple features from whole slide images (WSI) to make diagnostic predictions. One of the key advantages of AI in pathology is its ability to precisely evaluate quantitative features such as immuno histochemical biomarker assessment, cell counting, and various tissue features like cell arrangement, architecture, structure density, and distribution pattern. AI algorithms can assist in standardizing histological scoring standards for morphological traits that reflect an array of cellular processes, like Gleason score for prostatic carcinoma and breast cancer grading. AI helps in lymph node examination and metastasis detection. A deep neural network-based technique has been proven to be capable of classifying and categorizing hundreds of WSI from prostate cancer, basal cell carcinoma, and breast cancer metastases to axillary lymph nodes. As a result, the pathologists will be able to remove 65–75% of slides while maintaining 100% of sensitivity AI algorithms can accurately classify WSI of colorectal.

In radiology, AI has numerous applications including computer-aided detection (CAD), computer-aided diagnosis (CADx), and image segmentation. CAD involves using AI algorithms to analyze medical images and detect abnormal features that may be indicative of disease. CADx uses AI algorithms to provide a step further and uses AI algorithms to provide a diagnosis based on reviewing of images. Image segmentation involves using AI algorithms to identify and label different parts of a medical image, such as organs, blood vessels, or tumors. This can help radiologists locate abnormalities more easily and accurately and aid in the planning of surgical procedures.

AI algorithms have been developed to identify potential abnormalities in medical images, This can lead to faster and more accurate diagnosis, especially in cases where time is of the essence, such as in stroke or heart attack. These algorithms can assist radiologists in detecting cancer, identifying bone fractures, heart diseases, nodules and masses on X-rays, and detecting early signs of Alzheimer's disease.

Predictive and prognostic analytics

AI algorithms can analyze patient data to predict the likelihood of certain medical conditions, such as cancer or cardiovascular diseases, enabling early intervention and treatment. On the basis of

morphological characteristics, AI can prognosticate a patient's outcome and responsiveness to a certain medication.

Workflow optimization

AI can help automate and streamline many aspects of both pathology and radiology workflows, such as image analysis, report generation, and communication with other healthcare professionals.

Quality Control

Although being a time-consuming stage in the diagnostic routes, ensuring the QC of slides is currently highly crucial. AI tools can detect a range of flaws in scanned slides such as staining quality, tissue representation, processing faults, tissue fixation quality, and staining quality of control samples. In radiology, an amalgamation of machine learning, for natural language interface classification and deep learning (e.g., convolutional neural networks) models, has been studied in deciding on a suitable imaging study protocol based on the patient's signs and symptoms and prior imaging reports, obviating the need for an experienced radiologist for the same.

Treatment planning

AI algorithms can assist in treatment planning for certain medical conditions, such as cancer. By analyzing medical images and patient data.

Diagnostic Challenges Of Ai In Pathology And Radiology

Despite the potential benefits of AI in pathology and radiology, there are still several diagnostic challenges that need to be addressed before widespread adoption of these technologies can be realized

Lack of standardization

One of the main challenges of using AI is the lack of standardization in imaging and diagnostic protocols. Folded tissue section during cutting, staining variation, and the presence of air bubble during covering slide as well as brightness, intensity disparity, and boundary intensity during scanning can cause unreliable raw data. A single noise in big data can cause misclassification and change the slide prediction, resulting in a large number of false positives or negatives. Data quality is a major challenge in radiology.

Generalization/Limited training data

There is a lack of training data that is high quality enough to make AI algorithms. There is also an issue of data being not large enough to cause development of good AI systems. Institutional xenophobia may restrict access to image data between institutions. Failure to assemble a sufficiently large enough training set is a potential pitfall that could have the effect of making the results less accurate or generalizable.

Interpretability

While AI algorithms can make accurate predictions, it can be difficult to understand how they arrive at their conclusions. The inherent limits in distinguishing normal versus abnormal in continually variable biologic data may be the most significant limitation for AI in imaging. This can make it challenging for clinicians to trust and interpret the results of AI models and can limit the use of AI in clinical decision-making.

Bias

AI algorithms can be biased and can reflect and reinforce existing biases in healthcare. This can lead to disparities in health-care outcomes for certain patient populations. Recent literature on medical data has shown algorithmic bias in demographic inequities alleviating medical data bias can provide meaningful data normalization where patient data are being analyzed and not being inaccurately predicted Regulatory and ethical considerations.

Hardware limitations

One of the main hardware limitations of AI is processing power AI algorithms require large amounts of computational power to analyze medical images and identify potential abnormalities. Another hardware limitation of AI in DR and DP is storage capacity...Interoperability is another hardware limitation. Different imaging modalities and diagnostic systems may use different hardware and software platforms, which can make it difficult to develop and deploy AI algorithms that work seamlessly across multiple systems. Finally, cost can be a significant hardware limitation of AI in DR and DP. High-performance computing resources, storage solutions, and other hardware requirements for AI can be expensive and may be prohibitive for many health-care facilities and clinics.

Overcoming AI's Limitations

Despite the initial success of AI image models in pathology and radiology, their adoption in everyday practice has lagged behind expectations. Here are a few examples of how AI can be applied here:

Data quality: One of the biggest challenges in developing AI algorithms is ensuring that the data used to train these algorithms are of high quality. These issues can be resolved with the assistance of machine learning models and advanced algorithms, allowing for more accurate diagnosis and treatment recommendations. High-quality clinical data are crucial for conducting prospective, randomized, and multicenter trials required to find AI solutions, in addition to image data. Advanced solutions for data cleaning and validation can include techniques such as automated image segmentation, QC algorithms, and outlier detection. In addition, data enhancement techniques can be employed to produce additional training data and reduce the risk of overfitting.

Generalization: One possible solution to this challenge is to use a diverse training dataset that includes a wide range of cases. For example, if an AI model is being trained to diagnose breast cancer, the training dataset should include a diverse set of cases, including different types of tumors, different stages, and patients with different characteristics (e.g., age, race, and ethnicity). This will ensure that the AI model learns to recognize a broad range of features and characteristics that are relevant to accurate diagnosis, rather than just memorizing features that are specific to the cases in the training dataset. Another solution is to use transfer learning, which involves training an AI model on a large dataset in one domain and then fine-tuning it on a smaller dataset in another domain

Interpretability: Advanced techniques for visualizing and explaining the outputs of AI algorithms can include techniques such as saliency mapping, which is influential in the algorithm's decision-making process.

Ethics and bias : The most frequent ethical problem is unfairness caused by bias in data sources To address ethical difficulties in data, resource allocation and practices, ethicists must be included in the supervision of the entire AI process with full independence to the ethical committee In addition, techniques such as adversarial training, where models are trained to be robust to adversarial attacks that might attempt to introduce bias, can help to improve transparency in AI-based diagnostic tools.

Cloud computing: It allows medical institutions to outsource their computing needs to cloud-based infrastructure providers, which can offer significant scalability and performance improvements for AI-based medical imaging analysis. Cloud-based platforms such as Amazon Web Services or Google Cloud Platform can provide access to powerful graphics processing units (GPUs) and central processing units (CPUs) that can be used to train and validate AI models, without requiring significant investment.

Edge computing: It involves deploying AI algorithms on local devices, such as mobile phones or edge servers. It is useful for medical imaging applications where low latency and real-time analysis are critical, such as in emergency situations. It also reduces the risk of data breaches or other security issues.

Hardware optimization: Researchers have developed hardware-accelerated neural networks that can run on specialized hardware like field-programmable gate arrays or application-specific integrated circuits.

Hybrid approaches: Hybrid approaches combine the benefits of cloud computing and edge computing, by using cloud-based infrastructure for training and validation, while deploying the resulting models on local devices for real-time analysis.

Conclusions: The development of AI in pathology and radiology has enormous potential to revolutionize how diseases are detected and treated, but it also presents several challenges that need to be addressed. These challenges include data quality, standardization, generalization, ethical

considerations, and hardware limitations. To overcome these challenges, researchers and clinicians need to work together to develop advanced solutions that take into account the unique characteristics of health-care data and the complex nature of diagnostic decision-making. Overall, AI has great potential to transform the way we diagnose and treat diseases, ultimately leading to better patient outcomes and a healthier society.

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Use of derivatives of quinoline compounds as an anticancer

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Abstract

Quinoline is a weak tertiary base, composed of benzene and pyridine ring fused at two adjacent carbon atoms obtained by condensation of a benzene ring with pyridine. The quinoline ring plays an important role in biological and pharmacological activities. In recent years, large numbers of quinoline derivatives, including mono-, di-, tri-, tetra- and heterocyclic substituents have been synthesized and their cytotoxic activity reported. These quinoline and their derivatives possessed remarkable anticancer activity due to their structure diversity, which are responsible for their anticancer activities. Till date a large number of quinoline derivatives have been marketed for their cytotoxic activity and now scientists are also focusing on introducing new quinoline in the market to encompass anticancer activity. Among heterocyclic compounds, quinoline scaffold has become an important construction motif for the development of new drugs quinoline and its derivative possess many types of biological activities and have been reported to show significant anticancer activity. Quinoline compounds play an important role in anticancer drug development as they have shown excellent results through different mechanisms of action such as growth inhibition by cell cycle arrest, apoptosis, inhibition of angiogenesis, disruption of cell migration and modulation.

Keywords: quinoline, pharmacological activities, heterocyclic.

□□□

Assessment of Knowledge Regarding Needle Stick Injury Among Nursing Students Of Selected Nursing College, Jaipur, Rajasthan

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Abstract

Worldwide, about 35 million healthcare professionals face the risk of sharps injuries from contaminated sharp objects every year. Needle stick injury (NSI) became a major issue. Nursing students are posted in clinical areas to fulfil their curricular requirement. In clinical duties the students provide direct patient care which may include Intravenous drug administration, IM drug administration, Blood withdrawal etc. Nursing students are at high risk for getting Needle stick injury. These injuries also commonly occur during needle recapping and as a result of failure to place used needles in approved sharps containers. Research studies regarding NSI are conducted only among Medical students and health care workers. The objective of this study is to measure the occurrence of needle stick injury, the measures adopted post exposure and to assess the knowledge regarding needle stick injury among nursing student.

Methodology

A quantitative research approach was adopted in this study. A cross-sectional study was conducted in Selected Nursing college at Jaipur, Rajasthan. The study participants comprised of 63 nursing students. 35 students were studying in 4th year B.Sc. (N) and 28 in 3rd year General Nursing and Midwifery (GNM). Non probability Convenient sampling method was selected. A structured knowledge questionnaire was administered among students regarding their knowledge about needle stick injury and their occurrence to Needle Stick Injury throughout their clinical training with focus on measures adopted following exposure to needle injury.

Result

The study among 63 nursing students included 35 (55.55%) B.Sc. Nursing Students and 28 (44.44%). Out of a total 63 students, 63 (100 %) were females. The occurrence of NSI during their course was reported by 40 (63.49%) participants. The maximum NSI occurred during the first year of programme (60%). It was found that 23 (36.50%) of NSIs were not reported. Among those exposed, only 10 (25%) students had undergone blood investigation and very few students took post exposure measures. It was found that 55 (87.30%) students were immunized against Hepatitis B before NSI.

Conclusion

The present study revealed that there are huge chances of needle stick injuries among nursing students but most of the cases went unnoticed or unreported due to lack of knowledge about needle stick injuries. Students are not aware about complications and post exposure measures of Needle stick injury. There is an urge to educate the students about Needle stick injury, its complications, importance of prompt reporting of exposure and other post exposure measures before placing them in clinical areas.

Keywords: Knowledge, Needle stick Injury, Nursing students



Activated fly ash as an efficient and novel catalyst for some selected organic reactions in solvent-free conditions: A Review

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Abstract

There are several advantages to perform synthesis in solvent-free media (Microwave assisted): (i) short reaction times, (ii) increased safety (iii) economic advantages due to the absence of solvent (iv) clean and efficient (v) excellent yields. Activated Fly ash has the tendency to catalyze reactions which have industrial, pharmacological and therapeutic importance. Stereoselective Knoevenagel condensation, 'One-Pot' conversions of ketones to amides, Beckmann rearrangement, Schiff bases formation, biodiesel production, Claisen-Schmidt condensation of benzaldehyde etc. are some reactions which have been carried out using fly ash. The Claisen-Schmidt condensation between acetophenone and benzaldehyde derivatives is a valuable C–C bond-forming reaction which produces chalcones having a wide spectrum of biological activities including antioxidant, antibacterial, antileishmanial, anticancer, antiangiogenic, anti-infective and anti-inflammatory activities. Bulk and surface structure and their active sites formed by chemical and thermal treatment of solid based fly ash catalysts was elucidated by XRD, FTIR, SEM and TEM.

Keywords: Microwave assisted, Industrial, Pharmacological, Stereoselective.



Sequence Extraction and Molecular Visualization of Keratin Protein

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Abstract

Introduction

Keratin is a naturally deduced polymer which is biodegradable and cross linked to hydrogels. It is a 80 amino acid protein. It is used in organic detergents and production of urea. Keratin proteins have been shown to play a crucial part in crack mending. Keratin proteins are pivotal structural factors of epithelial cells, play a significant part in cancer progression and treatment. This study focuses on the sequence birth and molecular visualization of keratin proteins in the environment of cancer remedy. Sequences of keratin isoforms associated with colorful cancer types were uprooted and anatomized for conserved motifs and mutations. Molecular visualization ways, similar as structural modeling and docking simulations, were employed to understand the commerce between keratins and implicit remedial agents. Keratin offer avenues for targeted curatives, showcasing the eventuality of keratin proteins as biomarkers or remedial targets in cancer treatment strategies.

Methodology

GenBank is the NIH inheritable sequence database, an annotated collection of all intimately available DNA sequences. GenBank is part of the International Nucleotide Sequence Database Collaboration, which comprises the DNA DataBank of Japan(DDBJ), the European Nucleotide Archive(ENA), and GenBank at NCBI. These three associations exchange data on a diurnal base. The GenBank database is designed to give and encourage access within the scientific community to the most over- to- date and comprehensive DNA sequence information. thus, NCBI places no restrictions on the use or distribution of the GenBank data. In 1982, NIH awarded a five- time contract for the nucleic acid sequence database to the private establishment of Bolt, Beranek and Newman with a subcontract to Los Alamos National Laboratory, marking the sanctioned morning of GenBank.

Uniport Database

UniProt is the Universal Protein resource, a central depository of protein data created by UniProt is the Universal Protein resource, a central depository and functional information, numerous entries being deduced from genome sequencing systems combining the Swiss- Prot, TrEMBL and PIRPSD databases. It's a freely accessible database of protein sequence. It contains a large quantum of information about the natural function of proteins deduced from the exploration literature. It's maintained by the UniProt institute, which consists of several European bioinformatics associations and a foundation from Washington, DC, United States. Fast A (FAST ALIGNMENT) In bioinformatics and biochemistry, the FASTA format is a textbook- grounded format for representing either nucleotide sequences or amino acid sequences, in which nucleotides or amino acids are represented using single- letter canons. The format also allows for Sequence names and commentary to antecede the sequences It was first described by DavidJ. Lipman and WilliamR. Pearson in 1985. FASTA is sequence alignment tool which is used to search parallels between sequences of DNA and proteins. FASTA can not remove low complexity regions before aligning

the sequences as it's possible with BLAST. BLAST(The Basic Local Alignment Search Tool). The Basic Alignment Search Tool was developed by Altschul et al., 1990 for fast sensitive database hunt to find analogous sequence. There are two types of blast for protein and nucleotide

Blast Blast is used to search homologous protein and nucleotide sequence.

The common procedure for any BLAST Algorithm. These are the ways given below.

Step-1 : In the first step of BLAST Algorithm elect the program. And choose Nucleotide BLAST for show the alignment of nucleotide to nucleotide, and when choose Protein BLAST to show the alignment of protein to protein. And also when we choose the blastx also show alignment the of restated nucleotide to protein, and tblastn for show the alignment of the protein to restated nucleotide.

Step-2 : Enter a query sequence of protein containing sequence gain from GenBank.

Step-3 : After the selection of query sequence elect the protein database to search.

Step-4 : Elect the algorithm and the parameters of the algorithm for the hunt.

Step-5 : Run the BLAST program.

Visual Molecular Dyanamic(VMD)

VMD is a molecular visualization program for displaying, amping, and assaying large biomolecular systems using 3- D plates and erected- in scripting. It may be used to view more general motes, as VMD can read standard Protein Data Bank (PDB) lines and display the contained structure. VMD is developed substantially as a tool to view and dissect the results of molecular dynamics simulations.

Result and Discussion

GenBank:

National Library of Medicine
National Center for Biotechnology Information

GenBank

GenBank Overview
What is GenBank?
GenBank is the NIH genetic sequence database, an annotated collection of all publicly available DNA sequences.
GenBank release occurs every two months and is available from the [NCBI website](#). The release notes for the current version of GenBank provide detailed information about the release, including information about sequencing changes to GenBank. Release notes for individual GenBank releases are also available. GenBank growth statistics for both the traditional sequence database and the WGS database are available from the [GenBank growth statistics](#) page.
An annotated version of GenBank is available for a [GenBank release overview](#) page demonstrates many of the features of the GenBank database.
Access to GenBank
There are several ways to search and retrieve data from GenBank:

- Search GenBank for sequence identifiers and annotations with [TracNucleotide](#)
- Search and align GenBank sequences to a query sequence using [BLAST](#) (Basic Local Alignment Search Tool)
- Search [FASTA](#) files for more information about the numerous NCBI databases
- Search, test, and download sequences programmatically using [NCBI utilities](#)
- The ASN.1 and flat file formats are available at NCBI's anonymous FTP server: [ftp://ftp.ncbi.nlm.nih.gov/genbank/](#)

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[Submission Tools](#)
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National Library of Medicine
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BLAST®

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Basic Local Alignment Search Tool
BLAST finds regions of similarity between biological sequences. The program compares nucleotide or protein sequences to sequence databases and calculates the statistical significance.
Learn more

BLAST+ 2.13.0 is here!
Starting with this release, we are including the blastn_vdb and tblastn_vdb executables in the BLAST+ distribution.
Thu, 17 Mar 2022 12:00:00 EST

Web BLAST

Nucleotide BLAST
nucleotide → nucleotide

Protein BLAST
protein → protein

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BLAST®

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Standard Protein BLAST

Enter Query Sequence
Enter accession number(s), gi(s), or FASTA sequence(s)

Choose Search Set
Databases

☐ Standard databases (nr etc.)

☒ Try experimental clustered nr database

Job Title
AAB30058.2 keratin, partial [Homo sapiens]

RID
MFRD0HWP016

Search expires on 10-14 17:42 pm [Download All](#)

Program
BLASTP [Citation](#)

Database
pdb [See details](#)

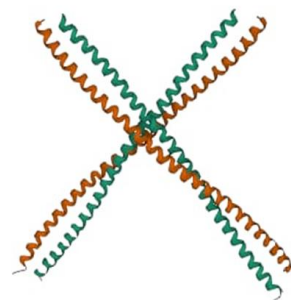
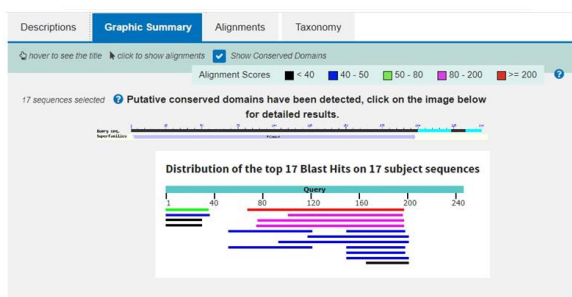
Query ID
Icl|Query_30914

Description
AAB30058.2 keratin, partial [Homo sapiens]

Molecule type
amino acid

Query Length
244

Descriptions	Graphic Summary	Alignments	Taxonomy
Sequences producing significant alignments			
☒ select all 17 sequences selected			
Description	Scientific Name	Max Score	Total Score
☒ Heterocomplex of coil 2B domains of human intermediate filament proteins	Homo sapiens	216	216
☒ Chain A Keratin type I cytoskeletal 14 [Homo sapiens]	Homo sapiens	155	155
☒ Crystal structure of the heterocomplex between coil 2B domains of human	Homo sapiens	138	138
☒ Crystal structure of the heterocomplex between coil 2B domains of wild type	Homo sapiens	134	134
☒ Crystal structure of the heterocomplex between human keratin 1 coil 1B co	Homo sapiens	52.0	52.0
☒ Crystal structure of a vimentin fragment [Homo sapiens]	Homo sapiens	49.7	49.7
☒ Human lamin coil 2B [Homo sapiens]	Homo sapiens	48.9	48.9
☒ Chain A Caspase assembly scaffolding protein Plectinin A/C [synthetic cons	synthetic cons	49.3	49.3
☒ Structure of F347K mutant of human Lamin [Homo sapiens]	Homo sapiens	46.6	46.6
☒ Structure of R335W mutant of human Lamin [Homo sapiens]	Homo sapiens	46.6	46.6
☒ Structure of Coil 2b of human lamin [Homo sapiens]	Homo sapiens	46.6	46.6
☒ Crystal structure of stabilised vimentin coil 2 fragment [Homo sapiens]	Homo sapiens	45.8	45.8
☒ Crystal Structure of Human Lamin B1 Coil 2 Segment [Homo sapiens]	Homo sapiens	44.7	44.7
☒ Crystal Structure of Vimentin (fragment 144-251) from Homo sapiens	Homo sapiens	40.0	40.0
☒ Tatomic crystal structure of vimentin coil1B fragment [Homo sapiens]	Homo sapiens	38.1	38.1



Discussion

The integration of sequence extraction and 3D structure visualization unveils crucial aspects of keratin proteins' role in cancer biology. Understanding the structural alterations and variations in keratin sequences associated with different cancer types provides a foundation for identifying biomarkers or therapeutic targets. Moreover, by visualizing the 3D structures, researchers gain insights into potential drug-binding pockets or sites within keratin molecules, aiding in the design of targeted therapies.

Conclusions

The combined approach of sequence extraction and 3D structure visualization of keratin proteins in the context of cancer offers a promising avenue for understanding cancer biology at the molecular level and advancing targeted therapeutic interventions.

Keywords: GenBank, Uniport, FastA, Nucleotide, Database, Alignment.

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Removal of Chloride from Ground Water sample by Brick Powder as a Low-Cost Adsorbent: A Common Study

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Abstract

Chlorides can corrode metals and affect the taste of food products. Therefore, water that is used in industry or processed for any use has a recommended maximum chloride level. Chlorides can contaminate fresh water streams and lakes. Fish and aquatic communities cannot survive in high levels of chloride increase. The presence of chloride in ground water causes many health problems in human beings. Low-cost brick powder as an adsorbent is used to reduce chloride contamination from ground water. The investigation was carried out on the adsorption of chloride ion to analyse effect of various parameters like pH, contact time, adsorbent dose and initial concentration. Adsorption study was conducted to analyse the adsorption of chloride in ground water. The experimental studies show that maximum removal of chloride in ground water by using brick powder adsorbent is 56 % at optimum conditions.



Advanced and Innovative Nano-Systems for Anticancer targeted Drug Delivery

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Abstract

The encapsulation of therapeutic agents into nano-based drug delivery systems for cancer treatment has received considerable attention in recent years. The unique properties of nanoparticles allow cancer-specific drug delivery by inherent passive targeting phenomena and adopting active targeting strategies. It improves the pharmacokinetics and bioavailability of the loaded drugs, leading to enhanced therapeutic efficacy and safety compared to conventional treatment modalities. The construction of nanosized drug delivery systems possesses tremendous potential due to their ability to improve the solubility of poorly soluble drugs and to reduce metabolism by

dissolving them in their hydrophobic and hydrophilic compartments. This study highlights the various nanocarriers and compounds that can be used for selective tumor targeting and the inherent difficulties in cancer therapy.

Methodology

The nanocarrier system is designed to target tumors through two different mechanisms of tumor targeting: nanocarriers that are capable of passive targeting, and nanocarriers that are equipped with ligands for active targeting. In passive targeting nanocarriers accumulate in tumors due to their small size and the leakiness of the tumor blood vessels. In active targeting, ligands attached to the surface of the nanocarriers bind specifically to receptors on the surface of the tumor cells, which results in the accumulation of the nanocarriers in the tumor and increased therapeutic efficacy. Typical nano-based delivery vehicles include liposome, micelle, dendrimer, nanogel, and nanoemulsions, while novel nanocarriers also contain biomimetic reconstituted high-density lipoprotein (rHDL) exosome and the hybrid nanoparticle, which come from the mixture of nanomaterials. Nanomedicine holds the advantages of passive targeting ability due to an enhanced permeability and retention (EPR) effect, a large surface-to-volume ratio for drug loading, and a tunable size compared to conventional chemotherapy.

Result and Discussion

Nanotechnology has the potential to significantly alter the way cancer is treated. This review has shed light on the remarkable potential of nanotechnology in the realm of targeted cancer therapy. It is evident from the discussion that nanoscale targeting techniques, propelled by advancements in protein engineering and material science, hold the promise of transforming the landscape of cancer diagnosis and treatment. Nanotechnology offers the potential for tailoring treatments to individual patients taking into account the unique molecular characteristics of their tumors. This promises not only increased efficacy but also reduced side effects, thereby enhancing the quality of life for cancer patients. It requires ongoing commitment, collaboration, and innovation from the scientific and medical communities to serve in cancer treatment. The potential to improve cancer detection and treatment through nanotechnology is tantalizing, however with perseverance and sustained investment in research, we can unlock the full potential of nanotechnology in the fight against cancer. The future holds the promise of more effective, targeted and less invasive treatments that will significantly improve the lives of cancer patients.

Conclusion

One of the primary future directions in nanotechnology in cancer therapy is the refinement and optimization of nanocarriers. These are tiny particles or structures designed to deliver drugs or therapeutic agents directly to cancer cells while sparing healthy tissue. Researchers are exploring various strategies to improve the design and functionality of nanocarriers. This includes enhancing their stability in the bloodstream, increasing drug-loading capacities, and fine-tuning their target

capabilities. Advances in material science and nanofabrication are enabling the creation of nanocarriers with precisely controlled properties, such as size, shape, and surface chemistry, which can influence their behavior within the body. Moreover, the development of nanocarriers is gaining momentum. These nanocarriers not only deliver drugs but also incorporate additional features, such as imaging agents or immune-stimulating molecules. This multifunctionality allows for simultaneous diagnosis, monitoring, and treatment of cancer, making therapy more personalized and precise. Furthermore, the development of nanocarriers with enhanced biocompatibility and reduced immunogenicity is essential for their widespread clinical adoption. Research efforts should focus on materials that minimize adverse reactions and toxicity, ensuring the safety of nanotechnology-based cancer therapies.

Keywords : Nanotechnology, encapsulation strategy, targeted drug delivery, cancer therapy, chemotherapeutics.

□□□

Robotics in surgical oncology: precision procedure enabled by industrial invocations

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Abstract

Robotic surgical oncology represents a paradigm shift in cancer treatment, leveraging cutting-edge innovations in robotics to enhance precision procedures. Industry advancements have fuelled the development of sophisticated robotic systems, enabling surgeons to perform minimally invasive surgeries with unparalleled accuracy. These systems integrate advanced imaging, AI-driven assistance, and teleoperation capabilities, revolutionizing the way oncological procedures are conducted. The abstract background of this field highlights a synergy between medical expertise and technological progress, ultimately improving patient outcomes and paving the way for further breakthroughs in the intersection of robotics and oncology.

Methodology

The methodology of robotic surgical oncology involves the seamless integration of advanced technologies and precise procedural techniques. Industry innovations play a pivotal role enabling this precision by providing state-of-the-art robotic system. Surgeons utilities these systems gor minimal invasive procedures, leveraging high resolution imaging , robotic arms and AI asset decision support. The procedures begins with meticulous patient specific planning followed by assets navigation during surgery. Surgeons remotely control robotic instruments with enhanced

dexterity, enhancing the precision of tumour resections and promoting fast recovery. The abstract methodology underscore a synergistic relationship between surgical expertise and technological advancements, offering a transformatinal approach on oncological care .

Result

The results of implementing robotic surgical oncology reveal a significant advancement in precision procedures and Patient outcomes showcase reduced morbidity, shorter hospital stays, and accelerated postoperative recovery.

The discussion emphasizes the impact of technological advancements on clinical outcomes, addressing challenges, and exploring future avenues for innovation. Overall, the results underscore the transformative potential of robotic surgical oncology in reshaping the landscape of cancer treatment through precision-driven approaches fuelled by industry innovations.

Conclusion

In conclusion, robotic surgical oncology stands a transformative frontier in cancer treatment. The success of robotic oncology highlights a promising future where innovation converges with medical practices for the benefit of patients and the advancement of healthcare as a whole .

Keywords : Robotic surgical oncology, Industry innovation, Minimal invasive surgery, Clinical transformation



A Study to Assess the Various Factors and Hazards Related to Mobile phone Addiction Among the adolescents of different schools in Jaipur

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Abstract

India has the second largest mobile phone market worldwide. The number of adolescent in India is the target of these companies by introducing various applications. Therefore, there is a significant difference in the use of cell phones and smartphones between the elderly and the young. The use of wireless internet and technology is focused on youth and entertainment. However, other reasons for attracting wireless internet and technology are like buttons and a small screen that often create eye strain. Online shopping apps are the main reason for the increase in consumers in the number of

young people. Initially mobile services were limited in large cities, but over time, they have finally reached rural areas. The objectives of the study were to identify the various factors leading to addiction and over use of mobile/smartphone; to identify the various physical hazards and psychological hazards leading to addiction and over use of mobile/smartphone

Methodology

The study was conducted in one government and one private school in Jaipur. The sample size was 100 adolescents (50 from government schools and 50 from private schools). The tool consists of a structured questionnaire. Content validity of the tool was established by giving to 9 experts from different fields and reliability was calculated by split half method. The adolescents who participated in the study were given structured questionnaire. Same day, it was collected back.

Results

Half of the participants were from private school i.e. 50% (50) and half of them were from government school i.e. 50% (50). Majority of the respondents selected for the study were studying in class 10th i.e. 27.6%, More no. of male adolescents i.e. 55% .Majority of the adolescents i.e. 42%. Most of them 77% were Hindus. Regarding occupation of father, 42% were working as private employee .Most of the adolescents participated in this study 31 % reported social circle/friends as the source of information about phone , Most of the participants of this study, 91% were using smartphone. ‘t’ value computed and found significant at 0.05 level of significance were in the area of the scores of physical hazards and psychological hazards related to mobile phone addiction between private school and government school; for the scores of psychological hazards related to mobile phone addiction between male and female; the scores of physical hazards related to mobile phone addiction between secondary class and higher secondary class. ‘t’ value computed and found non-significant at 0.05 level of significance were in the area of the scores of physical hazards related to mobile phone addiction between male and female.

Conclusion

The study concluded that there is a difference of physical hazards related to mobile phone addiction among adolescents between government and private school; secondary and higher secondary class. While no difference is found between male and female: simple mobile phone users and smartphone users. Difference was found of psychological hazards related to mobile phone addiction among adolescents between government and private school; and male and female. While no difference is found between secondary and higher secondary class: simple mobile phone users and smartphone users.

Keywords: Adolescents, mobile phones, physical, psychological, hazards



Revolutionizing Chemistry: Sustainable Green Innovations

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Abstract

The design of chemical products and processes that reduce or eliminate the generation of hazardous substances and protect our health are significant goals of green chemistry. It is likely a scientifically based natural evolution of pollution prevention initiatives. It leads to a cleaner, more sustainable, economically beneficial and other positive social impacts. This area of chemistry is a rapidly developing field providing the sustainable development of future science and technology. We are able to develop chemical processes and earth-friendly products that will prevent pollution in the first place. We can create alternatives to hazardous substances which are used as source materials and environmentally benign synthetic protocols to deliver life-saving medicines. The designing of chemical processes to reduce waste and reduce demand of depleting resources must be fulfilled by using the green chemistry.

Keywords: Hazardous, Sustainable, Social impacts, Alternatives



Replacement of Organic Solvent by Water

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Neetu Khandelwal**

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Abstract :

Under some circumstances, the removal of organic hydrocarbons from water by stripping them with air bubbles can be enhanced significantly using solvent sublation. In solvent sublation, part of solvent concentration in nongaseous from within the Gibbs layer of using bubbles is interception and removed by an immiscible solvent floating on the surface of water undergoing purification. In the present investigation of air stripping conducted with and without solvent sublation, concentration profiles along a column were measured as a function of time. The effects of solute volatility and solvent hydrocarbons were investigated quantitatively. The solutes studied in this work were toluene and o-dichlorobenzene and the sublation solvents used were mineral oil, 1-octanol, and 2-octanol. In the removal of toluene from water, sublation with 1-2-octanol as solvents gave better results than sublation with mineral oil as a solvent.

Keywords: Hydrolytes Carbo, sublation



New Era of Teaching learning via Hybrid and Blended Mode

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Abstract

Blackboard teaching is the most ancient and traditional method of teaching so far. Although some of the international and now national schools and colleges tried to create other modes of teaching and learning but after the emergence of corona the education system has compelled to do the changes instantly from the traditional method based learning to hybrid and blended mode. This sudden change caused problems in the education system to both the teaching and learning groups. To know about the consequences a small group (20) of instructors from the public authority schools were taken as test and gotten some information about the new changes, versatility and plausibility of these procedures under ICT with the understudies by taking their views in the form of Q and A. Practically all the employees valued the public authority strategies and adaptability in an teaching as well as learning and furthermore given ideas to consolidate a portion of the gaming applications in the review discussion and prospectus to make the understudies more thought and learn by means of edutainment mode.

Keywords: hybrid learning, blended learning, ICT, gaming application, education



Indoor Plants and their Role in Reducing Air Pollution

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Abstract

Gardening is a hobby of growing and cultivating plants. This habit relieves us from stress and gives relaxation to the mind. Gardening is generally of two types. One is indoor gardening while the other is outdoor gardening. Indoor gardening refers to growing of plants in indoor spaces such as homes or offices. Outdoor gardening is growing plants outside, in the open air. There are different plant varieties which absorbs various pollutants from the indoor. The addition of indoor plants has been shown to greatly decrease the amount of VOCs in indoor air, thus, reducing the health risks to the people exposed to them. In the present environment we need plants more than ever because of the flu season, the coronavirus pandemic, and the widespread anxieties for our health. Indoor Plants

have many benefits. Physically, they contribute to cleaner, healthier air for us to breathe, thus improving our well-being and comfort. They make our surroundings more pleasant, and they make us feel calmer. Interior plants have been associated with reduced stress, increased pain tolerance, and improved productivity in people. According to a NASA experiment these plants absorb some pollutants like benzene, xylene, carbon mono oxide and as such indoor plants belonging to different family will be selected for study.

Methodology

The morphological and anatomical study of some selected indoor plants will be study. For anatomical study the following procedure will use. Sections will fix in FAA (Formalin aceto-alcohol) solution for 24 hours The fixed materials will be preserved in 70% alcohol now the sample is passed through a dehydrating series. After this the sections will cut by microtome technique and stained through safranin and fast green and then observe under microscope.

Result and Discussion

The aspects of morphological characters like type of phyllotaxy, nodal anatomy, vascular tissues in some indoor plants will be studied. External morphological and anatomical characters will be studied in indoor plants belonging to different families with some interesting similarities. These indoor plants played an important role in air pollution also. These indoor plants remove some airborne toxins. This study will be based on growth influencing factors like sunlight, temperature, water, soil. The main objective is the comparative study of five indoor plants under the growth influencing factors (Sunlight, Water, Ventilation and Soil) by Microtome technique. We will also study their impact on air pollution reduction in the households. The morphological and anatomical characters will be observed based on growth influencing factors.

Conclusion

Morphological study is useful in the visual identification of plants. Morphological and anatomical characters are the end products of the interaction of the process of plant development with the environment. The primary objective of these studies will to enlist the indoor plants under variation of growth influencing factors. The detailed anatomical and histological studies enable a better understanding of special functions of entire plants. Morphological studies also used in taxonomic studies of plants These plants also reduce indoor Air pollution as they absorb variety of air pollutants. This study will also focus on the benefits of the indoor plants and their usefulness in reducing the Air pollution.

Keywords: Indoor plants, Air pollution, Pollutants, Morphology.



Digital Therapeutics: Redefining Supportive Care and Rehabilitation in Cancer

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Abstract

Digital therapeutics have emerged as a groundbreaking approach in the field of supportive care and rehabilitation for cancer patients. The integration of digital therapeutics into cancer care pathways has shown promise in addressing the complex physical, psychological and social needs of cancer patients. Digital therapeutics are evidence based devices aimed at interacting the patients, and offer potential benefits for the patients with cancer. Digital therapeutics can help implement behavioural modifications and empower patients through education, lifestyle support, and remote symptom monitoring. With current developments in oncology including increased availability of oral drugs and reduced availability of healthcare professionals, these solutions offer an innovative approach to optimize healthcare resource utilization.

Methodology

Through the utilizations of mobile applications, wearable devices and virtual reality platforms, digital therapeutics offer personalized interventions tailored to the unique needs of cancer patient. These interventions encompasses various domains including symptom management, physical activity, stress, reduction, and cognitive and social support. One key area where digital therapeutics have shown management of cancer related symptoms. Mobile applications equipped with symptom tracking tools and algorithms provide real – time monitoring of symptom progression, allowing for timely interventions and personalized support. Patients may use the Digital Therapeutics solution to identify their symptoms, determine when they should contact their care team, and learn more about their condition. Currently, there are several digital therapeutics that are developed.

Result and discussion

In total, 30 patients with cancer undergoing active therapy were enrolled and 29 registered in the app. Overall 97 percentage of participants were active in 3 of 4 weeks and completed pre and post program questionnaires. Users interacted with the app on average 7.7 times per day of the 28 participants who completed the satisfaction questionnaire, 25 were likely to recommend the program, 23 said the program helped them deal with the disease and 24 said it helped them remember their medication. In most studies digital intervention have resulted in positive outcome in patient reported symptoms.

Conclusions

There is growing evidence that digital therapeutics provide benefits to patients related to clinical and health economic endpoints. These digital solutions can be integrated into routine supportive care in oncology practice to provide improved patient- centered care. Future endeavors could focus on the use of valid, standardized outcome measure, maintenance of the design and delivery of supportive digital health interventions. In the future years, oncology will undergo substantial changes, with new IT and health-care technology enhancing the potential to customise cancer therapies to unique individual patient profiles and provide more personalised cancer care. Given that some components of healthcare will likely never be totally replaced by technology, digital therapeutics is likely to be used in tandem with other treatments to improve patient outcomes.

Keywords: Digital therapeutics, oncology, integrated, remote symptom, patient reported outcomes.



Advancements and Challenges in Ceramic Matrix Composites: A Comprehensive Review

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Abstract

Ceramic Matrix Composites (CMCs), also commonly known as ceramics, possess properties akin to glass or crystals, incorporating attributes from both. These materials, distinct in their non-metallic and non-organic nature, are characterized by their formation through the application of heat, lack of chemical reactivity, and inherent hardness. Widely employed in the military, defense, and aerospace sectors, ceramic materials like Alumina, ZrO₂, SiC, and Si₃N₄ enjoy broad applications and enhanced qualities. Notably, they boast significant compressive strength, fracture toughness, hardness, and outstanding refractoriness, rendering them indispensable for enduring harsh environmental conditions.

Despite these advantageous characteristics, conventional machining methods such as milling, turning, and drilling prove less effective when applied to ceramics. This inefficiency arises from the need for substantial cutting pressures, resulting in tool wear. The root cause lies in the low shear strength and high brittleness exhibited by ceramic materials. While these features offer advantages in challenging conditions, traditional machining techniques often yield surface damage, edge chipping, and tool wear. Non-traditional methods like Abrasive Jet Machining (AJM) and Laser machining, while enhancing dimensional precision, present suboptimal surface quality marked by severe pitting and hole formation.

This research article delves into alternative machining methods, focusing on Ultrasonic Impact Grinding and Laser Beam Machining, and scrutinizes their respective outcomes. Non-traditional machining techniques exhibit superiority compared to conventional procedures, showcasing a higher rate of material removal and superior surface polish. Moreover, this study outlines potential avenues for further investigation, emphasizing the dynamic nature of ceramic materials and machining methodologies to address the demands of forthcoming technological advancements.

Keywords: Ceramic Matrix Composites (CMCs), Aerospace and Defense Applications, Non-traditional Machining, Ultrasonic Impact Grinding, Laser Beam Machining, Technological Advancements in Ceramic Materials



Regenerative Oncology

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Abstract

Regenerative Oncology is a state-of-the-art field that combines oncology and regenerative medicine. Its focus is on developing novel tissue engineering techniques for the replacement and repair of cancer-affected organs. Often requiring the removal or damage of important tissues, cancer treatment presents a number of obstacles that this multidisciplinary area seeks to overcome. Significant tissue damage can result from cancer therapies such as radiation therapy, chemotherapy, and surgery, which can impact the shape and functionality of important organs. It represents a viable approach by utilizing tissue engineering techniques to rectify the damage and impairment of tissues caused by cancer therapies. Designing successful solutions for organ replacement and repair requires a thorough grasp of biomaterials, tissue regeneration, and cancer biology. This work used a multidisciplinary strategy that brought together the fields of biomaterial sciences, tissue engineering, and cancer biology. Gene therapy plays a crucial role in addressing genetic mutations associated with cancer and enhancing the regenerative capacity of engineered tissues. Targeted genetic modifications are employed to control cell growth, inhibit tumorigenesis, and ensure the safety of regenerated organs. Advanced 3D printing technologies in conjunction with biomimetic scaffolds were utilized to fabricate customized constructs that resemble the natural tissue architecture. The ability of stem cells—whether they were obtained externally or internally—to promote tissue regeneration was essential. Effective immunomodulation is essential to prevent graft rejection. Strategies such as immune-evasive biomaterials and immunosuppressive agents are incorporated to create an environment conducive to the integration of regenerated tissues into the

host, ensuring sustained functionality. It focuses on the translational potential of regenerative oncology, addressing challenges and opportunities. Ethical considerations, long-term safety, and the scalability of personalized regenerative approaches and collaborations between oncologists, tissue engineers, and bioethicists are emphasized to navigate the complexities of implementing regenerative strategies in clinical settings. The role of regenerative oncology in minimizing cancer recurrence through targeted tissue regeneration is also explored. A promising new field that could completely change the course of cancer treatment is called regenerative oncology. Repairing damaged tissues from cancer treatments may be possible with the combination of cutting-edge biomaterials, regenerative techniques, and patient-specific data. To realize the full potential of regenerative oncology, interdisciplinary collaboration and persistent research attempts are crucial, even though challenges still exist. The findings demonstrate the viability and effectiveness of regenerative approaches, providing groundwork for additional research and potential integration with traditional cancer treatment. With regenerative oncology, oncological care is moving toward a more holistic and regenerative approach, offering promise in the search for tailored and efficient ways to heal the collateral damage caused by current cancer treatments.

Keywords: Regenerative Oncology, Gene Therapy, Radiation Therapy, Immunosuppressive, Chemotherapy.



Hemiptera Fauna at Tal Chhapar Wildlife Sanctuary

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Abstract

Rajasthan has a high biological diversity due to its unique biogeographic location, diverse climatic conditions, and enormous eco- and geo-diversity. The Tal Chhapar wildlife sanctuary is located in the Churu district of Rajasthan. Tal Chhapar Wildlife Sanctuary is a vital and unique grassland ecosystem in India. Insecta are essential to diversity. It is the most populous Class in the Animalia Kingdom. The insect has infiltrated nearly every available habitat, and it may be capable of withstanding the widest range of climatic extremes of any taxon. Hemiptera is an insect classification that includes real bugs. Hemiptera are plentiful throughout the year, but particularly in the spring, rainy season, and autumn. Hemiptera are plant-eating insects with sucking mouthparts. Heteroptera and Homoptera were suborders of the Order Hemiptera. The structure of the wings was primarily responsible for this distinction. Heteropteran bugs have forewings that are clearly divided into two regions, a tough and leathery basal area and a membranous tip, and membranous hind

wings; all four wings fold flat over their backs when not needed for flight. Homopteran bugs with toughened or membranous forewings (but not both) and all four wings held tent-like over the body when at rest. Tal Chhapar Wildlife Sanctuary was used for Hemiptera research. During the study, Hemiptera families Pentatomidae, Dinidoridae, Reduviidae, and Cydnidae were observed at the Sanctuary.

Keywords: Diversity, Hemiptera, Wildlife, Ecosystem.



Advancing Cancer Care through Futuristic Technologies in Industry Tissue Engineering and Regenerative Medicine

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Abstract

With all the progress in cancer biology and treatment, the pathophysiology of the cancer is still not thoroughly known, and its treatments are limited. The advent of tissue engineering and regenerative medicine has revolutionized the treatment of various disorders, including genetic diseases, neurological and neurodegenerative diseases, organ dysfunction, and cancers. Tissue engineering helps develop promising in vitro and in vivo models, such as spheroids, organoids, and organ-on-a-chip for studying cancer biology and evaluating the safety and effectiveness of novel antitumor drugs. Moreover, drug delivery systems that use scaffolds and stem cells enable sustained and localized release of antitumor drugs. Scaffolds and stem cells could also be utilized in cancer immunotherapy and healing the wounds caused by the resection of tumors. Advancements in tissue engineering and regenerative medicine may provide therapeutic approaches to treat tumors effectively. This chapter will discuss different aspects of tissue engineering and their application in developing novel therapeutic approaches for cancer treatment.

1. **Biopsy (donor-tissue extraction)** : cells are extracted either from fluid tissue or from solid tissue by the use of centrifugation to remove the extracellular matrix, finally cells are free floating and extracted again by use of apheresis.
2. **Cell isolation and cultivation (manipulation with cells)** : it is safest to isolate autologous cells or to use mesenchyme stem cells from bone marrow. Isolated cells are cultivated to selective cell differentiation.
3. **Scaffolds, seeding, cultivation** : seeding of cells leads to cell-matrix interaction with scaffolds

to grow into 3-D tissue and eventually replace a biodegradable, biocompatible and brittle nature scaffolds which functionalized with biomolecules.

4. **Implantation** : implanted in the body where cell recreate their intended tissue functions as blood vessels attacks themselves to the new tissue, the scaffolds dissolves.
5. **Detection** : the newly grown tissue eventually blends in with its surroundings.

Keywords: Regenerative medicine, tissue engineering, scaffolds, immune modulation, biomolecules.



Peregrine Solitons of the Higher-Order, Inhomogeneous, Coupled, Discrete, and Nonlocal Nonlinear Schrödinger Equations

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Abstract

This study reviews the Peregrine solitons appearing under the framework of a class of nonlinear Schrödinger equations describing the diverse nonlinear systems. The historical perspectives include the various analytical techniques developed for constructing the Peregrine soliton solutions, followed by the derivation of the general breather solution of the fundamental nonlinear Schrödinger equation through Darboux transformation. Subsequently, we collect all forms of nonlinear Schrödinger equations, involving systematically the effects of higher-order nonlinearity, inhomogeneity, external potentials, coupling, discontinuity, nonlocality, higher dimensionality, and nonlinear saturation in which Peregrine soliton solutions have been reported.

Keywords:-Peregrine solitons and Equations



Huge use of X-rays in medical Science

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Abstract

Rontgen in 1895 discovered the x-rays, when was studying the phenomenon of discharge of electricity through rarefied gases. He found that when the pressure in the discharge tube is reduced to 0.001 mm of mercury and electric discharge is passed between cathode and anode, the glass wall behind cathode begins to glow with greenish yellow color. During his experiment he also observed that fluorescent screen placed close to discharge tube continued to fluorescent close to the discharge tube continued to fluorescent even if the discharge tube was completely covered with a black paper. Although the intensity of fluorescence was reduced by interposing various thickness of different substance between screen and tube but it could not be cut off entirely. When plate of iron was placed it casts a shadow on the screen showing that certain radiation are coming out from the discharge tube. After performing a series of experiment Rontgen concluded that when a beam of fast-moving electrons strikes a solid target, invisible high penetrating radiation is produced. Because of their unknown nature Rontgen called these Radiation as X-Ray.

Keywords: Radiation, Charge, X-RAY, Wave, Experiment



Environmental Sustainability and Ethical Disposal in Cancer Tech Development

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Abstract

In the development of cancer technology, environmental sustainability and ethical disposal entail taking the effects of technology use, manufacture, and disposal into account. This entails limiting resource consumption, handling electronic trash (e-waste) ethically, and guaranteeing moral behaviour throughout the lifecycle of the product. Using environmentally friendly materials,

conserving energy, and using appropriate disposal techniques can all help advance cancer technology in a more sustainable way.

Methodology

1. **Materials Selection:** Choose eco-friendly and recyclable materials for device components. Avoid hazardous substances in manufacturing.
2. **Energy Efficiency:** Design devices with energy-efficient components to reduce overall energy consumption. Explore renewable energy sources for powering devices.
3. **Waste Reduction:** Minimize waste during production by optimizing manufacturing processes. Explore opportunities for reusing or repurposing components.
4. **Ethical Disposal:** Develop a clear plan for the ethical disposal of devices, considering recycling, refurbishing, or safe disposal methods. Educate users on proper disposal practices and provide accessible recycling options.

Result and Discussion

The integration of environmental sustainability and ethical disposal in cancer tech development is crucial for responsible innovation. By adopting eco-friendly materials and manufacturing processes, we reduce the environmental impact of device production. Ethical disposal ensures proper handling of electronic waste, minimizing harm to ecosystems. These practices contribute to a more sustainable healthcare industry, aligning technological advancements with environmental and ethical considerations.

Conclusion

Integrating environmental sustainability and ethical disposal practices in cancer tech development is crucial for fostering a responsible and long-lasting impact. By prioritizing eco-friendly materials, minimizing electronic waste, and ensuring ethical disposal of obsolete technologies, the healthcare industry can contribute to a healthier planet while advancing cancer research and treatment. This commitment aligns with global efforts toward a more sustainable future and underscores the responsibility of technological advancements in improving both.

Keywords: environmental, sustainability, technology, eco-friendly, waste reduction



An Interventional study to assess the effectiveness of laughter therapy in the reduction of stress among geriatric people in selected old age homes of Jaipur, Rajasthan, India

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Abstract

Aging is a natural process. Old age is an inevitable one. Old age is a crucial phase where physiological, psychological and sociocultural changes make elderly to develop stress. Our pre historic ancestors probably had a Life span of 40 years. Stress is the one of the leading factor that brings psychological problems in our life. The aims of study was to evaluate of stress level among geriatric persons. To evaluate the effectiveness of laughter therapy on stress among geriatric people. To find out the association between the effectiveness of pre-test level of stress and selected demographic variables such as Age, religion, marital status, educational status, occupation before coming in old age home, financial support.

Methodology

The research approach adopted for the study was evaluative approach and the research design adopted was pre-experimental, one group pre-test – post-test design. The sample consisting of 60 elderly peoples. They were selected by Non-probability Convenient Sampling techniques. The study was conducted at Jeevan Jyoti old age home, Chaksu, Jaipur. DAS scale was used for assess stress level.

Results

The study findings revealed that (16) 26.6% respondents were belongs to the age group of 60-65 years, (16) 26.6% was found in the age group of between above 70-75 years , (15) 25.0% was found in the age group of above 75 years ,(13) 21.6% Respondents were belongs to the age group of between above 65-70 years. The maximum participant in the research study from the Age of the senior citizens (in years) group of 60-65 years & above 70-75 years. Religion wise distribution showed that (51) 85.0% respondents were Hindus. (20) 33.3% Respondents were belongs to the group widow. (16) 26.6% respondents were unmarried, (16) 26.6% respondents were married, (8) 13.3% respondents were belongs to the divorced. (26) 43.3% Respondents were graduates & post graduates. (14) 23.3% respondents were belong to the group of illiterate, (12) 20.0% respondents

were belongs to the group of secondary & senior secondary and (8) 13.3% respondents were belongs to the group of primary education. Majority of respondents (22) 36.6% respondents were government employees, (20) 33.3% respondents were private employees, (16) 26.6% respondents were self employed, and (02) 3.33% Respondents were belong to other jobs. Financial support wise distributions of elderly peoples (60) 100.0% all senior citizens were receiving retirement pension or old age pension. Pre test stress level revealed that in pre-test 60.0% were extremely severe, 26.6% were severe, 6.6% were moderate, 3.3 % were mild and 3.3 % were normal,. In post-test the 56.6% were normal, 20.0% were mild, 18.3% were moderate, 3.3% severe and 1.6% were extremely severe. Mean & S.D of Pre test was 32.85 ± 7.18 , and Post test was Mean & S.D. was 13.81 ± 6.97 on DAS scale . The chi square value of demographical variable religion was found significant.

Conclusions : This study concluded that laughter therapy is effective in reduction of stress level among elderly peoples.

Keywords: Level of stress, elderly people, reduction, laughter therapy.



Deep Learning Algorithms for Predicting Patient Waiting Times in Emergency Department in Healthcare Queue System

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Abstract

Many hospitals use the amount of time patients spend in queue as a gauge for overcrowding in the emergency room (ER). Many emergency rooms have lengthy wait times, which make it more difficult to adequately treat patients and raises overall expenses. In queuing system applications, cutting-edge methods like deep learning (DL) and machine learning have become crucial. In order to forecast patient waiting times in a system, this research will use deep learning (DL) techniques for historical queuing variables, either in addition to or instead of queuing theory (QT). Four optimization algorithms—SGD, Adam, RMSprop, and AdaGrad—were used. To determine which model has the lowest mean absolute error (MAE), the algorithms were compared. For further comparisons, a conventional mathematical simulation was employed. The findings demonstrated that the DL model may be used to estimate patients' waiting times using the SGD algorithm, with the lowest MAE of 10.80 minutes (24% error reduction) activated. In order to better priorities patients waiting in queue, this study makes a theoretical contribution to the field of patient waiting time prediction using alternative methodologies by establishing the highest performing model. This

study also makes a useful addition by utilizing actual data from emergency rooms. In addition, we suggested models that, compared to a conventional mathematical approach, produced more accurate predictions of patients' waiting times. Our method can be readily applied to the healthcare industry's queue system by utilizing electronic health records (EHR) data. Since over 50% of patients who are admitted to hospitals do so through the emergency rooms (ER), most hospitals suffer from extreme patient overcrowding. Since most ER departments in hospitals have lengthy patient wait times, they are an important component of healthcare facilities. Queuing is risky in an environment like the healthcare industry since waiting around may be costly for medical staff and uncomfortable for patients. Additionally, it could have an impact on a patient's life or health. One conventional method is queuing theory (QT). Mathematical method that has been applied for many years to the analysis of queuing systems. However, due to the methodology's limitations—such as the unrealistic assumptions about the time distribution needed to do queuing analysis—the typical QT approach might not be enough in real-world applications. As a result, alternative methods are thought to greatly increase ER efficiency, such as deep learning (DL) algorithms. Another type of machine learning technique is deep learning algorithms. Furthermore, new studies revealed that the approach used to estimate ER patient wait times has a limited degree of accuracy. In addition, DL algorithms have even higher accuracy and can minimize human error as compared to conventional methods. The purpose of this research was to provide a new and improved model for predicting wait times as well as a crucial tool for responding quickly in the event that emergency rooms report lengthy wait times. Due to significant error rates in earlier research, this goal was prompted. Compared to earlier research on this subject, the unique model used in this study minimizes error prediction.

Keywords: Customer, Queue, EHR, Optimization Algorithm, Phase type Queuing Model.



Sustainability: Pollution Prevention

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Abstract

This paper is based on the pollution prevention practice that can lead to important economic savings, materialized in benefits and resource preservation. There are some techniques for preventing pollution from happening there will always be the necessity of efficiency in use, because globalization is increasing and by consuming resources without putting them back leads to scarcity of lead, labor, raw materials and capital. The impact of processes and products on the environment demands eco- efficient pathways to prevent and reduce pollution quantity and quality. Pollution prevention programs offer sustainable alternatives that express. Precaution in usage of new and

more toxic substances and efficiency where the level of pollution must not pass a defined level. Economic analysis is considered as the most used method to determine how scarce resources should be allocated. There are sectors that may choose the cost benefit analysis because it is easy to implement and choose the best environmental project a more complete analysis involve performances analysis steps that contains a forecast of possible risk of factor that can influence the environment and the costs that may appear in the near future, or in the occurrence of unexpected events .Ecoefficiency has extended its converses from been concerned with making resource savings and preventing pollution in manufacturing sector, towards innovation and competitiveness in all types of companies. It was emphasized that based on ecoefficiency for pollution prevention analysis, companies can reengineer or redesigned their processes to reduce consumption of resources, avoid the risk and reduce pollution, saving costs.

Keyword: Pollution, Materialized, Globalization, Sustainable



Studies of Endangered Medicinal Plants

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Abstract

0.7 million plants species are there out of which more than 40% are Endangered, due to habitat loss, anthropogenic activities, house construction, Road construction, Industrialization, water, air and land pollution, Global warming, Climate Change. If there is 30 % decrease in population means these are Vulnerable to Extinction, If 50 % decrease in population means these are Endangered, If more than 90% decrease in Population means these are Critically Endangered. Dracena, Zelkova sicula, Z. abelicea, Helichryssum gossypinum, H. melitense, Sorbus whiteana, S. lobani, S. pauca, S. maravica, S. milensis, S. thayensis, S. cuculifera, Arabis kennedyae, Polygala urartu, P. simisica, Sicilian fir Abies nebrodensis, Picea omorica, Calandula marilima, Ribes sardoum, Saponaria jagelli, Salix canarensis, Sideritis discolor, Rhamnus integrifolia, Radula jonessi, Pyrus anatolica Artemisia granatensis, Centaurea corensis, Apium bermejoi, Astragalus cavanillesii, Juniperus brevifolia, J. cedrus, Aquilegia barbericina, BNetula celliberica, B. klokovii, Anchusa crispa, Cedrus brevifolia, Sideroxylon marginatum, Silene marizii, Ochyraea tatrensis, Naufraga balearica, Narcissus graditanus, N. lusitanicus N. nevadensis, Limonium strictissimum, Delphinium iris, Salvia herbanica, Cineraria, Delphinium caseyi, Centranthus amazonum, Carum foetidum, Centaurea akamantis, Allium iatrouinum, Apium bermejoi, Astragalus cavanillesii, Brimeura duvigneaudii, Anchusa

crispa, Bupleurum dianthifolium, Euphorbia handiensis, Centranthus, Senecio elodes, Salix herbanica, Cedrus brevifolia, Echium, Echinodium, Erysimum, Falsa sanicola, Petagnaea, Gradsteinia, Gyrocaryum, Medicago citrina, Salvia veneris, Delphinium iris, Ligusticum huteri, Limonium strictissimum, Lithodora nitida, Lonicera karataviensis, Biscutella rotgesii, Lysimachia minoricensis, Maltese centaury, Maltase clifforache, Euphorbia handiensis, Centranthus, Senecio elodes, Salix herbanica, Cedrus brevifolia, Echium, Echinodium, Erysimum, Falsa sanicola, Petagnaea, Gradsteinia, Gyrocaryum, Medicago citrina, Salvia veneris, Delphinium iris, Ligusticum huteri, Limonium strictissimum, Lithodora nitida, Lonicera karataviensis, Biscutella rotgesii, Lysimachia minoricensis, Arabis kennedyae, S. eminentoides, S. whiteaena, S. herbipolitana, S. leptophylla, S. rhodanthera, S. marizii, S. orphanidis, S. barrandienica, S. cuculifera, S. thayensis, S. milensis, S. moravica, S. pauca, S. portae bohemicarum, S. spectans, S. tobani, S. parviloba, Atraphaxis muschketowi, Sibiraea tianschanica, Picea omorica, Scapania sphaerifera, Ribes sardoum, Narcissus gaditanus, N. lusitanicus, N. nevadensis, Naufraga, S. scannelliana, Artemisia granatensis, Lonicera karataviensis, Salvia veneris, Lamyropsis microcephala, Delphinium iris, Limonium, Lithodora, Echinodium setigerum, E. spinosum, Echium acanthocarpum, E. callithyrsum, E. gentianoides, E. handienae, E. portosanctense, Erysimum kykkoticum, S. evansii, Salvia herbanica, Spiraeanthus schrenkianus, Maltese centaury, Maltase clifforache, are some Endangered medicinal plants. We should conserve Endangered medicinal plants.

Keywords: Endangered medicinal plants, Global warming, Climate Change

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Environmental Sustainability & Development

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Abstract

Promoting sustainable development is the main goal of environmental sustainability. Sustainability in one area may be a prerequisite for sustainability in another. It is possible to map sustainability criteria to illustrate intricate cross-domain relationships like social, economic and environmental level. We need to make it simpler to identify the steps that must be taken to achieve environmental sustainability by facilitating communication between all parties concerned in the matter. In order to extend perspective, businesses that are nearly solely financially focused frequently adopt a triple

bottom line strategy. However, companies that are narrowly focused on any other single bottom line such as environmental or social are able to use it in order to grow.

Keywords: Environmental, Social, Sustainability, Economic.

Introduction

Environmental sustainability is a key concern for society having the responsibility of preserving natural resources and protect global ecosystems in order to foster health and well-being both now and in the future. Environmental sustainability standards differ significantly depending on the economic, social, and environmental circumstances of a given area. Due to increasing agricultural and industry brought on by the rapid population development, there are now greater greenhouse gas emissions, unsustainable energy consumption, and deforestation. Sustainability of the environment is vital given the quantity of food, energy, and manufactured goods we use on a daily basis. Environmental sustainability is important as the preservation of natural resources is essential to society's survival since it depends on them for its resources. The planet's natural resources are limited, and so is its ability to recover from harmful activities and absorb pollutants. It becomes crucial to strike a balance between a society's growing population and consumption demands and its limited supply of resources. Long-term cost reduction or maintenance is possible with sustainable practices that guarantee the availability of material resources by efficient waste management, sustainable agriculture and forestry, construction, renewable energy sources *etc.*

Being the largest contributors and in a position to have a substantial impact, businesses are expected to take the lead in the field of environmental sustainability. With our growing population, a fully sustainable earth is unattainable unless we create and widely use renewable technology. People will be able to go about their regular lives without putting the environment in risk or making the climate worse. Everybody needs to adapt their way of life and learn how to live more sustainably.

Environmental Sustainability can be achieved by organizations like EPA that regulate and implement the laws to different business, individuals, institutions, state and local Governments to create the accountability. The roadmap to a brighter and more sustainable future for all is found in the prescribed 17 Sustainable Development Goals by UN. These objectives tackle worldwide issues related to clean water and sanitation, climate change, no poverty, industry and innovations, economic growth, use of clean energy at affordable rate, peace and justice *etc.*

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Impact of Educational Program on Knowledge Regarding “Home Management of Side Effects of Chemotherapy” among Caregivers of Cancer patients in selected Hospitals of Jaipur, Rajasthan

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Abstract

Cancer is most fatal disease. It is the second leading cause of mortality worldwide .As chemotherapy is one of the important treatment for cancer which targets all the rapidly dividing cell of human body consequently the side effects emerge after taking chemotherapy. The caregivers of the cancer patients play a significant role in their health-care wellness. These side effects bring physical and psychological impacts on the life of the patient and family members. The side effects of chemotherapy are very important to be managed at home by the caregivers. Since, it is significant to create awareness about chemotherapy among parents or caregivers. The most effective way of giving information to the caregivers was by giving a Educational program and enhancing their knowledge regarding home management and its side effects of chemotherapy.

Methodology

A quantitative research approach was used. The preexperimental research was conducted on sixty caregivers of patients receiving chemotherapy. The research design used was one group pre-test and post-test design. The demographic variables analysed for the study were age, gender, occupation, education, income, marital status and previous source of knowledge. The study was conducted by using non -probability purposive sampling technique on a sample of 60 caregivers by structured knowledge questionnaire to collect the data regarding home management and its side effects in terms of knowledge among caregivers of patients receiving chemotherapy. The data was gathered after obtaining formal written consent from the respondents and distributing participant information sheets to each subject.

Results

Majority of respondents (41 %) were in the age group of 49-60 years ,60 % were males and 41 % had primary level of education. 38% of them were doing jobs in private sector. Most of them were married (79%).71 % of respondents had income of Rs.10000 and 60 % of them had no previous knowledge regarding home management of side effects of Chemotherapy .The pre- test and post-test knowledge scores of participants regarding home management of side effects of chemotherapy

revealed that before implementing educational programme, that is in pretest ,13.34%(8) subjects had poor knowledge, 75%(45) had average knowledge, and 11.66%(7) had good knowledge scores, where after administration of educational programme, in posttest 4 (6.67%) subjects had poor knowledge, 65%(39) had average knowledge, and 28.33%(17) had good knowledge scores. The effectiveness of educational programme was assessed with paired t-test and it was revealed that there was a significant gain in the knowledge regarding home management of side effects of chemotherapy at 0.05 level of significance.

Conclusion

The study revealed that improving knowledge regarding home management of side effects of chemotherapy would improve the self-care practice in order to manage the side effects arising due to chemotherapy. The study concluded that administration of educational program was an effective teaching strategy to improve the knowledge regarding home management and its side effects in terms of knowledge among caregivers of patients receiving chemotherapy.

Keywords: Home Management, Side Effects, Chemotherapy, Care Givers, Cancer patients.



Integrating futuristic technologies in cancer case with homoeopathic principles: A comprehensive approach to personalized healing

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Abstract:

This includes – making cancer case better using as new technologies and an old healing way called “homoeopathy the blend of high tech treatment like precision medicine, immunotherapy with the gentle way of treatments with homoeopathy. By mixing these approaches we aim to create a personalized and casing method to help people with cancer feel better. Introduction: Cancer is tough, but we have new ways to treat it like using special medicines, the body’s own defenses At the same time, blending it with gentle harmless healing with homoeopathy. Technological advancements in cancer cases: Cancer cases have evolved with precision medicine customizing treatment based on genetic data and the rise of immunotherapy. Improved early detection though liquid biopsies and advanced imaging technologies further enhance personalized care. Homoeopathic principles and practices: Homoeopathic is based on the principle of “Like cure like” where a substance causing symptoms in a healthy person is used in diluted form to treat similar symptoms in a sick individual. It flows the “LAW OF MINIMUM” doses, using highly diluted remedies. It is also based on holistic approach considering the patient’s mental emotional and

physical state and thus helps for the cure and betterment of the patient. Intersection of cancer technologies with homeopathic principles:- In current scenario of the medical sciences homoeopathy, the most popular system of therapy is recognized as one of the component of complementary and alternative medicine (CAM) across the world. Homoeopathy is considered to be the safe & cost-effective therapeutic modality. A number of human ailments ranging from common to serious have been treated with homoeopathy. Available data suggest that homoeopathy has potency not only to treat various type of cancer but also to reduce the side effects caused by standard therapeutic modalities like chemotherapy, radiotherapy or surgery.¹ Along with this, there are specific homeopathic remedies for various cancer that target the tumor and may reverse its growth, some of them acts as drainage remedies and assist in healing the patient by eliminative channels and strengthen cell detoxification. This approach fixes the cause of tumor rather than attacking the tumor directly. It stops the malignant growth, eventually absorbing and discarding it from the body. In advanced stages homoeopathy many not help to cure the cancer but can help along with the advanced 2 technology to ease pain & prolong life of patients ² . Challenges and Ethical consideration:- Homoeopathic cancer treatment contends with challenges such as scientific skepticism and possible delays in seeking conventional case. Ethically, informed consent is paramount, emphasizing patient awareness of homeopathy's experimental status while promoting its potential benefits within a patient centered framework.³⁻⁵ Conclusion: The safety & effectiveness of homoeopathy in providing relief to cancer patients, along with modern technology & minimizing side effects, lack sufficient evidence based studies. While some individuals use homoeopathic remedies to address side effects from treatment like radiotherapy and chemotherapy.

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Changing Paradigms of Nanoparticles in Sustainable Farming

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Abstract

Worldwide problems that the farming sector is currently dealing with involve climate change and environmental issues like emission of pesticides and synthetic fertilizers. These issues will only become worse in the face of rising populations and food shortages. Therefore, it is required to replace traditional methods of farming with contemporary approaches. The application of nanotechnology, particularly green technology, holds great potential for resolving these issues. Biosensors, insecticides, fertilizers, food packaging, and other areas of the agricultural business are only a few of the technologies that have gone through modifications and enhancements as a result of nanotechnology. Nanomaterials are regarded as appropriate carriers for anchoring fertilizers and pesticides due to their particular characteristics, which also make them beneficial in assisting monitored nutrient transfer and enhancing crop protection. In an effort to support the expanding application of nanoparticles across various fields, investigations in the context of nanotechnology have therefore switched towards ecologically benign and commercially viable 'green' synthesis during the past ten years. Instead of using residing synthetic approaches, green synthesis, which is a component of bio-inspired protocols, offers robust and sustainable approaches for the production of nanoparticles by a wide range of microorganisms. Microorganisms are discussed together with their benefits and drawbacks in comparison to other widely used techniques. The use of these nanoparticles in many agricultural sectors to ensure food security, improve crop output, and decrease the use of pesticides are discussed here. These developments in the manufacturing of metal nanoparticles via green synthesis by different microorganisms are taken into consideration. Furthermore, the method by which various microbes produce metal nanoparticles and their benefits and drawbacks in comparison to other widely used techniques are brought up.

Keywords: Nanoparticles, Sustainable Farming, Microorganisms, Agriculture

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Antioxidant activity of some medicinal plants of family Rubiaceae

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Abstract

Interest in medicinal plants is increasing because of the presence of bioactive compounds. These compounds have been reported to possess pharmacological properties which are associated with antioxidant activity. Therefore much attention is being paid on phytochemicals as new sources of natural antioxidants compounds.

Methodology

In present study, the two medicinal plants of family Rubiaceae (*Hamelia patens* and *Mitragyna parvifolia*) have been examined for their free radical scavenging activity. The methanolic crude extracts of root, stem and leaves of *H. patens* and *M. parvifolia* were screened for their free radical scavenging properties by DPPH (1,1-diphenyl-2-picryl hydrazyl) radical scavenging assay.

Result and discussion

Total antioxidant activity was found to be maximum in leaf followed by stem of *H. patens* (89.11±1.14 and 88.05±1.42 respectively) at concentration 100 mg/ml. Leaf, stem and root of *M. parvifolia* also showed good antioxidant activity at concentration 100 mg/ml.

Conclusion

The results of this analysis revealed the fact that these plants could be used as a viable source of natural antioxidants and might be exploited for functional foods and nutraceutical applications.

Keywords: antioxidant, scavenging activity, *Hamelia patens*, DPPH, *Mitragyna parvifolia*.



The emerging role of digital therapeutics in Cancer treatment

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Abstract:

Nowadays Digital therapeutics (DTx) is playing a very significant role in treatment of Cancer patients, especially in follow-up care of patients where cancer has responded to the first recommended treatment. In digital therapeutics interventions, high quality softwares are used. These softwares are developed after clinical investigations and are purely based on scientific experimentations and evidences. The world health-care industry is not only focussing on sound treatment and cure of the disease but is also working in improving the patient's physical, mental and behavioural conditions".

The present paper presents a review on some of the DTx products with the special reference to "Oncology treatment management". The aim of this research paper is to provide an update on how the DTx works, and what are the outcomes of DTx interventions. It was observed that DTx significantly help the patients recover from stress and anxiety due the disease. This results in better co-operation of the patients towards medication and treatment and ensures fast recovery. It can be concluded that introduction of DTx in oncological maintenance therapy has a promising future.

Keywords: digital therapeutics, cancer, treatment

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Adsorption of methylene blue dye from wastewater by using *Murraya koenigii* leaves as bio-adsorbent

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Abstract

The removal of effluents is one of the active areas of pollution control research. These dyes may be either natural or synthetic in origin and used frequently due to their availability and range. Synthetic dyes such as methylene blue are mutagenic; and carcinogenic in nature causing skin allergy, nausea, skin irritation, and breathing difficulties and most of the dyes are not biodegradable toxic. Methylene Blue is an important dye which is extensively used in the colouring of paper, cottons, and wools and in preparing hair colourants. Methylene blue dye is cationic and more toxic in nature than anionic dye depriving it of harmful effects. This dye is widely used in industries like textile, printing and tanning. Bio-adsorbents can be made from a range of plant parts, including the leaf,

fruit, fruit peel, latex, stem, root or tuber, bark powder and seeds, and are easily available, cost-effective and eco-friendly.

Methodology

Activated bio-adsorbent was synthesised from the dried powdered leaves of *Murraya koenigii* (curry leaves) for the removal of methylene blue dye from wastewater. Two different solutions of methylene blue were used 10 ppm and 50 ppm. The efficiency of Methylene blue dye removal with synthesised bio-adsorbent was measured with different pH and adsorbent doses by using UV-Vis spectroscopy on wavelengths 661 nm.

Result

The present study shows that it is possible to utilise *Murraya koenigii* leaves biomass as a biosorbent for removing methylene blue dye from wastewater solution. The decrease in pH of the solution improved the removal efficiency of methylene blue using the adsorbent of *Murraya koenigii*-activated bio-adsorbent. The maximum removal efficiency for 10 ppm and 50 ppm solutions of methylene blue were 0.86 and 89.4 % respectively at pH 4 . Methylene blue concentration dramatically decreased after contacting for 60 minutes with the adsorbent.

Conclusion

In this study, it was found that at high pH this adsorbent has shown high affinity towards methylene blue dye. The standard increasing graph was obtained with the increase in bio-adsorbent doses. This was also confirmed by a significant colour change in the solution. The chemical composition of the bio-adsorbent has shown that the plant-based bio-adsorbent can be used to treat wastewater in industries.

Keywords: Bio-adsorbent, Methylene blue dye, *Murraya koenigii*, Absorbance, Optical density.



Optimisation of AGVs path layout in flexible manufacturing system using 0–1 linear integer programming

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Abstract

The use of AGVs has grown enormously since their introduction. The number of areas of application and variation in types has increased significantly. Flow path design is an important factor in the design of automated guided vehicle systems (AGVS). In this paper, the problem of optimal flow path layout design of automated guided vehicles in the flexible manufacturing system is discussed. The problem is analysed and formulated as 0–1 linear integer programming model with

the objective of minimising the total distance travelled by individual loaded AGV. An illustrative example of a layout consisting of four manufacturing cells with 16 nodes and 19 arcs is discussed to demonstrate the approach. In this approach, only the movement of loaded vehicles with the unidirectional flow is considered. A general linear optimisation computer software package, named LINGO 14 is used to find out the optimal flow path for the layout.

Keywords: Automated guided vehicle, AGV, flow path layout and linear integer programming.



The Microbial Fuel Cell: Advanced Waste Bioremediation with Renewable Energy

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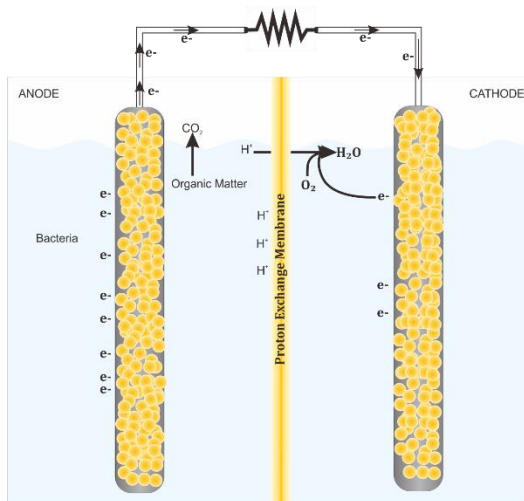
Abstract

The microbial fuel cell is a bioelectrochemical fuel cell system that operates by harnessing electrons generated by the microbial oxidation of reduced molecules, hence producing electric current. Microbial fuel cells facilitate the conversion of enzyme catalytic energy into electrical energy via an electrochemical mechanism. The electrons generated by bacteria during the oxidation of the substrate in the anode compartment, which serves as the negative terminal, are sent to the cathode compartment, acting as the positive terminal, via a conductive medium. Within the cathode, the electrons undergo a process of combination with oxygen, while the protons disperse via a membrane specifically designed for proton exchange.

Microbial fuel cells (MFCs) provide considerable promise in the generation of bioelectricity via the use of organic waste as a feedstock. This phenomenon has novel prospects for the use of renewable energy derived from biodegradable molecules that have undergone reduction. Multiple exoelectrogenic bacterial species have been identified as participants in electricity generation through microbial fuel cells (MFC). These species include *Bacillus firmus*, *Shewanella profunda*, *Bacillus isronensis*, *Brevundimonas bullata*, *Pseudomonas putida*, *Planococcus citreus*, *Micrococcus endophyticus*, *Acinetobacter tandoii*, *Bacillus safensis*, and *Shewanella xiamenensis*, which are considered dominant microbial strains in this process.

The energy produced by microbial fuel cells (MFCs) may be effectively used in power production systems that need low power output. The use of wastewater or organic components as a substrate for energy production presents itself as a viable and perhaps superior alternative to conventional

sources of energy. By monitoring biochemical oxygen demand (BOD) and toxicity in water, microbial fuel cells can function as an early warning system for food safety and security. However, they have few drawbacks as compared to other technologies, including limited power output, sluggish startup, and high cost.



Keywords: Bioremediation, Biomass, Energy, Exoelectrogenic Bacteria, Microbial Fuel Cell

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Studies on insecticidal properties of non-leguminous plants of Thar Desert

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Abstract

Papilio demoleus, commonly known as the lime butterfly, poses a significant threat to citrus crops due to the extensive damage caused by its larvae. Citrus is a woody, evergreen perennial plant cultivated for its non-climacteric unique berry like fruit. Traditional insecticides have been employed to control *P. demoleus* populations, but their adverse effects on human health and the

environment have led to the search for alternative, eco-friendly solutions. The purpose of the proposed investigation is to check the efficacy of *Euphorbia royleana*, *Lantana camara*, and *Cascabela thevetia*. Subsequently, the physical characterizations i.e. The biological toxicity test using spray application method. Acetone extract was also observed as to be most effective in a leaf disc assay. It showed potent activity. The suspension that sprayed onto the leaf disc area was led to dry and the powder shaped suspension residues were attached on the leaf surface, then the 3rd and 4th instar *P. demoleus* were exposed on it. Through laboratory bioassays and analysis of bioactive compounds, this study evaluates the efficacy and mechanisms of action of these plant extracts as potential natural insecticides. The findings contribute to the development of sustainable pest management strategies for the lime butterfly. Current investigations are related to evaluating bio-pesticide effect mainly consumption of pesticide properties of plant extracts of citrus plant, *Murraya koenigii* (curry tree) and *Cicer arietinum* (chick pea).

It has been established that use of synthetic organic pesticides, particularly the chlorinated hydrocarbons lead to serious environmental pollution (water, air and soil) affecting human health and causing death of non-target organisms (animals, plants and fishes). Scientist found that a number of plants possess pesticidal activity. Plant extracts and essential oils are safe, eco-friendly and more compatible with environmental components compared to synthetic pesticides. So they come under "Green pesticides" category. Now increasing trend in use to botanicals with more than 2400 bioactive plant species identified for their insecticidal and anti-pathogenic properties. Three different methods will also be used to conclude the results which are CONTACT METHOD, FEEDING METHOD and TOPICAL METHOD. Students "t" test will be used to compare different variables. To inspect the fatal concentration in 50% (LC 50) the toxicity and mortality rate for individual insect stages vary, standard error will be used. Report and structure were also added which would help in demonstrating efficiency and mortality.

Keywords: Plant extract, *Papilio demoleus*, Citrus, Pesticide, Soxhlet apparatus, leaf extract, Acetone extract, Aqueous extract, *Euphorbia royleana*, *Lantana camara*, *Cascabela thevetia*, Oil extract, Heating mental.



Curcumin as a Potent Antidepressant Drug: Curcumin contains pharmacological properties which is extracted from Turmeric plays a vital role in curing depression

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Abstract

Turmeric is a common spice which is widely used in India as a remedy. Turmeric originates from the root of *Curcuma longa*. It contains a chemical called curcumin, which has medicinal properties. This chemical helps in reducing swelling. Curcumin is the main component which gives the yellow color to turmeric. *Curcuma longa*, exhibits a wide range of pharmacological properties and has been considered a potent antidepressant drug with diverse mechanisms including monoaminergic imbalances (associated with serotonin, dopamine, noradrenaline and glutamate), neurotransmitters, neuro progression, the hypothalamic-pituitary-adrenal (HPA) axis disturbances, dysregulated inflammation and immune pathways, oxidative and nitrosamine stress and mitochondrial disturbances. Turmeric plants construct curcumin which is a biologically active compound. Depression is a common, chronic, recurrent and psychiatric disorder that seriously affects the quality of life and increases the risk of mortality.

As mental health is topic of concern so there is need of antidepressants. Effect of curcumin has been explored by doing trials on humans and animals. Preclinical work has been reported potent role of curcumin in autism spectrum disorder, post-traumatic stress disorder. Curcuminoids extracted from plant *Curcuma longa* mainly have three active components, namely curcumin, desmethoxycurcumin and bisdemethoxycurcumin. Among them the principal active therapeutic compound is curcumin. Besides being used as a food supplements curcumin has also displayed widespread biological and pharmacological features such as anti-inflammatory action, anti-carcinogenic and anti-microbial properties antioxidant and neuroprotective properties.

Methodology

Curcumin can be extracted from turmeric plant by using various traditional method such as Sonication, Soxhlet extraction, maceration, and solvent extraction and also by modern extraction technologies like ultrasound, microwaves, enzymes, and supercritical liquids. Extraction can be done by grinding raw material into powder then wash it with suitable solvent.

Result and Discussion

Curcumin is a polyphenol with anti-inflammatory properties and the ability to increase the number of antioxidants that the body produces. Extraction can be done by grinding raw material into powder then wash it with suitable solvent.

Conclusion

Chemical present in plants like curcumin plays a vital role in curing depression and several diseases. Curcumin extracted from turmeric act as antidepressant.

Keywords: Curcumin, *Curcuma longa*, neurotransmitters, pharmacological, antidepressant, serotonin, dopamine, noradrenaline, dysregulated inflammation.

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***In-silico* drug-drug and drug target predication of Doxorubicin and Cyclophosphamide with HER2 protein involved in Breast Cancer**

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Abstract

Cancer, a complex array of diseases characterized by abnormal cellular growth, manifests in various organs. In India, breast cancer stands as one of the prevalent malignancies, originating within milk ducts and exhibiting heterogeneous features. Understanding the diverse clinical and molecular subtypes of breast cancer is imperative for unravelling intricate cellular signalling pathways, cross-talk mechanisms, and factors influencing proliferation, survival, migration, and invasion. This knowledge facilitates the identification of new molecular drug targets. Particularly, the breast cancer subtype characterized by overexpression and amplification of human growth factor 2 (HER2) presents clinical aggressiveness, but prognosis has markedly improved with the introduction of anti-HER2 targeted therapy.

Methodology

Molecular docking is employed to model atomic-level interactions between small molecules and proteins by using the software Autodock Vina to predict the binding of small molecules and drug candidates to receptors. SWISS ADME is applied in drug discovery and medicinal chemistry contexts. Drug Lipinski's rule of five aids in predicting the likelihood of oral bioavailability for biologically active molecules.

Result

Both Doxorubicin and Cyclophosphamide exhibit optimal interactions with various receptors of the HER2 protein.

Conclusion

The predicted drug-target interactions of Doxorubicin and Cyclophosphamide with HER2 demonstrate promising outcomes. Considering these findings, a combined formulation of these drugs could be considered for the treatment of breast cancer. This research contributes insights into potential therapeutic strategies, emphasizing the importance of targeting HER2 in breast cancer treatment.

Keywords: HER2 -protein, breast cancer, doxorubicin, cyclophosphamide, *in silico*

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Some Transition Metal Complexes Synthesis, Characterization, and Biological Screening

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Abstract

The complexes of type $[MCl_2L_2]$ were formed by the interaction of zinc, nickel, cobalt, and copper chlorides with hydrazone ligands, which were derived from the interaction of methyl aromatic analogues with benzil monoxime hydrazone. The ligands were synthesized using a more environmentally friendly method, utilizing EtOH/AcOH instead of MeOH and concentrated H_2SO_4 . The newly synthesized complexes were characterized using elemental analysis, 1H -NMR, and IR spectroscopy. The spectra of the complexes were compared with that of the free ligands. The results of biological screening indicated that all of these compounds are biologically active, with the metal complexes exhibiting the best activity when compared to the ligands.

Keywords: benzil monoxime hydrazone, biological activity.

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Unraveling the Tapestry of Cancer: A Comprehensive Exploration of Molecular Insights, Therapeutic Innovations, and Future Perspectives

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Abstract

Cancer, characterized by uncontrolled cell growth and invasion, remains a major global health concern. Its complexity arises from a myriad of genetic and molecular alterations that drive tumorigenesis and progression. This study embarks on a journey to decipher the intricate molecular tapestry of cancer, with the overarching goal of shedding light on its underlying mechanisms and exploring novel therapeutic avenues. A nuanced understanding of cancer biology is essential for the development of effective and targeted treatments, personalized for the diverse manifestations of this heterogeneous disease.

Methodology

A multifaceted and integrative approach was adopted to unravel the complexities of cancer. The study commenced with an extensive review of current literature, providing a foundation in cancer biology. To delve deeper, advanced molecular techniques were employed, including genomic profiling, high-throughput sequencing, and bioinformatics analyses. These methodologies were applied across diverse cancer types, integrating data from clinical studies and cancer databases to ensure a holistic perspective. The synthesis of this information aimed to capture the dynamic interplay between genetic mutations, epigenetic modifications, and the intricate tumor microenvironment.

Results

The exploration uncovered the astounding heterogeneity intrinsic to cancer, with distinct genomic landscapes characterizing different types and subtypes. The identification of driver mutations and activation of oncogenic signaling pathways provided key insights into the initiation and progression of various cancers. Additionally, the tumor microenvironment emerged as a critical player, influencing disease aggressiveness and treatment response. Novel biomarkers with prognostic and predictive value were pinpointed, opening avenues for precision medicine approaches. The study also delved into the burgeoning field of immunotherapy, revealing the complex interplay between the immune system and cancer cells.

Discussion

The discussion section navigates through the implications of the identified molecular alterations, placing them within the broader context of cancer biology. The intricacies of the crosstalk between genetic mutations, epigenetic changes, and the dynamic tumor microenvironment are elucidated. Challenges in targeted therapies, such as the development of resistance, are examined alongside potential strategies to overcome these obstacles. The paradigm shift brought about by immunotherapy is explored in depth, discussing its successes, limitations, and the potential for combination therapies to enhance treatment efficacy.

Conclusion

In conclusion, this study contributes significantly to our understanding of the complex and dynamic nature of cancer. The identified molecular signatures and therapeutic targets pave the way for personalized and targeted treatment strategies, moving beyond the one-size-fits-all approach. The integration of immunotherapy represents a transformative milestone in cancer therapeutics, offering new hope for durable responses. Despite the challenges, the insights gained from this study lay the groundwork for future research endeavors and the continual evolution of innovative approaches to combat this formidable disease.

Keywords: Cancer heterogeneity, Genomic profiling, Precision medicine, Immunotherapy, Tumor microenvironment



Knowledge and Attitude Regarding Blood Donation among Undergraduate Students at selected College, Jaipur, Rajasthan

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Abstract

Blood is an important part of human body .Blood maintains the vitality and physiology of human body organs. Blood transfusion is the process of transfusing whole blood or its any component in a receiver which is obtained from a compatible donor. The indications for blood transfusion include restoration of oxygen level, replenishing the loss of any of the blood component (Plasma, RBC or Platelets etc.) Voluntary blood donors are the only source of blood in current scenario. The demand for blood transfusion is high so there is an urge to make people aware regarding blood donation to

meet the blood supply. Young students can be the active source as a blood donor so they need to be educated. This study was aimed to assess the knowledge and attitude of under graduating students regarding blood donation.

Methodology

A quantitative research approach was adopted for this study. A descriptive cross sectional research design was selected .Non probability Convenient sampling was used .125 students participated in the study. The data was obtained using a demographic and structured questionnaire which has questions related to knowledge and attitude.

Result

Majority of students 88%(110)were in the age group of 18-20 years,64% (80)of them were doing B.Sc.,76%(95) were Hindus and 79%(99) had no previous information regarding blood donation.35.2%(44) participants had adequate knowledge whereas 64.8% (81) had inadequate knowledge about blood donation .Majority of them were unaware about the age of blood donation 86.4%(108) 89(71.2%) respondents did not know the weight for blood donation. The mean $\pm$ SD knowledge score of the undergraduate students was 23.5 ± 4.5 .105(84%) students had positive attitude regarding blood donation and remaining 15 (12%) were having negative attitude regarding blood donation 5(4%) were neutral about blood donation. Approximately 100(80%) of the participants believed that is our moral responsibility to donate blood to save human kind and 88(88%) of them were willing to donate blood in future.

Conclusion

Age is an important factor to enhance the practice of blood donation. The study revealed a positive attitude of the under graduating students so Targeted strategies ought to be developed in order to increase the awareness of students about blood donation. Strategies to enhance blood donation should be made.

Keywords: Blood Donation, Undergraduate students, Knowledge, Attitude



Advancements in Graphene Semiconductor Technology: A Comprehensive Review

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Abstract

Graphene, an intriguing carbon allotrope with a two-dimensional structure, has emerged as a material poised for significant transformation within the realm of semiconductor technology. This extensive literature review aims to meticulously examine the latest advancements, challenges, and potential applications of graphene in its capacity as a semiconductor. Leveraging its distinctive electronic characteristics, remarkable thermal conductivity, and robust mechanical qualities, graphene holds immense promise for transformative breakthroughs in the semiconductor sector. The article initiates with a comprehensive analysis of the inherent characteristics of graphene that position it as an exceptionally promising material for semiconductor applications. Noteworthy attributes encompass high carrier mobility, the absence of a bandgap, and remarkable thermal conductivity, setting it apart from conventional semiconductors. Various synthesis techniques, such as chemical vapor deposition (CVD), liquid-phase exfoliation, and chemical reduction, are explored in detail, underscoring their significance in tailoring graphene properties for specific applications.

The establishment of a bandgap stands as a pivotal element in graphene semiconductor research, crucial for enabling the utilization of transistors. The article meticulously examines different approaches, including chemical functionalization, strain engineering, and the development of graphene-based heterostructures. These methodologies play a paramount role in expanding the applicability of graphene in the realm of electronic devices. The study delves into the diverse applications of graphene semiconductors across a spectrum of electronic devices, including transistors, sensors, and memory devices. Graphene's remarkable electrical performance facilitates the development of high-speed and energy-efficient electronic components, laying the foundation for next-generation semiconductor devices.

Despite the favorable attributes of graphene, obstacles necessitate resolution for pragmatic deployment. The paper conducts a comprehensive analysis of challenges related to large-scale manufacturing uniformity, doping control, and integration compatibility with established semiconductor technologies. Detailed discussions on strategies to address these problems, including functionalization techniques and interface engineering, are provided. The paper further explores prospective applications of graphene semiconductors in emerging domains such as optoelectronics

and quantum computing, expanding beyond traditional electronic applications. The unique optical and quantum characteristics exhibited by graphene present novel opportunities for cutting-edge electronics with unparalleled performance.

The analysis concludes by providing an overview of potential future paths and research prospects within the field of graphene semiconductors. Emphasizing the importance of ongoing investigation into innovative synthesis techniques, meticulous manipulation of electrical characteristics, and the seamless incorporation of graphene into established semiconductor fabrication practices. In conclusion, this comprehensive scholarly article offers an in-depth analysis of the progress, challenges, and potential applications of graphene semiconductor technology. The work contributes to a more comprehensive understanding of graphene's impact on the future of semiconductor devices by examining its fundamental features, production techniques, bandgap engineering, and diverse applications.

Keywords: Graphene semiconductor, Two-dimensional structure, Electronic characteristics, Semiconductor applications, Bandgap engineering, Emerging applications



Pharmacological and Biochemical Investigations of Medicinal Plant *Tribulus terrestris*

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Abstract

Medicinal plants have long been recognized for their therapeutic benefits as they are a rich source of bioactive compounds. Plants are a powerful source of phytomedicines. Plant metabolites can be derived chemically from any portion of the plant. Medicinal plants possess diverse therapeutic capabilities that are primarily attributed to the synthesis of their secondary products. The ongoing search for novel chemicals with the ability to combat germs that are resistant to many antibiotics is reflected in plant extracts. Plant extracts are a result of ongoing research into novel substances that may be able to combat germs that are resistant to many antibiotics. In this aspect, *Tribulus terrestris* an important plant of family Zygophyllaceae will be used for the phytochemical and biochemical investigations. This plant is used to treat a variety of diseases in different traditional medical systems. This plant has been known to possess many pharmaceutical properties such as antihelminthic, hepatoprotective, nephroprotective, wound healing, insecticidal, antitubercular,

anti-inflammatory, antioitrogenic, antimicrobial, antioxidant, anticancer, cardiovascular, hepatoprotective, anti-ulcer, diuretic, antiurolithiatic etc.

Methodology

The above selected plant will be evaluated for primary as well as secondary metabolites by using different qualitative and quantitative methods. Isolation of various primary and secondary metabolites will be carried out using various protocols like Lowery's method, Folch method, phenol sulphuric acid method, Singleton method, Fazel method and many more. Screening of plants for possible biochemical estimation will be done using crude extracts of different parts.

Result and Discussion

All of the studied extracts and fractions contain sugars, lipids, proteins, saponins, tannins, flavonoids, and alkaloids, according to the results of the phytochemical examination.

Conclusion

These results indicated the use of *Tribulus terrestris* to treat infections with emphasis on isolating and characterising the active principle responsible for antibacterial, antifungal and cytotoxic activities and its exploitation as therapeutic agents.

Keywords: Phytomedicines, antihelminthic, hepatoprotective, anti-inflammatory, secondary metabolites.



Elucidating the Anticancer efficacy of *Carica papaya* leaf extracts: A comprehensive study on their therapeutic potential in Breast cancer treatment

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Abstract

Cancer a leading cause of global mortality, demands innovative therapeutic approaches to mitigate its devastating impact. Breast cancer, specifically, affects millions annually, necessitating novel adjunct therapies to enhance efficacy and reduce side effects. *Carica papaya*, a traditionally revered medicinal plant, emerges as a promising candidate for such therapeutic intervention. This study delves into the potential anticancer activity of *Carica papaya* leaves, aiming to contribute valuable

insights into their application in breast cancer treatment. The prevalence and mortality rates of breast cancer underscore the urgency for novel treatments. Papaya leaf extracts, known for their nutritional richness and folk medicinal use, offer a compelling avenue for investigation. This research explores the antioxidative potential of papaya extracts, evaluating total polyphenol and flavonoid content, along with antioxidation capacity. Notably, the seeds and leaves exhibit superior antioxidative potential compared to skin and pulp fractions. In assessing the impact on breast cancer cell lines, methanol- and ethanol extracts demonstrate minimal effect, while water extracts of leaves and seeds exhibit modest cytotoxicity, particularly against estrogen receptor (ER)-negative cell lines. This implies the presence of bioactive compounds in papaya leaves, particularly in methanolic extracts, with the potential for development into anti-cancer agents targeting ER-negative breast cancer. The comprehensive medicinal value of *Carica papaya*, acknowledged throughout history, positions it as a noteworthy nutraceutical. As global cancer burdens escalate, the significance of exploring alternative therapies becomes paramount. This study, by shedding light on the anticancer properties of *Carica papaya* leaves, aims to serve as a foundation for further research and development in the pursuit of effective treatments for breast cancer.

Keywords: *Carica papaya* leaves, Anticancer, Breast cancer, Antioxidants, Polyphenols.



Awareness and attitude about basic life support among school teachers in Jaipur, Rajasthan: A cross-sectional study

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Abstract

Cardiac arrest is one of the most common and emerging public health issues worldwide. It is the sudden cessation of cardiac activity in which the victim becomes unresponsive with no circulation and no breathing. Early Cardiopulmonary Resuscitation (CPR) may reverse the cardiac arrest. 33% of the client required Cardiopulmonary Resuscitation (CPR) before reaching to the hospital. Therefore, many countries have been made Basic Life support training mandatory for teachers and students and other public workers. Schools are one of the best and suitable place to teach Basic Life Support, and in order to evaluate the effectiveness and quality of teaching and learning, it is important to gauge teacher performance and skill development. This study sought to measure how well the awareness programme on basic life support training programme was working with school teachers. Particularly in remote areas where there is no immediate medical care, Children frequently require emergency assistance. There is an urge to answer questions such as when BLS should be

considered and how a school teacher should handle a cardiac arrest. Another question was that –“Who will teach BLS in Schools”? A good basic life support (BLS) knowledge and skills are required for a school teacher. There are multiple reasons why teachers are unable to provide BLS such as out-dated skills and knowledge. As a result, this study was conducted to determine existing knowledge, skill and attitude, skills BLS.

Methodology

A quantitative cross sectional study was conducted among school teachers. A total of 60 participants were selected using a non-probability purposive sampling technique to evaluate the effectiveness of awareness programme on knowledge and attitude of teachers regarding Basic Life Support. The pretest was assessed before the intervention and the post-test assessment was done on 5th day. The data was gathered after obtaining formal written consent from the respondents and distributing participant information sheets to each subject.

Result

On assessment, the majority of participants were female 55 (92%), married 30 (70%) and aged between 41-50 years 30(50%). Of the 30(50%) graduates, teaching experience varied from 6 to 10 years 22 (36%). Majority of teachers were Hindus 24(60%) and don't have previous knowledge 36(60%). There was a correlation between knowledge score and gender, experience, educational status and prior knowledge. Before the intervention the majority of participants had poor knowledge 32(53.33%). Posttest improved good knowledge 52(86.66%). Similarly, in pretest, most of the participants had a negative attitude 33(55%), moderate knowledge 8(13.33%), after intervention, most of them 44(73.33%) had good knowledge. The mean knowledge score of the respondents on pretest was 16.93 whereas the mean knowledge score of posttest was 22.6. There was a significant difference in the knowledge score of pretest and posttest at $p < 0.01$ level. Hence educational programme on Basic Life support provides pertinent information and was found effective.

Conclusion

Basic life support is the most effective intervention in prevention of complications due to cardiac deaths. For school teachers it is important get equipped with guidelines of performing measures of Basic Life Support i.e CPR. Most of the school teachers improved their knowledge and attitude after the intervention.

Keywords: Knowledge, Attitude, Basic Life Support, School Teachers, Cardio Pulmonary Resuscitation



Breast Cancer Transcriptional Regulatory Network Reprogramming by using the CRISPR/Cas9 system: An Ontogenetic Perspective

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Abstract

Breast cancer (BC) is the second most commonly diagnosed cancer in the world. BC develops due to deregulation of transcriptional profiles, substantial interpatient variations, genetic mutations, and deregulation of signaling pathways in breast cells.

Methodology

CRISPR/Cas9 recently received a profound attention due to its potential in biomedical and therapeutic applications. Here, we review *the role* of various molecular signalling pathways dysregulated in BC development such as PTEN/PI3K/AKT/mTOR as well as BRCA1/BRCA2/TP53/TERT and their interplay between the related gene networks in BC initiation, progression and development of resistance against available targeted therapeutic agents.

Result and Discussion

This study presents a comprehensive overview and functional interplay among PTEN, PI3K, AKT, mTOR, BRCA1/2, TP53, and TERT genes in BC [29,30] Various reports have shown that a number of genes can influence BC fate and disease states either due to their mutational status or their capacity to regulate the associated gene regulatory networks. Therefore, targeting genetic mutations and *gene* networks involved in complex signaling pathways associated with the BC, by CRISPR/Cas9 technique *could present a novel strategy* to design therapeutic rationale to treat BC.

Conclusions

We compiled the potential therapeutic application of CRISPR/Cas9 target for TNBC genes. Mainly, we discussed major target genes, which are actively involved in tumor progression and TNBC drug resistance mechanism.

Keywords: Triple-negative breast cancer, CRISPR/Cas9, tumorigenesis, transcription factor, anti-cancer drug resistance.



Structural Properties of Ni Thin Films deposited on to Self-assembled polystyrene nanosphere

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Abstract

In this paper we report the structural properties of Ni nanocaps prepared by using as a function of thickness. These films were deposited by Electron beam evaporation technique on PS (Polystyrene) nanospheres (800nm diameter) coated Si (100) substrate. For a comparative study, the film was also deposited on plane Si substrate. Grazing incident X-ray diffraction (GI-XRD). Roughness and thickness of thin films were calculated using X-ray reflectivity (XRR) measurement. XRR oscillations changes with film thickness and their amplitude decreases.

Keywords: GI-XRD; XRR; Polystyrene nanosphere.

□□□

Performance evaluation of CETP (Common Effluent Treatment Plant) of Bhiwadi and its impact on environment

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Abstract

CETP was promoted by the MoEF (Ministry of Environment and Forests) in 1984 for the purpose of waste-water treatment. There are 14 CETPs in Rajasthan. Rapid industrialization and the addition of domestic waste water in Bhiwadi have led to a significant increase in the volume of waste water discharged from the region which can be hazardous to the environment if not treated properly. 9 MLD CETP with modernization of the advanced technology and the plant will have treatment consisting of physical, chemical and biological conventional filtration and tertiary treatment units with sludge handling infrastructure. The permissible standard for various parameters are to be ensure by the industry before sending the effluent to the CETP. The latest technology ZLD (Zero

liquid discharge) CETP plant has been set up in Bhiwadi, polluted water will be recycled. Plant cost is 174 crores and is going to start in this year.

Keywords : CETP, Treatment, Plant, Parameters, Water



Anti-Cancerous Property of *Ocimum sanctum* : Higher concentration of Eugenol have been shown to have Anti-Cancerous Property

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Abstract

In most cases, cancer develops due to abnormal cell growth and subsequent tumor formation. There are 30 natural compounds under clinical trials for the treatment of cancer. *Ocimum sanctum* commonly known as Tulsi or Holy Basil of the genus *Ocimum*, is one of the most widely available and effective medicinal plant in India and South East Asia. The Anti-cancer effect of Tulsi have earned the Title of “Queen of Herbs” in Ayurvedic Treatment. Herbal medicine, the backbone of traditional medicine in many countries have played an Important role in curing the diseases of humans since ancient times. Bioactive compounds of *Ocimum sanctum* responsible for its various-various medicinal properties and their effect at the molecular level needs to be investigated in more details. Scientific studies have shown it to possess anti-inflammatory, analgesic, antipyretic, anti-diabetic, hepatoprotective, hypolipidemic, anti-stress and immunomodulatory activities. Preclinical studies have shown that Tulsi and some of its phytochemical eugenol, rosmarinic acid, apigenin, myricetin, luteolin, β -sitosterol, and carnosic acid prevented chemical induced skin, liver, oral, lung cancer and to mediate these effects by increasing the antioxidant activity, altering the gene expressions inducing apoptosis and inhibiting angiogenesis and metastasis. *Ocimum sanctum* has a variety of biological/pharmacological activities such as Antibacterial, antiviral, anti-fungal, antiprotozoal, anti-allergic, antihypertensive, cardio protective, central nervous system depressant, memory enhancer antihypercholesterolaemic, hepatoprotective, anti-diabetic, anti-asthmatic, anti-thyroidic, antioxidant, anticancer, chemopreventive, radioprotective, immunomodulatory, antifertility, antiulcer, anticataract, antileucodermal and anticoagulant activities.

Methodology:

The aqueous extracts of Tulsi and its flavonoids, orion, and vicenin are shown to protect mice against γ - radiations induced sickness and mortality and to selectivity protect the normal issues against the tumoricidal effects of radiations. Leaves and flowering tops are used for extracting essential oils. Since Ayurvedic Times, various parts such as leaves, roots, seeds and whole plant recommended for treatment of a spectrum of diseases. Aqueous extracts of Tulsi plant by using methods like Hypo-distillation by using Clevenger type apparatus, sonication extraction method, steam distillation and ultra-sonic extractions.

Result and Discussions:

The aqueous extract of *Ocimum sanctum* leaves exhibited significant cytotoxic effect against Cancer cell line. This will not only kill the cancerous cell from the body but also detox the body from toxins and tumor cells and it also has anti-fungal property.

Conclusion:

Tulsi is referred to as the “Elixir of Life” based on various nutraceutical and pharmaceutical activities of tulsi as a whole or its parts, specially its leaves, against a wide range of diseases. The two main natural sources of eugenol are clove and cinnamon, but commercial level extraction of eugenol is quite expensive and requires lengthy cultivation times; hence, tulsi can be an affordable alternative that would be used in place of cinnamon and clove.

Keywords : *Ocimum Sanctum*, Eugenol, Anti-cancer, Tulsi, Cancer.

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Green synthesis of Nanoparticles by different methods

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Introduction:

Nanomaterials are building blocks for numerous nanotechnological devices. Some decades ago NMs word would have puzzled scientists regardless of the fact that in the nature NMs always existed. The term “nanomaterials” indicates particles having sizes in the range 1 to 100 nm, with at least one in out of three dimensions. The chemical and physical properties of molecules or atoms change in NMs state, than corresponding materials in bulk. NMs possess higher surface area and also exhibit quantum effects due to its very small size. Therefore, the unique properties of NMs cannot be predicted by comparing it with the bulk material.

Nanoparticles exist in the natural world and are also created as a result of human activities. Because of their submicroscopic size, they have unique material characteristics, and manufactured nanoparticles may find practical applications in a variety of areas, including medicine, engineering, catalysis, and environmental remediation.

Green synthesis of nanoparticles refers to the synthesis of different metal nanoparticles using bioactive agents such as plant materials, microorganisms, and various biowastes including vegetable waste, fruit peel waste, eggshell, agricultural waste, and so on.

Nanoparticles can be classified into any of various types, according to their size, shape, and material properties.

Classification of nanoparticles:

1. Carbon based nanoparticles: Due to the unique catenation property, carbon can form covalent bonds with other carbons in different hybridization states such as Sp , Sp^2 , and Sp^3 in order to form a variety of structures of small molecules and longer chains. Carbon-based nanoparticles are found in morphological forms such as ellipsoids, hollow tubes, or spheres. Graphene (Gr), carbon nanotubes (CNTs), Fullerenes (C60), carbon nanofibers, carbon black are the different categories of carbon-based nanomaterials.

2. Inorganic based nanoparticles: These nanomaterials include metal-based nanoparticles, metal oxide/hydroxide nanoparticles, and transition metal chalcogenide (TMC) nanoparticles. These nanomaterials can be synthesized into metals like Ag, Au, Fe nanoparticles, and metal oxides such as ZnO, TiO₂, and Fe₃O₄, CeO₂.

3. Organic based nanoparticles: These nanoparticles are made mostly from organic matter, aside from inorganic-based or carbon-based nanomaterials. The use of noncovalent interactions for self-assembling and molecular designing helps to transform the organic nanomaterials into coveted structures such as micelles, dendrimers, ferritin, micelles, compact polymers, and liposomes nanoparticles. These types of nanomaterials are usually biodegradable and nontoxic, and, therefore, considered environmentally friendly materials.

4. Composite nanoparticles:

Composite nanoparticles are defined as the nanomaterials with composite structure which are constituted by two or more components of nanoscale with special physical and chemical properties. Nanorods and nanofibers are the examples of **Composite nanoparticles**.

Industrial Uses of nanoparticles:

Nanomaterials can be utilized in the agriculture and food industries as nanoformulations for crop improvement, in crop protection for the identification of diseases, nanodevices for the genetic manipulation of plants, plant disease diagnostics, etc.

Nanoencapsulation displays the advantage of more efficient use and safer handling of pesticides, fertilizers, and vaccines with less exposure to the environment that guarantees eco-protection.

It can be applied to all aspects of the food sector including agriculture, food processing, food packaging, and supplements.

Introduction of nanotechnology in food packaging sector has significantly addressed the food quality, safety and stability concerns.

Additionally, nanotechnology has been explored for controlled release of preservatives/antimicrobials, extending the product shelf life within the package. The promising reports for nanotechnology interventions in food packaging have established this as an independent priority research area. Nanoparticles based food packages offer improved barrier and mechanical properties, along with food preservation and have gained welcoming response from market and end users.

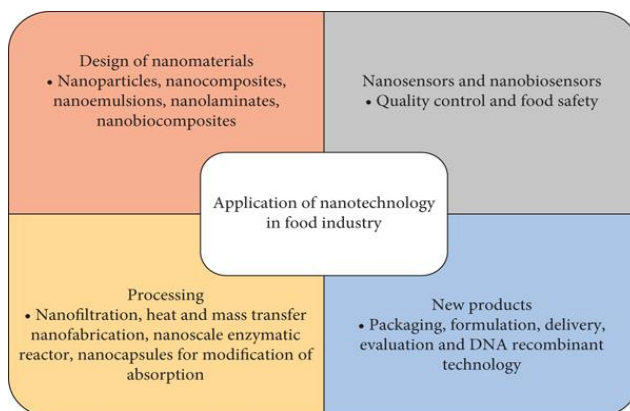


Fig 1. Application of nanotechnology in food industry

Nanoparticles have many uses in industrial level but this work will be focused on preparation of food packaging material by the use of nanoparticles.

Literature Review:

Green synthesis of magnesium oxide nanoparticles and its applications by S. Abinaya, Helen P *et al.* in 2020 who came to the conclusion that Green synthesis approaches are gaining the attention of researchers and they follow a less hazardous process to obtain nanoparticles [11].

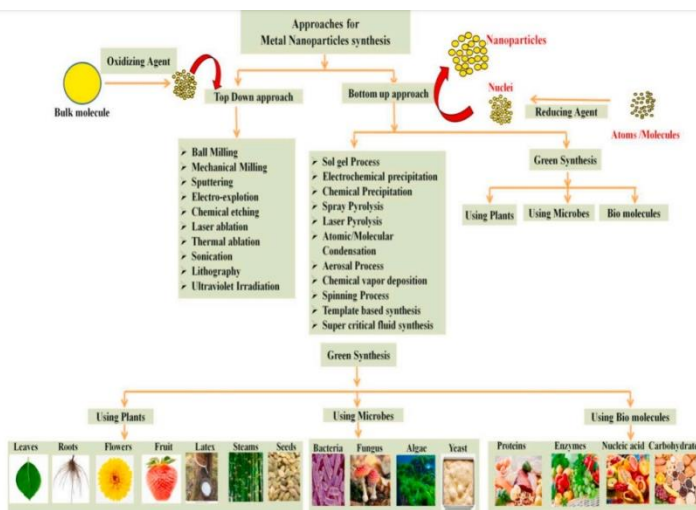


Fig. 2. Flow chart showing synthesis of metal oxide nanoparticles by using various sources

Green synthesis of ZnO nanoparticles from *Syzygium Cumini* leaves extract with robust photocatalysis applications was given by Hamad Sadiq, Farooq Sher *et al.* in 2021 who came to the conclusion that for better upcoming nanotechnology, biosynthesis and green synthetic method should be used for the synthesis of nanoparticles by saving the environment to avoid the use of dangerous chemical reducing agents and organic solvents.



Fig 3 : Preparation scheme of ZnO Nanoparticles from *Syzygium cumini* leaves

Preparation, properties, and biomedical applications of bimetallic nanoparticles was reported by Hamid Tayefi Nasrabadi *et al.* in 2016. They concluded that Au – Ag NPs are prepared by *S. mahogany* Jacq Leaves. One of the biological synthesis methods for Au–Ag NPs is by using the leaf

extract of *S. mahogani* Jacq. The role of the leaf extract is reduction and stabilization of Au and Ag for the quick arrangement of stable metal NPs with different compositions, shapes, sizes, and also with high monodispersities. Au/Ag BMNPs produced by this technique have prospect for biomedical applications in the future.

Metal Oxide Nanostructures: Synthesis, Properties, and Applications by Lin-Hua Xu, Dnyaneshwar S. Patil, *et al.* in 2015 who came to the conclusion that antimicrobial effectiveness of metal oxide nanoparticles is highly dependent on morphology as a result of the synthesis method. Solution casting and electrospinning are innovative methods applied to synthesize metal oxide incorporated biopolymer films for active packaging with improved mechanical and barrier properties combined with active components (antimicrobial, ethylene scavenging).

Green synthesis of metals and their oxide nanoparticles: application for environmental remediation by Jagpreet Singh, Tanushree Dutta *et al.* in 2018 came to the conclusion that green synthesis is regarded as an important tool to reduce the destructive effects associated with the traditional methods of synthesis for NPs commonly utilized in laboratory and industry.

Metal based nanoparticles, sensor, and their multifaceted application in food packaging by Antul Kumar, Anuj Choudhary *et al.* in 2021 reported that M-NPs helps in the improvement of properties including freshness indicators, mechanical properties during food packaging.

Green synthesis of silver nanoparticles from *Tectona grandis* seed extract: characterization and mechanism of antimicrobial action on different microorganism by Akhil Rautela, Jyoti Rani *et al.* in 2019 who observed that the method proved to be very simple, cost-efficient, and convenient.

Green synthesis of silver nanoparticles and characterization of their inhibitory effects on AGEs formation using biophysical techniques by Jalaluddin M. Ashraf *et al.* in 2016 reported the inhibitory effects of AgNPs (silver nanoparticles) in AGEs formation.

Biogenic synthesis of bimetallic (Zn - Cu) nanoparticles by leaf extract of citrus limon and evaluation of its antibiofilm activity against *E. coli*. by Tooba, Vikas Shrivastava *et al.* in 2021 who came to the conclusion that synthesized bimetallic Zn-Cu nanoparticles using the greener route i.e. dry leaves powder of Citrus limon as it is environment-friendly, cost-effective, has a high surface area to volume ratio and hence superior over monometallic nanoparticles synthesized via physical or chemical approach [13].

Synthesis of Zinc Oxide nanoparticles by ecofriendly routes: Adsorbent for copper removal from wastewater by Julia de, Carla Bitten court *et al.* in 2020 synthesized Zinc Oxide nanoparticles by two simple routes using Aloe vera (green synthesis, route I) or Cassava starch (gelatinization, route II) [12].

Green synthesis of bimetallic ZnO-CuO nanoparticles and their cytotoxicity properties were discussed by Yan Cao, Hayder *et al.* in 2018. They reported that these NPs contained polygonal ZnO with hexagonal phase and spherical CuO NPs with monoclinic phase. The anticancer activity of the prepared bimetallic NPs was evaluated against lung and human melanoma cell lines based on MTT assay [7].

Visible light responsive, self activated bionano composite films with sustained antimicrobial activity for food packaging was identified and discussed by Yongsheng Ni, Shuo Shi, *et al.* in 2021. They concluded that the research on a new type of low-cost, less-loss and adjustable sustained antibacterial activity food packaging films with self-activation ability and great industrialization potentiality is of great scientific and technological interest. Herein, a novel chitosan/negatively charged graphitic carbon nitride self-activation bionano composite films was prepared by one-step electrostatic self-assembly. This film can effectively extend the shelf life of tangerines to 24 days. This work can provide a new pathway for the preparation of low-cost packaging films with excellent visible light responsive property and sustainable antibacterial activity [3].

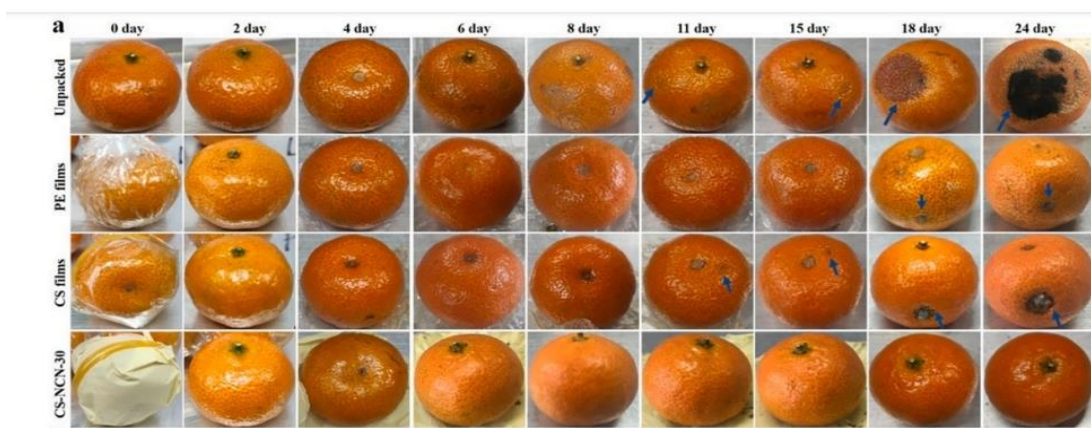


Fig 4: Experimental results for tangerine at different times with various treatment: unpacked, PE films, CS films and CS-NCN-30

Metal oxide nanoparticles for safe active and intelligent food packaging were reported by Maria Vesna Nikolic, Zorka *et al.* in 2019; who came to the conclusion that Bacterial contamination continues to be a crucial food safety issue. Smart packaging incorporates both active and intelligent components. Intrinsic antibacterial activity, oxygen and ethylene scavenging (active) and the sensing (intelligent) properties of metal oxide nanoparticles are in research focus for application in smart food packaging, especially bio-nanocomposite films. zinc oxide and titanium oxide are metal oxide most commonly used as antimicrobial agents especially in active food packaging [5].

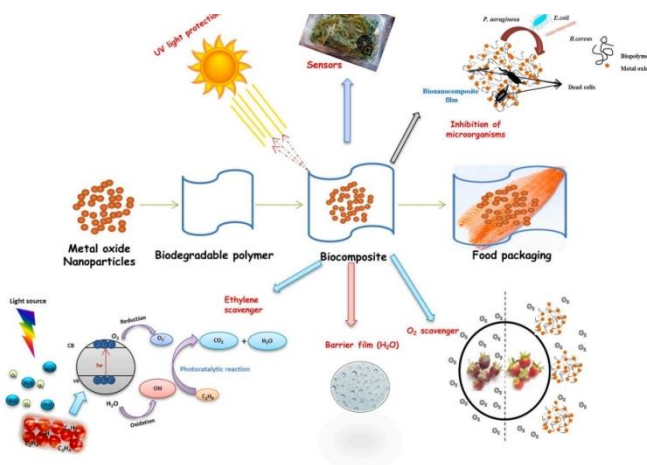


Fig 5: Schematic representation of the preparation of smart food packaging using metal oxide NPs as coating or incorporated in a biodegradable polymer and its application in the inhibition of microorganism, UV light protection, barrier, Oxygen and ethylene scavenging and sensing.

Enhanced structural, electrical, mechanical properties and antibacterial activity of Cs/PEO doped mixed nanoparticles (Ag/TiO₂) for food packaging applications was reported by M.M. Abutalib *et al.* in 2020 who came to the conclusion that the method is eco-friendly, cheap, and can produce Ag NPs at room temperature. The solution casting technique was used for preparing polymer blend doped with Ag/TiO₂ NPs films. A higher amorphicity of the doped polymer blend films was observed through the XRD analysis. The surface plasmon resonance of green synthesized silver nanoparticles (at 430 nm) was proved via UV–Vis spectral studies and the average size of the particle was substantiated by TEM analysis [1].

Steps of formation of Nanoparticles -

1. Synthesis of plant extract
2. Synthesis of metallic nanoparticles
3. Characterization of NPs
4. Synthesis of biodegradable film with metal based nanoparticles
5. Characterization of biodegradable-NPs film
6. Measurement of shelf life of fruit:

1. Preparation of plant part (leaves, root, stem, flower) extract :

Fresh plant part (leaves, root, stem, flower etc.) will be weighed and will be washed with distilled water. Plant part (leaves, root, stem, flower etc.) will ground in mortar and will be mixed with distilled water and then will be boiled. The solution will be filtered using Whatman filter paper and clear aqueous extract will be obtained.

2. Synthesis of metallic nanoparticles:

A stock solution of metal salt having specified molar concentration will be prepared. The plant extract will be added to the boiled salt solution. The reaction mixture will be kept at 95 °C and stirred for 1 h and finally store at room temperature. After 24 h, the mixture will be centrifuged to separate the produced nanoparticles from the supernatant. The as-produced nano-particles will be dried in an oven at 80 °C and store for further use.

3. Characterization:

Characterization of nanoparticles will be carried out by following techniques:

(a) SEM analysis:

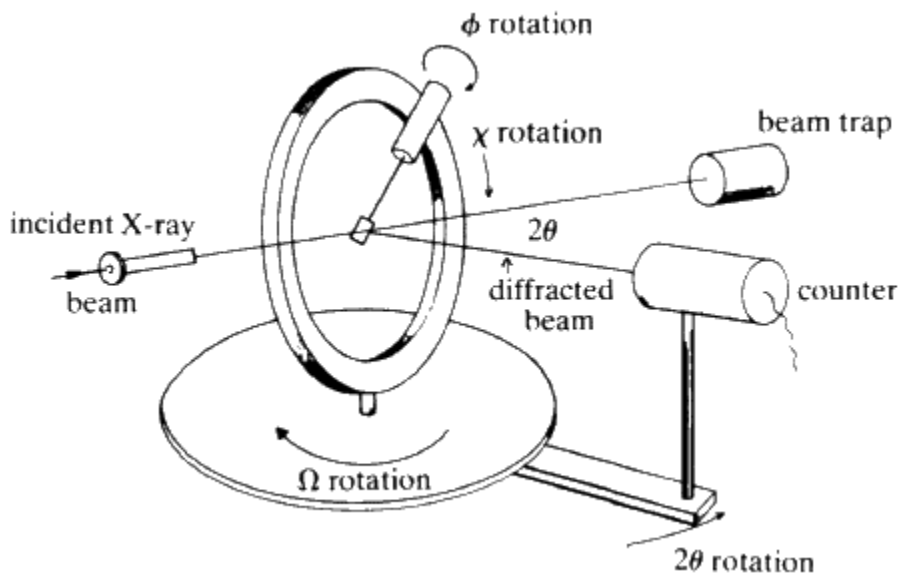


Fig 6 : diagram of SEM analysis

A scanning electron microscope (SEM) projects and scans a focused stream of electrons over a surface to create an image. The electrons in the beam interact with the sample, thereby producing various signals that can be used to obtain information about the surface's topography and composition.

The SEM images justify the structural and morphological behavior of the metallic nanoparticles. It was observed that the bimetallic copper–silver particles have semi-spherical agglomerated clusters (Zaleska-Medynska et al. 2016).

(b) XRD Analysis:

The X-ray diffraction patterns of the metallic nanoparticles consist of sharp peaks which indicated the crystallinity of the produced particles (Ibrahim 2015).

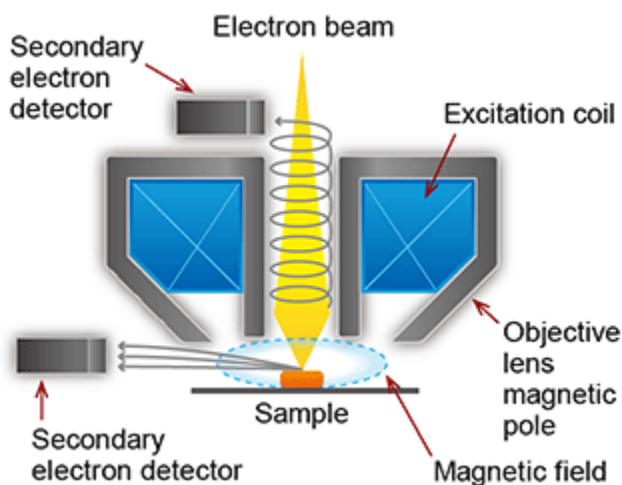


Fig 7 : Diagram of XRD analysis

(c) UV - Vis analysis:

UV-Vis spectroscopy is an analytical technique that measures the amount of discrete wavelengths of UV or visible light that are absorbed by or transmitted through a sample in comparison to a reference or blank sample.



Fig 8 : UV-VIS spectroscopy instrument

(d) Atomic Force Microscopy (AFM): Atomic force microscopy is a scanning probe microscopy technique that can be used to probe and visualize the surface (and several other force-related quantities) of nanometer-sized or even atomic-sized objects. A sharp tip at the end of a cantilever is rastered across the surface of a sample, and the forces the cantilever experiences during the

measurement as a result of the interaction of the tip with the sample are recorded with the help of a laser beam reflected off the tip of the cantilever onto a photodiode array.

(e) Small-Angle X-Ray Scattering (SAXS) :

Small-angle X-ray scattering is a very versatile method for the characterization of nanomaterials. The sample is illuminated with X-rays and the scattered irradiation is registered by a detector at small angles, usually between 0.1° and 5° . Based on the intensity distribution of the scattered X-ray photons that are passing through the sample, information about particle size, size distribution, morphology, crystallinity, molecular weight, and agglomeration can be obtained.

(f) Dynamic Light Scattering (DLS):

Dynamic light scattering estimates the particle size from the Brownian diffusion of the particles in solution. DLS size estimation is based on the determination of the free diffusion coefficient of suspended particles. A laser is transmitted through a measurement cell containing the particle suspension, and the random thermal motion of the particles causes time-dependent fluctuations of the intensity of the scattered light.

4. Synthesis of biodegradable film with metal based nanoparticles:

For the preparation of film two methods are available:

1. Electrospinning process
2. Solvent casting process

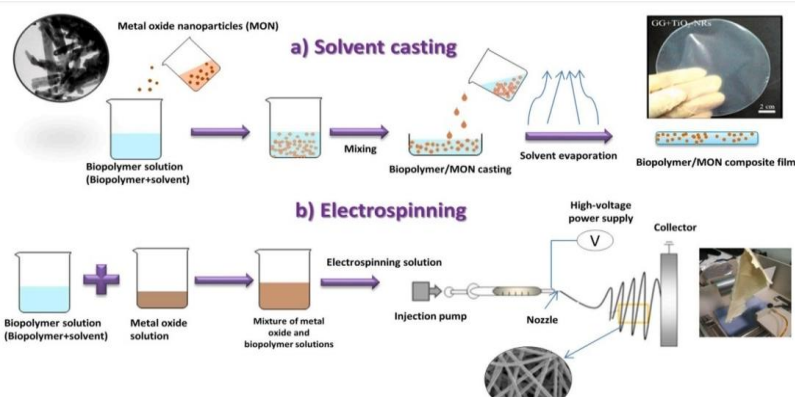


Fig 9 : Schematic diagram of solvent casting process and Electro-spinning process

But in this work we will use the solvent casting process because it is low cost process.

5. Characterization of biodegradable-NPs film

(a). FTIR analysis of bio nanocomposite films:

The pure CS films exhibited typical characteristic bands in the range of $3100\text{--}3500\text{ cm}^{-1}$, which was assigned to the characteristic O–H and N–H stretching vibrations of CS. But the peak intensity at the same range of its bionanocomposite films decrease because large number of hydroxyl groups in CS engaged in forming hydrogen bonds. There is a typical --NH_3^+ bending vibration (amide II) at 1620 cm^{-1} (Wu et al., 2019). Similarly, the peaks at 1637 , 1571 , 1404 , 1318 and 1238 cm^{-1} are

the characteristic stretching vibrations of C–N heterocycles and the peak at 814 cm^{-1} is the typical stretching vibration of triazine units of NCN (Sun et al., 2017). The characteristic peaks of CS (–NH₃ + peak at 1620 cm^{-1}) and NCN (–COO–peak of NCN at 1072 cm^{-1}) appeared in the all-prepared bio-nanocomposite (Wang et al., 2019), which demonstrated the successful fabrication of CS/NCN bionanocomposite films. The intensity of the two characteristic peaks in CS/NCN bionanocomposite films becomes weaker after adding the NCN. The above changes indicate that hydrogen bonds and electrostatic interactions appear in the CS/NCN bio-nanocomposite films (Tavares, Souza, Goncalves, & Rocha, 2021).

(b). XRD and thermal properties of bionanocomposite films:

The XRD patterns was used to confirm the successful fabrication of the bionanocomposite films. all spectra show the amorphous characteristic absorption peaks of CS at the range of 37° – 45° . The characteristic peaks of NCN can also be found at 17.5° and 27.37° (JCPDS 87–1526) in the spectrum of bionanocomposite films (Raha&Ahmaruzzaman, 2020), which demonstrate the successful fabrication of the CS-NCN. The intensity of characteristic absorption peak in XRD spectrum enhanced as the increase content of NCN from 20% to 40%. However, the enhancement of peak intensity was not obvious from CS-NCN-30 to CS-NCN-40, which also reflected that 30% may be the most appropriate addition.

6. Measurement of shelf life of fruit:

We will have different types of fruit and check their shelf life by biopolymer NPs film. Tangerine fruit at different times with various treatments: unpacked, PE films, CS films and CS-NCN-30. (Yongsheng Ni, Shuo Shi , Min Li , Liang Zhang 2021)

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Synthesis and Characterizaion of silver nanoparticles using tea leaf extractand evaluation of their stability and antibacterial activity

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Abstract

Using tea leaf extract, a straight forward, economical, and ecologically beneficial process for producing silver nanoparticles (AgNPs) has been established. We have investigated the effects of temperature, time, and dosage of tea extract on AgNP production. Silver nitrate and tea extract were used to create the AgNPs, and the reaction was allowed to run for two hours at room temperature. Transmission electron microscopy (TEM), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), thermogravimetric analyzer, and zeta potential analyzer were used to evaluate the produced AgNPs. The synthesised AgNPs ranged in size from 20 to 90 nm and were almost spherical. The tea extract served as the reducing and capping agents on the AgNPs' surface, according to FT-IR spectrum analysis. Additionally, the analysis of the time-dependent release of silver ions from the tea extract-synthesised AgNPs demonstrated good stability. Furthermore, the growth curve and the Kirby-Bauer disk diffusion method were used to assess the antibacterial activity of AgNPs. When compared to *Escherichia coli*, the AgNPs made from tea extract had reduced antibacterial action because of their bigger size and decreased release of silver ions.

Methodology:

Synthesis of AgNPs by tea extract

The AgNP syn- thesis was reduced by using an extract from tea leaves. 100 mL of ultrapure water in a 250 mL Erlenmeyer flask was filled with 16 g of dried green tea leaves (Richun Tea Company, Fujian). After boiling for five minutes, the mixer was cooled, filtered, and the filtrate was kept as the stock solution at 4°C for one week. When tea extract was examined using a TOC analyzer (TOC-VCPH, Shimadzu, Japan), the total organic carbon (TOC) content was about 20 g/L.

Result and Discussion

Effect of the tea extract dosage

At 25°C, the effects of the tea extract's initial concentrations on the productivity of AgNPs were investigated. The working solution was the tea extract stock solution, which had been diluted to 1%, 5%, 10%, 25%, 50%, and 100% (v/v), with corresponding TOCs of 1.0, 2.0, 5.0, 10.1, and 20.2 g/L. The solution began to take on its characteristic brown color, which signaled the formation of AgNPs (SI Fig. S1). The total and silver ion concentrations were examined in order to comprehend the formation of AgNPs.

Temperature effect on AgNP synthesis

Using 5% (v/v) tea extract, the effects of temperature on the formation of AgNPs were investigated at 25, 40, and 55°C. A prior study using *Pulicaria glutinosa* extract to synthesize AgNP revealed that a higher temperature increased AgNP production [21]. Our findings demonstrated that the production efficiencies of AgNPs were unaffected significantly by temperature increases (data not shown). This discrepancy may have resulted from the fact that the production efficiencies in the current study were already 99.7% (w/w) at 25 °C and had little room for improvement.

Conclusion

This study outlined an easy and environmentally friendly method of synchronizing AgNPs using tea extract. AgNPs were described using TGA, TEM, XRD, and FT-IR. The functional groups from the tea extract were capped on the surface of the synthesized AgNPs, which had a crystalline structure and ranged in size from 20 to 90 nm. Conditions like the tea extract dosage and reaction temperature had an impact on the rate of AgNP formation and the efficiency of production. Because the functional groups from the tea extract are capped on the AgNPs, the silver ion release from the AgNPs made from tea extract was less than that of the PVA-coated, uncoated, and commercial AgNPs. This indicates good stability. However, the biosynthesized AgNPs demonstrated only a minor antibacterial activity against *E. coli* because of their larger size and decreased release of silver ions.

Keywords: Transmission electron microscopy (TEM), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), thermogravimetric analyzer, and zeta potential analyzer.

□□□

Striving for a Greener Future: Environmental Sustainability and Ethical Disposal in Cancer Tech Development

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Abstract

Environmental sustainability and ethical disposal are crucial considerations in the development of cancer technologies. As the field of cancer treatment and diagnosis advances, it is imperative to prioritize sustainable practices and responsible waste management to minimize adverse environmental impacts and uphold ethical standards. Environmental sustainability entails reducing the environmental footprint of cancer tech development. This includes minimizing the use of harmful chemicals and materials, and adopting energy-efficient manufacturing processes. By selecting environmentally friendly materials and exploring eco-friendly alternatives, researchers can contribute to the reduction of resource depletion and pollution associated with cancer tech production. Furthermore, ethical disposal plays a significant role in ensuring responsible end-of-life management for cancer technologies. Many cancers treatment and diagnostic devices contain hazardous substances, such as heavy metals and radioactive materials, which can pose risks to human health and the environment if not disposed of properly. Developers should incorporate design principles that facilitate the safe and proper disposal of these devices, including clear instructions for handling and recycling. Implementing sustainable and ethical practices in cancer tech development also involves considering the entire lifecycle of these technologies. This encompasses responsible sourcing of raw materials, reducing waste generation during manufacturing, and promoting the recycling and proper disposal of devices after their useful life. Collaboration among manufacturers, healthcare providers, and regulatory bodies is crucial to establish and enforce guidelines and regulations that prioritize sustainability and ethical disposal. By integrating environmental sustainability and ethical disposal practices into cancer tech development, various benefits can be achieved. Firstly, the reduction of environmental impacts minimizes harm to ecosystems, human health, and future generations. Secondly, responsible disposal prevents the release of hazardous materials into the environment, thereby protecting communities and ecosystems. Lastly, promoting sustainable practices in the cancer tech industry can lead to innovation and cost-saving opportunities, fostering a more sustainable and responsible healthcare system. In conclusion, environmental sustainability and ethical disposal are essential considerations in the development of cancer technologies. By prioritizing these principles, researchers and manufacturers can minimize the environmental impact of cancer tech production and ensure responsible end-of-life management. Integrating sustainable practices into cancer tech development is not only ethically responsible but also contributes to a healthier future for the planet and its inhabitants.

□□□

New sighting of Asian Woolly necked stork, *Ciconia episcopus* at wetland of Kekri District of Rajasthan

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Abstract

Woolly necked Stork *Ciconia episcopus* is a tropical species which has its distribution range in south Asia and southeast Asia with a stronghold of its population in India, Sri Lanka, Nepal, Myanmar, Thailand, and Indonesia. It inhabits a wide range of habitat from wetlands, rivers, ponds, tanks, mudflats, and agricultural fields. Despite its population having a strong presence in India, little is known about their habitat preferences, nesting, and foraging behavior. This paper reports observations about the Asian Woolly necked stork, *Ciconia episcopus* at wetland of Kekri District of Rajasthan. There are no published records of this species from Kekri.

Keywords: Woolly necked Stork, flock size, habitat

Introduction:

Appearance: The woolly-necked stork is a medium-sized stork at 75–92 cm tall. The iris is deep crimson or wine-red. The stork is glistening black overall with a black "skull cap", a downy white neck which gives it its name. The lower belly and under-tail coverts are white, standing out from the rest of the dark coloured plumage. Feathers on the fore-neck are iridescent with a coppery-purple tinge. These feathers are elongated and can be erected during displays. The tail is deeply forked and is white, usually covered by the black long under tail coverts. It has long red legs and a heavy, blackish bill, though some specimens have largely dark-red bills with only the basal one-third being black. Sexes are alike. Juvenile birds are duller versions of the adult with a feathered forehead that is sometimes streaked black-and-white. The African birds are described as having the edges of the black cap diffused or with a jagged border compared to a sharp and clean border in the Asian birds. Sexes are identical, though males are thought to be larger. When the wings are opened either during displays or for flight, a narrow band of very bright unfeathered skin is visible along the underside of the forearm. This band has been variously described as being "neon, orange-red", "like a red-gold jewel", and "almost glowing" when seen at close range.

Distribution:



Fig. woolly-necked stork two individuals basking in agriculture fields

It is a widespread tropical species which breeds in Asia, from India to Indonesia, and across much of western, eastern and south-central Africa. It is a resident breeder building nests on trees located

on agricultural fields or wetlands, on natural cliffs, and on cell phone towers. They use a variety of freshwater wetlands including seasonal and perennial reservoirs and marshes, crop lands, irrigation canals and rivers, but are mostly seen in agricultural areas and in wetlands outside protected areas across south Asia and Myanmar. They are attracted to fires in grasslands and crop fields where they capture insects trying to escape the fire. They use ponds and marshes inside forests in both Africa and Asia, especially in south-east Asia where they use grassy and marshy areas in clearings in several forest types. In India, they are an uncommon species in coastal habitats. They use coastal areas in Africa also, with birds in Sulawesi observed to be eating sea snakes, and birds on the Kenya coast foraging in coral reefs and mudflats. In an agricultural landscape in north India, woolly-necked storks preferred fallow fields during the summer and monsoon seasons, and natural freshwater wetlands during the winter. Here, irrigation canals were preferentially used during winters when water levels were low, and birds avoided crop fields in all seasons. Assisted by construction of new irrigation canals, this species is spreading to arid areas like the Thar Desert in Rajasthan, India. Across south Asia, woolly-necked storks largely use agricultural landscapes with more numbers seen using unprotected wetlands relative to the amount of wetlands on the landscape, and a majority of individuals use agricultural crops.

Study area: Kekri is a city in Kekri district of the Indian state of Rajasthan. It is situated at a distance of about 78 km from the city of Ajmer. Kekri was made a district on March 17 2023, this city used to come in Ajmer district earlier. This place is situated in Ajmer, Rajasthan, India, its geographical coordinates are 25° 58' 0" North, 75° 9' 0" East and its original name (with diacritics) is Kekri. Site of interested is known as Bhimaravas Village Latitude 25.855789⁰ Longitudes 75.037056⁰. To know the status of migration birds under Kakri in winter season random field visit is planned. During one such random field survey on 31 October 2023 at about 11:10 hrs Mr. Surya Prakash Jat bird's watcher spotted woolly-necked storks near Bhimaravas Village in agricultural area of Kekri district. It was identified and confirmed by using Grimmett *et al.* (1999); Kumar *et al.* (2005) Kazmierczak and Perlo (2006) and Manakandan *et al.* (2011).



Fig. Map and Satellite image of Kekri and study site.

Conclusion: The main objective of present study is that we must pay attention to the environmental conservation and data collection of those areas in the field of biodiversity, where no research work

has been done so far from the scientific point of view, so the animal species diversity that is being known should be put to practical use and for detail research work. It is necessary to study on behavioral and statistics and other dimensions for new report species.

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