National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Anticancer potential of Evodiamine and its synthetic derivatives in lung cancer cell lines
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Venue	: Life Science Seminar Hall
Date and Time	: 23 Oct 2024 (10 AM)
Abstract	: **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. Various phytocompounds have been used as dietary supplements and being explored for their therapeutic properties. Evodiamine, an alkaloid derived from *Evodia rutaecarpa*, highlighting its anticancer properties showing the inhibition of cancer cell growth and induce apoptosis. Recent research suggests that preparation of synthetic derivatives of Evodiamine have shown better anti-cancer activity than Evodiamine itself. To achieve Evodiamine&rsquos better activity, we have been preparing synthetic derivatives of Evodiamine to check their anti-cancer activities in lung cancer cells lines as well as cisplatin-resistant lung cancer. Additionally, we have prepared a synthetic micelle by conjugating mPEG and Palmitic acid for the better delivery of Evodiamine in lung cancer. We have checked the cytotoxic potential of micelle encapsulated evodiamine by performing MTT assay in A549 lung cancer cell line, and the result was evident. PA-Evo inhibits A549 cells showing IC50 better than only Evodiamine. Also, colony forming potential of A549 cells was observed in concentration dependent manner. Moreover, PA-Evo can induce cell death by suppressing cell migration. Apoptosis inducing potential of PA-Evo was observed by AO/EtBr and DAPI staining. Furthermore, Evodiamine treatment potentially induces DNA damage in a dose-dependent manner. These results concluded that PA-Evo can decrease cell viability in a concentration and time dependent manner by releasing slowly into the cells. Also, we performed molecular docking of evodiamine, cisplatin and DNA and we found that evodiamine showing binding affinity with DNA. Further, we have performed 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 P-Evodiamine and evodiamine is working as a cytotoxic agent having anticancer potential. In further research, we will explore the delivery of PA-Evodiamine in normal lung cancer and cisplatin-resistant lung cancer cell lines.

Keywords: Phytocompounds, Evodiamine, Lung cancer, Therapy resistance, In-Silico analysis, Synthetic derivatives, micelle, Drug delivery