"Pushpagiri Research Centre's

Tissue Engineering Lab Marks Historic Breakthrough in Stem Cell Research"

Pushpagiri Research Centre

In a momentous stride toward scientific innovation, Pushpagiri Research Centre's (PRC) Tissue Engineering Lab hasachieved a ground-breaking milestone. Spearheaded by a distinguished team comprising eminent scientist Prof. Anil Sukumaran, Research Director Rev. Dr. Mathew Mazhavancheril, PRC scientists Prof. Nebu George Thomas, and Dr. Yogesh Bharat Dalvi. The lab has successfully developed a pioneering research protocol for the isolation, culture, and characterization of stem cells from the dental pulp of both human deciduous and permanent teeth.

This remarkable achievement, has been highlighted by the publication of the research protocol in The Journal of Visualized Experiments (JoVE). JoVE is a prestigious international peer-reviewed scientific journal renowned for presenting experimental methods in video format.

Key Highlights of the Achievement:

1. Research Protocol Development: The Tissue Engineering Lab at PRC has crafted a revolutionary research protocol, marking the first of its kind in India. This protocol delineates precise steps for isolating, culturing, and characterizing stem cells from dental pulp, providing invaluable insights into this burgeoning field of research.

2. JoVE Video Publication: JoVE Publishers have recently completed the video documentation of this ground-breaking protocol. The video not only captures the intricacies of isolating stem cells from dental pulp but also showcases the expertise of the team at Dr. Nebu's Tissue Engineering Lab and Cell Culture and Molecular Biology Lab, under the leadership of Dr. Yogesh Bharat Dalvi.

3. Collaboration and Support: The achievement stands as a testament to collaborative efforts, with guidance and support from Prof. Anil Sukumaran, an adjunct professor at Pushpagiri Research Centre and the Department of Dentistry, Hamad Medical Corporation, Qatar. The visionary leadership of Rev. Dr. Mathew Mazhavancheril and Prof. Nebu George Thomas has been instrumental in propelling this collaborative venture forward.

4. Showcasing Diverse Research Capacity: Beyond its implications for stem cell research, the publication emphasizes the diverse research capacity of Pushpagiri Research Centre. It underscores the institution's commitment to advancing scientific knowledge and contributing to the global research community.

5. Acknowledgment of Support: The research team extends heartfelt gratitude to Rev. Dr. Mathew Mazhavancheril for his unwavering support and encouragement throughout this transformative journey. His belief in the team's endeavours has been a driving force behind the success of this project.

The breakthrough opens up exciting possibilities for the future of regenerative medicine and stem cell research. Pushpagiri Research Centre remains steadfast in its dedication to pushing the boundaries of scientific exploration.

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Isolation, Culture, and Characterization of Dental Pulp Stem Cells from Human Deciduous and Permanent Teeth

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Citation

Anil, S., Thomas, N.G., Chalisserry, E.P., Dalvi, Y.B., Ramdoss, R., Vellappally, S. Isolation, Culture, and Characterization of Dental Pulp Stem Cells from Human Deciduous and Permanent Teeth. *J. Vis. Exp.* (), e65767, doi:10.3791/65767 (2023).

Date Published

August 16, 2023

DOI

10.3791/65767

URL

jove.com/t/65767

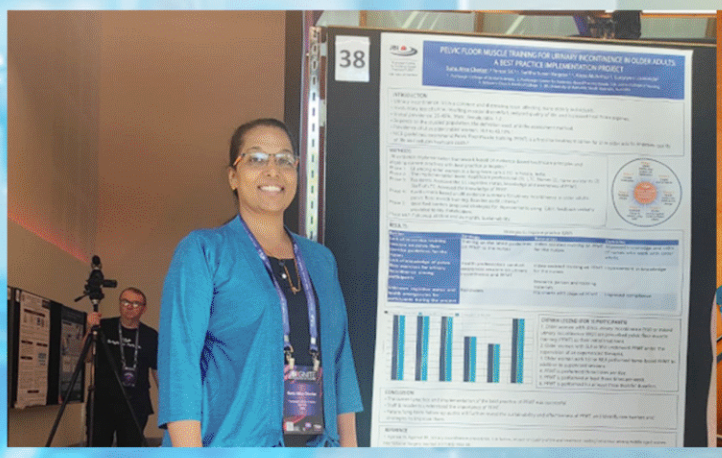
Abstract

In the realm of regenerative medicine and therapeutic applications, stem cell research is rapidly gaining traction. Dental pulp stem cells (DPSCs), which are present in both deciduous and permanent teeth, have emerged as a vital stem cell source due to their accessibility, adaptability, and innate differentiation capabilities. DPSCs offer a readily available and abundant reservoir of mesenchymal stem cells, showcasing impressive versatility and potential, particularly for regenerative purposes. Despite their promise, the main hurdle lies in effectively isolating and characterizing DPSCs, given their representation as a minute fraction within dental pulp cells. Equally crucial is the proper preservation of this invaluable cellular resource. The two predominant methods for DPSC isolation are enzymatic digestion (ED) and outgrowth from tissue explants (OG), often referred to as spontaneous growth. This protocol concentrates primarily on the enzymatic digestion approach for DPSC isolation, intricately detailing the steps encompassing extraction, in-lab processing, and cell preservation. Beyond extraction and preservation, the protocol delves into the differentiation prowess of DPSCs. Specifically, it outlines the procedures employed to induce these stem cells to differentiate into adipocytes, osteoblasts, and chondrocytes, showcasing their multipotent attributes. Subsequent utilization of colorimetric staining techniques facilitates accurate visualization and confirmation of successful differentiation, thereby validating the caliber and functionality of the isolated DPSCs. This comprehensive protocol functions as a blueprint encompassing the entire spectrum of dental pulp stem cell extraction, cultivation, preservation, and characterization. It underscores the substantial potential harbored by DPSCs, propelling forward stem cell exploration and holding promise for future regenerative and therapeutic breakthroughs.

Dr Aniket Naha, Scientist, Medical Biotechnology and Computational Drug Designing Laboratory, Pushpagiri Research Centre, was invited to deliver a talk on antimicrobial resistance in 4th International Conference on Contemporary Antimicrobial Research (ICCAR-2023) at Assam University, Silchar from 16-18th November, 2023. The topic of his research presentation was 'Novel V8C Mutant of SAAP-148 as a Potent ESβL Inhibitor Restoring Sulbactam Activity against Nosocomial XDR Acinetobacter baumannii

JBI Meeting and Symposium

Dr. Sunu Alice Cherian, Deputy Director of Pushpagiri Centre for Evidence Based Practice (a JBI Centre of Excellence), and Lecturer at Pushpagiri College of Dental Sciences attended the 70th JBI meeting and JBI IGNITE at Adelaide Australia, from August 13-17, 2023. The JBI meeting spanned over three days (November 13th-15th, 2023), with a gathering of over 100 JBIC members from all regions of the globe. The JBIC Meeting served as a platform for interactive workshops, during which attendees deliberated on JBI's strategic initiatives. Open and constructive discussion included how JBI could elevate its work towards achieving the UN's Sustainable Development Goals, and to enhance equity, diversity and inclusion. The JBI IGNITE, a 2-day evidence based healthcare methodology symposium (November 16th-17th, 2023) was attended by more than 200 people across the world. The symposium featured presentations by international leaders and innovators. Dr Sunu Alice Cherian represented the Centre and presented a poster at the IGNITE. She also presented the activities of the Centreat the South Asian Regional Meeting of JBI Centers



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Chitosan bioactive glass scaffolds for *in vivo* subcutaneous implantation, toxicity assessment, and diabetic wound healing upon animal model

N. Manjubaashini [a], P. Bargavi [b], Nebu George Thomas [c], Nikhil Krishnan [d], S. Balakumar [a]

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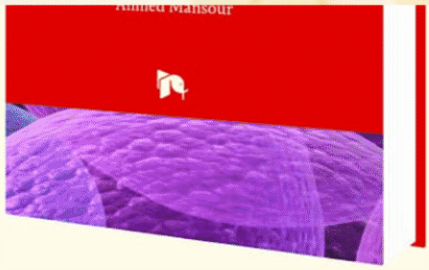

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PUBLISHED

15 November 2023

2. Toxicity Evaluation and Biocompatibility of Nanostructured Biomaterials

By Nebu George Thomas, Nibu Varghese, Nandakumar Kalarikkal, Sabu Thomas, Mridula Sreedharan, Sherin Sara George, Saumya John, Mekha Grace Varghese and Valliaveettil Thomas George

VIEW ABSTRACT

Biomaterials have occupied a prominent plac in regenerative procedures to restore human health. Moreover, there is a greater need in understanding, analyzing and establishing their toxicity profile. These, when made into nano-sized constructions called nanostructured biomaterials, their regenerative potential is enhanced, which could influence their toxicity nature. This chapter intends to give comprehensive information on their nanotoxicology pathwa at the cellular level, their entry pathways into the human body, and their potential consequences on human health. It clearly explains the cytocompatibility and biocompatibility of various nanostructured biomaterials for potential human health applications like drug delivery and tissue engineering. A detailed overview of various i vitro and in vivo evaluation methods of biocompatibility of nanomaterials are outlined in this chapter that researchers