



INSTITUTE OF ADVANCED VIROLOGY



**Science and Technology Department
Government of Kerala**

About IAV

The establishment of the Institute of Advanced Virology (IAV) is the culmination of the unbridled ambitions and aspirations of the enthusiastic and vibrant Kerala to combat and emerge as a global player in virology. Kerala's close proximity to Western Ghats, a global biodiversity hotspot and home to fauna which may be harboring unknown pathogens, and arrival of tourists from across the globe make us prone to a wide range of infections. The state faces severe public health challenges due to sequential viral epidemics. Establishing a dedicated institute for virology was essential for Kerala to achieve self-sufficiency in diagnosis and management of viral diseases.

IAV strives to support the state's public health system by extending solutions that range from early speedy diagnosis to the invention of preventive vaccines and therapeutics. Starting at a slow pace, IAV's activities have gained momentum and the center is currently fully equipped with the necessary infrastructure and manpower to carry out its mandated activities. IAV presently has 14 functional BSL 2-level laboratories, an advanced molecular diagnostic facility, an animal house facility for mice, a dedicated training laboratory, an incubation facility for startup firms, an R&D facility for established firms, and all associated support systems. The construction of a state-of-the-art BSL 3 facility and animal house for five species of small animals has also commenced. A dedicated incubation facility in an area of 25000 sq.ft is also being established. Also, IAV has commenced clinical research activities in collaboration with healthcare institutions within and outside Kerala as part of its effort to expand its research activities. The eight departments of the institute are designed with focused goals to develop platform technologies and prototypes to convert the advanced theoretical knowledge generated into translational outcomes for public benefit. IAV currently offers doctoral programs in Virology and internships for PG/UG students in life science subjects. Structured short-term training programs in collaboration with ASAP Kerala have also been commenced to cater to the requirements of academia and industry.

IAV is an institution with a prodigious future and envisions to be a center of global importance, delivering key contributions to India's pandemic preparedness.





Departments and Ongoing Research Programs.

1. Virus Applications

- Development of broad-spectrum, host-directed antivirals against emerging viruses
- Development of high-affinity human recombinant monoclonal antibodies against Nipah Virus for therapeutic uses.
- Synthesis of polyhydroxylated pyrrolidine iminocyclitol-based novel antivirals against Dengue Virus
- Viral Bio-assay Facility (VBaF) for Recombinant monoclonal antibody generation and Pseudovirion based services for vaccine response and therapeutics evaluation
- Development of a rapid and reliable in vitro screening platform based on fluorescent reporter knock-in targeting host cell IFITM gene to identify phytochemical immunomodulators against Dengue virus

2. General Virology

- Development of neutralizing and diagnostic monoclonal antibodies for Nipah virus infection.
- Identification and characterization of a functional cellular receptor for Kyasanur forest disease virus entry

3 Clinical Virology

- Evaluating selected endothelial protein biomarkers as prognostic indicators for severe dengue-An invitro, clinical and machine learning approach

4. Viral Vaccines

- Development of DNA vaccine for ZIKA and Chikungunya virus
- Role of TRIM family proteins in megakaryocyte development /maturation and platelet production in dengue virus-induced thrombocytopenia
- Exploiting the ubiquitin-proteasome system as novel target therapy against dengue virus-induced thrombocytopenia

5. Antiviral Drug Research

- Discovery and Optimization of Pan-Coronavirus Inhibitors for Nsp14 Guanine N7-Methyltransferase through Structure-Based Drug Discovery Approach

6. Viral Diagnostics

- New generation multiplex diagnostic platforms against viral syndromes causing Acute Febrile Illness (AFI) in Kerala.

7. Virus Epidemiology, Vector Dynamics and Public Health

- Virus-Metagenomics-based Virus Discovery from Symptom-specific Human Clinical Samples

8. Virus Genomics, Bioinformatics and Statistics

- Machine learning approach to identify novel viral entry receptors and other human interactomes: Uncovering multiple entry mechanisms and developing potential inhibitors against emerging viruses



ADVANCED MOLECULAR DIAGNOSTICS FACILITY



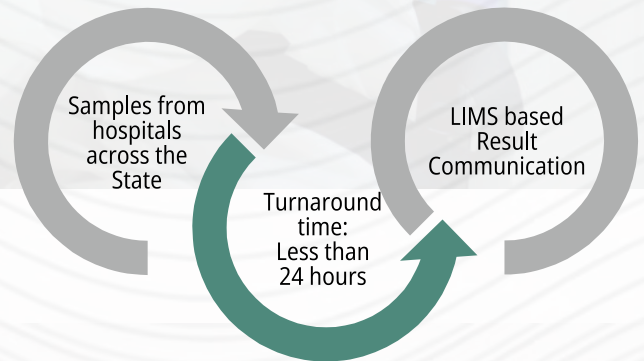
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Referral Viral Diagnostic facility

Syndromic detection of 80+ Viruses	Outbreak investigation	Sero-surveillance	15000+ Tests Done	Biorepository generation	Panel Based Testing
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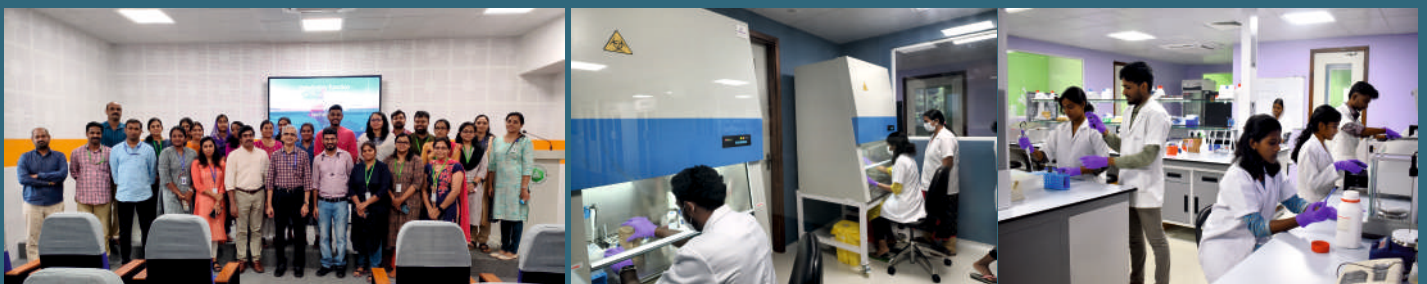
Diagnostic Panels

Encephalitis	Fever & Rash
Tropical Fever	Carcinogenic Virus
Respiratory Pathogens	Gastroenteritis
Immunosuppressed	Eye infection
Hepatitis	



ACADEMIC/TRAINING PROGRAMS

training@iav.res.in



Dedicated Training Laboratory	Job oriented training programmes with ASAP	Internship Opportunities	Advanced Diploma Programmes
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Areas : Cell Culture, Molecular Virology & Diagnostics



- » PhD in Virology
- » Industry Linked PhD Programs
- » Advanced diploma in Molecular Virology and Analytical techniques
- » Certificate programme in Cell culture and Virology techniques, Cell biology Techniques, Clinical and Diagnostic Virology
- » Internship programmes
- » Academic projects



CORE INSTRUMENTATION FACILITY

- ▶ High-end & unique machines required for cutting edge research in Virology.
- ▶ Provide technical support for internal and external users.
- ▶ Training on high end equipment.
- ▶ Accessible for start-ups/industries / academia.



Confocal Laser Scanning Microscope



DNA SEQUENCER



Fluorescence Activated Cell Sorter



Biolayer Interferometry (BLI) Based System



Inverted Fluorescence Microscope



High Pressure Homogenizer



Ultra Centrifuge



Automated Protein Purification System



Uv-vis Spectrophotometer



S6 Ultimate M2 Elispot reader



Protein crystallization robot

Upcoming facilities



Fermentor



Bioinformatics High-performance workstation

More Details



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INNOVATION & TRANSLATION FACILITATION CENTRE (ITFC)

Discovery to Delivery:
Accelerating Life Science Innovations through Industries

Plug & Play BSL2 Laboratories

Central instrumentation facility

Uninterrupted power supply and Leased line internet

Mentoring Support through IAV

Animal Experiment Facility

Co-working spaces

25,000 sq.ft. Built-up space

Thrust areas

Infectious diseases | Emerging Viruses | Antivirals, Vaccines and Diagnostics
One health | Microbiology | Interdisciplinary areas

OTHER FACILITIES

Phage Display Laboratory

- » Generation of antigen specific mAbs using phage display technology
- » Generation of antigen specific recombinant proteins using bacterial and mammalian expression systems
- » Development and screening of antibody libraries

Metagenomics Facility

- » Identifying viruses using virus-metagenomics
- » Determining evolutionary development, mutations, prevalence, pathogenicity, and host range
- » Prediction of outbreaks/pandemics, to facilitate public health decision making.

Synthetic Chemistry

- » Synthesis of antiviral drugs against existing and newly emerging viruses
- » Multi-step synthesis of small molecules

Animal House

- » Separate facilities to house, breed and conduct experiments on mice
- » Open for startup firms

Upcoming Facilities

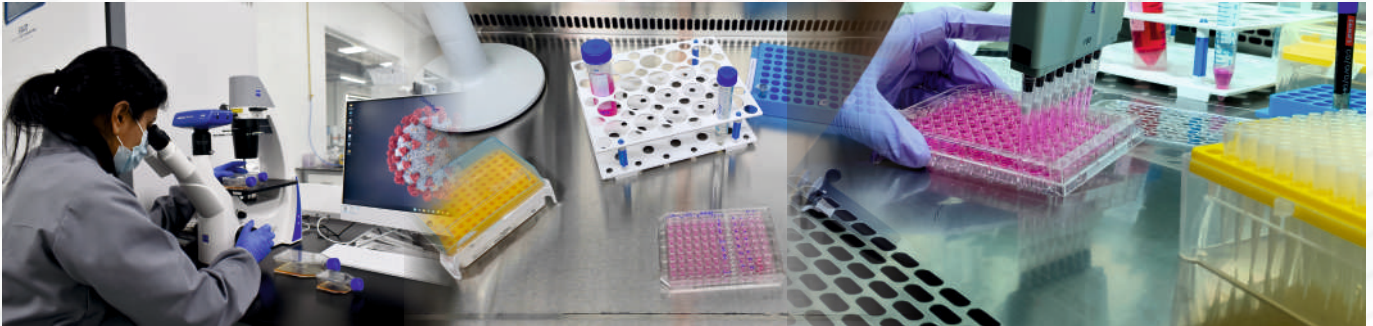
- » BSL-3 laboratory complex
- » Animal house for 5 species of small animals (Mice, Rat, Rabbit, Ferret, Hamster)



DBT – SAHAJ

Viral Bio-assay Facility (VBaF)

Transforming Viral Research: Bioassays Engineered for Accuracy



High-throughput BSL-2 neutralizing antibody/antiviral screening assays

Viral Antigen production facility

Platform facility for Recombinant human monoclonal antibodies

Assay based testing facility for industries and academia

Recombinant
Proteins

Human
Recombinant
Monoclonal
Antibodies

Antiviral
Assays

Sero-surveillance
and vaccine
efficacy studies

Nipah

KFD

Zika

SARS

JEV

CHIKV

WNV

Yellow
fever

Dengue

Rabies

RSV

Measles

Other
Viruses



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The Institute of Advanced Virology (IAV), an autonomous institution under the department of Science and Technology, Government of Kerala, was established in the year 2019. IAV serves as a key player in research, diagnosis, management of emerging / re-emerging viruses and productive scientific exchange. The Institute encompasses state-of-the-art laboratories to address needs in virology research to foster young talents. IAV contributes to the society through knowledge generation in virology as well as generating products that are potentially translatable for overall benefit of the mankind.

Vision:

To harness the best and eliminate the worst of viruses for a better human life.

Mission:

To develop state-of-the-art infrastructure, skilled scientific & technical personnel, and services & products in virology to serve local, national and global needs



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