National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Identification and validation of rottlerin, a repurposed drug candidate, and its target for tongue cancer
Speaker	: Sruti Biswal (Rollno : 522ls2017)
Supervisor	: Bibekanand Mallick
Venue	: Chemistry Seminar Hall
Date and Time	: 16 Apr 2025 (11.00 AM)
Abstract	: Tongue cancer is very aggressive and demonstrates a high risk of relapse even after treatment with available drugs. Hence, surgery remains the primary treatment option, which sometimes impairs speech and swallowing. So, there is a need for an effective drug to treat this lethal cancer by minimizing the risk of tumor relapses and chemoresistance. We predicted potential drug(s) for tongue cancer by adopting a signature-based drug repurposing approach by correlating their impacts on reversing the expression of genes implicated in tumorigenesis and chemoresistance and validated its anticancer roles by performing *in vitro* molecular studies. We analyzed 12 gene expression profile data of tongue cancer tissues and cells obtained from the GEO database and our in-house NGS study. We found that 487 genes are upregulated in at least two datasets of tongue cancer. Enrichment analysis of these genes revealed that 119 genes are significantly enriched in cancer-related pathways. We employed L1000CDS^2 using these genes to identify existing drugs that can potentially reverse these tongue cancer-related dysregulated genes. We evaluated the drug candidates, their reversal genes, and their reversal scores and selected drugs by the leave-one-out approach based on their prior reports in oral cancer types and toxicities. We discovered that rottlerin, a natural product, could be a repurposed drug for tongue cancer therapy. This reverses 77 genes and is predicted to bind the SH2 domain of STAT1, the topmost hub target of this drug. Our *in vitro* studies revealed that rottlerin reduces the viability and migration of tongue cancer cells while inducing DNA damage and apoptosis, which confirms its anticancer role. Further investigation is in progress.