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❖ Editorial

What is ACER?

D. MubarakAli

School of Life Sciences, B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai-600048, Tamil Nadu, India

Association of Cancer Education and Research shortly called ACER. An association founded with focused mission and vision to discuss and disseminate the cancer education and perform cancer related research in the School of Life Sciences. ACER was inaugurated on February 18 2019 by by the pro-Vice chancellor, Prof. Peer Mohamed, and Dr. A. Azad (Registrar, BSACIST). Prof. Dr. S. Hemalatha (Dean, SLS) and also the president and Dr. Neesar Ahmed, Dr. Soumen Bera, Assistant Professors, and Dr. P. Ashok Kumar Associate Professor, SLS are the co-ordinators of ACER.

Vision:

Cancer Control among community through education and research.

Mission:

To disseminate cancer awareness through organised seminar, workshops and conferences.

To encourage cancer based research among the students and research scholars.

❖ Mini Review

Stem Cells Laboratories in India

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Abstract:

Stem cells are a type of undifferentiated cell that has the ability to self-renew and specialise into mature cells in certain tissue types. Body homoeostasis, damage repair, and tissue formation all rely on stem cell differentiation. Because of the importance of stem cell differentiation, several researches have been conducted on the complicated molecular mechanisms and signalling networks that drive stem cell differentiation. Circular RNAs (circRNAs) are a new type of noncoding RNAs found in eukaryotes with a covalently closed structure. CircRNAs have been shown to have numerous biological functions and to play multiple regulatory roles in a variety of physiological and pathological processes in numerous studies. Importantly, aberrant expression of several circRNAs during stem cell differentiation has been demonstrated by multiple lines of evidence, and some of these circRNAs play a role.

Introduction:

Stem cells are mother cells that have the potential to become any type of cell in the body. One of the main characteristics of stem cells is their ability to selfrenew or multiplies while maintaining the potential to develop into other types of cells. Stem cells can become cells of the blood, heart, bones, skin, muscles, brain etc. There are different sources of stem cells but all types of stem cells have the same capacity to develop into multiple types of cells.

Types of stem cells

Pluripotent Stem Cells (PS cells):These possess the capacity to divide for long periods and retain their ability to make all cell types within the organism. The best known type of pluripotent stem cell is the one present in embryos that helps babies grow within the womb. These are termed embryonic stem cells.These cells form at the blastocyst stage of development. A blastocyst is a hollow ball of cells that is smaller than a pinhead. The embryonic stem cells lie within this ball of cells. Recent research has enabled scientists to derive pluripotent cells from adult human skin cells. These are termed induced pluripotent stem cells or iPS cells.Fetal stem cells: These are obtained from tissues of a developing human fetus. These cells have some characteristics of the tissues they are taken from. For example, those taken from fetal muscles can make only muscle cells. These are also called progenitor cells. Adult stem cells: These are obtained from some tissues of the adult body. The most commonly used example is the bone marrow. Bone marrow is a rich source of stem cells that can be used to treat some blood diseases and cancers.

Stem Cell Laboratory:

The process of establishing an hPSC laboratory can be divided into two equally important parts. One is completely administrative and includes developing protocols, seeking approval, and establishing reporting processes and documentation. The other part of establishing a hPSC laboratory involves the physical plant and includes design, equipment and personnel. Proper planning of laboratory operations and proper design of the physical layout of the stem cell laboratory so that meets the scope of planned operations is a major undertaking, but the time spent upfront will pay long-term returns in operational efficiency and effectiveness. A well-planned, organized, and properly equipped laboratory supports research activities by increasing efficiency and reducing lost time and wasted resources. While the culture of hPSCs is carried out in a laboratory that is not much different than one used to culture other types of human cells (1, 2), due to the special status of these cells, there is a higher degree of oversight, review, and reporting. The equipments required to establish a stem cell laboratory are

Microscopy (phase contrast, dissecting microscope),storage the cabinet and shelves for the shortage of tissue culture supplies, refrigerator, freezer(low temperature freezer, cryogenic freezer). The key considerations when setting up the laboratory include (1) defining of the scope of the work which includes the numbers and types of cell lines to be cultured and (2) determining the number of people who will work in the laboratory and their specific tasks.

Stem Cell Laboratory In India:

Life Cell International Laboratory:

Life Cell International is a biotechnology business based in India that was founded in 2004. It owns and operates India's largest stem cell bank, as well as diagnostics and tissue therapies.In 2017, the company introduced a community stem cell banking programme that allows participants to share preserved umbilical cord stem cells. In India, community stem cell banking is said to be one of the largest and only of its kind. In 2017, LifeCell announced that it has maintained stem cells from 3,00,000 people in India and that it anticipated to add 60000 people each year in the future.

BIO BANK:

BioBank refers to the collection of stem cells from the umbilical cord blood at birth, processing, testing, cryopreservation, and storage of stem cells from the umbilical cord blood by LifeCell's community cord blood banking division. The blood that remains in the umbilical cord and placenta after a child is born and the umbilical chord is cut is known as cord blood or "placental blood." The umbilical cord serves as a lifeline for mother and child throughout pregnancy. Haematopoietic stem cells (HSCs) are important for replenishing blood and repairing the immune system, and cord blood is a significant source of them.

Head Centre For Stem Cell Research:(CCSR)

Centre for stem cell research, a unit of the institute for stem cell biology and regenerative medicine bengaluru,government of india located on the campus of the christian medical college,vellore

Research in CCSR: Brain Development & Disease Mechanisms

The Brain Development and Disease Mechanisms theme at inStem aims to comprehend mammalian brain development at different scales of organisation, from molecules to brain circuits and behaviour.They are particularly interested in cell-cell interactions and sub-cellular mechanisms that support normal brain development and physiology and can lead to brain illnesses when they're disrupted. Membrane organisation, translational control, chromatin regulation, RNA-mediated mechanisms, and related processes are examples of such processes. The work in this area aims to connect these fundamental biological principles to features of human brain illnesses, including as disease susceptibility, disease progression, and pharmacogenomics, in order to inform the creation of new diagnostic and treatment alternatives.Through discovery, the topic takes a multidisciplinary approach to understanding brain function.

Centre for Cardiovascular Biology & Diseases:

Interactions and collaborations across the team members are strong, bringing together biochemistry, biophysics, biology, genetics, structural biology, computational biology and clinical sciences to define how the cardiomyopathy mutations affect the power output of the human heart. The Center for Cardiovascular Biology and Disease theme in inStem focuses on genetic hypertrophic and dilated cardiomyopathies, autosomal dominant myocardial diseases caused by missense mutations in any one of the genes encoding the fundamental contractile apparatus of the heart. These diseases are common and are debilitating and often lead to sudden death. the team is composed of six superb investigators with diverse backgrounds – John Mercer, Minhaj Sirajuddin, R. Sowdhamini, and Dhandapany Perundurai, based in Bangalore, and inStem faculty Sivaraj Sivaramakrishnan (Visiting Professor) and James Spudich (Collaborative Science Chair), based in the United States. This group brings together a team of scientists using complementary approaches to a fundamental clinical issue in India and worldwide. Interactions and collaborations across the team members are strong, bringing together biochemistry, biophysics, biology, genetics, structural biology, computational biology and

clinical sciences to define how the cardiomyopathy mutations affect the power output of the human heart. The ultimate goal is to understand the underlying molecular mechanisms of hypertrophic and dilated cardiomyopathies in order to develop new therapeutic approaches for these diseases.

Regulation of Cell Fate:

The activities of the Regulation of Cell Fate (RCF) theme are organized around the central question of how endogenous metabolites control decisions of cell fate. There is an emerging understanding that a subset of metabolites termed 'hub' metabolites is critical mediators of information flow within and between cells/tissues. Apart from their metabolic roles, these hub metabolites participate directly in cellular signaling and in epigenetic modification. they aim to uncover mechanisms by which these metabolites control cell fate across biological systems by pursuing the following tracks (i) cell autonomous (using T cells and yeast), (ii) spatially organized 3D organoids (e.g. skeletal muscle organoids), (iii) in vivo model systems that integrate tissue injury and repair (mouse models of lung and skeletal muscle injury), and (iv) physiology and hematopoiesis (in Drosophila). For the analysis of the role of hub metabolites in the regulation of cell fate, the theme is bringing to bear technological and analytical capabilities including metabolomics, metabolic flux analysis, 3D tissueengineering, bioprinting and metabolite imaging.

Institute for Stem Cell Biology and Regenerative Medicine:

The Institute for Stem Cell Biology and Regenerative Medicine (inStem), is a state-of-the-art research institute in Bangalore, India, dedicated to the study of stem cell and regenerative biology. An autonomous institute funded by the Dept of Biotechnology, Govt. of India, inStem emphasizes collaborative research in stem cell biology. inStem's mandate to allow this cross-disciplinary, multipronged approach to research, straddles the divide between clinical and laboratory research in stem cell biology. In trying to answer intractable and challenging questions that face the field, inStem seeks to rewrite the paradigm of the research institute: without barriers and across disciplines.

Conclusion:

Stem cell studies can increase understanding of how disease occurs and it generates health cells to replace cells affected by disease and also it test new drugs for safety and effectiveness.

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Stem cell laboratory RobinL.Wesselchmidt and Philip h.schwartz

PMCID: PMC3695816

NIHMSID: NIHMS468057

PMID: 21822863

https://www.indiascienceandtechnology.gov.in/organisations/ministry-anddepartments/department-biotechnology-dbt/institute-stem-cell-biology-and

https://www.instem.res.in/positions/1630

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❖ Mini Review

In Silico Insight: Navigating the Landscape of Computational Methods in Drug Discovery

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Abstract

The integration of computational methods in drug discovery, commonly referred to as in silico analysis, has become a cornerstone in the quest for novel therapeutics. This review explores into the multifaceted realm of in silico approaches, elucidating their pivotal role in accelerating drug development. From molecular docking to artificial intelligence-driven analyses, each method contributes uniquely to the understanding of molecular interactions and the identification of potential drug candidates. The review navigates through the methodologies, applications, and challenges associated with in silico analysis, offering a comprehensive overview of how computational tools have transformed the landscape of pharmaceutical research.

Introduction

The first step in the drug discovery process is the diagnosis of a condition with distinct symptoms that lower quality of life. A desirable medicine is typically defined as a chemical (which could be as simple as a molecule or as complex as a protein) or a combination of chemicals that lessens symptoms without seriously harming the patient. Aside from cost and financial gain for pharmaceutical corporations, other desirable pharmacological attributes include minimal environmental damage (e.g., no bacterial reactivation following human use) and low risk of drug resistance, which would result in a sharp decline in the

drug's market value. A desired medication is therefore one that has few long-term detrimental impacts on the patient, society, or the environment in addition to being effective and having few adverse effects (Vaidhya et al., 2023). These comparisons have four main goals: 1) establish a link between disease symptoms and genetic mutations, epigenetic modifications, and other environmental factors that affect gene expression; 2) find drug targets that can either eliminate cancer cells or restore cellular function; 3) predict or improve drug candidates that can act upon the drug target to minimize side effects and achieve the intended therapeutic result; and 4) evaluate the impact on environmental health and the possibility of drug resistance. The main goal of this review paper is how bioinformatics can help find these kinds of effective medications (Dugger et al., 2018).

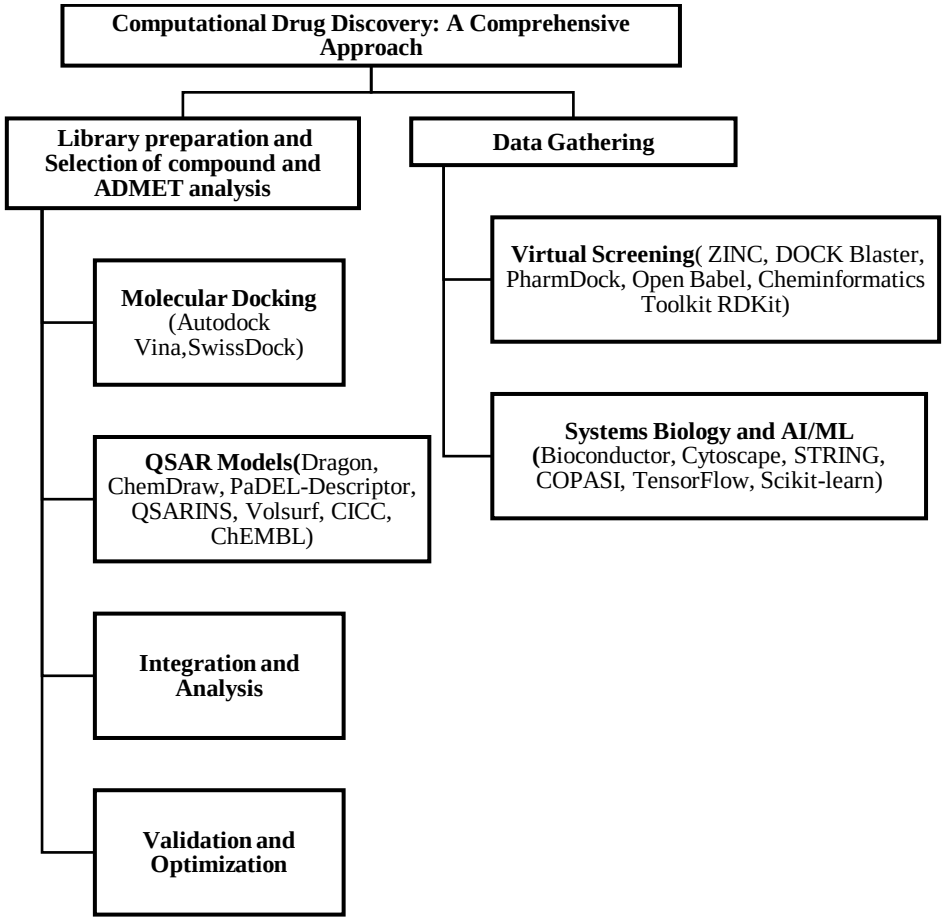

Figure 1 Generalized Flowchart for computational method analysis in Drug discovery

Molecular Docking: Deciphering Molecular Interactions

Molecular docking, a fundamental computational technique in drug discovery, unravels the complexities of molecular interactions at the atomic level. Researchers often turn to reputable molecular docking platforms to facilitate this process. Autodock Vina and SwissDock are widely utilized tools known for their user-friendly interfaces and robust algorithms. These platforms streamline the identification of target receptors, the introduction of ligands, and the exploration of various binding orientations. Autodock Tools, integrated with Autodock Vina, aids in the preparation and analysis of docking simulations. These user-friendly tools significantly enhance accessibility for researchers engaging in molecular docking analyses(Agu et al., 2023).

Virtual Screening: Navigating Molecular Landscapes

For virtual screening endeavors, numerous online resources and software platforms are available. ZINC, a comprehensive database of commercially available compounds, serves as a valuable starting point for assembling chemical libraries. Screening platforms such as DOCK Blaster and PharmDock enable researchers to virtually navigate these vast libraries against specific target proteins. Additionally, open-source tools like Open Babel assist in format conversions, ensuring seamless integration of diverse chemical structures. The Cheminformatics Toolkit RDKit offers a powerful suite of cheminformatics tools, facilitating the preprocessing and analysis of chemical data. These resources collectively empower researchers to efficiently sift through molecular landscapes in the quest for potential drug candidates(Pérez-Regidor et al., 2016).

QSAR Models: Unraveling Structure-Activity Relationships

The development and validation of QSAR models often involve specialized software and databases. Dragon and ChemDraw are popular software tools for calculating molecular descriptors, essential for QSAR model development. PaDEL-Descriptor, an open-source

software, automates the calculation of a diverse set of molecular descriptors. QSAR modeling software such as QSARINS and Volsurf aids in model construction and statistical analysis. The Chemical Informatics and Cyberinfrastructure Collaboratory (CICC) and the ChEMBL database provide extensive datasets for training and validating QSAR models. Leveraging these resources enhances the robustness and reliability of QSAR analyses, making them indispensable in understanding structure-activity relationships.

In the dynamic landscape of computational drug discovery, researchers can access these user-friendly websites and software platforms to seamlessly integrate molecular docking, virtual screening, and QSAR analyses into their workflow. These tools collectively empower researchers to navigate the complexities of molecular interactions, efficiently explore chemical libraries, and unravel the intricate relationships between molecular structure and biological activity.

Table 1: Computational Tools in Molecular Docking, Virtual Screening, and QSAR Models

Computational Task	Tools and Platforms
Molecular Docking	Autodock Vina, SwissDock, Autodock Tools
Virtual Screening	ZINC, DOCK Blaster, PharmDock, Open Babel, Cheminformatics Toolkit RDKit
QSAR Models	Dragon, ChemDraw, PaDEL-Descriptor, QSARINS, Volsurf, CICC, ChEMBL

Systems Biology Approaches and Artificial Intelligence: Navigating Complex Biological Systems

In silico drug discovery transcends the realm of individual molecules, venturing into the intricacies of systems biology. This segment elucidates the pathway of analysis,

showcasing how computational methods seamlessly integrate with systems biology to unravel complex biological systems, pinpoint potential drug targets, and illuminate critical pathways(Sarkar et al., 2023).

Pathway of Analysis:

1. Data Integration: The journey begins with the integration of diverse biological data sets, encompassing genomics, transcriptomics, proteomics, and metabolomics. Platforms like Bioconductor and the Systems Biology Markup Language (SBML) provide tools for harmonizing and managing this wealth of information(Wanichthanarak et al., 2015).

2. Network Analysis: Computational tools such as Cytoscape and STRING facilitate the construction and visualization of biological networks. These networks unveil intricate relationships between genes, proteins, and metabolites, offering a holistic view of the interconnectedness within a biological system(Su et al., 2014).

3. Dynamic Modeling: Systems biology embraces dynamic modeling to simulate and understand the behavior of biological systems over time. Tools like COPASI and Virtual Cell enable the construction and analysis of mathematical models, allowing researchers to explore how perturbations may impact the system's dynamics(Knüpfer & Beckstein, 2013).

4. Identification of Key Nodes: Utilizing topological analysis, centrality measures, and graph theory, researchers identify key nodes within biological networks. These nodes represent crucial elements such as hub proteins or genes, serving as potential targets for therapeutic intervention.

5. Pathway Analysis: Pathway enrichment analysis tools like Reactome and KEGG aid in deciphering the biological significance of identified pathways. This step ensures a deeper understanding of the functional context and relevance of potential drug targets (Mubeen et al., 2022).

Artificial Intelligence and Machine Learning: Revolutionizing Analysis

The role of artificial intelligence (AI) and machine learning (ML) takes center stage in this transformative phase of analysis. These technologies harness the power of predictive

modeling and pattern recognition, revolutionizing the interpretation of vast biological datasets.

1. Predictive Modeling: AI and ML algorithms, including support vector machines, random forests, and neural networks, are employed for predictive modeling. This involves training models on existing data to make accurate predictions about future observations, facilitating the identification of novel drug targets(Bohr & Memarzadeh, 2020).

2. Pattern Recognition: ML algorithms excel in recognizing intricate patterns within biological data. Pattern recognition aids in uncovering hidden correlations, identifying biomarkers, and predicting potential drug responses, contributing to a more nuanced understanding of complex biological systems(Yaqoob et al., 2023).

3. Deep Learning: The advent of deep learning, a subset of ML, has brought unprecedented capabilities to analyze high-dimensional biological data. Deep neural networks, such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs), excel in image analysis, sequence modeling, and other complex biological data tasks(Alzubaidi et al., 2021).

Table 2: Systems Biology and Artificial Intelligence Tools

Analysis Step	Tools and Platforms
Data Integration	Bioconductor, Systems Biology Markup Language (SBML)
Network Analysis	Cytoscape, STRING
Dynamic Modeling	COPASI, Virtual Cell
Identification of Key Nodes	Topological analysis, centrality measures, graph theory
Pathway Analysis	Reactome, KEGG
Predictive Modeling	AI and ML algorithms (support vector machines, random forests, neural networks)
Pattern Recognition	ML algorithms (deep learning, CNNs, RNNs)
Websites for Analysis	Bioconductor, Cytoscape, STRING, COPASI, Reactome, TensorFlow, Scikit-learn

Websites for Analysis:

1. Bioconductor (https://www.bioconductor.org/): A comprehensive open-source platform providing tools for the analysis and comprehension of high-throughput genomic data.

2. Cytoscape (https://cytoscape.org/): A versatile software for visualizing and analyzing biological networks, enabling researchers to explore and interpret complex interactions.

3. STRING (https://string-db.org/): An online database that facilitates the construction and analysis of protein-protein interaction networks, aiding in the identification of key nodes.

4. COPASI (http://copasi.org/): A software application for creating and solving mathematical models of biochemical systems, supporting dynamic modeling and simulation.

5. Reactome (https://reactome.org/): An open-source database for pathway analysis, offering insights into the biological processes associated with potential drug targets.

6. TensorFlow (https://www.tensorflow.org/): An open-source machine learning framework developed by Google, widely used for building and training ML models.

7. **Scikit-learn (https://scikit-learn.org/)**: A simple and efficient tool for data analysis and modeling, providing user-friendly implementations of various ML algorithms.

These integrated analyses, merging systems biology approaches with the prowess of artificial intelligence and machine learning, propel in silico drug discovery into a new era of understanding and innovation.

Conclusion:

In conclusion, the review encapsulates the transformative impact of in silico analysis in drug discovery. From deciphering molecular interactions to predicting complex biological activities, computational methods have become indispensable in navigating the intricate

landscape of pharmaceutical research. As we stand at the intersection of technology and biology, in silico insights not only accelerate drug development but also redefine the boundaries of what is possible in the pursuit of novel therapeutics.

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❖ Scientific Tips

Overview of TNSCST and Schemes

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ABOUT TNSCST:

The Tamil Nadu State Council for Science and Technology established in 1984 as an autonomous body is undertaking various activities to promote Science and Technology at the state level. Being the apex body which is to initiate, support and coordinate fundamental and applied research programmes in universities, other scientific bodies and non-government organizations, it has been implementing various programmes to achieve the following objectives for which it has been established.

- To determine areas where science and technology can be applied to meet Tamil Nadu's development demands, aims, and goals—especially with regard to the state of poverty, unemployment, and backwardness that now exist in the state.
- To provide advice to the government on the creation of policies and programs, including technical, administrative, and legal tools, that will encourage their application to identified needs, objectives, and goals. These include, but are not limited to, health, education, and the use of labor, with a focus on the development of human skills in slums and rural areas as well as the scientific management of the state's natural resources.
- In order to initiate, promote, and effectively deploy promising research and development work in the agricultural industry, government, and other domains, it is important to: • Promote effective coordination; develop and foster communication; and create other links between centers of scientific and technological research, government agencies, farms, and industries.]

- To establish, promote, and oversee basic and applied research projects in fields determined to be particularly well-suited for the application of science and technology in universities, the Tamilnadu Academy of Sciences, and other scientific, academic, and professional organizations.
- To encourage public awareness of science and technology through the planning of awareness campaigns, training courses, exhibitions, seminars, lectures, audiovisual presentations, and other events.
- To develop science and technology plans that are pertinent to the state's development needs and to include these plans into the state's annual plans.
- To take into account and counsel the government on additional issues pertaining to the use of science and technology to address Tamil Nadu's issues.
- To communicate with the Cabinet of the Government of India's Scientific .

TNSCST PROVIDED SCHEMES:

- Partial assistance for seminar/symposium/work shop(SSW).
- Popularization of science and technology(PST).
- Student project scheme(SPS).
- Tamilnadu scientists award(TANSA).
- Travel grant for young scientists(TG).
- Young student scientist programme(YSSP).
- Young scientists fellowship scheme(YSFS).
- Quality improvement of science education in rural schools(QISE).
- Science and technology projects(STP).
- Assistance for science & Technology publication(PUB).
- Dissemination of innovative technology(DIT).
- Innovation and product development(IPD).
- Science and technology capacity building for industrial needs(STCB).
- Programme for bridging the gab in research funding for research scholars in colleges(RFRS).

- Improvement of science and technology infra-structure facilities at government colleges(INFRA).

PATENT INFORMATION CENTER

The Intellectual Property Rights (IPR) are conferred in respect of work that results from the creative and inventive activity of the human mind. The protection of intellectual property plays a key role in gaining an advantageous position in the competitive technological gain for achieving technological, industrial and economic growth of a country. IPR includes patent, copyright and related rights, trademarks, geographical indication, industrial designs, layout designs of integrated circuits and protection of know-how and undisclosed information. Patents are legal protection for new inventions, which are solutions to scientific and technological problems granted by government for a limited period of time. The importance of patent information is being realized more and more all over the globe. The number of patents filed in a particular country has been an index of technological development of the country. The state of Tamilnadu has diverse geoclimatic and cultural variety, vast network of institutions, and is rich in man and material. IPR encourage entrepreneurship and innovation by providing a mechanism to reward entrepreneurs for their intellectual capability and innovation potential. It is crucial to foster generation of more IPRs and to strengthen the IPR ecosystem in the State and thereby spur economic growth.Thus the scientists, technologists and researchers need information, orientation and facilities for protecting the products of their intellectual prowess.

The Patent Information Centre (PIC), Tamilnadu has been set up under the aegis of Council of Science & Technology, Tamilnadu in collaboration with Patent Facilitating Cell (PFC), Technology Information, Forecasting & Assessment Council (TIFAC), Department of Science & Technology, Government of India, New Delhi to provide regional level facilitation services regarding intellectual property protection especially to Science and Technology community by encouraging innovation, promoting Intellectual Property Rights (IPR) awareness and facilitating IP protection.

Beneficiaries: All the scientists, technologists, researchers, innovators, R&D establishments, financial institutions, business entrepreneurs, non-government organizations (NGOs) and individuals are welcome to utilize the facilities of Patent Information Centre (PIC).

OBJECTIVES OF PATENT INFORMATION CENTRE (PIC)

- Introducing patent information as a vital input in the process of promotion of R&D programmes.
- Providing patenting facilities to scientists and technologists in the country for Indian and foreign patents on a sustained basis.
- Keeping a watch on developments in the area of IPR and make important issues known to policy makers, scientists, industry etc.
- Creating awareness and understanding related to IPR and the challenges and opportunities of this area including arrangement of workshops, seminars, conferences etc.
- Promoting Intellectual Property filings.
- Providing advisory and facilitation services for IP protection such as patents, trademarks, copyrights, industrial designs, geographical indications etc,

FACILITIES;

Organising programmes, technical workshops and hands-on training programmes on general awareness as well as on specific issues on IPR including patents, copyrights, industrial designs, trademarks, geographical indications etc.

- Networking of S&T community and other potential users of patent information.
- Delivering lectures on IPR issues.
- Analysis of patent documents on specific topics.
- Facilitating universities, industry, government departments, R&D institutions and grass-root innovators for patent searches and patent filing; registration of GI, Copyrights, Industrial Designs, trademarks, Semiconductor IC layout designs, New Plant Varieties (NPVs) etc.

- Publication of information booklet, brochure, charts and other literature on IPR.
- Forwarding applications related to patent filing to PFC, TIFAC, New Delhi.

Related Websites:

- Intellectual Property Office (https://ipindia.gov.in/)
- Department of Industrial Policy and Promotion (https://dpiit.gov.in/)
- Cell for IPR Promotion and Management (http://cipam.gov.in/)
- Technology Information, Forecasting and Assessment Council (http://tifac.org.in/)
- World Intellectual Property Organization (https://www.wipo.int/)
- Tamil Nadu State Council for Science and Technology(www.tanscst.tn.gov.in/)

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❖ INSTRUCTIONS TO AUTHORS:

SLS newsletter, a biannual publication by the School of life science intends to enlighten the readers with research articles, reviews, reports, research highlights, news and facts, concerned to the advancing field of biotechnology.

In order to acknowledge recent advancements and potential knowledge, bringing it to the notice of the science community through the newsletter, SLS welcomes original research, review and reports and details of the forthcoming events (conferences, seminars, symposia, trainings and workshops.)

❖ GUIDELINES FOR SUBMISSION:

✓ The article submitted must be an own write up on the selected article.

✓ References: The research paper referred must be assessed from renowned publishers (science, nature etc.,) and the references must be mentioned in the article.

✓ No Plagiarism will be entertained.

✓ The article should be typed in double space in word format limited to > 1000 words with font “Cambria” and font size 12 with 1.5 line spacing.

✓ Illustration and tables: Illustrations must be reduced to one – third of the page. Typed tables should be provided with tittles. Authors are specially requested to reduce the number of tables, illustrations and diagrams to a minimum (maximum 2).

✓ The SLS newsletter assumes no responsibility for statements and opinions advanced by the contributors to the journal.

SLS NEWSLETTER - MEMBERSHIP FORM

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***Conditions apply**