Parties

National Institute of Biotechnology (NIB), Ganakbari, Ashulia, Savar, Dhaka-1349, Bangladesh

And

Jagannath University, Dhaka - 1100, Bangladesh

also collectively referred to herein as "the Parties" and individually as "Party", join in the MoU in order to establish and maintain scientific research and development activities between the two Parties, make primarily arrangement for an exchange program among teachers, scientists, researchers, research students and integrate scientific research and development activities.

Article 1

The Parties agree upon academic exchange and research development in the following fields of interest

1. **Animal Biotechnology-**Vaccine development and production; Testing of semen quality and fertility; Livestock and Poultry barcoding; Animal genotyping, genetic marker detection, Full Genome Sequencing, QTL Mapping, Gene Editing; Detection of drug resistant genes, drug residue in animal products or in farms.

2. **Bioinformatics-** Analysis of qualitative and quantitative data (proteomes, interactomes, metabolomes and microbiomes) to investigate living organisms & their communities; development of most comprehensive range of freely available and up-to-date research databases against some common diseases of Bangladesh; Designing the analogues from medicinal plant compounds for novel drug discovery; Development of molecular therapy (vaccines and drugs) against prevalent diseases of Bangladesh; Biological data analysis by software and tools.

3. **Environmental Biotechnology-** Development and improvement of bio-fertilizer for different agricultural crops; Development of indigenous plants and microorganisms based technologies for environmental remediation and monitoring of organic and inorganic pollutants; Development of ecofriendly and cost effective bio-pesticide and biofuel.

4. **Fisheries Biotechnology-** Diagnosis of Bacterial fish diseases; Probiotics production for fish feed; Artificial propagation of economically important and threatened fish species; Fish genome sequencing, genotyping, and genome editing.

5. Microbial Biotechnology- Enzyme technology (specially for commercial production of keratinase, amylase, cellulase and pectinase enzyme), Anti-viral therapies; Diagnostic tools against bacterial pathogens; Development of probiotics for human health and nutrition; Development of drugs and diagnostics kits against viral and bacterial pathogens.

6. Molecular Biotechnology-Whole Genome Sequencing and annotations of indegenous species; Mutational and functional genomics analysis of non-communicable diseases; Molecular diagnosis of genetic disorders and various infectious diseases; Monitoring the presence and progress of cancer through analysis of gene expression; Exploration of bioreactive compounds from marine flora; Genome editing & GMO development; DNA sequencing services.

7. Plant Biotechnology- Tissue culture; Molecular physiology and genetic engineering; Genetic and phytochemical diversity analysis; Detection of plant diseases; Scaling up production of economically important plants; Development of biotic and abiotic stress tolerant transgenic plants; Functional genomics to understand plant response to stress; Establishment of plant diseases testing services.

Article 2

For the fulfillment of the cherished goals, both the parties agree to deepen their collaboration in the following areas:

1. Application for and execution of collaborative research projects;
1. Exchange of technical and scientific information and publications;
2. Exchange of online data base and journal facilities;
3. Joint organization of scientific and technical seminars, symposia and conferences;
4. Joint supervision of graduate, postgraduate, M. Phil and PhD students on advanced research topics;
5. Use of the services of the existing sophisticated laboratories of both the parties, experts by resource personnel, scientists and students to carry out joint research programs with the view of achieving excellence and outstanding results in the relevant research fields;
6. Joint publications and processing of patents of the results obtained from joint projects;
7. Any other kind of co-operation that will be useful to achieve the joint objectives.

The MoU activities could be revised, modified and expanded according to the common interests, requirements and the development of the research undertaken upon mutual and written agreement between two parties.

Article 3

The parties acknowledge and understand that any and all intellectual property rights and research materials resulting from this agreement will be shared in equal parts by both the parties.

Article 4

Unless otherwise agreed, the parties will jointly own the technological and scientific results obtained within the present cooperation programme. They undertake to protect and exploit them according to the laws and regulations in both the institutions. In order to permit an easier negotiability of the results obtained, each party undertakes to prevent any claim of right by its personnel or by persons in contact with the institution.

Article 5

Both the Parties understand that all the financial arrangements must be negotiated in advance of any programme and will be depended on the availability of funds. This MoU does not place any financial obligation on either institution.

The Parties agree to give the logistic support to the visitors from either organization.

Article 6

NIB assigns Research Coordinator, National Institute of Biotechnology (NIB) and JnU nominates Director, Research, Jagannath University for the monitoring and execution of MoU. Aforementioned scientists will be responsible for organizing programs and deal with experts to execute co-operational activities under this MoU.

Article 7

The implementation of this MoU will be effective from 25 April 2022 and this arrangement shall continue thereafter for five (5) years. The representatives of the two Parties shall discuss the possibility and the terms of renewal of this MoU not less than six (6) months prior to the natural termination of the current MoU. If any of the Parties do not have any objection, this MoU will be automatically renewed for the next five years and so on. Either Party or the other may terminate this MoU at any time by mutual agreement between the two Parties or by six (6) months' notice in writing.

Article 8

This MoU may be revised as necessary after consultation and mutual agreement between the two Parties.

Any provisions contained herein shall neither be binding nor construed as constituting a commitment by any of the Parties hereto.

This MoU is made in English and will be kept in each organization.

The undersigned relying on each other's good faith and honour do hereby sign the MoU and accept its terms and conditions on the date indicated below:

Executant

For National Institute of Biotechnology (NIB)	For Jagannath University
..... Dr. Md. Salimullah Director General National Institute of Biotechnology (NIB) Ganakbari, Ashulia, Savar, Dhaka-1349 Date:	..... Professor Dr. Md. Imdadul Hoque Vice-Chancellor Jagannath University, Dhaka-1100 Date:
Witnesses: 1..... Dr. Jahangir Alam Chief Scientific Officer Animal Biotechnology Division National Institute of Biotechnology (NIB) Ganakbari, Ashulia, Savar, Dhaka-1349 Date:	Witnesses: 1..... Engr. Md. Ohiduzzaman Registrar Jagannath University, Dhaka-1100 Date:
Witnesses: 2..... Keshob Chandra Das Principal Scientific Officer & Head Molecular Biotechnology Division &Research Co-ordinator National Institute of Biotechnology (NIB) Ganakbari, Ashulia, Savar, Dhaka-1349 Date:	Witnesses: 2..... Dr. Parimal Bala Director (Research) and Professor, Department of Physics, Jagannath University, Dhaka-1100 Date: