SCHOLARLY PUBLICATIONS
School of Biotechnology
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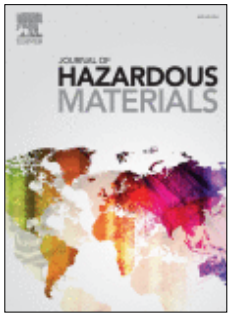
Journal Name: Journal of Hazardous Materials **IF: 11.3**

Title: Teabag-derived microplastics pose steatosis and oxidative stress-mediated toxicity in embryonic zebrafish

Author: Naser, S.S.; Sahu, R.N.; Lenka, S.S.; Barik, D.; Kujawska, M.; Souto, E.B.; Suar, M.; Verma, S.K.

Details: Volume 503, February 2026

Abstract: Microplastics released from consumer products, such as teabags, are an emerging environmental and health concern. Teabag-derived microplastics (TMPs) represent a significant yet underexplored source of micropollutants. This study investigated the developmental and molecular toxicity of TMPs in zebrafish embryos through integrated experimental and computational approaches. TMPs extracted from commercial teabags had a mean hydrodynamic diameter of 389.7 nm and a zeta potential of –59.4 mV, indicating high colloidal stability. Embryos exposed to TMPs exhibited dose-dependent developmental abnormalities, with up to 45 % mortality and over 30 % incidence of pericardial edema and notochord defects at higher concentrations. ROS levels increased significantly ($p < 0.0001$), accompanied by lipid droplet accumulation, indicating steatosis. Gene expression analysis showed marked upregulation of *Zhe1* (>10-fold), *Sod1* (>12-fold), and *Tp53* (~4.5-fold), reflecting hatching stress, oxidative imbalance, and apoptosis. Flow cytometry confirmed elevated acridine orange-positive apoptotic cells. Molecular docking revealed strong binding affinity of styrene, a leachate from TMPs, to *Zhe1*, *Sod1*, and *p53*, with Sod1 showing the highest affinity (–5.4 kcal/mol). These findings suggest TMPs toxicity results not only from physical exposure but also from specific molecular interactions. The study underscores the urgent need to evaluate the risks of microplastic leachates from food-contact materials.



URL: https://www.sciencedirect.com/science/article/abs/pii/S030438942600110X?

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Materials Today Bio **IF: 10.2**

Title: Selenium-modified graphene oxide: A tri-dimensional study of its cytotoxicity and developmental effects

Author: Oz, T.; Verma, S.K.; Kuznetsov, A.; Nagarajan, P.; Cole, I.; Naser, S.S.; KsiÄ…Å¼ek, K.; Yin, H.; Kujawska, M.

Details: Volume 36, February 2026

Abstract: Graphene oxide functionalized with selenium (GO-Se) has emerged as a promising nanomaterial due to selenium's antioxidant and redox-regulating properties, yet its safety profile remains unclear. The present study systematically investigated the cytotoxic, oxidative, and developmental effects of GO-Se using normal human dermal fibroblasts (NHDF) cells, zebrafish embryos and complementary density functional theory (DFT) calculations. GO-Se induced a dose- and time-dependent reduction in NHDF cell viability (IC_{50} = 274.6 μg mL^{-1} at 24 h), associated with oxidative stress modulation and apoptosis. Zebrafish models revealed concentration-dependent cardiac dysfunction, developmental abnormalities, and increased reactive oxygen species (ROS) levels at ≥100 μg mL^{-1}. DFT analyses supported these findings by showing strong electron-accepting properties of GO-Se. Overall, the study highlights both the biomedical potential and the safety concerns of GO-Se, underlining the need for further investigations into its applicability.

URL: https://www.sciencedirect.com/science/article/pii/S2590006425012220

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

Journal Name: Materials Today Bio **IF: 10.2**

Title: Graphene oxide-microplastic hybrid showcase elicited discrepancy through intrinsic interaction mediated steatosis, and apoptosis in macrophages

Author: Sinha, A; Mayur, A; Jena, S; Ghosh, A; Suar, M; Verma, SK

Details: Volume 37, April 2026

Abstract: The widespread natural abundance of microplastics (MP) has been recognized to pose significant global health concerns, particularly due to limited understanding of their biological interactions. With the uncontrolled increase in MP accumulation in the environment, their interaction with xenobiotics like nanomaterials used for different biomedical and environmental applications is likely to be enhanced, raising concern over the advanced toxicological impacts. Hence, it is important to deduce their threatening toxicity to the biological niche, including humans. This study deduces the cytotoxicity of a green-synthesized GO@MP hybrid using macrophage cells, integrating experimental and computational methods. Physicochemical characterization was performed using FTIR, SEM, and DLS. Toxicological assessment revealed that GO@MP significantly reduced cell viability, primarily via surface adherence and deposition. Experimental analysis demonstrated concentration-dependent accumulation and internalization of GO and MP. Compared to individual MP and GO, the hybrid induced higher levels of lipid peroxidation and mitochondrial membrane damage, triggering enhanced apoptosis. In silico analysis indicated interactions between GO@MP and proteins involved in oxidative stress and apoptotic pathways for the molecular discrepancies. Computational modelling further unraveled atomic-level interactions between GO and MP with key metabolic and apoptotic proteins, including PEX5, PEX14, BCL2, and Caspase Furthermore, this study aims to provides critical insights into the mechanistic toxicity of nanomaterial-microplastic hybrids, emphasizing the need for caution in their environmental and biomedical applications.

URL: https://www.sciencedirect.com/science/article/pii/S2590006426002309?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Biochimica Et Biophysica Acta-Reviews on Cancer **IF: 8.3**

Title: Colorectal cancer stem cells in the tumor microenvironmental niche: Mechanistic insights and emerging therapies

Author: Viswanathan, S; Raha, M; Mishra, S; Patnaik, S

Details: Volume 1881, Issue 2, April, 2026

Abstract: Colorectal cancer (CRC) is a highly heterogenous disease, wherein a specific population of cancer stem cells (CSCs) are crucial in tumor initiation, therapeutic resistance, metastasis and disease progression. The tumor microenvironment (TME) plays a key role in the development of CRC stem cells (CCSCs) by sending signals and allowing cells to interact with each other, which helps to stem cells stay viable and regenerate. The ongoing interaction between CCSCs and diverse components of TME promotes treatment resistance and tumor recurrence. Recent advancements permitted the fabrication of three-dimensional (3D) tumor models using CCSCs. These models better replicate the in vivo TME and provide useful ways in personalized drug discovery and tumor biology. Therapy resistance in CCSCs is still an important concern in CRC therapy, because cells remain active, have good DNA repair systems, and interact with other cells in the TME. Targeted treatment techniques are being formulated to interrupt in various pathways, including DNA/RNA-based methods that inhibit oncogenic drivers or restore tumor suppressors in CCSCs. TME-targeted immunotherapies, including immune checkpoint inhibitors, T-cell-based treatments, and cytokine modulation, are shown potential in counteracting immune evasion by CCSCs. Numerous clinical trials are examining the effectiveness of inhibitors targeting CCSC-related pathways in metastatic CRC. This review comprehensively explores the evolution and role of CCSC within the TME, development of 3D TME models from patient derived stem cells, mechanism of resistance and targeted immunotherapeutic strategies aimed at eradicating CSCSs to improve clinical outcomes in CRC.

URL: https://www.sciencedirect.com/science/article/pii/S0304419X26000314

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Biochimica et Biophysica Acta - Reviews on Cancer **IF: 8.3**

Title: Estrogen-related receptor α in breast cancer: From molecular insights to targeted therapy

Author: Pradhan, J.; Samal, A.P.; Khatoon, U.; Prusty, M.; S.

Details: Volume 1881, Issue 1, February 2026

Abstract: Breast cancer outcomes continue to be undermined by metastasis, relapse, and therapeutic resistance. While endocrine and targeted therapies have improved clinical outcomes, aggressive subtypes such as HER2-positive and triple-negative breast cancers remain challenging, exhibiting poor prognosis and frequent relapse. The constitutively active orphan nuclear receptor, estrogen-related receptor α (ERRα), has emerged as a key regulator of tumor energy metabolism and a crucial driver of breast cancer progression. The ERRα overexpression, frequently observed in aggressive subtypes, is strongly correlated with epithelial-mesenchymal transition, angiogenesis, invasion, metastasis, and therapy resistance. Preclinical studies demonstrate that pharmacological inhibition or gene silencing of ERRα suppresses oncogenic signaling and enhances therapeutic sensitivity. This review explores the multifaceted roles of ERRα in breast cancer and highlights its translational potential as a molecular target for treating aggressive breast cancer subtypes.

URL: https://www.sciencedirect.com/science/article/pii/S0304419X25002677?

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Materials and Design **IF: 7.9**

Title: Polyimide-based polymers: a new frontier in antimicrobial materials and healthcare applications

Author: Mehra, A.; Chakraborty, M.; Nayak, S.

Details: Volume 262, February 2026

Abstract: Polyimide-based materials have emerged as versatile candidates due to their exceptional thermal stability, mechanical robustness, and chemical resistance. Recent research highlights their antimicrobial, antifouling, and biocompatible properties, offering promising solutions for infection control and device safety. These materials inhibit microbial growth on surfaces without compromising biocompatibility, making them ideal for healthcare applications and reducing device-related infections. This review emphasizes the biomedical applications of polyimides, particularly as antimicrobial coatings for implants, wound dressings, and medical devices. This emphasis stems from the critical need in healthcare to reduce infections and ensure device compatibility with human tissues, a role that polyimide-based materials appear exceptionally suited to fulfill. Despite their potential, several challenges persist, including long-term stability, limited biocompatibility assessments, and regulatory compliance, which necessitate interdisciplinary research efforts. By refining fabrication and surface engineering techniques, polyimide-based materials could significantly impact infection control practices and related complications. Further, the review provides a comprehensive overview of current advancements in polyimide research and highlights areas for future research, aimed at fully harnessing the antimicrobial and biocompatibility potential of polyimides in healthcare sector.

URL: https://www.sciencedirect.com/science/article/pii/S0264127526000237?

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Environmental Research **IF: 7.7**

Title: Imperative implication of microplastics as vital agent for salmonellosis inducing biofilms, antibiotic resistance, and health risk

Author: Asima, SP; Mayur, A; Sonalisha, S; Parashar, R; Batsya, I; Sinha, A; Raina, V; Suar, M; Verma, SK

Details: Volume 297, May 2026

Abstract: Microplastics (MPs) have emerged as dynamic microbial interfaces that reshape pathogen ecology, antibiotic resistance evolution, and disease transmission. This review examines how MPs function as reservoirs and vectors for *Salmonella enterica*, highlighting the plastisphere as a stable biofilm microhabitat that enhances bacterial adhesion, environmental persistence, stress tolerance, and virulence expression. We summarize evidence that MP surfaces especially weathered, hydrophobic polymers, promote dense biofilms that protect *Salmonella* from desiccation, UV exposure, sanitization, and antimicrobial agents. Within these structured communities, co-localization of *Salmonella* with antibiotic residues, heavy metals, and diverse microbial taxa accelerates horizontal gene transfer and co-selection of antibiotic resistance genes and virulence determinants. MPs thereby act as mobile genetic "incubators" that disseminate multidrug-resistant *Salmonella* across soil, aquatic systems, wastewater networks, food production environments, and host microbiomes. These interactions link environmental contamination with zoonotic and foodborne transmission pathways, constituting a critical One Health concern. We identify current methodological gaps and propose research priorities for mechanistic risk assessment, monitoring frameworks, and intervention strategies. Recognizing MPs as active ecological players rather than inert pollutants is essential for mitigating their role in the global spread of pathogenic and antimicrobial-resistant *Salmonella*.

URL: https://www.sciencedirect.com/science/article/abs/pii/S0013935126004184?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

Journal Name: Critical Reviews in Biotechnology **IF: 7.7**

Title: Scope for vitamin B deficiency redressal through microbial vitamins with reference to India and South Africa

Author: Nayak P.P.; Gona T.A.; Galada S.; Mehlomakulu N.N.; Dey G.; Buys E.M.; Panda S.K.

Details: February, 2026

Abstract: B vitamins are the most widely used supplements for women and children to maintain good health conditions. Vitamin B deficiency is prevalent in many countries including India and South Africa. Synthetic vitamins (such as folic acid) are administered orally to vulnerable groups to address the vitamin B deficiency. B vitamin-fortified foods have also been adopted as the mandate of the governments of India and South Africa. However, the policies have not been able to bring any sustainable solutions to vitamin B deficiency. This article describes the natural production of B vitamins by cultured microorganisms. Furthermore, this article describes the scope of microbial B vitamin availability in India and South Africa through dietary interventions (foods obtained from microbial processing/fermented food products). The article also elucidates the different fermented foods of India and South Africa and the increment of different B vitamins, namely riboflavin (vitamin B2), folate (vitamin B9), and cyanocobalamin (vitamin B12) during the fermentation. The technoeconomical feasibility and commercial aspects have been discussed in the article.

URL: https://www.tandfonline.com/doi/full/10.1080/07388551.2026.2616412

SCHOLARLY PUBLICATIONS
School of Biotechnology
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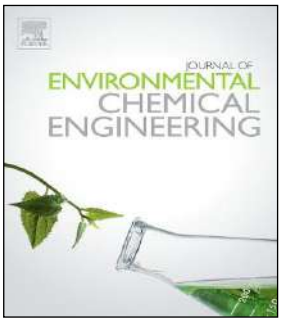
Journal Name: Journal of Environmental Chemical Engineering **IF: 7.2**

Title: Intrinsic atomic interaction determined synergistic toxicity of Graphene oxide and microplastic (GO@MP) hybrid through steatosis and apoptosis

Author: Sinha, A.; Mayur, A.; Barik, D.; Suar, M.; Verma, S.K.

Details: Volume 14, Issue 2, April 2026

Abstract: Despite the heterogeneous nature of the aquatic systems, the interactions between microplastics (MP) and pollutants co-existing under environmental conditions are rarely discussed. While Graphene oxide (GO) nanosheets are being used for water desalination and purification, their potential as a sorbent is highly liable to form a hybrid with other contaminants, raising concerns for the biomedical and environmental health. In this context, we synthesized a GO@MP hybrid using green methodology under lab-mimic environment parameters. The hybrid was characterized by FTIR, SEM, and DLS for physicochemical properties. The study investigated the toxicological impact of GO@MP hybrid in comparison to GO and MP with HCT116 colon cancer cells through experimental and computational approaches. Toxicity assessments showed that GO@MP significantly reduced the cell viability primarily through attachment and internalization. Flow cytometry confirmed enhanced cellular uptake, while fluorescence assays revealed elevated ROS levels followed by apoptosis, demonstrated through mitochondrial damage and nuclear fragmentation. The LC50 values of cells treated with GO@MP were 52.6 µg/ml (24 h) and 5.25 µg/ml (72 h), which are significantly lower than GO or MP alone. In-silico analysis revealed strong interactions of GO@MP with the membrane and apoptotic proteins (p53, PEX5). The findings suggest that environmental co-existence and interaction of MPs with nanomaterials like GO can magnify their biological toxicity. The results advocate for precautionary measures in material use and disposal, and more in-depth toxicological examinations of the combined pollutant systems.



URL: https://www.sciencedirect.com/science/article/abs/pii/S2213343726006135

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Carbohydrate Polymer Technologies and Applications **IF: 6.5**

Title: Chitosan-ZnS nanocomposite hydrogel beads to combat multi-drug-resistant pathogens

Author: Sahoo, R.; Padhiary, M.; Tripathy, C.S.; Charan Behera, K.C.; Senapati, S.; Behera, S.K.; Bal, N.C.; Pati, S.; Samal, S.K.

Details: Volume 13, March 2026

Abstract: The extensive use/misuse of antibiotics is a key factor for the rapid rise and global spread of multidrug-resistant (MDR) pathogens, which now pose a major threat to public health. This situation necessitates the development of innovative, biocompatible, and sustainable antimicrobial materials capable of overcoming the limitations of traditional drug-based therapies. Chitosan (CS), a cationic polymer, is an excellent candidate for various medical applications; however, its antimicrobial activity alone may be insufficient against broad-spectrum pathogens. Therefore, in this study, CS-ZnS nanocomposite hydrogel beads were successfully synthesized that demonstrated excellent antibacterial, anti-biofilm properties, as well as suppression of metabolic activity against both Gram-positive and Gram-negative MDR bacterial pathogens. In addition, the hydrogel beads showed significant antioxidant property and demonstrated hemocompatibility. The morphology of this composite was characterized using SEM and TEM, revealing Zinc sulfide (ZnS) nanoflakes sized 8 to 10 nm. The structural properties were evaluated using XRD, Raman, and FTIR spectroscopy. The findings of this study were further supported by *in silico* analysis, which demonstrated strong interactions with target proteins, including MecA in *Staphylococcus aureus* and oxacillin-hydrolyzing class D β-lactamase in *Pseudomonas aeruginosa*. This CS-ZnS system represents a novel, sustainable, and cost-effective biotherapeutic material with potential applications in combating MDR pathogens.

URL: https://www.sciencedirect.com/science/article/pii/S2666893925004189

SCHOLARLY PUBLICATIONS
School of Biotechnology
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Journal Name: Biomaterials Advances **IF: 6.0**

Title: In vitro and ex vivo evaluation of a papain-loaded mucoadhesive buccal patch with potential antifibrotic and anticancer activity

Author: Parida, N.; Kokkanti, R.R.; Biswas, S.; Abikshyeet, A.; Patnaik, S.; Bajoria, A.A.

Details: Volume 182, May 2026

Abstract: Oral submucous fibrosis (OSMF) and oral squamous cell carcinoma (OSCC) are characterized by aberrant extracellular matrix remodeling, chronic inflammation, and limited responsiveness to current local treatment modalities. In this study, we report the design and in vitro / ex vivo evaluation of a papain-loaded bilayer mucoadhesive buccal patch as a proof-of-concept platform for localized enzyme delivery. Papain, a plant-derived cysteine protease with collagenolytic activity, was incorporated into a biocompatible polymeric matrix to enable controlled, site-specific release within the buccal environment. The optimized formulation exhibited acceptable physicochemical properties, including uniform thickness, flexibility, near-neutral surface pH, sustained hydration, and controlled papain release within a clinically relevant residence window. In vitro biological evaluation demonstrated differential responses in HGF and CAL-27 cells, with reduced cytotoxicity toward normal fibroblasts and decreased viability, clonogenicity, migration, invasion, and three-dimensional spheroid outgrowth in carcinoma cells under experimental conditions. Ex vivo collagen degradation studies using rat tail tissue further supported the ability of the formulation to interact with collagen-rich matrices. Hemocompatibility testing indicated minimal hemolysis, suggesting preliminary blood compatibility. Collectively, these findings establish the formulation feasibility and biological plausibility of a papain-loaded mucoadhesive buccal patch (P-MABP) as a localized enzyme delivery system. While the results support its potential relevance for fibrotic and neoplastic oral conditions, further in vivo studies and mechanistic investigations are required to define therapeutic efficacy, safety, and translational applicability.

URL: https://www.sciencedirect.com/science/article/pii/S2772950826000294

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

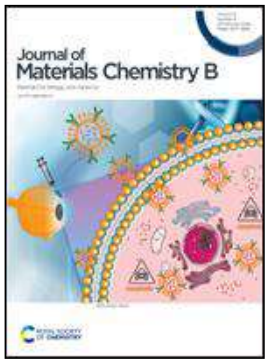
Journal Name: Journal of Materials Chemistry B **IF: 5.8**

Title: Designing of porous scaffolds for tissue engineering and regenerative medicine

Author: Sahoo, R.; Swaroop Sanket, A.; Pattnaik, A.; Pany, S.; Pradhan, S.; Pati, S.; Haugen, H.J.; Puppi, D.; Samal, S.K.

Details: Volume 14, Issue 9, March 2026

Abstract: The potential of the porous scaffolds lies in its dynamic architectural features, such as porosity, pore size & shape, interconnectivity, and spatial distribution which are highly essential in tissue engineering applications. The porous structure of the scaffolds influences the biological and physicochemical activities in the tissue regeneration process. The porosity also allows better distribution of nutrients and diffusion of biological fluids thereby dispersing the seeding material uniformly. Generally, damaged tissues can be regenerated on their own but many times due to unavoidable factors, the healing process slows down or even gets impaired and is impossible to heal. Therefore, it is necessary to design and functionalize porous scaffold with different biomolecules for specific tissues, that can enhance its biomimetic property. In this review, the importance of designing porous scaffold and their fabrication process by using various traditional, advanced and combinatorial techniques have been discussed. Furthermore, specific applications for tissue regenerative ability in damaged tissues like bone, cartilage, trachea, skin, nerve, retina, cardiac, pancreatic, breast, GI tract, hepatic, kidney and reproductive tissues have been discussed in detail.



URL: https://pubs.rsc.org/en/content/articlelanding/2026/tb/d5tb02507a

SCHOLARLY PUBLICATIONS
School of Biotechnology
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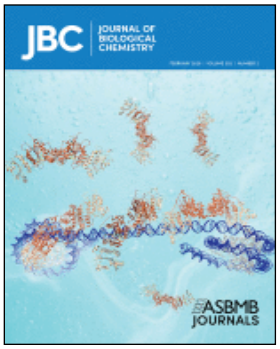
Journal Name: Journal of Biological Chemistry **IF: 5.2**

Title: Single-cell analysis identifies BASP1 as a driver of drug resistance and cell plasticity in oral squamous cell carcinoma

Author: Behera, A.; Datta, S.; Mohanty, S.; Mohapatra, P.; Ansari, S.A.; Podder, S.; Rath, R.; Muduly, D.K.; Swain, R.K.; Raghav, S.K.; Dash, R.

Details: Volume 302, Issue 2, February 2026

Abstract: Despite initial positive responses with chemotherapy, many cancer patients experience relapse, continued tumor growth, and metastatic spread due to drug resistance. It is well documented that a rare population of phenotypically heterogeneous cells contributes to intratumour heterogeneity and drug resistance. To date, these rare populations are poorly characterized. To identify the potential role of these rare populations in drug resistance, here we have performed single-cell RNA sequencing of human oral squamous cell carcinomas lines presenting with sensitive, early, and late cisplatin-resistance patterns. The single-cell RNA-sequencing data identified two different transitional clusters within the three, sensitive, early, and late cisplatin-resistant major clusters. The differential gene expression profile and deregulated pathways analysis suggested Brain Abundant Membrane-Attached Signal Protein 1 (BASP1) as a major upregulated gene not only in major drug-resistant clusters but also in transitional clusters. Selective knockdown of BASP1 reverses epithelial to mesenchymal transition (EMT) phenotype in cisplatin-resistant cells and restores cisplatin-induced cell death. Mechanistically, BASP1 positively regulates LIN7A expression through phosphorylation of RAC-alpha serine/threonine-protein kinase as well as by supressing microRNA hsa-mir-501-3p, which in turn induces β-catenin-mediated EMT in chemoresistant cells. Overall, our study demonstrates that BASP1 acts as a key regulator of EMT in cisplatin-resistant oral squamous cell carcinoma and represents a promising therapeutic target to overcome drug resistance in advanced stages of the disease.



URL: https://www.sciencedirect.com/science/article/pii/S0021925825029783

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

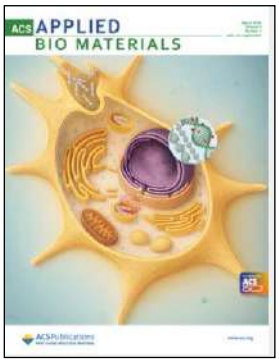
Journal Name: ACS Applied Bio Materials **IF: 4.7**

Title: In Vitro Antimycobacterial Activities of Short Peptide-Functionalized Silver Nanoparticle and It's In Silico Mechanistic Insight

Author: Suryakanta, U.; Mishra, S.; Dhal, A.K.; Panigrahi, B.; Singh, R.K.; Mandal, D.

Details: Volume 9, Issue 4, February 2026

Abstract: The rise of drug-resistant microbes has made antimicrobial therapy increasingly challenging, and despite several reports on peptide-functionalized silver nanoparticles, their efficacy against Mycobacterium species remains largely unexplored. In this study, we synthesized short peptide functionalized silver nanoparticles to develop an effective antimycobacterial agent, where peptides acted as both reducing and stabilizing agents for the one-pot synthesis of silver nanoparticles (AgNPs). The developed nanoparticles were characterized by high-resolution transmission electron microscopy (HR-TEM), dynamic light scattering (DLS), Fourier transform infrared spectroscopy (FTIR), and UV–visible spectroscopy (UV–vis). The positively charged peptide-cap ped silver nanoparticles exhibited significant antimycobacterial activity against acid-fast mycobacterial strains, including Mycobacterium smegmatis, Mycobacterium bovis, and Mycobacterium marinum, compared to peptides alone, which could be due to the integrated effect of the peptide-functionalized AgNPs. Among the synthesized nanoparticles, linear peptide 2 (LP 2) functionalized AgNP exhibited the highest antimycobacterial efficacy against the Mycobacterium strains, with the lowest MIC (5 μM).. Molecular docking and molecular dynamics (MD) simulations of the peptides with key enzyme FadD32 (MsmFadD32), Mycobacterium smegmatis, demonstrated strong interactions near the active site cleft, indicating potential inhibition of the mycolic acid biosynthesis pathway by the LP 2 peptide. Additionally, AgNP LP 2 demonstrated the ability to inhibit biofilm formation and effectively disrupt preformed mycobacterial biofilms while exhibiting negligible cytotoxicity toward human embryonic kidney (HEK293) cells. In summary, our results suggest that newly developed AgNPs exhibit antimycobacterial activity without compromising the cell viability of normal cells, making them highly potent as prospective antimycobacterial agents.



URL: https://pubs.acs.org/doi/10.1021/acsabm.5c02302

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

Journal Name: Plant Science **IF: 4.1**

Title: Unearthing the secrets of drought-driven root system architecture: Nutrient acquisition and rhizosphere microbe interplay

Author: Nayak, J.; Chattopadhyay, D.; Giri, M.K.; Singh, N.

Details: Volume 363, February 2026

Abstract: Drought, a climatic occurrence that cyclically affects all climatic regions, is more prevalent in tropical and subtropical areas. This phenomenon inflicts physiological harm upon plants within ecosystems and agroecosystems. Apart from the direct scarcity of water, which severely impairs plant development and productivity, there can be consequential issues related to mineral nutrition. These secondary effects can arise and further impact plant development. Amidst drought conditions, roots play a critical role in shaping the growth and development of plants. During these circumstances, our understanding of the molecular mechanisms governing critical responses and interactions between plant roots and their surrounding rhizosphere is less comprehensive in comparison to other studies with well-characterized model species like Arabidopsis. This article examines the molecular mechanisms governing the adaptability of root system architecture (RSA) to drought stress in plants. It also explores how soil nutrients and microorganisms are regulated in response to these adaptive processes. We first give a general description of how plant hormones control RSA under water-scarce conditions. Additionally, we explore how nutrients, particularly phosphorus and nitrogen, affect the developmental responses of RSA to low water status. Additionally, this article delves into the existing understanding of the interactions between RSA and soil microbial niches under drought. Based on these understandings, our conclusion emphasizes that to achieve a more comprehensive grasp of the mechanisms underlying drought adaptation in plant roots, future research should adopt a holistic network perspective.

URL: https://www.sciencedirect.com/science/article/abs/pii/S016894522500473X?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

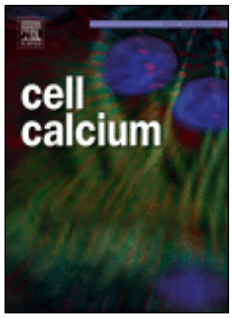
Journal Name: Cell Calcium **IF: 4.0**

Title: Isoform-specific structure and function of calsequestrin: Implications beyond calcium buffering in health and disease

Author: Pani, P.; Aich, D.; B.P.; M.S.; Swalsingh, G.; Periasamy, M.; Bal, N.C.

Details: Volume 134, March 2026

Abstract: Calsequestrin (CASQ) plays an important role in muscle contraction by buffering Ca2+ inside the sarcoplasmic reticulum (SR). Intriguingly, mammals express two CASQ isoforms encoded by separate genes with highly conserved protein structure. CASQ1 is mainly expressed in fast-twitch skeletal muscles; whereas CASQ2 predominates in slow-twitch muscles and heart. CASQ2 function is poorly defined in rhythmically beating heart where SR Ca2+-release is graded through Ca2+-induced Ca2+-release (CICR), compared to CASQ1 in skeletal muscle where Ca2+-release is all or none. A unique property of CASQ is that it can dynamically polymerize-depolymerize in Ca2+-concentration dependent manner. CASQ1 and CASQ2 not only differ in their polymerization properties but also interact with different RyR protein complexes at the junctional SR governing muscle fiber specific SR Ca2+-release. In recent years CASQ has gained renewed attention because mutations in CASQ1 and CASQ2 proteins cause cardiac and skeletal muscle disease, including malignant hyperthermia (skeletal muscle), cardiac arrhythmias and sudden cardiac death. Additionally studies have implicated that CASQ is more than a Ca2+-buffer and CASQ-dysfunction can affect mitochondrial function and Ca2+-entry via store operated Ca2+-entry. Therefore, the isoform specific functions of CASQ1 and CASQ2 in different striated muscles requires further investigation in the light of recent findings. This review explores what we have learned over last 30 years about CASQ and what gaps of knowledge still exist. Here, we discuss how structural divergence between CASQ1 and CASQ2, shape physio-pathological outcomes and highlight some of the recent findings that trigger renewed interest in CASQ proteins, including their role beyond Ca2+-buffering.



URL: https://www.sciencedirect.com/science/article/abs/pii/S0143416026000138?

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

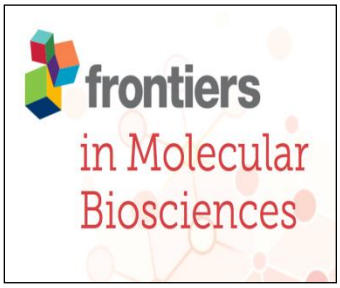
Journal Name: Frontiers in Molecular Biosciences **IF: 4.0**

Title: Mitochondrial metabolism in cancer stem cells (CSCs): molecular and diagnostic implications

Author: Psvv, C; Sunil, S; Thuyyath, N; Kokkanti, RR; Lavudi, K

Details: Volume 13, March 2026

Abstract: Cancer stem cells (CSCs) are a self-renewing population often linked to tumor initiation, metastasis, relapse, and resistance to therapy. While bulk tumor cells are often dependent on glycolysis, CSCs demonstrate metabolic plasticity can switch between glycolysis and OXPHOS (oxidative phosphorylation) depending on context. Mitochondria buffer against stress and allow for a metabolic reprogramming towards apoptosis evasiveness, making mitochondrial function crucial to CSC survival. The acquisition of stem-like traits coincides with the rewiring of mitochondrial metabolism, as newly emerging CSCs intermittently upregulate respiration, ROS detoxification, and metabolic plasticity to satisfy cellular demands. Hypoxia-inducible transcription factors, along with tumor stromal signals such as CAF-derived metabolites induce metabolic rewiring and strengthen antioxidant defenses in CSCs, thereby making it easier for CSCs to survive in unfavourable niches. More research is required to identify mitochondrial vulnerabilities that are specific to therapy and then translate those findings into effective, precision-based cancer treatments. In this review, we try to provide a comprehensive overview of mitochondrial metabolism in regulating behaviour of CSCs, origin and characteristics of CSCs, the metabolic reprogramming for OXPHOS and glycolytic flexibility, molecular regulators of mitochondrial function, mitochondrial dynamics in stemness pathways and how the TME regulates these processes. We also review novel diagnostic techniques and therapies that target mitochondrial vulnerabilities to eliminate CSCs and provide better clinical outcomes.



URL:https://www.frontiersin.org/journals/molecularbiosciences/articles/10.3389/fmolb.2026.1741800/full

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

Journal Name: Journal of Pharmaceutical Sciences **IF: 3.8**

Title: Cocrystals of telmisartan with ascorbic acid: Enhanced solubility and antiviral potency against Japanese encephalitis virus

Author: Regu V.R.; Datey A.; Vitthal T.K.; Swain R.P.; Kumar S.; Chattopadhyay S.; Subudhi B.B.

Details: Volume 115, Issue 5, May 2026

Abstract: The significant impact of Japanese encephalitis virus (JEV) on society and the lack of any approved antiviral drugs demand urgent attention. Considering the prohibitive cost involved in new antiviral development, repurposing existing drugs is an alternative strategy. Telmisartan (TM) is a prime candidate for repurposing against JEV due to its ability to inhibit JEV infection. Poor aqueous solubility of TM can be a major hurdle in harnessing its repurposing against JEV. Cocrystallization with appropriate coformers has the scope to improve solubility and antiviral properties. The cocrystal showed adequate stability under refrigeration conditions. Using valid analytical methods, the solubility of the cocrystal was found to be enhanced by 81-fold compared to TM. The significant increase in solubility was also associated with a significant enhancement in ex vivo intestinal permeability of the cocrystal (60%) compared to that of TM (28%). Antiviral assay revealed a 2-fold enhancement in the potency of the cocrystal. This was also associated with a significant increase in selectivity index (29) as compared to TM (14.18), indicating its enhanced antiviral properties. Cocrystallization with Asca enhanced solubility, ex vivo permeability, and antiviral properties of TM, which can encourage its further progress with validation in preclinical and clinical conditions.

URL: https://www.sciencedirect.com/science/article/abs/pii/S0022354926000687?via%3Dihub

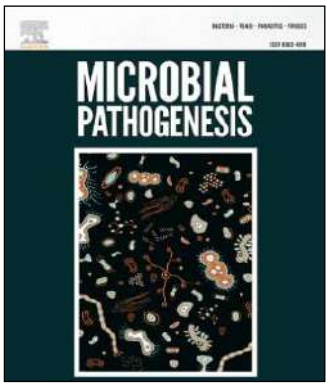
Journal Name: Microbial Pathogenesis **IF: 3.5**

Title: The anti-biofilm potential of triterpenoids isolated from Sarcochlamys pulcherrima (Roxb.) (vol 139 , 103901, 2020)

Author: Ghosh, C; Bhowmik, J; Ghosh, R; Das, MC; Sandhu, P; Kumari, M; Acharjee, S; Daware, AV; Akhter, Y; Banerjee, B; De, UC; Bhattacharjee, S

Details: Volume 212, March 2026

Abstract:



URL: https://www.sciencedirect.com/science/article/pii/S0882401026000148

SCHOLARLY PUBLICATIONS
School of Biotechnology
KIIT Deemed to be University

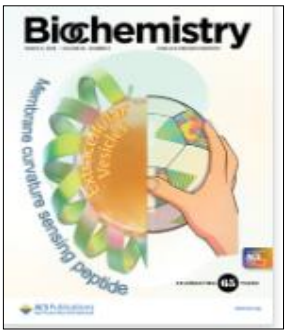
Journal Name: Biochemistry **IF: 3.0**

Title: Gradual Modification of Ferritin 4-Fold Pore Promotes Cage Instability, Fe2+Exit, and Iron-Induced Protein Precipitation

Author: Subhadarshanee B.; Jagdev M.K.; Bhattacharyya G.; Parida A.; Mohanty A.; Vasudevan D.; Behera R.K.

Details: Volume 65, Issue 5, March 2026

Abstract: Ferritins are symmetrical, hollow nanocaged iron storage proteins, which sequester and concentrate iron as a hydrated ferric oxyhydroxide (ferrihydrite) biomineral. Spontaneous self-assembly of 24 subunits in eukaryotic ferritins leads to the formation of symmetrical pores, i.e., eight hydrophilic 3-fold pores and six hydrophobic 4-fold pores. However, unlike the relatively wider 3-fold pores, which drive Fe^{2+} inside, the functions of narrow 4-fold pores are relatively understudied. The current work investigates the role of 4-fold pores by gradual alterations of specific amino acids using site-directed mutagenesis, structural analysis by X-ray crystallography, and solution-based kinetic studies. Increasing the negative charge in ferritin 4-fold pore retained the cage integrity and iron-loading capability despite altering the pore structure/size/electrostatics. As additional substitutions accumulated within the same channel, the aperture widens further and the electrostatic environment became progressively more acidic around the pore lining. These gradual alterations resulted in an enhanced rate of iron mobilization (up to ∼10-fold), possibly due to remodeling of the 4-fold (C4) pore, leading to a progressive increase in 4-fold pore diameter. Moreover, these modifications decreased cage stability, both thermally (∼5 °C) and chemically (∼3–4 folds), and increased iron-induced ferritin precipitation, similar to the case of neuroferritinopathy.



URL: https://pubs.acs.org/doi/10.1021/acs.biochem.5c00744