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CSIR - Institute of Himalayan Bioresource Technology

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19<sup>th</sup> August, 2023

To Whom It May Concern

**Justification Letter in favour of Ms. Ruchika application for the “Sun Pharma Science Scholar Award”**

It gives me immense pleasure to recommend Ms. Ruchika for “**Sun Pharma Science Scholar Award**”. Ms. Ruchika is a CSIR-SRF fellow and joined her PhD under AcSIR in August 2020 at CSIR-Institute of Himalayan Bioresource Technology and working under my supervision.

As a student, Ruchika has a good understanding of the fundamental in her subjects and demonstrated highest level of commitment towards research with intellectual stability to achieve the targets. Her positive attitude and ability to work untiringly towards her goals have enabled her to overcome any difficulty that came in her way.

While working in my laboratory, she is working on development of novel formulations such as conjugating GRAS excipients to bioactive leads for augmenting their therapeutic efficacy. More specifically, she is working on polymer-drug conjugation approach, electrospun nanofibers, solid dispersions, hydrogels and self-emulsifying formulations. She is a tool kit of interdisciplinary scientific skills involving conjugation chemistry, nanoformulation, pharmacology, analytical and characterization techniques (ELISA, Western blotting, HPLC, SEM, TEM, NMR and molecular biology). She has also worked on mice, rat and zebrafish animal models and has enough knowledge of animal handling. Her hard work and dedication yielded research as well as review articles in peer reviewed journals of international repute. She has also received prestigious **IGSTC-PhD Industrial Fellowship - 2022**, awarded by Department of Science and Technology (DST), Government of India and the Federal Ministry of Education and Research (BMBF), Government of Germany.

***Significance of Ruchika’s research work for clinical application***

In recent years, Oral Thin Films (OTFs) have emerged as a potential approach for nutraceutical delivery especially for paediatrics and geriatrics. These formulations can overcome certain technological challenges in nutraceutical delivery such as chemical instability in gastro-intestinal tract, low aqueous solubility, low permeability, chemical degradation, hepatic – first pass

metabolism, and efflux transporter specificity. Further, a recent clinical study (on 50 healthy volunteers) demonstrated electrospinning method to be a preferred choice as compared to solvent casting method in terms of sensory attributes of end-user acceptability, which renders them suitable for clinical translation.

In this regard, the work submitted by Ms. Ruchika for this prestigious award entitled **“Orally Fast Dissolving  $\alpha$ -Lipoic acid Electrospun Nanofibers Mitigates Lipopolysaccharide Induced Inflammation in RAW 264.7 Macrophages”** is the perfect example of interdisciplinary research for clinical translation of oral thin films. In this work we highlighted the significance of combined effect of inclusion complexation and nanofiber technology as a potential rapid disintegrating delivery system for  $\alpha$ -lipoic acid (a dietary supplement).  $\alpha$ -lipoic acid (LA), known for its strong antioxidant and anti-inflammatory potential, faces challenges due to its poor solubility and thermal instability. To address these issues, we have utilized methyl-beta-cyclodextrin (M- $\beta$ -CD) to create inclusion complex (IC) of LA and thereafter encapsulated in pullulan nanofiber using **green and sustainable approach (without utilizing organic solvent)**. The developed nanofibers (NF) demonstrated **accelerated release, quick dissolution, and disintegration along with high encapsulation efficiency**. Additionally, NF demonstrated the ability to downregulate the production of NO, ROS, suppresses the upregulation of **pro-inflammatory enzymes (iNOS and COX-2), cytokines (TNF- $\alpha$ , IL-6, and IL1 $\beta$ ) and nuclear translocation of NF- $\kappa$ B in lipopolysaccharide (LPS) stimulated RAW 264.7 macrophage cells**. The study has opened new avenues in terms of sustainable approach for production of nanofibers as well as its mechanistic insight for anti-inflammatory activity.

I wholeheartedly support her application for Sun Pharma Science Scholar Award and wish her the best. I remain available for any additional enquiries.

Sincerely Yours,

*Ankit Saneja*

**Dr. Ankit Saneja, PhD**

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