A MASTER'S PROGRAM IN BIOTECH FROM THE MASTERS OF THE FIELD

STUDY REAL BIOTECHNOLOGY WITH REAL BIOTECHNOLOGISTS

DISCOVERIES FOR A BETTER TOMORROW

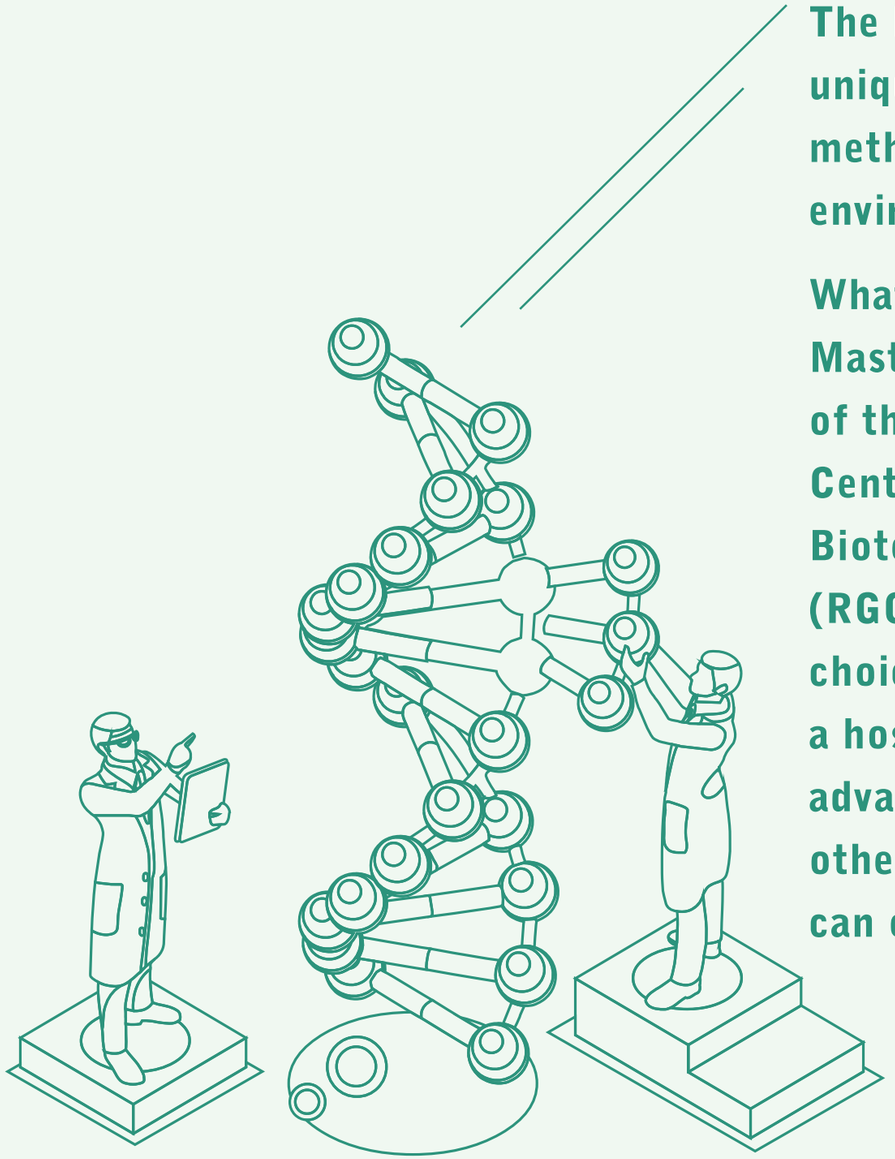
Find the right path towards a promising career in Biotechnology with a Master's Program from the Rajiv Gandhi Centre for Biotechnology (RGCB), India's foremost institute in the field. Learn from the experts and arm yourself with the knowledge and skills required to meet the rising demand for highly skilled people in this rapidly growing sector.

Read on to find out more.

THE RIGHT COURSE

The best mentors, unique teaching methods, inspiring environs...

What makes the Master's Program of the Rajiv Gandhi Centre for Biotechnology (RGCB) the best choice for you is a host of advantages that no other institution can offer.



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One-of-its-kind:

RGCB's two-year post baccalaureate degree is a research based teaching program that combines the disciplines of Biochemistry, Cell biology Molecular biology, Genomics, Proteomics, Microbiology and Immunology as well as application of Computer Science to Biology (Bioinformatics) along with principles of design and engineering in biological systems.

Designed by experts:

The unique course structure has been designed in consultation with clinical, agricultural and industrial experts to give students cutting-edge knowledge and practical skills. Working under the mentorship and supervision of highly accomplished scientists, students will gain extensive research experience through research based teaching in top-notch laboratories, hands-on computer modelling, internship in industry or medical institutions and carrying out a full semester research project.

Learn from real scientists:

The program includes lectures, seminars and laboratory-based teaching by scientists who do exciting high-end research. Also guiding you will be the best of teachers from the medical and scientific education system as well as professionals from the biotechnology and pharmaceutical industry.

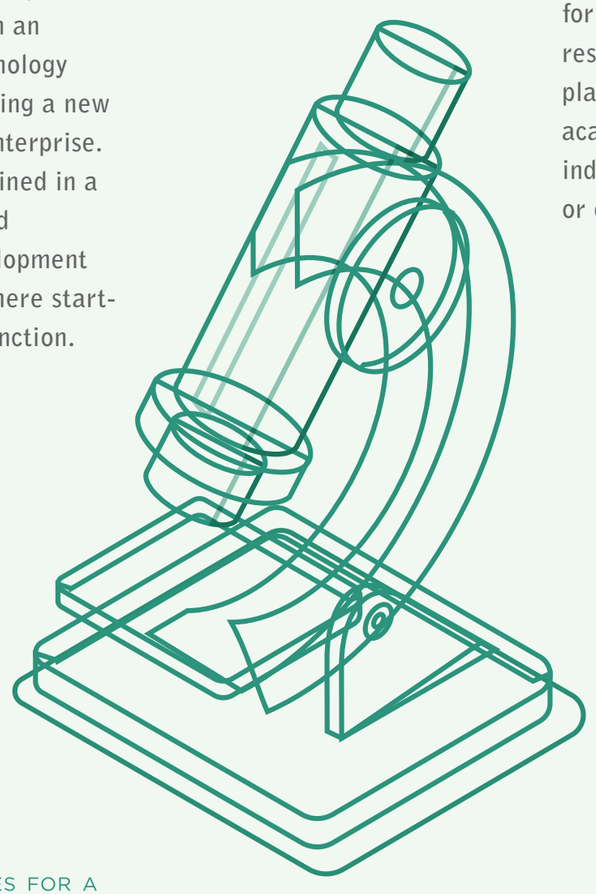
A career beyond the lab:

The program will introduce students to the concepts of "Enterprise and Entrepreneurship"- thus allowing them to pursue a career beyond the laboratory in an existing biotechnology industry or starting a new biotechnology enterprise. Students get trained in a real business and technology development bio-incubator where start-up companies function.

An inspiring curriculum:

Dry-lab exercises, foundation courses in ethical, legal and regulatory aspects of biotechnology

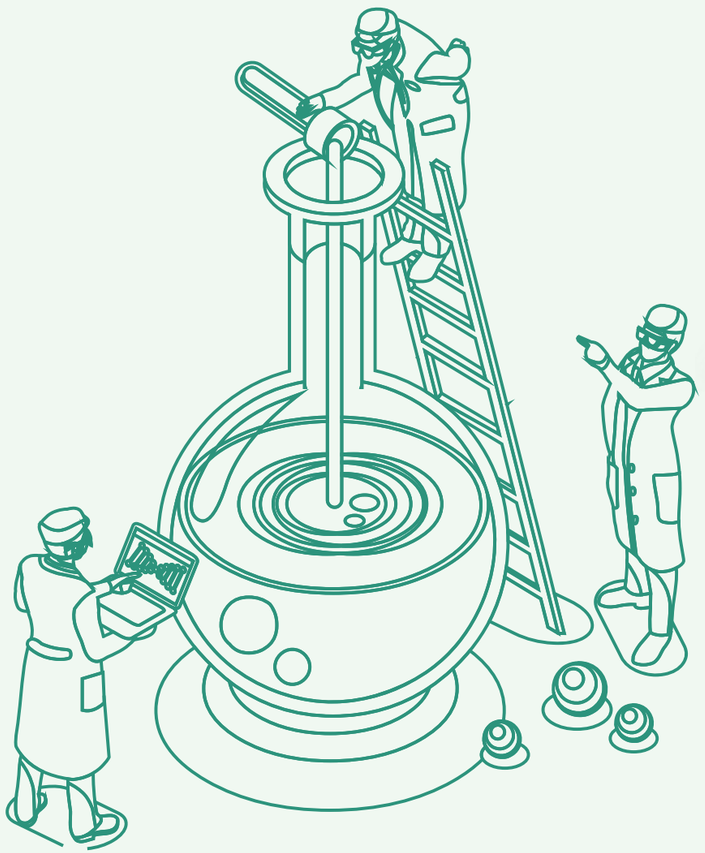
applications, regular seminars, journal clubs, scientific retreats... the program has been designed to make learning an inspiring experience and arm the students for a career in further research or important placements in academic, clinical, industrial, agricultural or commercial sectors.



DISCOVERIES FOR A BETTER TOMORROW

THE RIGHT PLACE

An autonomous National Institute of the Government of India's Department of Biotechnology, the Rajiv Gandhi Centre for Biotechnology (RGCB) today plays a key role in the country's rapidly evolving engagement with Biotechnology, Life sciences and Bio medical research.



DISCOVERIES FOR A BETTER TOMORROW

A pioneer in biotechnology:

Since its inception in 1990, RGCB has played a key role in the research and development of biotechnology. It has contributed much to understanding disease biology and processing this knowledge for better management and design of potential therapeutics.

Opening fertile learning environments:

A distinct feature of RGCB is its collaborative and interdisciplinary approach to everything it does. This apart, the three campuses of the Centre, with cutting-edge infrastructure and an inspiring ambience, provide an ideal and fertile teaching atmosphere for students as well as postdoctoral trainees.

Bettering lives:

RGCB provides services to the judiciary and criminal justice systems with DNA fingerprinting & DNA Barcoding for identification of plants, animals, unidentified bodies and paternity disputes. It also provides state-of-the-art molecular diagnostics for viral diseases, cancer markers and risk markers for cardiovascular & genetic diseases.

Degree from the best:

RGCB's MSc program is affiliated to the Regional Centre for Biotechnology, an 'Institution of National Importance' providing education, training and research established through an Act of Parliament by the Department of Biotechnology, Government of India under the auspices of the United Nations Educational, Scientific and Cultural Organization or UNESCO, a specialized agency of the United Nations (UN) based in Paris.

GROWTH SPACES

RGCB currently functions from three campuses.

Main campus at Thiruvananthapuram: Where the bulk of discovery research programs are implemented.

BioNest at Kochi: Designed to provide infrastructure and scientific support to enable researchers become entrepreneurs. It offers incubation space for individual companies backed up by a state-of-the-art plug-and-play laboratory.

The Bio Innovation Centre (BIC) where RGCB's R&D programs on Pathogen Biology, Cancer Research and the nation's only NABL and NABH accrediated molecular diagnostic facilities are located.

THE BEST STREAMS.

RGCB offers three specialised post-graduate programs that allow developing an understanding of the molecular and cellular basis of life and its applications to health, diagnostics or plant science.

MASTER OF SCIENCE IN BIOTECHNOLOGY — Specialization in Disease Biology

MASTER OF SCIENCE IN BIOTECHNOLOGY — Specialization in Molecular Plant Sciences

MASTER OF SCIENCE IN BIOTECHNOLOGY — Specialization in Molecular Diagnostics and DNA Profiling

DISCOVERIES FOR A BETTER TOMORROW

MASTER OF SCIENCE IN BIOTECHNOLOGY

Specialization in Disease Biology

Biosciences research has a huge impact in helping people live longer and healthier lives. With the World Economic Forum identifying healthcare as one of the top 10 Global Challenges for 2030, there is a growing demand for specialists in this field. This course provides you with an understanding of the molecular basis of biological systems and focuses on applying this knowledge to improve human health and disease, food biosecurity and sustainable technology based application.

- RGCB's MSc Biotechnology program with specialization in disease biology is unique and one of a kind in India.
- In the first two semesters, there is comprehensive teaching and training in the fundamental sciences associated with cell molecular biology, genetic engineering, biochemistry, microbiology, immunology, bioinformatics, genomics and proteomics.
- In the third semester, there are intensive courses for understanding of human diseases and the potential use of such knowledge for preservation of human health. A detailed understanding of the molecular mechanisms of disease biology will form a rational basis for improved disease prevention.
- This is carried out by theory and laboratory teaching through the third and fourth semesters that will also include a carefully selected dissertation done with one of the many accomplished scientists at RGCB. There will be continuous seminars, quiz programs, debates and scientific retreats on contemporary topics by the students during the 3rd and 4th semesters.
- This goal can only be reached by performing high-quality scientific research that is based on the most advanced methodology available. While medical students develop very good background in structure and function of the human body as well as methods of diagnosis and treatment, they often face difficulty in formulating research questions in the context of modern biology on a structured hands-on laboratory platform to tackle molecular research questions.
- RGCB's MSc Biotechnology students specializing in disease biology will become ideally positioned by their training to take up this research challenge. This will create more demand for them in the best PhD programs in biomedical research as well as ensure attractive jobs in the biotechnology, pharmaceutical and health industry.

MASTER OF SCIENCE IN BIOTECHNOLOGY

Specialization in Molecular Plant Sciences

Life on Earth depends on solar energy captured by plants - they are the base of most food webs and the platform for functioning of all major ecosystems. Plants release the oxygen that we breathe. Plants convert solar energy into chemical energy, providing us with food and renewable energy sources as well as raw materials for many industries. Plants use intricate systems for growth, development, transport and metabolism to cope with adverse environmental conditions, but also have considerable capacity to adapt genetically to both biotic and abiotic factors. An understanding of the mechanisms that underlie these features is of fundamental importance for all biological disciplines.

Nothing can describe the importance of studying plant science better than reading a landmark article – " The Importance of Plants" published in a 1944 issue of Science (Vol 100, 2603; pp 440-443, 1944). These delightful narrations written 7 decades ago by William J Robbins, then Director of the New York Botanical Garden & Professor of Botany at Columbia University, will inspire and motivate any prospective student of plant science.

DISCOVERIES FOR A BETTER TOMORROW

PLANTS - THE BASIS OF LIFE

"Plants are the basis upon which all other life depends. In the last analysis, they supply us with all the food we eat, they maintain the oxygen content of the air and they are the primary source of those important necessary foods, the vitamins. Without plants, we would starve to death, die of suffocation and expire from a combination of deficiency diseases. In addition, plants are the chief means by which the energy of the sun is and has been in ages past caught and stored for us in usable form. Without plants, fire would be unknown because there would be no wood or coal or petroleum to burn, and electricity - except as a natural phenomenon – would be at most limited to areas freely supplied with waterpower".

The study of plants played a major part in the development of our knowledge of cells and the formulation of the cell theory. Cells were first described by Robert Hooke in 1665 from charcoal, cork and other plant tissues. The discovery of the nucleus is generally ascribed to the botanist Robert Brown, who made his announcement in 1831. The credit for the first careful description of cell division goes to the botanist Hugo von Mohl, who introduced the term protoplasm in its present sense. Chromosomes were figured by the botanist, Anton Schneider, in 1873 and first adequately described by Strassburger in 1875

PLANTS AND RESEARCH IN SCIENCE

"Botany", said Thomas Jefferson, "I rank with the most valuable sciences whether we consider its subjects as furnishing the principal substances of life to man and beast, delicious varieties for our tables, refreshments from our orchards, the adornment of our flower-borders, shade and perfume of our groves, materials for our buildings or medicaments for our bodies".

Jefferson wrote these words in 1814. Priestley had but recently demonstrated that plants produce oxygen; the uniqueness and importance of photosynthesis was still to be recognized; coal and petroleum were still to be developed; vitamins and amino acids, the relation of plants to them and their importance in animal nutrition were unknown; rubber was a plaything; the relation of bacteria and molds to disease and decay was still to be discovered and penicillin was a long way in the future.

Thomas Jefferson estimated the importance of plants on the basis of the knowledge available about them in 1814. What would he have said today?

RGCB's MSc Biotechnology program with specialization in Molecular Plant Sciences is unique and one of a kind in India.

The Molecular Plant Science program extends over four semesters. This includes didactic lectures, seminars and laboratory-based teaching by scientists who do exciting and high-end research, the best of teachers from the agriculture education system and professionals from the plant biotechnology industry.

In the first two semesters, there is comprehensive teaching and training in the fundamental sciences associated with cell & molecular biology, genetic engineering, biochemistry, microbiology, immunology bioinformatics, genomics and proteomics.

There will also be dry lab exercises where students learn on their own computer, design of experiments in molecular biology as well as fundamentals of computational modeling, structural biology, data analysis from proteomics platforms, genomic sequencing & genomic analysis and microarray analysis as well principles of statistical analysis on software platforms.

The program includes foundation courses in ethical, legal and regulatory aspects of biotechnology applications.

Students will be part of regular seminars and journal clubs. They will learn the importance of correct reading & scrutiny of scientific publications, critical analysis of manuscripts rejected for publications to realize the reasons behind this and the art of writing manuscripts and grant proposals.

Students, once in 6 months, will get to go on a scientific retreat where there will be invited talks and one-to-one formal interactions between students and faculty.

In the third semester, there are intensive courses for understanding of molecular plant sciences designed to address some of the critical global challenges of the 21st century including crop improvement, food security, renewable energy, climate change, protecting biodiversity and improving global health.

This is carried out by theory and laboratory teaching through the third and fourth semesters that will also include a carefully selected 8-month duration dissertation done with one of the many accomplished scientists at RGCB. There will be continuous seminars, quiz programs and debates on contemporary topics by the students during the 3rd and 4th semesters.

RGCB's MSc Molecular Plant Science graduates can continue with the best of PhD programs in India and abroad or move directly into a career. MSc Plant Science graduates can also take on a wide variety of possible jobs including positions in horticulture & plant breeding, nurseries, biotech & seed industry, greenhouses, plant research & development, food & plant production, plant based biotechnology, phytomedicines and nutraceuticals and much more.

MASTER OF SCIENCE IN BIOTECHNOLOGY

Specialization in Molecular Diagnostics and DNA Profiling

Molecular Diagnostics is an emerging platform that has gained wide acceptance due to the outcome of the fruitful interplay among laboratory medicine, genomics knowledge and emerging genetic engineering technology, resulting in faster and accurate diagnostic support. Strict adherence to evidence based medical practice has opened new avenues in molecular medicine-based diagnostics in both infectious and non-infectious diseases. DNA fingerprints have been used to identify individuals in criminal cases, cases of disputed parentage and victims or warfare or accidents. DNA fingerprints are also used for identifying pathogens including viruses, bacteria and parasites. Individual plants, animals, fungus or alga and their progeny may be traced using DNA fingerprints. DNA barcodes, on the other hand, use short DNA sequences that are present in all plants, animals, microbes or viruses, in order to identify individual species. Hence the key to protecting life on earth may be barcoding it.

- Very often, there cannot be a definitive clinical diagnosis without the assistance of molecular diagnostic tests or a criminal case or missing person or paternity disputes resolved without DNA fingerprinting. DNA based testing is therefore acknowledged as the gold standard in molecular based testing for disease and molecular forensics.
- Having adequate exposure and theoretical background will generate professionals capable of planning, executing and troubleshooting advanced molecular diagnostic aids in health care and judicial systems.
- RGCB's MSc Biotechnology program with specialization in Molecular Diagnostics and DNA Profiling is unique and one of a kind in India.
- In the first two semesters, there is comprehensive teaching and training in the fundamental sciences associated with cell and molecular biology, genetic engineering, biochemistry, microbiology, immunology bioinformatics, genomics and proteomics.
- The 3rd and 4th semester will empower the students with advanced knowledge in various diagnostic platforms, using molecular techniques and provides an opportunity to understand molecular diagnostics for viral and chronic diseases or DNA profiling for solving human identification, resolving paternity disputes, use of DNA barcodes to identify protected wildlife and in the identification of different plant species. Hands-on training using state-of-the art machinery and latest techniques used in diagnostics and DNA fingerprinting will be the highlight of these semesters.
- The 4th semester will in addition have a dissertation work, to be carried out at the Diagnostic and DNA Fingerprinting facilities of RGCB under the direct supervision of senior scientists. This is supplementary to regular seminars, presentations, and Problem-Based Learning (PBL) sessions.
- A Post-graduate Degree in MSc Biotechnology program with specialization in Molecular Diagnostics and DNA Profiling, will generate immediately employable workforce with minimal on-job training, which will make the degree holders highly desirable for employment by any institute catering to quality molecular diagnostic services, diagnostic kit manufacturers and function as technical support executives in the diagnostic marketing field as well as in molecular forensics laboratories in the government sector.
- Additionally, further research opportunities leading to a PhD in various domains of molecular based diagnostics will pave the way for applying for academic and research jobs as well as generating academic entrepreneurs in the field of medical diagnostics.

RGCB

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BETTER TOMORROW

Rajiv Gandhi Centre for Biotechnology (RGCB)
An Autonomous Institution of the Government of India
Ministry of Science and Technology
Deparment of Biotechnology

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DATES AND FIGURES TO REMEMBER

Fee details	Semester 1	Semester 2	Semester 3	Semester 4
One admission time fee	3500	--	--	--
Semester fees				
Tuition fees*	40000	40000	40000	40000
Medical Insurance	1000	1000	1000	1000
University application fee	5000	5000	5000	5000
Exam fee	500	500	500	500
Deposits (refundable)	10000	--	--	--
Hostel fees**				
Room rent	15000	15000	15000	15000
Mess fees***(veg)	20000	20000	20000	20000
Mess fees ***(non veg)	30000	30000	30000	30000

*SC/ST/PWD candidates will be exempted from payment of tuition fees. OBC and economically backward forward class will be entitled to fee concession as per Government of India rules.

**Hostel fees will not be applicable to day scholars

***Mess fees inclusive of standard breakfast, lunch, dinner as well as morning and evening tea. Extras not included.

STIPENDS

All students selected for the MSc program will be awarded the RGCB-DBT Masters Stipend. First year students will be awarded Rs 6000 per month and the second year students will be awarded Rs 8000 per month.

Intake for the current year:

- MSc Biotechnology (Disease Biology) = 15
- MSc Biotechnology (Molecular Plant Sciences) = 10
- MSc Biotechnology (Molecular Diagnostics and DNA Profiling) = 15

DATES TO REMEMBER

Opening of applications: May 2019

Entrance examination: June 14, 2019

Examination Centers: 16 centers across India

Commencement of classes: July 2019

Eligibility: Students with 60% aggregate marks (or an equivalent grade point average) in Bachelor's degree in any branch of Science, Engineering, or Medicine are eligible to be apply for admission. Students from the SC, ST, OBC (non-creamy layer), and PWD categories shall be given a relaxation of 5% aggregate marks. Students in the final year of their qualifying degree program are also eligible to apply provided that they produce a proof of having secured the required marks in their undergraduate degree program at the time of admission.

ADDRESS FOR COMMUNICATION

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