



## DR. SOUMYA R S COMPLETED CERTIFICATION COURSE IN CYTOGENETICS

Dr. Soumya RS, Scientist, Biochemistry and Cytogenetics Lab, Pushpagiri Research Centre has successfully completed 'Certificate Program in Basics of Genetics and Related Disorders (CBGRD-01)' conducted by School of Translational Health Sciences, Kerala University of Health Sciences during the period from June to November 2025.

## DR. NEBU GEORGE THOMAS NOMINATED AS EXTERNAL MEMBER IN THE PHD ADVISORY BOARD OF YENEPOYA UNIVERSITY

Dr. Nebu George Thomas, Professor and Scientist, Tissue Engineering Laboratory, Pushpagiri Research Centre has been nominated as External Member in the PhD Advisory Board of Yenepoya University (Deemed to be University), Mangaluru for a period of 2 years.



## DR. SOUMYA R S AS KEYNOTE SPEAKER AT BISHOP MOORE COLLEGE MAVELIKKARA

Dr. Soumya RS, Scientist at the Pushpagiri Research Centre, delivered the keynote address during the National Science Day Seminar on “Women in Science: Catalyzing Viksit Bharat” held on 26 February 2026 at Bishop Moore College, Mavelikkara. In her address, she highlighted the pivotal role of women in advancing scientific research and innovation; while also addressing the challenges they encounter in their professional journeys.

The event was organized by the Department of Botany and Biotechnology in association with the Kerala Academy of Sciences, featured an esteemed panel of women scientists. As part of the seminar, Dr. Soumya RS also delivered a lecture titled “Targeting Mitochondria: A New Frontier in Translational Medicine,” further enriching the academic discourse.



## MOU SIGNED BETWEEN ST. THOMAS COLLEGE (AUTONOMOUS) AND PUSHPAGIRI INSTITUTE OF MEDICAL SCIENCES AND RESEARCH CENTRE

A Memorandum of Understanding (MoU) was formally signed between the St. Thomas College (Autonomous), Palai and the Pushpagiri Institute of Medical Sciences and Research Centre (PIMS&RC) on 23 March 2026 at the Director's Office, PIMS&RC. This MoU follows the exploratory and planning discussions held earlier between the two institutions to provide internship opportunities and a two-month (April to May) training in data analysis every year for the MSc students of the Department of Biostatistics of St. Thomas College.

On behalf of St. Thomas College (Autonomous), the MoU was signed by Prof. Dr. Sibi James, Principal, while Rev. Dr. Mathew Mazhavancheril, Director signed on behalf of PRC. The collaboration will be coordinated by Mrs. Nisha Kurian, Assistant Professor (Biostatistics), PIMS&RC and Mrs. Meenu Tom, Head of Department of Biostatistics, St Thomas College. They will oversee the implementation of activities outlined in the agreement.

In connection with the signing of the MoU, an interaction session was also held with the scientists of the Pushpagiri Research Centre. In addition to fostering academic collaboration, this initiative will pave the way for joint research activities.



## Evaluation of the cell viability and *in vivo* biocompatibility of three potential regenerative biomaterials derived from eggshells in Wistar rats

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Received October 30, 2025; Accepted February 9, 2026

DOI: 10.3892/wasj.2026.450

**Abstract.** The development of novel bone substitutes for the management of periodontal osseous defects requires assured biological function upon implantation. Chicken egg shells have been introduced for some time in reconstructive surgeries due to their mineral composition. Egg shells are among the most abundant byproducts of food processing waste and appear to have unique biological and chemical properties that support cell differentiation. Additives such as fish collagen and glycerine may enhance their efficacy by improving their regenerative properties, which mimic those of human bone, and increasing their handling characteristics. Biocompatibility and cell viability are two critical factors affecting the ability of any regenerative material to integrate into the body. The aim of the present study was to determine the cell viability and biocompatibility of three egg shell-derived biomaterials, namely, egg shell-derived hydroxyapatite (EHPA), EHPA modified with fish collagen EHPA/Coll, and EHPA/Coll with glycerine. Chicken egg shells were used to synthesise hydroxyapatite via chemical precipitation. The synthesised hydroxyapatite was modified with fish collagen and then with glycerol. All three materials were tested for their viability in mouse fibroblasts and for their *in vivo* biocompatibility in Wistar rats. The results revealed that eggshell-derived

hydroxyapatite was highly biocompatible and did not exert any cytotoxic effects. Its modification using fish collagen and glycerine also resulted in derivatives that were biocompatible and nontoxic. On the whole, the present study demonstrates that all three materials tested, which were eggshell derivatives, were highly biocompatible and promoted cell growth.

### Introduction

A wide variety of replacement grafts have been attempted in the pursuit of achieving the elusive goal of bone regeneration in osseous defects. These materials are indicated for osseous regeneration in the management of periodontal and peri-implant defects, as are procedures such as socket preservation, ridge augmentation and guided bone regeneration. Biocompatibility and cell viability are critical properties for biomaterials that come in proximity to biological tissues, and represent the capability of a substance to associate with cells in a living system without leading to destruction by unfavourable reactions (1). It is directly related to cytotoxic effects, or the capacity of the material to induce damage to a living system (2).

There are two types of materials that induce bone formation:

Prathap, Sruthy, Rajesh Kashyap Shankar, Nebu George Thomas, Riaz Abdulla, Binsi Puthanpurakkalkizhakkethil Kamalamma, Suprith Surya, and Prathap Mulackal Sreekanatan. 2026. "Evaluation of the Cell Viability and *In Vivo* Biocompatibility of Three Potential Regenerative Biomaterials Derived from Eggshells in Wistar Rats." World Academy of Sciences Journal 8: 35. <https://doi.org/10.3892/wasj.2026.450>

Pati, Sukanya, Aseem Mishra, Rahul Modak, Aniket Naha, and Soumya Basu. "Determination of nutrient diffusion through biocompatible cross-linked hydrogels: A smart phone based analytical method." Next Materials 11 (2026): 101865. <https://doi.org/10.1016/j.nxmte.2026.101865>

Next Materials 11 (2026) 101865

Contents lists available at ScienceDirect

Next Materials

journal homepage: [www.sciencedirect.com/journal/next-materials](http://www.sciencedirect.com/journal/next-materials)

Research article

Determination of nutrient diffusion through biocompatible cross-linked hydrogels: A smart phone based analytical method

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ARTICLE INFO

Keywords:  
 Diffusion kinetics  
 Smartphone  
 Cross-linkers  
 Gelatin  
 Hydrogel

ABSTRACT

**Introduction:** Quantification of diffusion kinetics in hydrogels through smart-phone, essential for optimizing their applicability in various biomedical applications.  
**Methods:** In this study, we have cross-linked gelatin using EDC and NHS at varying concentrations. We have developed a smartphone based method to track the movement of dye-doped solution through hydrogel, and analyzed grayscale intensity profiles. The data was fit according to decay model derived from Fick's second law of diffusion and diffusion kinetics at various points in the hydrogel was quantified. Physical characterization of hydrogels was also performed using self-stability assessment, poke-tests, and rheological measurements and correlated with diffusion behavior.  
**Results:** The evaluated diffusion coefficients ranged from  $1.7 \times 10^{-8}$  to  $2.5 \times 10^{-8}$  m<sup>2</sup>/s, consistent, followed Fick's law of diffusion, supporting macroscopic solute diffusion in hydrogels. The sample 5 C had highest diffusion coefficient, inferring to superior permeability. Rheological data demonstrated the importance of network homogeneity and free volume in diffusion. Statistical analysis confirmed the reproducibility, and reliability of the method. The hydrogels demonstrated key properties essential for biological applications like sterilizability and compatibility for spheroid cultures. Manual extrusions confirmed that the finalized hydrogel could be processed into desired forms.  
**Conclusion:** The integration of a smartphone based detection method offers a reliable, cost-effective, yet analytical, and readily accessible approach for real-time monitoring nutrient diffusion. This holds a strong potential for escalating hydrogel characterization in biomedical research.



14<sup>th</sup> International Conference  
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