

# Hands-on Training Course on "Cytogenetic and Genotoxicity Assessment Markers"

June 06-15, 2023



## Course Director

Dr. Basdeo Kushwaha  
Principal Scientist & Head  
Genomics & Computational Resources Division  
ICAR-NBFG

## Course Coordinators

Dr. Ravindra Kumar, Principal scientist  
Dr. Murali S., Scientist  
ICAR-NBFG

## Dates to remember

Last date for submission of Application 30 May, 2023  
Last date for submitting Course fee 05 June, 2023



ICAR - National Bureau of Fish Genetic Resources  
Canal Ring Road, Dilkusha P.O, Lucknow -226 002

## Dear Colleagues,

Natural habitats and native fish along with other aquatic organisms play a critical role in maintaining the aquatic ecosystem's health and functions. They contribute to the social and economic liveliness of both the region and the nation. Due to various anthropogenic and developmental activities, the production, consumption and excretion of chemicals into the aquatic environment continue to increase. A large proportion of these chemicals contain potentially genotoxic and carcinogenic substances. Most of aquatic organisms are the ultimate sufferers of these pollutants which cause heritable mutations and loss in the total genetic diversity with significant implications on the long-term survival of natural stocks.

Biomarkers are sensitive indicators of certain biological condition that gives early warning to assess the effect of pollutants on organisms after exposure. They have frequently been used for monitoring biological damage and assessing the health of organisms and populations in aquatic ecosystems. Cytogenetic tools are considered a very robust way of basic characterization of a fish species as the number and morphology of chromosomes remain stable from generation to generation, which generally is not affected by the changing climate. The karyotypic information also provides clues on the phylogenetic relationship among fish species and their evolution. In the recent past, many laboratories used a broad range of short-term bioassays having different sensitivities, methodologies and end-points for cytogenetic studies and detection of the genotoxic potential of contaminants. These include cytogenetic and molecular Assays, like karyotyping, chromosomal aberration test (CAT), fluorescence in situ hybridization (FISH), micronucleus Test (MNT), single cell gel electrophoresis (SCGE) or comet assay (CA). In order to disseminate the new knowledge and techniques, a training programme is being organized to cater the need of young researchers with an inclination towards cytogenetic and genotoxicity studies. The available information will be integrated to determine the validity of different biomarkers, and their relevance for assessing genotoxicity.

## About ICAR-NBFGR:

ICAR-National Bureau of Fish Genetic Resources (NBFGR) was set up in 1983 under the aegis of the Indian Council of Agricultural Research for providing research inputs for sustainable management and conservation of fish germplasm resources. It has emerged as a Center of Excellence in cataloging and conserving aquatic bio-resources of the country. It has developed modern facilities, multidimensional strategies, and technological capabilities to achieve its mandate related to genomics, conservation, health, genotyping, database development, registration of aquatic germplasm, gene banking, and evaluation of endangered as well as exotic fish species.

## Hands-on training course on “Cytogenetic and Genotoxicity Assessment Markers”

ICAR-NBFGR is actively involved in the research on genotoxicity aspects in fishes and has successfully developed various assays for fruitful conclusions. During the training course, emphasis will be set to train the participants for in vivo assessment of genotoxicity of different chemical agents/ environmental pollutants at cellular, chromosomal, molecular, and protein levels using various genotoxicity biomarkers. The Bureau has developed well-equipped facilities, infrastructure and technological expertise for conducting such studies.

## Course Objectives:

The proposed training is planned to give theoretical as well as practical insights into different assays used in cytogenetics, genetic toxicology and biotechnology. The programme aims to develop trained manpower in the field of fish genetic toxicology.

## Course Contents:

- ★ Basic concepts of :
  - Fish cytogenetics
  - Fluorescence *in situ* Hybridization (FISH)
  - Genotoxicity assays
- ★ Techniques of :
  - Chromosome preparation
  - Karyotyping, C-banding, NOR-banding
  - DNA probe construction and FISH
  - Genotoxicity assays
    - ↳ Micronucleus Assay
    - ↳ Comet Assay
  - Cytotoxicity testing using cell line

## External Faculty members:

Resource persons from other reputed laboratories will be guest faculty

### Eligibility:

Faculty members, research scholars/ fellows, student (in permanent or temporary positions) associated with such works or students in fisheries/ genetics/ biotechnology/ environmental sciences/ zoology/ life sciences.

**Intake capacity:** 20 participants

### Fee:

Rs. 10,000/- for selected candidates holding permanent positions/ funded by some projects. Rs. 5,000/- for self-financed candidates recommended by their Project Leader/ Head of Department of the Institute/ University. The course fee includes a course kit and working lunch and tea during the training period. The candidate will be provided accommodation in the Institute's guest house on payment of nominal charges; however, hotel accommodation can be arranged on request by the participants on payment basis. The sponsoring organization or participants will meet expenses for their travel and local transportation

### Application:

Interested persons can apply on the attached Registration Form and send to the Course Director at the given address. Selected candidates will be informed through E-mail. For enquiry, write to: Dr. Basdeo Kushwaha, [basdeo.kushwaha@icar.gov.in](mailto:basdeo.kushwaha@icar.gov.in) (Mob. 9450912730)



### About Lucknow

Lucknow, the capital city of Uttar Pradesh historically known as the Awadh region, is believed to begin after Ramchandra of Ayodhya, the hero of the Ramayana, ordered his devoted brother Lakshman to establish a town at the present site of 'Lakshman tila'. Therefore, people say that the original name of Lucknow was 'Lakshmanpuri', and slowly the name 'Lakshmanpuri' became 'Lakhnau' and then named 'Lucknow' by the British. It is situated on the bank of river Gomti.

Lucknow's rise to growth and fame begins with its elevation to a capital city under the Nawabs of Awadh. The architectural contributions of the Awadh rulers, many paintings of whom are maintained at the Art Gallery today, include numerous mosques and palaces. Of the monuments standing today, the Bada Imambara, the Chhota Imambara, and the Roomi Darwaza are notable examples.

Today, Lucknow is a vibrant city with a perfect blend of the ancient with the modern, as many glitzy shopping arcades coexist with the old monuments. Lucknow has emerged as a "Science City", as numerous national laboratories, premier medical colleges, universities along with engineering and Management institute exists here. The greatest attraction of Lucknow, where the past jostles with the present, is its unique ability to achieve harmony amidst disorder and to assimilate the new into the old.

Lucknow, the golden city of the east retains an old world charm that fascinates one and all. Regarded as one of the finest cities of India, Lucknow emanates a culture that combines emotional warmth, a high degree of sophistication, courtesy and a love for gracious living. This sublime cultural richness famous as 'Lucknowi Tehzeeb' blends the cultures of several communities living side by side for centuries, sharing similar interests, speaking a common language.

The climate during June will be little humid and hot with temperature of around 38-40°C. The campus of ICAR-NBFGRI is located around 8 km away from Lucknow (Charbagh) railway station and 10 km from Ch. Charan Singh International Airport, Amausi, both of which are well connected with pre-paid Auto/ Taxi services.

**REGISTRATION FORM**

Hands-on Training Course on “Cytogenetic and Genotoxicity Assessment Markers”

June 06-15, 2023

ICAR-National Bureau of Fish Genetic Resources  
Lucknow-226002, U.P., India

Name (Dr./ Mr./ Miss/ Mrs.) :.....  
 Designation :.....  
 Date of Birth :.....  
 Educational Qualification :.....  
 Professional Experience :.....  
 Present area of work :.....  
 Mailing Address :.....  
 E-Mail ..... Fax:.....  
 Phone: (O) ..... (R) ..... (M) .....

Training fee may be paid either

- Online through ICAR-NBFGR website (<https://www.nbfggr.res.in:801/>) **OR**
- Through NEFT/IMPS to ICAR-NBFGR account having following details:  
 Name of beneficiary: ICAR Unit NBFGR, Lucknow  
 Name of Bank and Branch address: Axis Bank Ltd., Aashiyana, Lucknow  
 Account No.: 918020045053793  
 IFS Code: UTIB0001878  
 Branch code: 001878  
 MICR code: 226211010

Amount..... (In Words).....  
 Transaction No..... Date.....  
 Issuing Bank.....  
 Any other information:.....

Place:  
Date:

(Signature of candidate)

Forwarding from Head of Institution/ Competent Authority:

1. Candidature of Dr./ Mr./ Miss/ Mrs..... working as ....., is forwarded for inclusion in the training course. The course fee will be sent by due date, if selected.
2. Candidature (Mark “” as applicable in the parenthesis):  
 a. Sponsored (  )      b. Self financed (  )

(Signature and seal of Competent Authority)  
Name:  
Designation: