Course details

- **Goals:** Hands-on training in classical and molecular cytogenetic techniques with relevance to clinical diagnostics and public health.
- **Equipments & Facilities available:** Yes
- **Duration and schedule of The Course:** 5 weeks (per batch) × 2 batches annually × 3 years
- **Eligibility:** Faculty from recognized Medical Colleges or Biomedical Research Institutes in India. Background in Genetics, Pathology, Microbiology, Anatomy, or related disciplines. Prior exposure to molecular biology techniques is desirable
- **Attendance and leave rules:** Minimum 80%
- **Duties and Responsibilities of fellows:** NA
- **Evaluation Process:** Practical based examination
- **Course Content (Curriculum):**

S. No.	Topics with Schedule	Training to be provided to the candidate
1	Week 1: Fundamentals of Cytogenetics	**Day 1:** Introduction to Human Cytogenetics: History, Chromosome Structure, Banding Techniques (Lecture) **Day 2-3:** Cell Culture Basics: Blood Sample Collection, Lymphocyte Culture Setup (Practical) **Day 4-5:** Harvesting, Slide Preparation, and Giemsa Staining (Practical) **Theory:** Chromosome Classification, Nomenclature (ISCN), Common Structural and Numerical Aberrations
	Week 2: Karyotyping Techniques and Analysis	**Day 1-2:** GTG Banding: Slide Review, Microscope Handling, Image Capture **Day 3-4:** Karyotyping Software Training: Digital Analysis and Karyotype Preparation (Practical) **Day 5:** Case-based Discussions on Chromosomal Syndromes (Down, Turner, Klinefelter) (Theory + Practical) **Theory:** Mitotic Index, Culture Quality Control, Reporting Formats
	Week 3: Introduction to FISH	**Day 1:** Principle and Types of FISH (Lecture) **Day 2-3:** FISH Sample Preparation, Probe Selection, Hybridization Techniques (Practical) **Day 4-5:** Post-hybridization Washes, Fluorescence Microscopy, Signal Interpretation (Practical) **Theory:** Single Locus vs. Multiplex FISH, Applications in Prenatal, Oncology
	Week 4: Advanced FISH Applications and Interpretation	**Day 1-2:** Interphase vs. Metaphase FISH; Troubleshooting and Signal Scoring (Practical) **Day 3:** HER2/neu and Prenatal Aneuploidy Detection Panels (Practical) **Day 4-5:** Case Interpretation and Reporting Exercises (Practical + Theory)

		Theory: Validation of FISH Assays, Role in Personalized Medicine
	Week 5: Integrated Cytogenetic Diagnostics and Case Work-up	**Day 1-2:** Real-case Diagnostic Work-up – From Sample to Report (Simulation) **Day 3-4:** Quality Control, Accreditation Guidelines, Ethical Considerations **Day 5:** Final Assessment, Viva, and Feedback Session **Theory:** Lab Management in Cytogenetics, Turnaround Time, and Cost-effectiveness
2	Relevance in Public Health	Chromosomal disorders are a significant cause of congenital anomalies, reproductive failure, and cancer. This training prepares participants to apply cytogenetic techniques for early detection and diagnosis in resource-limited settings. Applications in prenatal screening, genetic counseling, and oncology have major implications for reducing disease burden and improving patient care. The programme also emphasizes adherence to WHO and ICMR guidelines for genetic disorders and integration of cytogenetic services into public healthcare systems.

Yours sincerely,

Dr. Susmit Kosta
Scientist & Incharge
Central Research Laboratory
Sri Aurobindo Medical College & PG Institute
INDORE (M. P.) 453111

Dr. Susmit Kosta
HOD and Senior Scientist
Molecular Biology and Medical Genetics