Seminar

Institute for Plasma Research

Title : Flavonoid mediated gold and silver nanoparticle's synthesis and characterization and checked the efficacy by antioxidant, anti-inflammatory, and anticancer activities

Speaker: Dr. Poonam Gawali
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Date : 01st April 2022 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:
https://lobby.ipr.res.in/Dr.PoonamGawali_PDFTalk

Abstract :

Pre Ph.D. research work: Cancer epigenetics entitled 'Characterisation of Histone variant gene (H2A.2)' the expression profiling H2A.1 and H2A.2 during liver development and Mapping of 3'UTR of H2A.2 gene. Learned molecular biology and biochemistry techniques.

Ph.D. research work: Mangrove plants are a rich source of flavonoids, alkaloids, saponins, etc., with medicinal properties. Among these, Flavonoids have anti-inflammatory, antioxidant, and anticancer activity. Nanoparticles (Nps) made of Natural products are known to improve their therapeutic potency. In this study, we had synthesized a simple, eco-friendly, and stable silver (Ag) Gold (Au) Nanoparticle (NPS) of flavonoid isolated from Sonneratia alba fruits and studied in vitro anticancer, antioxidant and anti-inflammatory, and in vivo anti-inflammatory activity using Carrageenan-induced mouse paw edema. Fruits were collected from Ratnagiri coast, Maharashtra, India, methanol extract was prepared, and chromatography isolated flavonoid. The isolated compound was characterized as a Quercetin derivative. The characterization of isolated flavonoids was done by LCMS, FTIR, and NMR. Biosynthesized AgNPs and AuNPs were confirmed using different characterization techniques: FTIR, TGA, DLS, NTA, HR-TEM, EDS, XPS, and XRD. In vivo studies were carried out by CPCSEA and OECD guidelines. Significant ($p<0.001$) reduction in paw volume was observed in low and high doses of QF, and FS AuNps treated mice over the disease control group. All groups were compared to the diclofenac sodium group (Nonsteroidal anti-inflammatory drug- NSAIDs) at 2 to 24hrs. All treated groups except mice administered FS low dose, and the paw volume reduced from 3 hrs ($p<0.001$), which was comparable to Diclofenac sodium (till 5 hrs) than the disease control group. In all groups, Paw volume returned to normal at 24 hrs.

Post Ph.D. research work: Hepatocellular Carcinoma study using C57BL/6 mouse strain. The mouse liver cancer cell lines and the drug used is novel nanoformulation, Gold nanoparticles using standard chemo drug Sorafenib. Coating gold nanoparticles with proteins and secondary metabolites of plants increases the biocompatibility biodistribution of gold nanoparticles. This study aims to inform nanomedicine design, and the combination strategy showed promising results.