National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Investigating the role of bioactive compounds from Terminalia bellirica for STON2-mTOR-TFEB-depedent lysosomal biogenesis and autophagy
Speaker	: Prakash Kumar Senapati (Rollno : 523ls2003)
Supervisor	: Sujit Kumar Bhutia
Venue	: LS Seminar Room
Date and Time	: 24 Jul 2025 (3.00 PM)
Abstract	: The mammalian target of rapamycin (mTOR) is a central regulator of cell survival, growth, and proliferation. Its hyperactivation is closely linked to the progression of various cancers, including oral cancer. Although several synthetic mTOR inhibitors have been developed for therapeutic use, their clinical effectiveness is often limited due to adverse side effects, poor stability, and reduced efficacy over time. These limitations underscore the need for safer and more effective alternatives particularly those derived from natural sources. *Terminalia bellirica* (TB), a medicinal plant native to the Indian subcontinent and widely used in Ayurvedic medicine, possesses notable antioxidant, anti-inflammatory, and antimicrobial properties. However, its potential as a source of mTOR-inhibiting compounds remains underexplored. Preliminary investigations in our laboratory have identified gallic acid, a key phytochemical in TB, as a potential anticancer agent in oral cancer models. Building on these findings, the present study aims to identify and characterize additional bioactive compounds from TB capable of inhibiting mTOR activity and inducing autophagic cell death, with a focus on evaluating their anticancer efficacy both in vitro and in vivo. In parallel, this project also examines the role of Stonin2 (STON2), a protein involved in vesicular trafficking, in regulating TFEB-mediated lysosomal biogenesis and its potential interaction with mTOR signaling. Previous data from our lab suggest a functional link between STON2 and mTOR activation in oral cancer cells. By integrating natural compound screening with molecular pathway analysis, this study aims to advance the development of plant-based mTOR inhibitors and uncover novel regulatory mechanisms involving STON2-mediated TFEB in lysosomal biogenesis.