SOCIETY FOR INDIAN ACADEMY OF MEDICAL GENETICS

Building a Healthier Tomorrow with Genetic Insights and Research

# SIAMG Prenatal Genetics Fellowship

# Program name: SIAMG Prenatal Genetics Short term fellowship

1. Motivation: This fellowship is intended to train fetal medicine practitioners in aspects of genetics relevant to their practice. As a significant proportion of conditions affecting the fetus have an underlying genetic basis, recognition of these disorders enables appropriate counseling of couples and facilitates reproductive decision making. Maternal fetal medicine residency programs in other countries involve genetics as part of their curriculum, and practitioners from our country would also benefit from similar training.

# 2. Program objectives:

- 1. To train fetal medicine practitioners in basic and clinical aspects of genetics
- 2. To empower fetal medicine colleagues to guide patients towards appropriate genetic evaluation with aim to detect and manage pregnancies affected with genetic diseases
- **3.** To train obstetric and fetal medicine colleagues in recognition of clinical scenarios necessitating a genetic workup and/or referral
- **4.** To train the professionals in pre and post-test counseling as required for performance of prenatal screening and other basic genetic tests
- **5.** To collaborate with professional bodies dedicated to fetal medicine and prenatal diagnosis, in order to develop standard practice guidelines for genetic screening and diagnosis

#### Program duration: 12 weeks

**Host Institution:** Medical Genetics centres with facilities for teaching, clinical and laboratory training in the domain of prenatal genetics

**Eligibility:** MD/MS in Obstetrics & Gynecology or MD Radiology or equivalent degree with certification in fetal medicine or at least 6 months experience in advanced fetal imaging.

Intake (number of students): 08 candidates per year in batches of 2 per quarter

**Mode of selection:** Online submission of applications and letter of motivation to the Secretary,SIAMG. Scoring of applications by SIAMG sub-committee, followed by telephonic interview. Assessment would be based on eligibility criteria, clinical and academic aptitude and motivation for joining the fellowship. Weightage to be given to candidates from academic institutions and government organisations.

# **Program highlights**

This fellowship program aims to provide practically applicable knowledge and learning experience in the field of prenatal genetics. This is inclusive of a teaching of basic genetics, practical genetics as applicable in the outpatient clinic, ultrasonography during pregnancy with the aim to diagnose fetal genetic diseases, invasive fetal sampling for genetic diagnosis, fetal post-mortem evaluation and a comprehensive laboratory genetics training as applicable to prenatal testing. This program would enable the trainees towards appropriate management of pregnancies complicated by fetal abnormalities, preconceptional counseling of couples for

primary prevention of genetic diseases, training of medical students under them, and forming a referral base for tertiary genetic centres.

**Program structure:** This is envisaged to be a comprehensive program covering clinical and laboratory training in the field.

- **A. Clinical training:** The candidates are expected to accompany the teaching faculty during clinical care of the patients and participate in bed-side learning. They are also expected to observe and assist(as per institute policies) in prenatal ultrasounds, invasive diagnosis procedures and fetal autopsies. They would also be observing and be involved in pre-and post test genetic counselling sessions.
- **B.** Laboratory training: The candidates would be observing genetic test experiments, report preparation and interpretation of findings through dedicated posting in laboratory.
- **C. Academic activities:** The candidates would be attending the academic sessions of the host institute. They would be expected to present o2 case discussions and o1 seminar during the duration of the fellowship. They would also be provided access to the online teaching module available on the SIAMG website.

# Learning objectives :

- 1. Experience on suspecting and diagnosing genetic disorders on ultrasound
- 2. Exposure to amniocentesis, chorionic villus sampling and other invasive fetal procedures
- 3. Learning to draw family tree and suspect genetic disorders in the clinic
- 4. Which genetic tests to order for an obstetric/gynaecological patient and when?
- 5. Reading, interpreting genetic tests reports and counselling of patient
- 6. Genetic counselling in preconceptional and prenatal period
- 7. Exposure to post-mortem evaluation of fetuses
- 8. ABCs of laboratory genetics karyotype and beyond
- 9. Screening for genetic disorders in pregnancy- old and new technologies: Test ordering, interpretation and counselling
- 10. Practical aspects of PNDT act, Ethical, legal and social issues as relevant to clinical care
- 11. Research in Prenatal Genetics: How to design proposals and guide students

S No	Broad categories	Topics to be covered	Day wise schedule
1.	Basic Genetics	<ul> <li>a. Mendelian disorders</li> <li>b. Chromosomal disorders and Cytogenetics</li> <li>c. Developmental genetics</li> <li>d. Embryology and Teratology</li> </ul>	<ul> <li>a. One theory class</li> <li>b. Practical exposure to search of teratology databases- print and online</li> </ul>
2.	Clinical Genetics	a. Family history and Pedigree analysis	a. Theory class/Bedside learning

# **Detailed Program Schedule and Curriculum**

		b. c. d.	Dysmorphology and Syndrome diagnosis Indications for genetic testing and prenatal diagnosis Pre-conceptional and Prenatal counselling	b. с.	Outpatient clinics with exposure to all relevant clinical scenarios especially related to obstetrics Participation in counselling sessions
3.	Antenatal ultrasonography in context of genetic evaluation	a. b. c.	Nuchal and early anomaly scan abnormalities- syndromic diagnosis and genetic evaluation Abnormalities on Targeted anomaly scan- syndromic diagnosis and genetic evaluation Approach to individual ultrasound abnormality w.r.t genetic diagnosis and testing	a. b. c.	Theory class/bedside learning Observation of ultrasounds in- house or through rotational postings with emphasis on genetic evaluation and syndrome diagnosis Preparation of ultrasound report w.r.t. counselling for abnormal ultrasound findings
4.	Invasive diagnosis – Indications and appropriate sample collection	a. b.	Amniocentesis- Indications, risks and adequate sample collection and transport Chorionic villus sampling- Indications, risks and adequate sample collection & transport	а. b. c.	Theory class/Bedside learning Observation (and assistance, as per institute policies) of invasive procedures Pre-test counseling
5.	Anueploidy screening- pre and post test counseling and report interpretation	а. b. c.	Maternal serum screening Ultrasonography markers for aneuploidy Non-invasive prenatal test	a. b. c. d.	Theory class /Bedside learning Pre and post test counseling Interpretation of serum screening reports Practical approach to counseling of high risk patients
6.	Laboratory genetics- test ordering and interpretation	a. b. c.	Cytogenetic techniques- Karyotype, FISH, MLPA, QF-PCR, Microarray Molecular genetics- PCR, Sanger sequencing, Next generation sequencing Biochemical genetics- HPLC, TLC, Enzyme assays	a. b. c. d.	Theory class/benchside teaching Observation of lab experiments Indications of test, ordering ,sample collection Complexities in interpretation of laboratory results in prenatal setting

				e.	Complexities in
					counseling during
					prenatal testing
7.	ELSI	a.	Psychosocial, ethical and	a.	Theory class/bedside
			legal aspects of prenatal		teaching
			genetics	b.	Participation in
		b.	Genetic counselling		counselling sessions
					and actual cases
					scenarios during
					outpatient clinics
8.	Fetal autopsies	a.	Indications and Technique	а.	Theory
			of fetal autopsy		class/benchside
		b.	Dysmorphology and		learning
			syndrome diagnosis in	b.	Observation (and
			fetuses		hands on experience
					as per institute
					policies) of performing
					autopsies
				с.	Observation of
					histopathology of fetal
					organs in
					collaboration with
					pathology department
9.	Research	a.	Introduction to clinical and		
	methodology		laboratory research	a.	Encouragement to
			methodologies		write a manuscript
		b.	Research in the field of		based on interesting
			prenatal genetics		cases observed during
10	Delevence in		Deputation concerning for		training
10.	Relevance in	a.	Population screening for	a. h	One theory class
	Public Realth	Ь	Birth defects provention	D.	carrier screening for
		D.	PNDT act		serieuc disorders III
		с. д	Constic education for		scepario
		u.			SCENARIO
			and other health		
			professionals		
8. 9.	Fetal autopsies Fetal autopsies Research methodology Relevance in Public Health	a. b. a. b. c. d.	Indications and Technique of fetal autopsy Dysmorphology and syndrome diagnosis in fetuses Introduction to clinical and laboratory research methodologies Research in the field of prenatal genetics Population screening for genetic disorders Birth defects prevention PNDT act Genetic education for laypersons, community and other health professionals	a. b. c. a. b.	and actual cases scenarios during outpatient clinics Theory class/benchside learning Observation (and hands on experience as per institute policies) of performing autopsies Observation of histopathology of fetal organs in collaboration with pathology department Encouragement to write a manuscript based on interesting cases observed during training One theory class Carrier screening for genetic disorders in actual outpatient scenario

**Fellowship amount:** The candidates would be provided a consolidated fellowship of Rs 50,000/ per month by SIAMG with support of industry.