

## REPORT

Report on participation of the ICMR International Fellow (ICMR-IF) in Training/Research abroad.

1. Name and designation of ICMR- IF : Dr Rahul Kumar Verma
2. Address : Institute of Nano Science and Technology (INST), Mohali
3. Frontline area of research in which training/research was carried out : Ophthalmology (Ocular drug Delivery)
4. Name & address of Professor and host institute : Dr Sunil K Chauhan  
Associate Professor  
Department of Ophthalmology  
Harvard Medical School, Boston,  
United States of America (USA)
5. Duration of fellowship with exact date: 1 year (1<sup>st</sup> March 2023 -29<sup>th</sup> February 2024)
6. Highlights of work conducted :
  - i) Technique/expertise acquired:
    - 1) Designing of drug eluting Smart contact lenses that can release drug in response of ocular inflammation in eye disease
    - 2) Designing of nano-liposomal formulations for corneal wound healing.
    - 3) Characterization techniques like Transmission Electron Microscopy, Confocal Microscopy and Flow cytometry.
    - 4) Cell culture ocular cells like Corneal Epithelial cell lines, Ocular Fibroblast cells and LUVA human mast cells
    - 5) Development of murine animal model for corneal wound injury
    - 6) Technique of excision and processing of cornea from eye
    - 7) Imaging techniques like fundus photography and optical coherence tomography (OCT)
    - 8) Examinations of corneal wound healing rates using fluorescent vital dye application and slit-lamp bio microscopy (slit-lamp)

  
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- 9) Efficacy assessment of nano-liposomes and smart contact lenses in-vitro, ex-vivo and in-vivo systems.
- 10) Biochemical Molecular and biochemical techniques for characterizing corneal wound and ocular inflammation.

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ii) Research results, including any papers, prepared/submitted for publication

- My research work carried out during this fellowship tenure is selected Poster presentation and prestigious conference ARVO-2024 with Travel Award


Specific targeting of Mast cells via ST-2 receptor for intervention in ocular diseases, Vinay Pulimamidi<sup>1</sup>, Rahul Kumar Verma<sup>1</sup>, Nishant R Sinha, Sunil Chauhan#, Department Ophthalmology, Harvard Medical School, **The Association for Research in Vision and Ophthalmology, USA May 5-9 , 2024**

- Surface-reactive formulation for prolonged corneal retention and sustained delivery of Hepatocyte Growth factor (HGF) for ocular wound healing Rahul Kumar Verma, Nishant R Sinha, Vinay Pulimamidi, Sameul Olufemi Folorunso, Xi Lei, Sunil Chauhan#, Department Ophthalmology, Harvard Medical School, ( Manuscript to be communicated)

iii) Proposed utilization of the experience in India

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I am confident that I will be able to bring the invaluable learning and experience acquired at Harvard University back to my home institute. My goal is to establish a state-of-the-art laboratory dedicated to designing formulations for ocular drug delivery. The research insights gained at Harvard will serve as a solid foundation for crafting innovative project proposals in this specialized field.

  
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Signature of ICMR-IF

ICMR Sanction No. INDO/FRC I 4521 (Y -21) I 2022-23-I H&HRD