Special Centre for Molecular Medicine

Molecular medicine is an emerging area within biomedical sciences that aims to understand the molecular determinants of health and disease with the ultimate goal of applying this knowledge for the prevention, diagnosis and treatment of diseases. The Special Centre for Molecular Medicine (SCMM) at JNU has pioneered research and education in this field in India and is imparting Ph.D. level training in this field. The centre aims to accomplish its goal through innovative and collaborative basic and clinical research programs and has initiated many collaborative research activities with reputed national and international medical research institutes.

The objective of SCMM is to foster teaching and research activities in the study of human diseases using advanced tools of molecular and cell biology. SCMM conducts academic programs for the training of young scientists (clinical and non-clinical) who are keen to pursue a career in basic medical research. The academic programs have been designed for non-clinical biologists/chemists, with sufficient knowledge to deal with medical problems, to enable them to deliver product/processes to society and clinicians with a basic clinical degree, who understand modern biology and chemistry at the molecular level to enable them to apply this knowledge to drug development. For successful implementation of these objectives, SCMM offers the following programs of study.

To encourage students from basic sciences and medical graduates, the centre offers Ph.D. Programs in Molecular Medicine and is pursuing teaching & research activities in the following thrust areas:

1. Metabolic disorders such as cardiovascular diseases, role of iron in insulin resistance related pathogenesis, neurodegenerative disorders like Parkinson and Alzheimer diseases, and endocrine-related cancers.
2. Nuclear receptors in health and diseases: to study underlying molecular mechanisms of nuclear receptors functions with specific reference to PXR, RXR, CAR, SHP. Involvement of PXR in drug metabolism and hepatic cancer.
3. Diseases associated with cell-cell junctions and modulation of cell-cell junctions by pathogens.
4. Infectious and non-infectious diseases: hepatitis C, Leishmaniasis, Helicobacter pathogenesis, Candidiasis, Inflammatory Bowel Disease, Pathobiology of innate immune dysfunction, DNA replication and cell cycle regulation of medically important pathogens: Helicobacter pyroli and Plasmodium falciparum, application of codon-shuffling against Mycobacterium tuberculosis and Plasmodium falciparum, Mycobacterium tuberculosis and drug resistance.
5. Chemical biology, radiation biology and cell signaling; development of novel synthetic methodology for drug development and study of their mechanism of action based on genomics and proteomics against radiotherapy; cancer; development of antibiotics for gyrase resistant strains targeting topoisomerase 1A gene in bacteria.
6. Synthetic organic chemistry: Synthesis of biologically active heterocycles using novel methodology with transition metal catalyst.
7. Designing /Discovering codon shuffled de-novo peptide/protein inhibitors against essential/crucial proteins of pathogens. To study crucial host-pathogen interactions by designing codon shuffled de-novo peptide/protein inhibitors. Synthesis and selection of novel drug like de-novo peptide binders by codon shuffling method that may inhibit crucial host-pathogen interactions in Malaria and Tuberculosis diseases.
8. Diagnostics and medical proteomics, and mass spectrometry based metabolomics.

Selected students will have the option to choose their research area depending on their merit/aptitude and according to the vacancy available.

SCMM also offers **M.Sc. Programme in Molecular Medicine**. The goal of this program is to train students in modern areas and techniques of cell, molecular biology and organic chemistry in relation to human health and disease and the subsequent application of this training to identify new targets for the diagnosis and therapy of different diseases. The completion of the Human Genome project and various other genomes including pathogenic organisms has opened new opportunities for the understanding of the molecular mechanisms of diseases both from the host as well as pathogen's perspectives. Students will be trained to use the tools of modern biology including bioinformatics so as to understand, retrieve and exploit the wealth of information provided in the Genome projects to design modern and personalized medicines.

PROGRAMMES OFSTUDY

(i) Admission to Ph.D. Programme in "Molecular Medicine"

Students holding an M.Sc. degree in Biological Sciences/Chemical Sciences froma recognized institution as well as medical graduates who have an interest in basicsciences and are willing to pursueresearchasacareer are encouragedtoapply, subject to the condition that the candidate fulfils the eligibility criteria of UGC Regulations 2016.

Admission procedure: Candidates appearing for above program will be selected through a JNU entrance examination followed by an interview of short listed candidates.

Entrance test would involve MCQ with two parts, A and B. Part A would contain questions on research methodology (50%) and Part B will be subject-specific (biological /chemical science i.e. 50%). **Candidates need to obtain minimum prescribed marks i.e. 50% marks, for eligibility. The eligible students would be short-listed and invited for interview.**

(ii)M.Sc.Programmein "MolecularMedicine"

Duration

The duration of the academic program leading to the award of M.Sc degree in 'Molecular Medicine' shall be for a period off our semesters (two Monsoon Semesters and two Winter Semesters) with a compulsory requirement for submission of a research-based dissertation at the end of the Winter Semester of the 2nd year .

M.Sc.Programme

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility
1	Centre for Molecular Medicine (SCMM)	Molecular Medicine-CMMM (233)	Bachelor's degree in any branch of Basic or Applied Sciences (including MBBS/ BVSc./B.Pharm) from recognized Universities and Institutes with at least 55% marks.

Ph.D. Programme

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility
1	Centre for Molecular Medicine (SCMM)	Molecular Medicine- CMMH (905)	Only those candidates shall be considered for Admission to the Ph.D. programme, who have either -- (a) Obtained masters degree or equivalent from recognized University /institution in any branch of biological sciences /chemical sciences with at least 55% marks or equivalent Grade 'B' in UGC 7-point scale (or an equivalent Grade in a point scale wherever Grading system is followed). **OR** (b) Obtained MBBS/M.Pharm./M.VSc/MD degree with at least 55% marks (during 2013 or later) from a recognized University/Institution OR Candidates with M.Tech. degree with at least 55% marks in Biological/Chemical Sciences . **OR** (c) obtained 2 years M.Phil Degree with at least 55% marks of a recognized University/Institution (with dissertation/seminar/viva) or one year M.Phil with 55% marks with additional one year research experience of a recognized University/Institution and one publication and relevant Master's Degree with 55% marks or equivalent Grade 'B' in UGC 7-point scale (or an equivalent Grade in a point scale wherever Grading system is followed). Relaxation to SC/ST/OBC (Non creamy layer)/Differently abled as per the UGC Regulations 2016.