National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Deciphering the role of inter-domain crosstalk in Oral Squamous Cell Carcinoma (OSCC)
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Venue	: Life Science Seminar Room
Date and Time	: 24 Jul 2025 (04:30 PM)
Abstract	: Oral squamous cell carcinoma (OSCC) is one of the world's most prevalent cancers, with particularly elevated occurrences in South Asian countries such as India, Sri Lanka, Pakistan, and Bangladesh. This study examines the potential association between oral biofilms, complex microbial networks often found in the oral cavity, and OSCC development. Specifically, the study aims to elucidate the role of bacterial quorum sensing (QS) molecules, namely N-acyl homoserine lactones (AHLs), in the modulation of important regulatory signalling pathways in the development of oral cancer. Quorum sensing is a cell-to-cell communication process of bacteria that controls the expression of genes based on cell population density and is essential for the formation of biofilms. AHLs, being the major QS molecules of Gram-negative bacteria, could have inter-kingdom activities by modulating eukaryotic host cells, such as cancer cells. The present investigation explores the potential of AHLs to modulate cellular signalling pathways involved in cancer development. Our research focused on evaluating the ability of AHLs to regulate the target oncogenic pathways, the Ras/MAPK pathway and the NF-&kappaB pathway, both of which are central to cell growth, survival, and inflammation. Initial experimental findings show that some AHL compounds can bind to and regulate the levels of proteins in these signalling pathways and thereby impact cancer cell behaviour. The results of this research suggest the potential role of bacterial QS molecules in modulating the tumour microenvironment by inducing or suppressing cancer cell proliferation. This initial evidence provides a new insight into host-microbe crosstalk in the oral cavity and its function in OSCC tumorigenesis. Finally, this study would be leading to novel aspect to target microbial signalling molecules for oral cancer therapeutic intervention.