RESEARCH SEMINAR SERIES REMOTE

The Center for Dermal Research Welcomes

Dr. Mandip Singh Sachdeva, Florida A&M College of Pharmacy

"Fabrication and in Vivo Evaluation of 3D Printed Dissolvable Microneedles Using DLP Printing"

Monday, February 7 at 5:30pm EST

Mandip Singh Sachdeva is currently a Professor and Section leader, Pharmaceutics at Florida A&M College of Pharmacy, Tallahassee, FL. He received his M.Sc. and Ph. D. of Biopharmaceutics from Dalhousie University, Canada in 1986 and 1989 respectively. He then worked with SynPhar laboratories in Edmonton, Canada as a Group Leader, Drug Targeting from 1989-1993 and then moved to academia as an Assistant Professor, Pharmaceutics at Florida A&M University in 1993 and was promoted to Full Professor in 2002. Dr. Sachdeva has won many honors and awards such as Novapharm Award for the year 1989-1990 for excellence in Biopharmaceutics, AAPS Fellow award 2007, Davis Productivity Award from the State of Florida, 2009, 2011, 2014, Research Excellence Award from FAMU, 2011 and Distinguished Research award in 2017. He was selected as a Fulbright Fellow for the year 2014-2015 and 2022. He was also selected as a GIAN Fellow in 2016 to perform outreach activities in India. He was bestowed with the Elizabeth Hurlock Beckman Award in 2020 which is given to mentors who have made a difference in the community. Dr. Sachdeva has published more than 160 articles and papers in Biopharmaceutics and has made over 250 presentations in national and international meetings. Further he has organized several symposiums for the AAPS national meeting and has been speaker/moderator for several AAPS symposia. He has ten issued US patents and is a senior member for the National Academy of inventors. He is a member of the Controlled Release Society (CRS), American Association of Pharmaceutical Scientists (AAPS), American Association of Cancer Research (AACR), Society of Toxicology (SOT) and Society of Investigative Dermatology. Dr. Sachdeva is the editor in chief for CRC Critical Reviews in Therapeutic Drug Carrier Systems. Further he is the past chair of the Dermatopharmaceutics Focus group at AAPS for the year 2014-2016. Currently he is the chair elect for the Nanotechnology community of AAPS. He has been consistently funded for over 25 years by various agencies such as DOD, NIH, NASA and NSF. His research interests include cancer drug delivery (breast and lung cancer), 3D printing of tumor cells, topical and transdermal delivery, formulating and developing targeted nanoparticles, exosomes and inhalation delivery of pharmaceuticals.

(Abstract on page 2)

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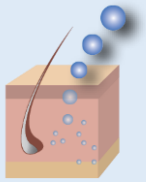

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Abstract: Microneedles (MNs) are primarily fabricated using multistep polydimtheylsiloxane (PDMS) micromolding method which makes it a batch process and may face reproducibility issues with final product. Lately, MNs have been formulated using a continuous one step process of 3D printing technology. Moreover, it is highly efficient and reproducible technique and can print any design or dimensions of MNs in much less time compared to micromolding approach. Although, dissolving MNs fabrication with Diphenyl (2,4,6 trimethyl benzoyl) phosphine oxide (TPO), Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide (BAPO) as a photo initiator using digital light projector (DLP) printing technology is reported in the literature, these photo initiators can cause cell toxicity. In our laboratory, we have used a biocompatible resin (poly (ethylene glycol) dimethacrylate (PEGDA), containing Lithium phenyl-2,4,6- trimethylbenzoylphosphinate (LAP) as a photoinitiator using 3D printing technology and fabricated dissolvable MN patch to deliver ibuprofen (IBU) transdermally as a model drug. Further, we fabricated the dissolvable IBU microneedle patch using DLP printer (Kudo 3D) with aspect ratio (ratio of height of MN: base diameter of MN) of ~3 and tip with radius of curvature of ~15 µm by applying Quality by design (QbD) approach and validating it by using Artificial intelligence (AI). Further, in vitro and in vivo studies have also been conducted with these MNs and these results will be discussed in the presentation.

CONFERENCE LINK:

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