



**ICAR-National Institute on Foot and Mouth Disease,
Arugul, Bhubaneswar, Odisha**

21 DAYS TRAINING PROGRAM ON “PRECISION MOLECULAR DIAGNOSIS FOR VIRAL INFECTIONS”

**Chief Patron
Program Director
Program Coordinators**

Co-coordinators

**Dr. R.P. Singh, Director
Dr. Jajati K. Mohapatra, Principal Scientist
Dr. Jitendra K. Biswal, Senior Scientist
Dr. B.V. Sunil Kumar, Senior Scientist
All the Scientists of ICAR-NIFMD**

Program information

A **bout the Institute:** ICAR-National Institute on Foot and Mouth Disease (FMD) is a leading institute dedicated to research on transboundary animal diseases, primarily FMD under the aegis of the Indian Council of Agricultural Research. Elevated to the status of a National Institute in 2023, it is equipped with a modern Biosafety Level-3 (BSL-3) containment laboratory complex accredited by DBT/RCGM for compliance with biosafety norms. The advanced high-containment infrastructure facilitates secure handling and investigation of high-consequence pathogens, including FMD

virus, and those with pandemic potential and supports cutting-edge molecular diagnostics, epidemiological analysis, and vaccine research. Through its robust biosafety systems and scientific expertise, International Centre for Foot and Mouth Disease (ICAR-NIFMD) significantly contributes to national disease surveillance, strategic preparedness, and capacity building for the control of exotic and emerging FMD strains. It is recognized not only as the national referral laboratory but also as FAO reference centre for FMD.

D **etails about the program:** This 21-day intensive training program is designed to bridge the gap between theoretical knowledge and practical laboratory skills in molecular virology. By providing hands-on exposure to contemporary diagnostic and genomic tools, the program aims to empower researchers

and clinicians to effectively detect, characterize, and monitor viral pathogens, thereby contributing to improved disease control, livestock productivity, and national biosecurity.

Beginning of training: 04.06.2026 to 24.06.2026

Eligibility: Post-graduate students / PhD scholars / Faculty/ Researchers from Veterinary Science, Biotechnology, Microbiology, Molecular Biology, Life Sciences, Virology.

Number of Seats: 16

Mode of Selection: Based on CV, Statement of Purpose, and Institutional Nomination. **Only shortlisted candidates will be required to pay the training fee before the training.**

Trainning Fee (Rs.): Rs. 33,300 per participant. **This is a non-residential training programme.** Participants need to arrange their own boarding and lodging during the 21-day training period, however, accommodation will be facilitated. Local transport will be provided during the training

Evaluation: Practical performance, Post-training assessment.

What you will learn:

- Molecular diagnostic techniques for viral diseases
- Bioinformatics, phylogenetic analysis, and molecular epidemiology.
- Recombinant protein expression and immunoassays for viral disease diagnosis.
- Biosafety practices in high-containment virology laboratories

Link for application: <https://forms.gle/hFxiugjGmwVrcU1e9>

Last date to apply?

May 21, 2026

For further information, please contact

ICAR- National Institute on Foot and Mouth Disease

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Contact numbers: 7830474225, 9855943164

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Account details:

Payment should be done in favor of ICAR UNIT PDFMD

A/C number: 00000011576142063

IFSC code: SBIN0002071

Course Structure (21 Days)

Total Modules: Six (6)

1. Fundamentals of Molecular Virology.
2. Molecular Diagnostic Techniques.
3. Cell Culture, Virus Propagation and Hybridoma Technology.
4. Bioinformatics.
5. Expression of Recombinant Antigens & Immunoassays.
6. Final Evaluation.

Detailed Course Outline

Module 1: Fundamentals of Molecular Virology (Days 1–3)

- i. Structure, genome organization and molecular determinants of the virulence using FMDV as a model.
- ii. FMDV serotypes and lineages.
- iii. Antigenic variation and immune escape.
- iv. Biosafety and biosecurity.

Module 2: Molecular Diagnostic Techniques (Days 4–8)

Theory	Practical
Biosafety level practices	Basic laboratory practices and sample handling
Introduction to molecular diagnostic workflow	Laboratory orientation and biosafety demonstration
Principles of RT-PCR and real-time RT-PCR	RNA extraction from clinical samples
Primer and probe design for FMDV	cDNA synthesis
Multiplex PCR and serotyping assays	Real-time PCR (qRT-PCR) Gel electrophoresis and data interpretation

Module 3: Cell Culture, Virus Propagation and Hybridoma Technology (Days 9–11)

Theory	Practical
Cell lines used for virus isolation (BHK-21, Vero etc.)	Maintenance of cell lines
Cytopathic effect (CPE) monitoring	Sample inoculation & observation of CPE
Virus titration (TCID ₅₀ method)	Virus titration
An overview of hybridoma technology	Basic protocols in hybridoma technology

Module 4: Bioinformatics (Days 12–15)

Theory	Practical
Multiple sequence alignment methods	Multiple sequence alignment
Phylogenetic analysis in FMD epidemiology	Phylogenetic tree construction and lineage identification
BLAST	BLAST analysis

Module 5: Expression of Recombinant Antigens and Immunoassays (Days 16–20)

Theory	Practical
Cloning of genes	Gene cloning
Expression systems	Recombinant protein expression
Principles of ELISA (Indirect, Sandwich, SPCE, NSP ELISA)	SDS-PAGE analysis
DIVA strategy for viruses	ELISA
Point of care tests	Data analysis and interpretation

Module 6: Final Evaluation (Day 21)

- i. Post-training evaluation.
- ii. Valedictory session and certificate distribution.

Expected Outcome

1. Follow biosafety practices in high-containment virology laboratories.
2. Perform RNA extraction and molecular detection of viral agents using RT-PCR and real-time PCR.
3. Sequence analysis and construct phylogenetic trees.
4. Develop, optimize and perform ELISA-based assays for FMD/other TADs diagnosis.
5. Expression and purification of recombinant proteins.
6. Design research proposals relevant to molecular virology.

Certification

Participants completing the training will receive a certificate issued by the ICAR-National Institute on Foot and Mouth Disease.