

National Institute of Virology

(Indian Council of Medical Research)

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INDIA.

HAND BOOK





Preface

National Institute of Virology is a premier research organization, under the auspices of Indian Council of Medical Research, engaged in research on viruses of public health importance for the last 50 years. Several viral diseases have been investigated over the years and contributions of the Institute have been phenomenal. Starting in 1953 as a modest temporary Virus Research Center to study only arthropod-borne viruses it attained a status of a national Institute in 1978. Since then it has made significant contributions in other diseases caused by viruses such as hepatitis, HIV, influenza, rota, measles, Chandipura, etc.

On the occasion of the Golden Jubilee celebrations of the Institute, I am pleased to present this Handbook on NIV. The document is aimed at providing information about the Institute to policy makers, scientists, students and general public. The task of making such a document, which is intended for such a diverse group, has been difficult and demanding. We have tried to keep the document simple but informative. Topics are arranged according to diseases and other activities. Our research contributions have been highlighted and general information has been provided in brief. The document may appear preliminary to specialists but a little too technical to others. Striking such a balance that all should be able to appreciate the document was challenging but we do hope that we have succeeded in doing so.

All my colleagues have contributed in making of the document in various ways. I am especially grateful to Dr. D. A. Gadkari, Emeritus Medical Scientist, Mr. R. S. Soman, Ex Deputy Director and Mr. J. Pinto for their help in editing and compilation of this Handbook.


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Foreword



National Institute of Virology has completed 50 years of its existence. This Handbook prepared on the occasion of Golden Jubilee, gives a bird's eye view of the Institute's achievements and successes. Almost 50 years ago Kyasanur Forest Disease, was described as new disease. Last year, the institute described Chandipura encephalitis, another new disease of public health importance. A lot has been achieved between the discoveries of KFD and Chandipura encephalitis.

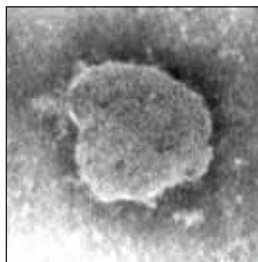
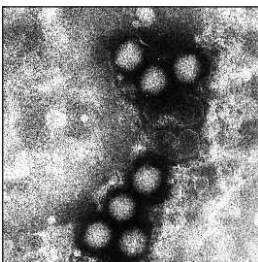
Various chapters in this Handbook not only highlight NIV's achievements but also give an idea about the multifaceted activities of the Institute and timely absorption of modern technology that was essential to maintain the high standards in biomedical research. Creation of Microbial Containment Complex, first of its kind in India, is another feather in NIV's cap. This facility will give an added impetus to research on hazardous and exotic viruses.

I am sure you will find the Handbook useful and informative. I congratulate NIV for publishing this Handbook on the occasion of its Golden Jubilee and wish success in their future endeavors.

Prof Nirmal K. Ganguly
Director General

Contents

Introduction	1
Kyasanur Forest Disease (KFD)	7
Japanese Encephalities (JE)	13
West Nile (WN)	23
Dengue (DEN)	27
Chikungunya (CHIK)	35
Chandipura Encephalities	39
Rotavirus (RV)	45
Hepatitis A	51
Hepatitis B	57
Hepatitis C	63
Hepatitis E	67
Delta and Other Hepatitis Viruses	75
Influenza	79
Respiratory Syncytial Virus (RSV)	85
Measles	89
Retro Viruses	93
Other Viruses	97
Medical Zoology and Entomology	107
Tissue Culture and Cell Biology	111
Electron Microscopy	115
Other Studies and Support Services	119
Animal House	125
Microbial Containment Complex (MCC)	131





Introduction





Background

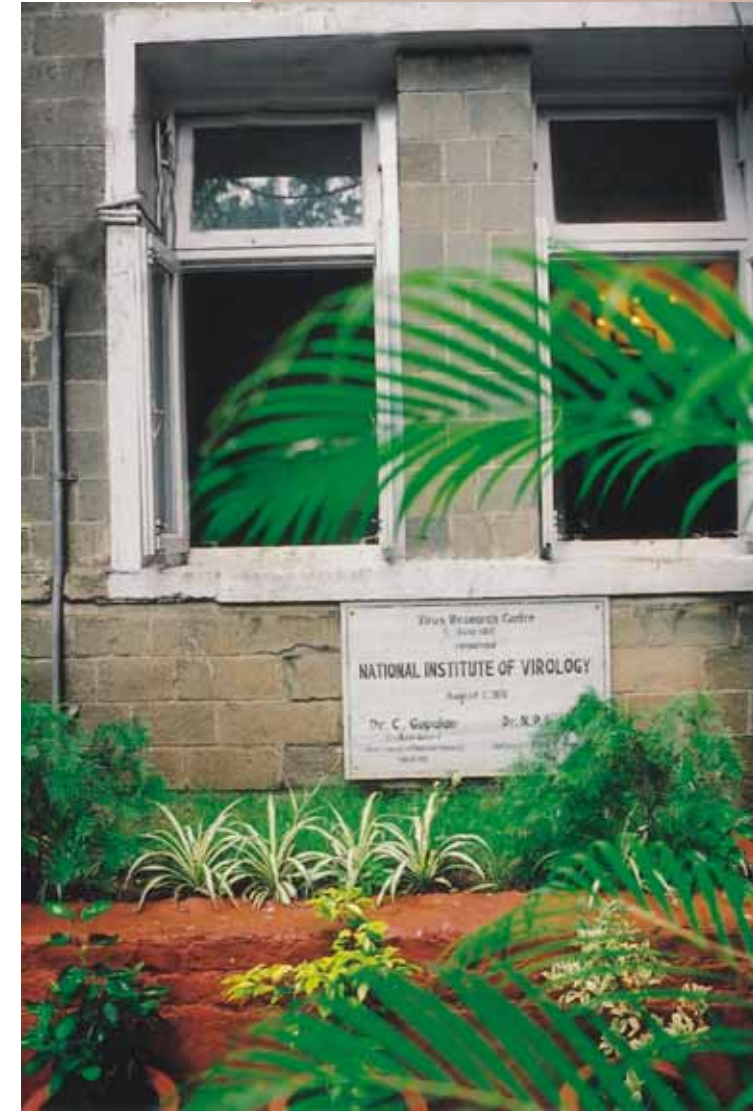
Established as Virus Research Centre in 1953, by Rockefeller Foundation, USA and Indian Council of Medical Research (ICMR), New Delhi, to study "Arthropod-borne viruses" in India.

Became an independent institute of ICMR in 1967.

Renamed as National Institute of Virology (NIV) in 1978; the scope was broadened by inclusion of studies on other viruses of public health importance.

In 1979, Planning Commission approved construction of containment laboratories as a part of NIV. A new campus having an area of about 27 acres has been developed in Pashan, 10 kms away from the main campus on Dr Ambedkar Road, Pune .

Recognized as the World Health Organization (WHO) Regional Collaborating Centre for Reference and Research on Arboviruses, and National Reference Centre for Hepatitis and Influenza.



Mission

High quality applied and basic research in the areas of epidemiology, molecular biology, immunology, diagnostics, vaccinology, prevention and control strategies for viruses of public health importance, by creating a center of excellence, safe workplace and risk-free environment, through the establishment of state-of-the-art laboratories and development of appropriate human resources.

Objectives

- Studies on viral diseases affecting humans.
- Investigations of outbreaks, isolation and characterization of viruses.
- Providing diagnosis for viral diseases and development of indigenous diagnostic tests.
- Study of natural cycle, maintenance and spread of viruses.
- Developing models for prediction of viral epidemics.
- Developing animal models to study pathogenesis of viruses.
- Developing *in vitro* culture systems, including development of cell lines from mammals, arthropods and fishes.
- Studies on genetic and immunological properties of various viruses.
- Molecular epidemiology.
- Developing methods of prevention and control of viral diseases.

- Development and evaluation of vaccines and immunotherapeutics.
- Supply of reference virus strains and diagnostic reagents.
Teaching and training of scientific and technical personnel.
- Creating awareness of viral diseases.

Landmark achievements

- First laboratory in the country that developed comprehensive infrastructure facilities like tissue culture, epidemiology, biochemistry, immunology, medical zoology for research in arbovirology.
- Discovery of Kyasanur Forest Disease (KFD) as a new disease caused by KFD virus, transmitted by ticks.
- Developed and produced inactivated vaccine against KFD and transferred the technology to Karnataka state. Over 50 thousand doses are prepared and administered every year for the last three decades.
- First institute to confirm the occurrence of many arboviral diseases like Japanese Encephalitis, Chikungunya, West Nile and Chandipura in India.
- Ecological studies to understand complex natural cycle of zoonotic viruses like KFD, JE, etc.
- Pioneering effort in outbreak investigations, over 200 epidemics investigated.
- Conducted numerous serological surveys to create background information on prevalence of viral diseases in India.

- Invaluable collection of more than 250,000 serum samples and over 600 strains of different viruses, isolated from humans, animals and arthropods. Isolated 21 viruses, new to science.
- Several unrecognized and partially characterized viruses available.
- Several new species of arthropods have been discovered; 1 mosquito, 2 sandflies, 14 sucking lice, 2 fleas, 3 bugs, 18 ticks, and 63 trombiculid mites.
- One new species each of rodent, bat and a subspecies of bird has also been described.
- In 1967 the institute developed world's first mosquito cell line- popularly called Singh's cell line. Many other new cell lines are also developed from tissues of fishes and arthropods.
- Monoclonal antibodies developed against JE, Dengue, West Nile, Chikungunya, Influenza and respiratory syncytial viruses.
- Development of indigenous ELISAs for detection of JE, Dengue, West Nile, Hepatitis A, B, Rota and Measles virus infections.
- First visualization of virus particles in a stool sample of a human case that led to the discovery of Hepatitis E virus as causative agent of water borne hepatitis.
- Prevalence of Hepatitis A, B and C viruses and risk factor assessments.
- Production of recombinant proteins for diagnostics and vaccine for hepatitis viruses.
- Genotyping of important viruses like JE, WN, Dengue, Hepatitis, Measles.
- Isolated 43 strains of influenza A and B from humans during epidemics in Pune and 1 strain of influenza A(H4N2) from a duck. Also established seasonality of Influenza in Pune.
- First detection of human meta-pneumovirus from acute pneumonia cases in India.
- Discovery of Chandipura virus and involvement of this virus as the causative agent of large encephalitis outbreaks in children in India.
- Isolation of several strains of rota viruses. Development of ELISA for diagnosis. Underscored the utility of immune goat colostrum for prevention of diarrhea.
- Vaccine trials for JE, KFD, measles, hepatitis, etc.
- The Bangalore Field Station is an accredited National Laboratory for Karnataka under National Polio Surveillance Program (NPSP) since 1997.

Vision

To alleviate suffering from viral diseases, by providing knowledge data-base, reliable diagnosis, effective vaccines and proper management strategies for prevention and control of the diseases of public health importance.