S.A.S. NAGAR

राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान
NATIONAL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH (NIPER)
(Ministry of Chemicals & Fertilizers Govt. of India)
Sector 67, S.A.S Nagar (Mohali) Punjab - 160062 (India)
Tel.: +91-172-2214682-87, Website : www.niper.gov.in
Fax : +91-172-2214692, 2230068

Citation (summary) on the outstanding research work on which award is claimed

Ref: Nomination of Prof. Sanyog Jain for Sun Pharma Research Award- 2023 (in Pharmaceutical Sciences)

Title of the work: Combination drug therapy using nanotechnology for cancer therapeutics

Combination therapy of cancer with more than one drug has appeared as a favorable approach to vanquish multidrug resistance, because different drugs act with different mechanism of action and on different stages of growth cycles, and thus show synergistic action. Combination may also increase the efficacy of the treatment due to modulation of the biopharmaceutical properties like solubility, permeability or metabolic stability, thereby overcoming the delivery challenges. Severe adverse effects associated with single drug molecule are also reduced by combination therapy. Dr. Jain is actively working in the field of combination therapy of cancer for past several years and explored several combinations of anticancer drugs, drug+antioxidant, drug+gene, drug+chemo sensitizer. Dr. Jain successfully delivered Docetaxel (water insoluble drug) and Gemcitabine (highly water soluble and unstable drug) by synthesizing combinatorial conjugate with the help of PEG spacer. The synthesized conjugate demonstrated optimum solubility profile and increased the metabolic stability gemcitabine. On the similar line, he increased metabolic stability of gemcitabine and achieved synergistic efficacy by conjugating gemcitabine with methotrexate and curcumin He further developed albumin nanoparticles of the combination for targeted anticancer delivery. In other work, he tackled the delivery challenges of Docetaxel (use of ethanol and surfactant in commercial formulation due to its water insolubility) by formulating in nanoparticles and liposomes along with antioxidant quercetin and sirT1 shRNA.

Recently, Dr. Jain has developed dual acting cisplatin prodrug with chormabucil which not only overcome the problem of chemoresistance, stability and toxicity of cisplatin but also increase therapeutic efficacy. He also explored combination of Sorafenib with simvastatin for ferroptosis induced cancer treatment. In nutshell, Fruitful outcomes of the implemented strategies offer an additional research horizon of safer synergistic chemotherapy, and have the promising potential to act as platform technology (requiring minimum or no solvent system and energy) for the delivery of potent but difficult to deliver drugs and improved patient compliance which is still an unmet task. Moreover, simple manufacturing process, use of relatively cost effective excipients and high drug payload offer high level of industrial scalability and applicability.

24/08/23

[Prof. Dulal Panda]

Prof. Dulal Panda, Director
राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान
National Institute of Pharmaceutical Education and Research
Punjab, INDIA