Criterion 3:- Research , Innovations and Extension

The Department has two broad thrust areas:

- **Plant Genetic engineering for value addition of crop plants:** The Department is focused on research in the area of Plant Genetic Engineering, Stress physiology, Plant phenomics studies, and sustainable nano-formulations for plant growth and protection. Research involves various aspects of the molecular mechanism involved in the abiotic stress tolerance and tuberization mechanism in the Potato (Solanum tuberosum). The research is also focused on the development of sustainable nano formulations for the plant growth development and protection. The above thrust area of research is also financially supported by various funding agencies including UGC, DBT and DST, Govt of India.
- **Infectious disease biology:** The importance of infectious disease, especially viral disease is very evident from the COVID-19 pandemic. The Department is engaged in understanding various aspect of viral pathogenesis. The focus is on understanding the host-viral protein interactions and their significance in viral pathobiology and viral lifecycle. Currentlly, department is focused on HTLV-1 retrovirus and it preparing to undertake molecular virology research on viruses such as SARS-CoV-2, Nipah virus, Dengue virus, etc. In addition, the focus is also on development garlic based novel antibacterial and antibiofilm drugs to counter the alarming problem of antibiotic resistant bacterial infections.

National and International Collaborations:

1. Mikhail Pooggin, Research Director INRA, France. Control of biotic stresses in crop plants.
2. Vishal Trivedi, Department of Biotechnoloyg, IIT Guwahti, Assam. Investigating and probing RBC endothelia cells interaction through ex-vivo cerebral malaria model to develop adjuvant therapy for malaria pathology.
3. Muthuthiruvengdam, Department of Bioresource and Biotechnology, Konkuk University, Seoul, Southr Korea. Molecular mechanism of potato tuberization.
4. Tirmit Tripathi, Deparment of Biochemistry, NEHU, Shillong. Structural studies to understand the stability of human T lymphotropic virus type 1 (HTLV-1) p30 protein and its recombinant expression. NEHU, Shillong.
5. Rupesh Srivastava, Department of Biotechnoloyg, AIIMS New Delhi. Bone biology and influence of diet and probiotics on bone health.
6. Rajesh Mondal, Department of Microbiology, BMHRC, Bhopal. Antibacterial and antibiofilm studies on Shiga toxin producing *E. coli* (STEC).

Research Projects:

Name of the Faculties	Sl. No.	Title of the project	Duration	Funding agency	Amount (Lakhs)
Dr. C. P. Upadhyaya	1	investigating and probing RBC endothelia cells interaction through ex-vivo cerebral malaria model to	2013-2016	DBT, New Delhi	84.10

		develop adjuvant therapy for malaria pathology			
	2	Metabolic engineering of potato for enhanced vitamin B6 accumulation by overexpression of pyridoxin gene	2017-2020	DST, SERB, New Delhi	38.40
Dr. R. Anupam	1	Role of HTLV- 1 p30 and REG-gamma interaction in DNA damage regulation	2014-2016	U.G.C, New Delhi	6.0
Dr Devanshi Chandel Upadhyaya	1	Genetic engineering of potato (solanum tunberisum) for enhanced vitamin E content by overexpression of homogentisate phosphotransferase (HPT) gene.	2015-2018	DST-WOS scheme	30 .0

Scientific events, workshops, and seminars:

2015: Seminar on Evolving trends in Biotechnology

2015: Intercollegiate Competitive Events in Biotechnology

2015: Workshop on DNA Sequencer and RT-PCR

2016: Intercollegiate Competitive Events in Biotechnology

2016: Seminar on Scope of Biotechnology

2016: Seminar on Science and Technology for National Development

2017: Workshop organized on Molecular Biology: Theory and Practice