National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Evodiamine: A Promising Phytocompound for Lung Cancer Therapy – In-vitro and In-silico Exploration
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Supervisor	: Prof. Bijesh Kumar Biswal
Venue	: Life Science Seminar Hall
Date and Time	: 18 Jul 2024 (11.00 AM)

Abstract : Lung cancer has been a significant global health burden all over the world. Conventional therapies such as chemotherapy often have limitations, such as therapy resistance, prompting exploration of alternative approaches. Researchers have focused on phytocompounds which hold great promise in cancer treatment. Evodiamine, an alkaloid derived from *Evodia rutaecarpa*, highlights its anticancer properties showing the inhibition of cancer cell growth and induce apoptosis. But there are limited evidence of the mechanism of evodiamine in its DNA damaging response in Lung cancer. To explore the mechanism of its anti-cancer potential, we studied the cytotoxic potential of evodiamine in A549 lung cancer cell line. Evodiamine inhibits A549 cells showing IC50 of 5 &muM. Moreover, evodiamine can induce cell death by suppressing cell migration. Apoptosis inducing potential of evodiamine was observed by AO/EtBr and DAPI staining. In addition, evodiamine resulted in reactive oxygen species (ROS) formation, confirmed by N-acytylcysteine (NAC) treatment. Excess ROS by evodiamine leads to disruption of the mitochondrial inner membrane, which results in the depletion of mitochondrial membrane potential. Furthermore, evodiamine treatment potentially induces DNA damage in a dose-dependent manner. These results concluded that evodiamine can reduce cell viability by inducing mitochondria-mediated apoptosis via excess ROS generation and inhibiting cell migration and. Also, we performed molecular docking of evodiamine, cisplatin and DNA and interestingly we found that evodiamine showed lesser binding affinity with DNA. So, different pathways must be explored in our future studies. Further, we have also done MD simulation to confirm the stability of complexes. It was found that, when cisplatin and evodiamine were both bound to DNA, the stability was higher than other complexes. Altogether our findings suggest that evodiamine is working as a cytotoxic agent showing anticancer potential. So, we will further explore some different pathways by evodiamine targeting other proteins of DNA damage response pathways along with binding to DNA.