National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Hub genes in driving colon cancer progression: plasma membrane lipid raft signaling regulates the hub genes by epigenetic modulation
Speaker	: Ankan Roy
Supervisor	: Santosh Kumar #2787
Venue	: LS Seminar Hall
Date and Time	: 06 Nov 2024 (11:00 AM)
Abstract	: Colon adenocarcinoma (COAD) ranks among the most prevalent malignant tumors, yet there remains a significant lack of comprehensive epigenetic data concerning this condition. This study uses various intelligent computational algorithm-based high-throughput data analysis tools to initially identify crucial hub genes through comparative analysis of multiple gene-expression datasets. This study presents a novel streamlined approach for systematically screening and identifying COAD-related hub genes, delving in to their regulatory mechanism and relevant key signaling pathways, while also exploring potential therapeutic interventions. Gene set enrichment, Protein-Protein Interaction (PPI) network, hub-gene investigation, methylation pattern, and immune cell infiltration status were analyzed, and experimental validation was further executed. The identified hub genes were considered as critical hub genes and gradually reveals that their expression pattern critically supports COAD initiation and progression. Methylation analysis reveals that abnormal hypomethylation over these gene loci determines their explicit high expression in COAD. The identified hub genes can also be considered epigenetic biomarkers for early detection and treatment of COAD patients. This study reveals that the efficacy of immunotherapies in COAD can be enhanced through the strategic targeting of these hub genes. This study demonstrates for the first time that there is a correlation between the membrane-bound lipid raft signaling hub and cumulative expression of the identified gene hub. Lipid rafts facilitated membrane signaling dictates the cumulative expression of these hub genes by modulating DNA methyltransferase activity.