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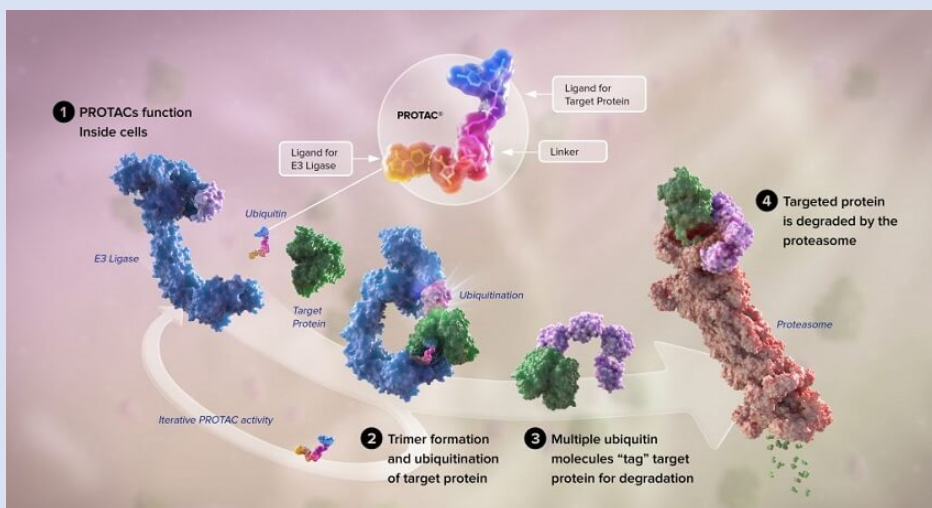
DEVELOPMENT OF PROTEOLYSIS TARGETING CHIMERAS (PROTACS) TECHNOLOGY IN NEURODEGENERATIVE DISORDERS DISEASE



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PROTACs are a novel drug development strategy that selectively degrades targeted proteins, offering advantages such as high selectivity, reversibility, and low dosage effects.

The technology has been widely applied in cancer research, targeting proteins like BCL-2 and BRD4, and also shows potential in treating neurodegenerative diseases, immunotherapy, metabolic diseases, and infectious diseases.[1]



<https://xvivo.com/illustrating-the-unconventional-protac-technology-for-disease-therapy/>

Development of PROTAC in the 1990s

In the 1990s, scientists began exploring the use of protein-protein interactions to achieve protein degradation, which laid the foundation for the development of PROTAC technology.

This approach involves the design of molecules that can target specific proteins for degradation within the cell.[2]

Discovery of strong PROTAC molecules

Over time, with advancements in technology, scientists have identified and developed specific PROTAC molecules with potent effects, such as ARV-110 and ARV-471.

These molecules have demonstrated significant potential in the treatment of various diseases, including cancer and autoimmune diseases.[3]

Diseases Treated by PROTACs

PROTAC technology can be used to treat neurodegenerative diseases, such as multiple sclerosis, by targeting proteins like α -synuclein.

It can also overcome tumor drug resistance by degrading drug-resistant proteins, enhancing the sensitivity of cancer cells to inhibitors.

PROTACs offer higher selectivity and reduced adverse effects, making them a promising approach for treating various diseases, including cancer, neurodegenerative diseases, immunotherapy, metabolic diseases, and infectious diseases.[4]

Advantages of PROTAC Technology

One of the key advantages of PROTAC technology is its high specificity, allowing it to selectively degrade the target protein without affecting the function of other proteins in the cell.

This specificity contributes to reducing the side effects and adverse reactions commonly associated with traditional drugs, making PROTAC a promising approach for minimizing unwanted effects.

Additionally, PROTAC can induce multiple rounds of protein degradation, leading to a longer duration of action for the drug, which can be beneficial in treating certain diseases, such as cancer and autoimmune conditions.[5]

Challenges in the Development of PROTAC

Despite its potential, the development of PROTAC technology faces several challenges, including the identification of suitable small molecules that can effectively achieve protein degradation.

Another significant challenge is improving the stability and bioavailability of PROTAC molecules, which is crucial for their effectiveness as therapeutic agents.[6]

PROTACs in Targeting Multiple Targets

PROTACs can simultaneously target multiple proteins, effectively inhibiting tumor cell growth and metastasis. Some small molecule inhibitors can bind to multiple targets simultaneously and produce inhibitory effects, leading to the development of PROTACs that can simultaneously bind to multiple tumor growth-related proteins, thereby improving the therapeutic effect. [7]

Conclusion:

The technology's high specificity and efficacy make it a promising strategy for treating difficult-to-treat diseases, with potential applications in neuroprotection and regeneration.

Despite facing challenges, continuous development and optimization of PROTAC technology are expected to lead to its application in the clinic, indicating positive outcomes in drug development and disease treatment.

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RABIES Vs HYDROPHOBIA



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Rabies is a viral infection caused by Lyssaviruses , which can infect warm-blooded creatures like dogs, bats, and people. 30–50 days after the virus enters a victim's body, it targets the central nervous system. In certain circumstances, the infection could go unnoticed for years ⁽¹⁾

The virus causes inflammation in the brain and the tissues surrounding the spinal cord as it spreads throughout the body, which results in seizures and partial paralysis. Additionally, violent or unusual conduct and a dread of water are displayed by victims. Death is near once the symptoms start to appear.

Furious and paralytic rabies are the two primary varieties. More than 80% of cases of rabies are of the furious variety. Victims of furious rabies will act aggressively or erratically, foam at the lips, and produce more saliva.

Slow paralysis is brought on by paralytic rabies, which first produces muscle weakness and a loss of feeling on the site of the bite.

On 28 May 2023 Rajasthan Police have arrested a 24-year-old man, believed to be suffering from hydrophobia, who allegedly killed an elderly woman and consumed her flesh and the doctors at Bangar Hospital, said, "Thakur, a Mumbai resident, has been diagnosed with hydrophobia (2)

A five-year-old girl, Khushi Photographer, died due to rabies infection on 2nd March 2023 Khushi was showing signs of hydrophobia and photophobia (3)

These reports astonish us. Many individuals still not aware about the rabies attack and its effect. Even your own pet could be at risk for a rabies attack. Therefore, if you get a dog or cat bite, please get a complete anti-rabies vaccination. Rabies infection known to be 100% fatal if it spreads to the central nervous system.

Tens of thousand human deaths are caused each year by dog-mediated rabies, and it is difficult to vaccinate dogs in settings with limited resources to stop the spread of the illness. Currently, parenteral dog vaccination campaigns are the main method used to eradicate rabies.

Free-ranging and stray dogs must be specifically addressed in vaccination programs in order to boost herd immunity; oral rabies vaccination (ORV) of dogs is one potential remedy.⁽⁴⁾

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IMMUNOTHERAPY ADVANCEMENTS



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The field of immunotherapy holds great promise as it optimizes and strengthens the immune system of the host against cancer.

It has emerged as a significant application of the basic research on cancer immunology in recent times. This novel concept holds the promise of not only improving the health of the affected individual but also reshaping the landscape of disease treatment.

Immunotherapy: is used to raise or lower the immune system activity in order to treat the diseases that are mediated by the immune system, such as immune deficiencies, hypersensitivity reactions, autoimmune diseases, organ and tissue transplants, cancers, inflammatory disorders, infectious diseases, and other conditions in which immunotherapy can extend the quality and life expectancy of the patient. The immune system can be trained to recognize cancer cells, making cancer immunotherapy more targeted than non-specific therapy options like chemotherapy or radiotherapy.

The use of medications (such as immunosuppressors), biologicals (such as cytokines, monoclonal antibodies, and antisera), vitamins and minerals (such as zinc, vitamin C, and vitamin B6), transplants (such as bone marrow), and vaccinations (such as prophylactic and therapeutic vaccines) to regulate immune responses in various directions is known as immunotherapy.

Several types of immunotherapy that are used to treat cancer are:

- **Immune checkpoint inhibitors**, which are drugs that block immune checkpoints. These checkpoints are a normal part of the immune system and keep immune responses from being too strong.

- By blocking them, these drugs allow immune cells to enhance efficient response to cancer.
- **T-cell transfer therapy**, is a treatment that boosts the natural ability of T cells to fight cancer. In this treatment, the immune cells are taken from the tumour and those that are most active against the cancer are selected or changed in the lab to enhance its efficiency against cancer cells, grown in large batches, and administered into the body through intravenous route. T-cell transfer therapy may also be called adoptive cell therapy, adoptive immunotherapy, or immune cell therapy. CAR T-cell therapy is a notable example of ACT.
- Monoclonal antibodies, are immune system proteins that are designed to bind to specific targets on cancer cells. Some monoclonal antibodies mark cancer cells in order to be identified and destroyed by the immune system and such monoclonal antibodies are efficient in action and also be called therapeutic antibodies. Rituximab, for instance, targets CD20 on B cells, leading to the depletion of these cells.
- **Treatment vaccines**, enhance the immune system response against cancer cells. Treatment vaccines are different from the vaccines that provide preventive measures against disease.
- **Immune system modulators**, enhance the body's immune response against cancer. Some of these agents affect specific parts of the immune system, whereas others affect the immune system in a more general way.

T lymphocyte-based cancer immunotherapy:

T lymphocyte-based cancer immunotherapies are the main objective for enlisting the immune system to combat cancer in recent times. As a result, new research highlights T cells' capacity to support cancer therapies such as adoptive cell therapy, checkpoint inhibition, and cancer vaccines. Cancer vaccinations strengthen the immune system to launch action against cancerous cells. When introduced with a non-self or foreign material, the immune system warns the body, but when introduced with a known or self-substance, it reacts chemotactically and functions normally in the system. On the surface of cell, cancer cells produce molecules that healthy cells do not produce; these molecules are known as cancer-specific antigens, neoantigens, or tumour associated antigens (TAAs). Cytolytic T lymphocytes (CTL) are able to identify these TAAs. The benefit of TAAs being expressed more on tumour cells and less on normal tissues can be leveraged in the development of therapeutic vaccines. To stop the spread of advanced cancers, immune effector mechanisms that specifically target cancer cells can be strengthened.

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DEPARTMENTAL ACTIVITIES

B.Pharm, M.Pharm & Pharm.D Students & Faculty of The Erode College of Pharmacy, Erode participated in the Two Day National Level Seminar "Innovative Breakthrough in Pharmacare -Nurturing the Future Pharmacist - 2023" held on 10.08.2023 to 11.08.2023 at Vivekanandha Pharmacy College for Women, Sankagiri, Salem District. Six of our students present their research work during the national seminar. The Management, Principal & Staff appreciate the students for active participation & presentation.



The Department of Pharmacy Practice at the Erode College of Pharmacy organized a One Day facility visit to Spinos Life Science and Research Private Limited, located in Coimbatore. A contingent of 60 students from the D.Pharm & Pharm.D programs, accompanied by Dr. C. Kannan (Associate Professor), Mrs. M. Sudha (Assistant Professor), and Mrs. Smitha Sarah Thambi, participated in this event on August 19, 2023. The dedicated team at Spinos Life Science and Research provided valuable insights into the realms of clinical research, encompassing data collection, analysis, and ethical considerations. Dr. R. Sambathkumar, our Principal, extended encouragement for this field visit, which was organized by the Department of Pharmacy Practice

and staff. We extend our sincere appreciation to Abiraamasundari R (Managing Director), Seenivasan P (General Manager), Robert Benjamin C (Business Development Executive), and Dr. Kuriakose Joy (Medical Writer) of Spinos Life Science and Research Private Limited, Coimbatore, as well as to our Management, for graciously affording our students this wonderful learning opportunity.



Pharm.D students of The Erode College of Pharmacy, Erode, is undergoing training at Lotus Hospital, Erode from 21.08.2023. They are participating in ward rounds and gaining special training in the various clinical activities involved in the hospital. The training program was initiated by The Department of Pharmacy Practice.



Fourth Pharm.D students, Department of Pharmacy Practice at The Erode College of Pharmacy in Erode came together on September 5, 2023, to celebrate Teacher's Day. Dr. R. Sambathkumar, Principal, extended a warm welcome to all attendees. Thiru. A. Natarajan, the Secretary & Correspondent, delivered a compelling presidential address, shedding light on the life and contributions of Dr. Sarvepalli Radhakrishnan, the former President of India. The significance of educators and their pivotal role in student development was eloquently explained by Thirukural Urai Asiriyar, Mr. K. Thirumalaiahazhagan, M.A., B.Lit., and B.Ed. The event featured a diverse array of cultural programs that captivated the audience. Dr. V. S. Saravanan, the Vice Principal, expressed heartfelt gratitude during the closing remarks in the form of a vote of thanks.



World Pharmacists Day 2023 - Organ Donation Awareness Rally (Theme: Pharmacy strengthening health systems) was held at The Erode College of Pharmacy, Erode on 25.09.2023. The Awareness Rally was led by Principal Dr. R. Sambathkumar, Vice Principal Dr. V.S. Saravanan and all the HOD's. Dr. R. Natarajan, Professor and Head, Department of Pharmaceutics and Staff Members organized the Rally from ECP to Veppampalayam Village. The B.Pharmacy (II-Sem) Students were participated during the Rally and visited the Veppampalayam Govt. School given the Organ Donation Awareness speech by Mr. S. Stanley Baskar and our Principal

Dr. R. Sambathkumar honored the Head Master, teaching staff members and students.



The Erode College of Pharmacy, Erode, celebrated World Pharmacists Day 2023 (Theme: Pharmacy strengthening health systems) on 25.09.2023. On this auspicious occasion Department of Pharmacy Practice organized Webinar.

Session 1 was taken by Dr. K. Krishnaveni, Professor & Head, Dept. of Pharmacy Practice, Vivekananda Pharmacy College for Women, Sankagiri, Salem on the Topic of Title: "Enhancing Adverse Drug Reaction (ADR) Monitoring and Reporting for Improved Patient Safety".

Session 2 was taken by Dr. Krishna Ravi, Associate Professor & Clinical Preceptor, Dept. of Pharmacy Practice, JKKN College of Pharmacy, Kumarapalayam, Namakkal on the topic Title: "Ensuring Drug Safety: The Significance of Pharmacovigilance". Numerous participants were actively participated from various institutions.

