

Report on Clinical Genetics Program
(Enrichment Course for 1st year MBBS Students)
Conducted by Department of Anatomy and NTRIC
Narayana Medical College, Nellore, Andhra Pradesh
Inauguration: 20th October, 2021
Course: 21st & 22nd October, 2021

Prologue:

The approach towards diagnosis and treatment of diseases or disorders have changed drastically with the deeper understanding of the genetic material and its relationship to health and disease. Thus, clinical genetics has evolved as a branch of biology, involving the study of genes, genetic variations and heredity with emphasis on its implication on human health.

In consideration with the aim, Narayana Medical College conducted an “Enrichment Course on Clinical Genetics” for 1st Year MBBS students on 21st to 22nd October, 2021 to provide an overview of this branch of biology highlighting the recent developments to the students of the institution. The course was conducted under the mentorship of Dr SP Rao (Professor & Dean, NMC). Faculty members of different departments of the institution acted as resource person of the program.

Inauguration of the course:

An eminent scientist, Dr Subhabrata Chakrabarti, who is Associate Director (Research) at LV Prasad Eye Institute, Hyderabad (India), inaugurated the program online on 20th October. Dr Chakrabarti is associated with many national and international organizations, including Indian Society of Human Genetics, where he holds the position of General Secretary. His research on the functional genomics of glaucoma and AMD are pioneering in the field that have provided some molecular insights into the disease pathogenesis. These works have been widely recognized through several honors and awards; notable among them being the 'Research Recognition Award' of the World Glaucoma Association (WGA). In the inaugural lecture, Dr Chakrabarti, elaborated the course subject from the very basics of genetics to the recent developments of the subject in a

holistic manner. Using glaucoma as a disease model he explained molecular-genetics, with emphasis on the widely used advanced cell and molecular genetic tools and techniques.

Course structure and organization:

The course content was organized in different modules encompassing both the theoretical and clinical aspects of the field, catering to the syllabus of the 1st year MBBS students. At the end of the program, an assessment of individual participating students was made through an online multiple-choice questions (MCQs) based test on the course curriculum.

Theoretical part of the course was conducted at the Lecture-Theater, Narayana Medical College and the clinical module was accomplished in the Obstetrics & Gynecology (Ob-Gyn) Clinic, Narayana Medical College. The total duration of the course was 15 hours and the theory modules were demonstrated with through power-point presentations. While, the clinical exposure to the subject was provided in the Ob-Gyn clinic with reporting subjects. The resource persons demonstrated the procedure of pedigree chart preparation and subsequent analysis and the students had hands-on experience of the process. Details of the course curriculum and the involved resource persons are highlighted below.

The Course content covers the following modules:

Module 1: Elements of Medical Genetics

Module 2: Biochemical & Molecular basis of Genetic

Module 3: Prenatal Diagnosis & Genetic Counselling

Module 4: Prenatal Diagnostic Techniques

Module 5: Genetic Assessment and Newborn screening

Module 6: Pedigree Chart Drawing

Module 7: Case Studies (Clinical evaluation, Pedigree analysis & Risk assessment)

Module 8: Psychological assessment and Genetic Counselling

Resource Person	Affiliation
Dr Biswa P Das Purkayastha	Associate Professor, NTRIC, Narayana Medical College
Dr L Hema	Professor, Department of Anatomy, Narayana Medical College
Dr R Gokul Krishnan	Associate Professor, Department of Paediatrics, Narayana Medical College
Dr G Mithilasri	Assistant Professor, Department of Obstetrics & Gynaecology, Narayana Medical College
Dr G Shweta Reddy	Assistant Professor, Department of Obstetrics & Gynaecology, Narayana Medical College
Dr S Lavanya	Professor & Head, Department of Obstetrics & Gynaecology, Narayana Medical College
Dr K Ashalatha	Professor & Head, Department of Anatomy, Narayana Medical College

Date & Time	Course Module/ Topic	Course Instructor
21/ 10/ 2021	Module 1/ Chromosomes (Structure and types of associated diseases and abnormalities)	Dr L Hema
	Module 1/ Patterns of Inheritance (Mendelian/ Non-Mendelian and associated disease/ disorder, pedigree chart preparation)	Dr Biswa P Das Purkayastha
	Module 1/ Patterns of Inheritance (Genetic Basis & Clinical features of Diseases or Disorders)	Dr L Hema
	Module 2/ Chromosomal Aberrations (Description with examples of associated Diseases or Disorders)	Dr L Hema
	Module 2/ Chromosomal Aberrations (Genetic Basis of Variation)	Dr Biswa P Das Purkayastha
	Module 3/ Prenatal Diagnosis & Genetic Counselling	Dr Biswa P Das Purkayastha
22/ 10/ 2021	Module 2/ Chromosomal Aberrations (Genetic Basis of Variation) Module 3/ Overview of human genome	Dr Biswa P Das Purkayastha
	Module 4 & 5/ Prenatal Diagnostic techniques and Genetic Assessment and New Born Screening	Dr R Gokul Krishnan
	Module 6, 7 & 8/ Case studies, Pedigree analysis, Genetic Counselling	Dr G Mithilasri, Dr G Shweta Reddy & Dr Biswa P Das Purkayastha
	Module 2/ Molecular Basis (Core DNA technologies, Genetic manipulation and single cell genomics)	Dr Biswa P Das Purkayastha
	Assessment	

Assessment Outcome:

During the two days, attendance was documented twice each day of the program and it was found that on an average 89% attended the first day (21st October) and 82% attended the second day (22nd October, 2021) of the program. The average attendance during the course was observed to be 85%.

Following the completion of theoretical and clinical-based course modules, the students were subjected to an online MCQ-based test for assessment of subject-matter acquisition. The MCQs designed catered to the course curriculum, which also tested their reasoning skills along with the subject-knowledge. Questions related to pedigree analysis were given special emphasis in the list of 40 questions, which needed to be solved in 1 hour duration. The assessment test was attempted by 68% (169 Nos) of the total number (250 Nos) of 1st year MBBS students. In the score of 0-10, the average score observed to be ~7.1. However, the maximum number of participating students (25 Nos) have successfully answered 95-100% of the questions.

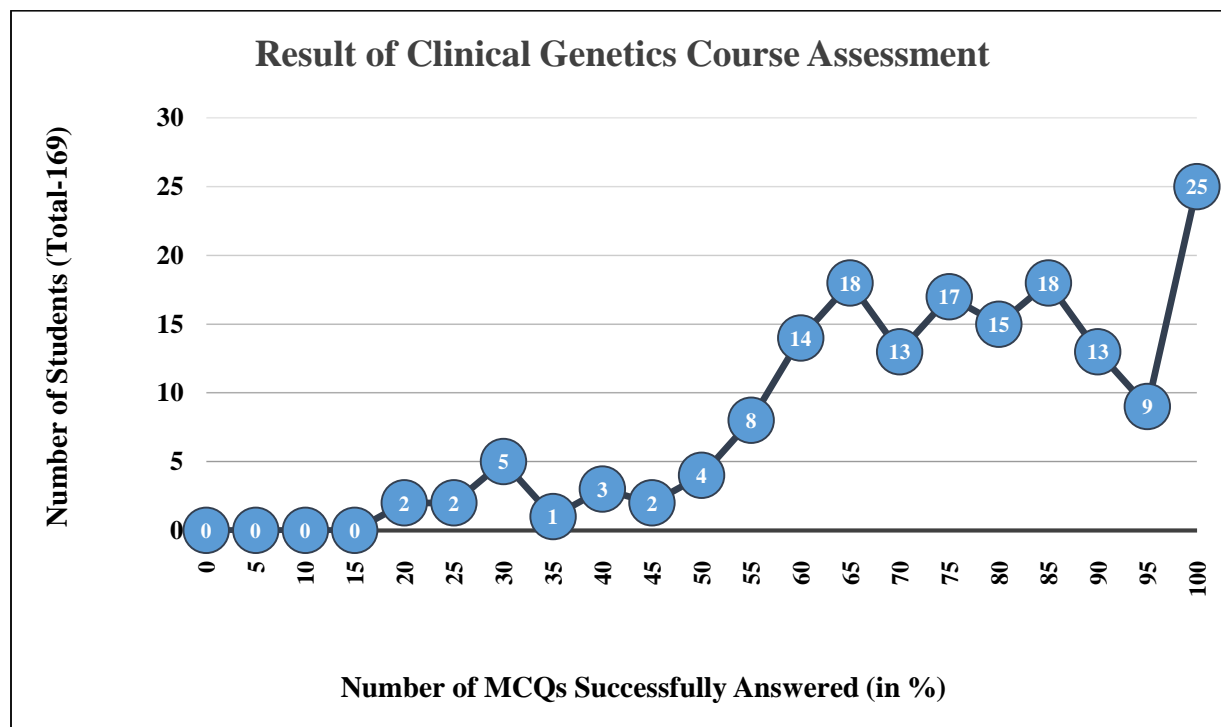


Figure: Result of the Clinical Genetics Course Assessment. A total number of 169 students appeared for the online assessment. The X-axis resembles the percentage of MCQs correctly answered by the students and the Y-axis depicts the number of students successfully answering the MCQs in the assessment.

Correct MCQ Answers (in %)	Number of Students
0 to 10	0
10 to 20	2
20 to 30	7
30 to 40	4
40 to 50	6
50 to 60	22
60 to 70	31
70 to 80	33
80 to 90	31
90 to 100	33

Table: Tabulated result of the Clinical Genetics course assessment, showing number of students correctly answering the respective proportion of MCQs. Greater number of students correctly answered more than 60% of the MCQs in the assessment

Concluding remark:

The response from the students was very good, which appeared from their interaction. The students showed great interest in the clinical module, where they interacted with the patient reporting to Ob-Gyn clinic and prepared pedigree charts by themselves. Basis their learning from theory sessions, the students tried analyzing it. From the output of the assessment test through MCQs, it may be assumed that similar programs in an extended manner would help the students greatly.

Schedule of Enrichment Course on Clinical Genetics:

20/ 10/ 2021 2:15 pm - 2:30 pm	Welcome Address - The Dean, Narayana Medical College		
20/ 10/ 2021 2:30 pm - 03:30 pm	Inaugural Address - Dr Subhabrata Chakrabarti Secretary, Indian Society of Human Genetics Associate Director (Research), LV Prasad Eye Institute, Hyderabad		
Enrichment Course – 21 st & 22 nd October, 2021			
Date & Time	Venue	Course Module/ Topic	Course Instructor
21/ 10/ 2021 08:30-09:30 am	Lecture Hall	Module 1/ Chromosomes	Dr L Hema Professor (Deptt of Anantomy)
21/ 10/ 2021 09:30-10:30 am	Lecture Hall	Module 1/ Patterns of Inheritance	Dr Biswa P Das Purkayastha Assoc. Professor (NTRIC)
21/ 10/ 2021 10:30-11:30 am	Lecture Hall	Module 1/ Patterns of Inheritance	Dr L Hema Professor (Deptt of Anantomy)
21/ 10/ 2021 11:30 am-1:30 pm	Lecture Hall	Module 2/ Chromosomal Aberrations	Dr L Hema Professor (Deptt of Anantomy)
21/ 10/ 2021 1:30-2:30 pm	Lunch Break		
21/ 10/ 2021 2:30-3:30 pm	Lecture Hall	Module 2/ Chromosomal Aberrations	Dr Biswa P Das Purkayastha Assoc. Professor (NTRIC)
21/ 10/ 2021 3:30-5:30 pm	Lecture Hall	Module 3/ Prenatal Diagnosis & Genetic Counselling	Dr Biswa P Das Purkayastha Assoc. Professor (NTRIC)
22/ 10/ 2021 08:00-09:00 am	Lecture Hall	Module 2/ Chromosomal Aberrations	Dr Biswa P Das Purkayastha Assoc. Professor (NTRIC)
22/ 10/ 2021 09:00-10:00 am	Lecture Hall	Module 4 & 5/ Prenatal Diagnostic techniques and Genetic Assessment and New Born Screening	Dr R Gokul Krishnan Assoc. Proff, (Deptt of Paediatrics)
22/ 10/ 2021 10:00 am-1:00 pm	Obg & Gyn Clinic	Module 6, 7 & 8/ Case studies, Pedigree analysis, Genetic Counselling	Dr S Lavanya &/or Team Proff & Head Department of Obstetrics & Gynaecology
22/ 10/ 2021 1:00-2:00 pm	Lunch Break		
22/ 10/ 2021 2:00-4:00 pm	Lecture Hall	Module 2/ Molecular Basis	Dr Biswa P Das Purkayastha Assoc. Professor (NTRIC)
22/ 10/ 2021 4:00-5:00 pm	Assessment		

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CLINICAL GENETICS

ENRICHMENT COURSE FOR 1ST YEAR MBBS STUDENTS

Conducted by Department of Anatomy and NTRIC
Narayana Medical College, Nellore, Andhra Pradesh

Inauguration: 20th October 2021

Course: 21st & 22nd October 2021

About the Course:

The word genetics originates from the Greek word, 'genetikos' meaning 'geni-tive'/'generative'. The approach towards diagnosis and treatment of diseases or disorders have changed drastically with the deeper understanding of the genetic material and its relationship to health and disease. Thus, human genetics has evolved as a branch of biology, involving the study of genes, genetic variations and heredity with emphasis on its implication on every facet of human being. The course provides an overview of this branch of biology, for igniting interest into the young minds of budding and aspiring medical practitioners. The content has been organized in different modules encompassing both the theoretical and clinical aspects of the field.

Patron

Dr. Surya Prakash Rao
Professor & Dean
Narayana Medical College & Hospital
Nellore, Andhra Pradesh.

Resource Person

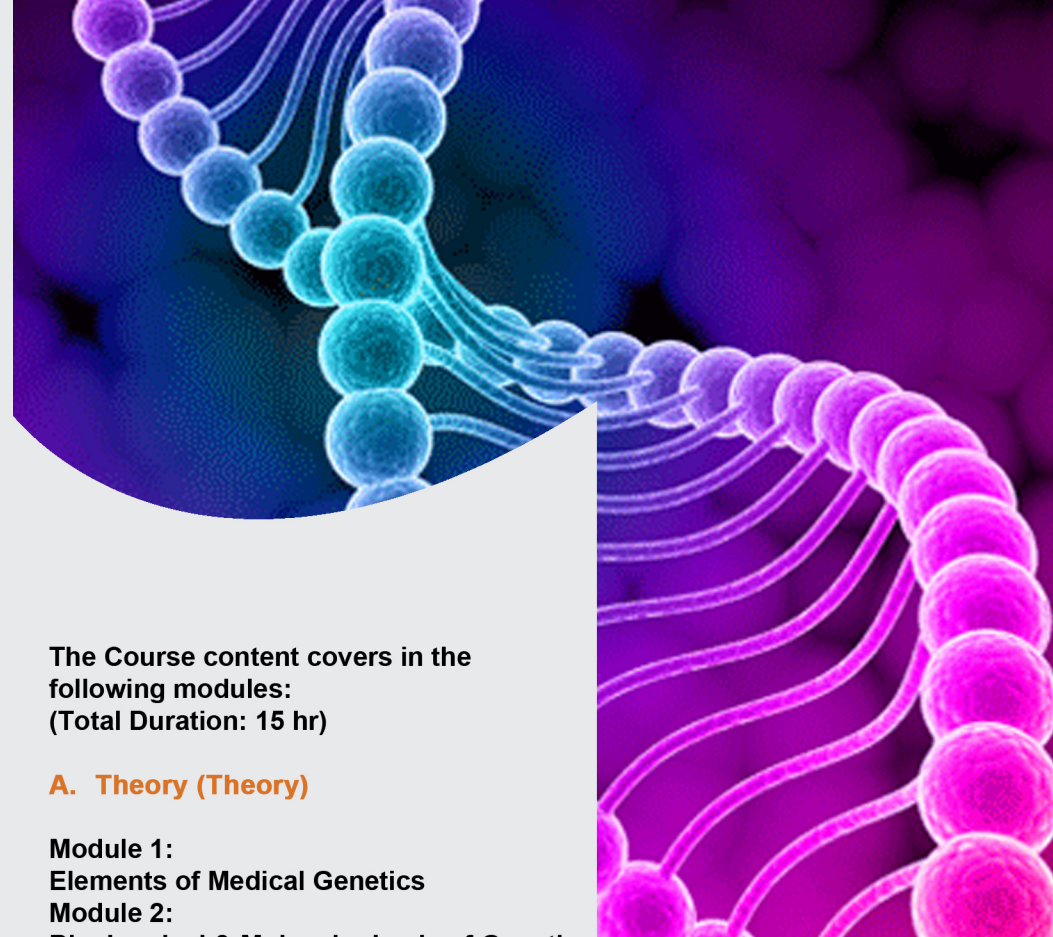
Dr. Biswa P Das Purkayastha
Associate Professor
NTRIC, Narayana Medical College
Nellore, Andhra Pradesh.

Dr. K. Ashalatha
Professor & Head
Deptt of Anatomy, Narayana Medical College
Nellore, Andhra Pradesh.

Dr. L Hema
Professor
Deptt of Anatomy, Narayana Medical College
Nellore, Andhra Pradesh.

Dr. S Lavanya
Professor & Head
Deptt of Obstetrics & Gynaecology, Narayana Medical College
Nellore, Andhra Pradesh.

Dr. R Gokul Krishnan
Associate Professor
Deptt of Paediatrics, Narayana Medical College
Nellore, Andhra Pradesh.



The Course content covers in the following modules:
(Total Duration: 15 hr)

A. Theory (Theory)

Module 1:
Elements of Medical Genetics
Module 2:
Biochemical & Molecular basis of Genetic
Module 3:
Prenatal Diagnosis & Genetic Counselling

B. Clinical (On site)

Module 4: Prenatal Diagnostic Techniques
Module 5: Genetic Assessment and Newborn screening
Module 6: Pedigree Chart Drawing
Module 7: Case Studies (Clinical evaluation, Pedigree analysis & Risk assessment)
Module 8: Psychological assessment and Genetic Counselling

