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REPORT

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

1. Name and designation of ICMR- IF : Dr. Shashi Bhushan Kumar
Technical Officer-A
2. Address : Department of Biochemistry
National Institute of Nutrition,
Jamai-Osmania PO, Near Tarnaka
Metro Station, Hyderabad-500007
3. Frontline area of research in which training/research was carried out : Role of Vitamin A metabolism in the pathogenesis of obesity and Type-2 diabetes and development of Nanotechnology-based therapies against these diseases.
4. Name & address of Professor and host institute : Dr. Ouliana Ziouzenkova,
Associate Professor,
The Ohio State University,
Department of Human Sciences,
Human Nutrition Program.
331A Campbell Hall,
1787 Neil Ave
Columbus OH 43210
5. Duration of fellowship with exact date : 15th Jan 2020 to 15th Jan 2021
6. Highlights of work conducted :
 - i) Technique/expertise acquired :
Cell culture techniques; Handling of Mouse 3T3-L1 fibroblast (preadipocyte) cells line, *Human brain endothelial cells (hBEC)* and Mouse 3T3-L1 NfκB, FABP4 and NRF2 reporter cells line. Animal training; Aseptic rodent surgery techniques, Animal handling and restraint, Injections (IV, IP, SibQ, IM) and blood collection technique. Biosafety hood training, Anesthetic machine use. Mouse body composition measurement with EchoMRI technique. Glucose uptake & Cytotoxicity Assay technique. Transient transfection and GLUT4 translocation measurement technique. Western blot and Immunoprecipitation. Oil-Red O staining of and Hematoxylin-Eosin staining for adipose tissues. Isolation of total RNA from animal cells using spin technology. Plasmid DNA isolation, LC-MS/MS and LTQ Orbitrap Mass spectrometer technique.

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

Research Publications:-

I have completed an animal study and began to work on additional two Research projects. I expect to have **at least five high-impact publications** from Dr. Ouliana Ziouzenkova lab in addition to Published work. Few of research publication MS has been drafted and ready for sending in high-impact journal which is enumerated below.

1. Epiregulin acts as an alternative ligand for leptin receptor to induce glucose uptake. (Manuscript Drafted- In Processes of sending in high-impact Journal)
2. Amino acid nanofibers control glycemia and improve cognitive performance in diabetic mice alone and in concert with insulin. (Manuscript Drafted).

Review Publications:-

1. Antibiotics in Food Chain: The Consequences for Antibiotics Resistance (Review Published 13 Oct 2020; Journal *Antibiotics* (impact factor **3.89**), and already received 933 abstract 824 full text views, and 1 citation)
PMID: 33066005 PMCID: PMC7600537 DOI: 10.3390/antibiotics9100688
2. Wrote a hypothesis-paper/review on underlying mechanisms of SARS-CoV-2 pathogenicity. More than 370 papers were utilized in compiling this manuscript, published 30 Oct 2020 in the journal *Biomedicines* (impact factor **4.717**).
Osmotic Adaptation by Na⁺-Dependent Transporters and ACE2: Correlation with Hemostatic Crisis in COVID-19.
PMID: 33142989 PMCID: PMC7693583 DOI: 10.3390/biomedicines8110460
3. Partners of angiotensin converting enzyme 2 (ACE2): a culprit for the pathophysiology of SARS-CoV-2 (Manuscript written)
4. Oxidative Stress mediated signaling in different cell lines by engineered nanomaterial. (Manuscript written)
5. Iron Deficiency Anemia (IDA) in India and strategies to mitigate it. (Manuscript written)
6. Nutrigenomics and Nutrigenetics: Future strategies, Challenges and outlooks (Content of this MS has been drafted)

Invitation For The special Issue Review:

1. Plant Nutraceuticals- Their occurrence, chemical transformation and health promoting properties of the journal *Biomolecules* (working on this MS)

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2. Plos ONE Review: Thermogenic fat: Possibilities of translation. (Working on this MS)

iii) Proposed utilization of the experience in India :

The gained knowledge would be used for designing new projects and research activities related to obesity and type-2 diabetes and development of plant nutraceuticals based therapies against these diseases.

ICMR Sanction No.

1. ICMR office order No. INDO/FRC/452/Y-60/2019-20/HD dated 19-12-2019
2. ICMR Award Letter No. INDO/FRC/452/(Y-60)/2019-20/HD dated 07-08-2019

Shashi Bhushan Kumar
Signature of ICMR-IF

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Sbi