Day 5 - Ethics, Regulation & Integration

- Bioethics, IPR, and biosafety; group project presentations; feedback and valedictory session.

Who Can Participate

Faculty and scientists from ICAR institutes, State Agricultural Universities, and other government organizations (through proper channel).

Young professionals associated with the ICAR–CRP on Vaccines and Diagnostics.

Application Details

Last Date for Application: **30th December 2025**

Applications should be forwarded through proper channel with a short CV.

Registration Fee

No fee will be charged for participation.

Travel and Accommodation

Travel and daily allowance (TA/DA) shall be borne by participants as per ICAR norms.

Limited accommodation may be arranged at the ICAR–CIFE Guest House on payment basis, subject to availability.

For Queries, Contact

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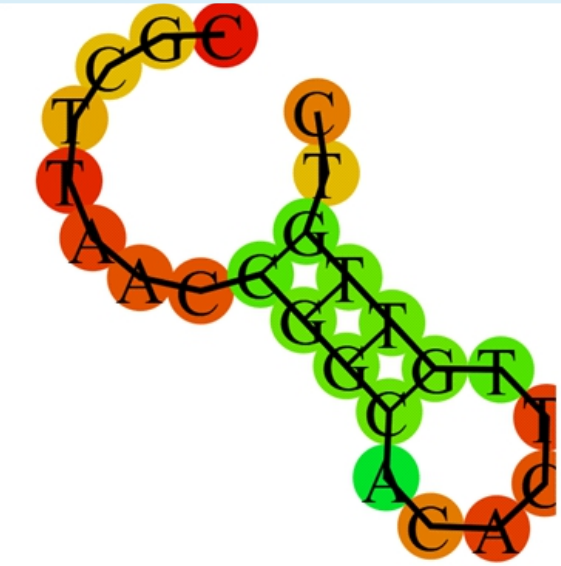
ICAR Consortia Research Platform on Vaccine and Diagnostics sponsored

Training Programme on

Application of CRISPR-Cas Mediated Genome Editing for Vaccines and Diagnostics

9th – 13th March 2026



ICAR-Central Institute of Fisheries Education
Mumbai

Introduction

The CRISPR-Cas system is one of the most transformative genome editing technologies of the 21st century. By enabling targeted genetic modifications, it has revolutionized biological research and applications across healthcare, agriculture, and aquaculture. Its precision, efficiency, and cost-effectiveness make it a vital tool for developing vaccines, diagnostics, and disease-resistant organisms.

CRISPR-Cas tools are increasingly integrated into plant, veterinary, and fisheries sciences to improve disease management and sustainability. In plants, genome editing enables the creation of disease-resistant and stress-tolerant varieties; in animals and fish, it facilitates the design of vaccines, therapeutic constructs, and diagnostic assays. These innovations offer new pathways for managing emerging diseases and advancing food security.

Institutes such as ICAR–CIFE, ICAR–IVRI, and ICAR–IARI have developed robust infrastructure and expertise to harness this technology. This interdisciplinary training programme aims to strengthen national capacity for CRISPR-Cas–based genome editing, focusing on applications in vaccine and diagnostic development across agriculture and allied sectors.

Course Outline

The five-day programme combines conceptual learning with practical sessions to provide comprehensive training in CRISPR-Cas–based genome editing.

1. **Fundamentals of CRISPR-Cas Technology**
- Discovery, evolution, and classification of CRISPR systems
- Mechanisms of genome editing and emerging innovations

2. **Bioinformatics for CRISPR Target Design**
- Identification of target sequences and guide RNA design
- Prediction of off-target effects and validation workflows

3. **CRISPR-Cas Applications in Vaccine Development**
- Generation of gene-deletion mutants and edit validation
- Case studies on CRISPR-mediated vaccine development

4. **CRISPR-Cas–Based Diagnostic Development**
- Hands-on sessions on SHERLOCK, DETECTR, and FELUDA platforms
- Guide RNA design, reaction setup, and assay optimization

5. **Bioethics, Regulation, and Biosafety**
- Ethical, legal, and biosafety considerations in genome editing
- Intellectual property and translational aspects

6. **Group Projects and Case Studies**
- Team-based design of CRISPR-based vaccine or diagnostic prototypes

Tentative Schedule

Day 1 - Introduction & Overview

- Inaugural session; overview of CRISPR-Cas systems; classification and mechanisms; applications in plant, animal, and fisheries research; lab demonstration.

Day 2 - Bioinformatics & Target Design

- gRNA design principles; target selection; tools for prediction and validation; hands-on sequence analysis and construct design.

Day 3 - CRISPR in Vaccine Development

- Generation of deletion mutants; workflow for vaccine candidate development; data analysis and result interpretation.

Day 4 - CRISPR in Diagnostic Development

- Development of CRISPR-based assays (Cas12/Cas13); fluorescence and lateral flow detection; troubleshooting and optimization.

About ICAR-CIFE

The ICAR–Central Institute of Fisheries Education (CIFE), established on 6th June 1961 under FAO/UNDP assistance, is a pioneering institute in fisheries education and research. It came under ICAR in 1979 and was conferred Deemed University status in 1989.
Over six decades, CIFE has trained more than 4,000 professionals and evolved into a premier center of excellence with world-class facilities and multidisciplinary expertise in fisheries and allied sciences.

About AEHMD

The Division of Aquatic Environment and Health Management (AEHMD) at ICAR–CIFE is an NABL ISO 17025–accredited laboratory specializing in molecular detection of fish and shrimp pathogens. Equipped with advanced infrastructure, the division conducts cutting-edge research in aquatic health and environmental monitoring. Its faculty are experts in both classical and modern molecular approaches, contributing to innovative diagnostics and sustainable aquaculture solutions.