MAHATMA GANDHI INSTITUTE OF MEDICAL SCIENCES, SEVAGRAM

Centre for Genetics & Genomics

Introduction

The Mahatma Gandhi Institute of Medical Sciences Sevagram has developed a state of art diagnostic and research facilities for human genetic diseases at the Centre for Genetics and Genomics. It serves as an incubation centre and facilitation centre for undertaking extramural research in multidisciplinary areas. The infrastructure present inthis centre can be utilized by all departments of the institute to conduct research.

The Centre for Genetics and Genomics has facilities of a fully equipped cytogenetics and molecular cytogenetic laboratory, and advanced molecular biology set up for diagnosis of single gene disorders. In addition, we also have a tuberculosis research lab. The infrastructure includes: four capillary Sanger sequencer, Real Time thermos-cycler, 96 well thermo-cyclers for polymerase chain reaction, geldocumentation unit, fluorescence microscope with karyotyping software and FISH software etc.

There is also a provision for office space and space for major research projects in the institute with the availability of necessary office equipment and assistance and secretarial staff. This can ease the process of research with necessary support in terms of physical space, human resources and equipment.

Research and Diagnostics Work being conducted:

The Centre for Genetics & Genomics plays crucial role for catering cytogenetics and molecular cytogenetic diagnostic services to the rural populations. Different type of genetic test can be conducted, including diagnostic test to identify the specific genetic disorders, predictive test to assess the risk of developing certain conditions, and carrier testing to determine if individuals carry a gene associated with particular disorder.
Furthermore, this center contributes significantly to research initiatives and the advancement to the understanding of the genetic basis of diseases. In 2020-21, one of our young researchers, Dr Prafulla Shriram Ambulkar has filed a patent on his research “A process for detecting microdeletions in Y chromosome”. In 2023, the patent has been granted for next 20 years by government of India. (Can be viewed at https://drive.google.com/file/d/1GbxyNTBWNEquW0E64oBNAnM0ksrGFCrk/view)

At present some PhD students who are doing their PhD work are also using this lab. Work on molecular genetics of breast cancer and cytogenetics is being conducted. The list of PhD candidates is as follows:

PhD students working at the Centre for Genetics & Genomics

Sr. No.	PhD. Topic	Name of PhD student	Name of Guide	Academic year	Registered University
1	Molecular genetic analysis of GATA4 gene in congenital heart disease at central Indian population.	Dr. Jwalant Waghmare	Prof. (Dr) Nitin Gangane	2021-2022	Maharashtra University of Health Sciences, Nashik.
2	Study of Association of Polymorphism of Interleukin 17F and Interleukin 17A Gene with the Causation and Severity of Rheumatoid Arthritis	Dr. Samir Yelwatkar	Prof. (Dr) Nitin Gangane	2021-2022	Maharashtra University of Health Sciences, Nashik.
3	Molecular genetic analysis of mitochondrial DNA D-loop region and their correlation with clinical severity in Sickle cell disorder patients.	Dr. Shweta Talhar	Prof. (Dr) Nitin Gangane	2021-2022	Maharashtra University of Health Sciences, Nashik.
4	Study of association of estrogen receptor 1 (ESR1) gene mutation with clinicopathological characters and overall survival in carcinoma breast patients	Dr Bharat Patil	Prof. (Dr) Nitin Gangane	2021-2022	Maharashtra University of Health Sciences, Nashik.

New PhD students registered for Medical Genetics at the Centre for Genetics & Genomics:

Sr. No	Name of PhD student	Name of Guide	Academic year	Registered University
1	Dr Nitin Kulkarni	Prof. (Dr) Anshu	2022-2023	Maharashtra University of Health Sciences, Nashik.
2	Dr Kalpana Welaskar	Prof. (Dr) Anshu	2022-2023	Maharashtra University of Health Sciences, Nashik.

The Centre has been sanctioned a funded research project on new-born and rare genetic diseasesscreening under the DBT-UMMID Initiative for NIDAN Kendra

Government funded Ongoing/ Approved research projects

Sr. No.	Name of the project	Principal Investigator	Duration (Years)	Cost (Rs)	Funding Agencies
1	Study of mitochondrial DNA polymorphism, mutation and oxidative stress in relation to susceptibility and severity of type 2 Diabetes mellitus.	Dr. Jwalant Waghmare	3 yrs (2021-2025) Ongoing	36.00 lacs	ICMR, New Delhi
2	Establishment of DBT-NIDAN Kendra under UMMID initiative for rural population at Mahatma Gandhi Institute of Medical Sciences, Sevagram	Dr. Nitin M Gangane Dr. Asoke Pal Dr. Poonam Verma Dr. Manish Jain Dr. Jwalant Waghmare Dr. Prafulla Ambulkar	3 yrs (2022-2025) Approved	2.25 crores	Department of Biotechnology, Govt. of India

List of major equipment and instruments

Sr. No.	Generic Name of Equipment	Model, Make & year of purchase	Current usage of equipment
1	Four capillary Genetic Analyzer	(Seq-Studio, Applied Biosystem, USA) 2019	Fully working
2	Real Time PCR		
3	96 well Thermal Cycler: 2 No.	(Veriti, Applied Biosystem, USA) 2010; 2019	Fully working
4	Fluorescence Research Microscope with Karyotype & FISH software	Carl Zeiss, GmbH, Germany	Fully working
5	Gel Documentation system with image analysis system	(Uvi-tec, Cambridge, UK),2010	Fully working
6	Horizontal gel electrophoresis with power pack	(Hoffer. USA), 2010	Fully working
7	Inverted microscope with phase contrast	(Olympus), 2000	Fully working
8	CO_2 Incubator	(Forma Scientific), 1999	Fully working
9	CO_2 Incubator with oxygen control	(Thermo scientific), 2019	Fully working
10	Type I & II Ultra water purifier	Ion exchange, India, 2019	Fully working
11	Laminar flow clean air work station	(Klenzaids), 1999	Fully working
12	Double beam UV-spectrophotometer	(Elico), 2014	Fully working

13	Refrigerator No:3	LG, Haier, 2010 & 2019	Fully working
14	Deep freezer (–20^{o}C)	Blue star, 2002 & 2010	Fully working