National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Design and synthesis of multifunctional micellar based drug delivery vehicles for cancer therapy
Speaker	: Aiswarya Pradhan (Rollno : 518cy6025)
Supervisor	: Sabita Patel
Venue	: Chemistry Seminar Room
Date and Time	: 17 Jul 2025 (11.00AM)
Abstract	: Poly(ethylene glycol) (PEG)-based drug delivery vehicles represent a foundation stone in advanced cancer therapy, leveraging the unique properties of PEG to enhance the systemic circulation time and tumor accumulation of therapeutic agents via the enhanced permeability and retention (EPR) effect. PEG based eight amphiphilic conjugates were successfully synthesized and characterised by ^{1}HNMR and FTIR.The physicochemical properties of these micellar aggregates, drug-micelle interaction with change in micellar size, shape, hydrophilic shell and hydrophobic core and their subsequent therapeutic application in the delivery of hydrophobic drugs are investigated. This process of micellisation encapsulates hydrophobic anticancer drugs within the core, while the hydrophilic PEG corona forms a protective outer shell, shielding the payload from premature degradation and opsonization. Upon reaching the tumor microenvironment, these nanocarriers release their drug cargo, facilitating targeted delivery and increased intracellular concentration within cancer cells. In vitro studies consistently demonstrate the efficacy of these systems in enhancing cytotoxicity against various cancer cell lines, while in vivo applications in animal models have shown significant improvements in tumor regression, reduced systemic toxicity, and overall therapeutic index, validating PEGylated nanocarriers as a powerful platform for translational oncology.