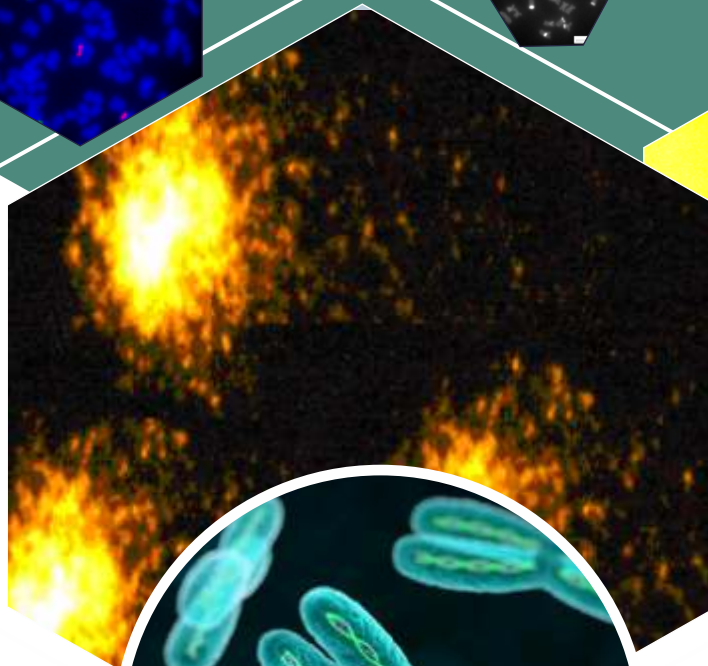
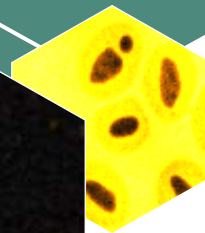
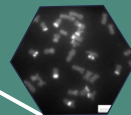
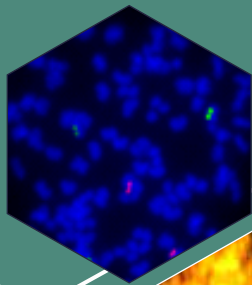




# Hands-on Training Course on *"Cytogenetic and Genotoxicity Biomarkers: Principles & Practices"*

September 10-19, 2025



**Course Convener**  
Dr. Kajal Chakraborty  
Director, ICAR-NBFGP

**Course Director**  
Dr. Basdeo Kushwaha

**Course Coordinators**  
Dr. Ravindra Kumar  
Dr. Murali S

## Dates to remember

Last date for submission of Application: 31 August, 2025

Last date for submitting Course fee : 05 September, 2025



**ICAR - National Bureau of Fish Genetic Resources**

## Dear Colleagues,

Natural habitats and native fish along with other aquatic organisms play a critical role in maintaining the aquatic ecosystem's health as well as function and contribute to the social and economic liveliness of both the region and the nation. Due to various anthropogenic 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 for the long-term survival of the natural populations.

Biomarkers are measurable indicator that are use as early warnings to determine the effect of pollutants on organisms after exposure. They have frequently been used for monitoring biological damage and assessing the health of the organisms and populations in aquatic ecosystems. Cytogenetic tools are considered a very robust tool for basic characterization of a fish species, as the number and morphology of the chromosomes remain stable generation to after generation generally not affected by the changing climate. The karyotypic information also provides clues on the phylogenetic relationship between species and evolution in fish species. 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, FISH, micronucleus Test (MNT), Single Cell Gel Electrophoresis, or Comet assay etc. In order to disseminate new knowledge and techniques, a training programme is being organized to cater to 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 NBFGR:

The 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 India. 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 and exotic fish species.

The 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 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 workforce in the field of fish genetic toxicology

## Course Contents:

- Basic concepts in fish cytogenetics
- Basic concepts in Fluorescent in situ Hybridization (FISH)
- **Methods**
  - Chromosome preparation
  - Karyotyping, C-banding, NOR-banding
- Basic concepts in genotoxicity assays
- Methods to assess genotoxicity in fishes by
  - Micronucleus Assay
  - Comet Assay
  - Cytotoxicity test using cell line

## External Faculty members:

Resource persons from other reputed laboratories will be guest faculty



**Eligibility:**

Faculty members/ research workers/ fellows or students in fisheries/ genetics/ genetic toxicology/ biotechnology/ environmental sciences/ zoology /life sciences

**Intake capacity:** 20 participants

**Course Fee:**

Rs. 6,000/- for selected candidates. The course fee includes a course kit and working lunch and tea during the course 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 prescribed format (Registration Form) and send to the Course Director at the Institute address. Selected candidates will be informed through E-mail/ Fax. For enquiry, write to:

**directornbfgr2025@gmail.com; basdeo.scientist@gmail.com** (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, who 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-NBFGR 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 Biomarkers: Principles and Practices"

September 10-19, 2025

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.nbfgr.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)

**Please send:**

- Duly filled REGISTRATION FORM by email to:  
The Director, ICAR-NBFGR at "[directornbfgr2025@gmail.com](mailto:directornbfgr2025@gmail.com)"

- Travel plan by email to:  
The Course Director at: [basdeo.scientist@gmail.com](mailto:basdeo.scientist@gmail.com)

With the subject as: Hands-on Training Course on 'Cytogenetic and Genotoxicity Biomarkers: Principles and Practices' at ICAR-NBFGR, Lucknow, during September 10-19, 2025.