

Department of Biochemistry

FACULTY OF SCIENCE

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

VADODARA – 390 002

GUJARAT, INDIA



PROSPECTUS 2023-24

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Prof. C. Ratna Prabha

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Faculty of Science
The M S University of Baroda,
E-mail: cratna.prabha-biochem@msubaroda.ac.in
head-biochem@msubaroda.ac.in



Head's message:

Department of Biochemistry, established in 1955, is a pioneering Department in the country for Biochemistry teaching and research. The Department endeavors to produce competent Biochemistry professionals to meet the emerging needs of the society in academics, research and industry. Department of Biochemistry offers three academic programmes at present, M.Sc. in Biochemistry, M.Sc. in Medical Biotechnology and Ph.D. We welcome students who have keen interest in the “Actions and Reactions of Life” and want to find answers to many challenges therein.

About the Department

Department of Biochemistry was started as a part of the Department of Chemistry under the initiative of Dr. K. G. Naik in 1955. Under the leadership of Prof. C. V. Ramakrishnan, it grew into one of the major centres for research and post-graduate studies in Biochemistry and Nutrition. Department of Biochemistry takes pride in the strong research and development environment which has been a hallmark since its inception. Prominent research areas of the department include structural biology, protein engineering, protein folding and degradation, biosensors, cell death, metabolic engineering, soil microbes, plant growth, antibiotic resistance, and biofilm formation. The department is endeavoring to understand the mechanisms underlying various human diseases like Diabetes, Metabolic syndrome, Polycystic ovarian syndrome, Fragile-X syndrome, Cancer, Hypothyroidism, Huntington's disease, and to develop potential cures by exploring new chemical molecules, plant products and stem cells.

The Department offers two M.Sc. programmes, M.Sc. in Biochemistry and M. Sc. in Medical Biotechnology. The Department has more than 40 research scholars working in frontier areas of biochemical research. Research has been supported by Extra Mural Research Projects funding from various government funding agencies including DBT, DST, UGC, CSIR, SERB, GSBTM, BRNS, ICMR, NRDC and GUJCOST. We also have a few industry-sponsored projects. Department is connected with more than 45 scientists across the globe in terms of joint projects and collaborations. In last five years over 150 International peer reviewed research papers were published and cited by over 8000 researchers across the globe. Our teachers are members of several national and international scientific forums to peer review and judge the quality of projects submitted to various

funding agencies. Young scientists who are produced by the department are a matter of pride not only for the University but the nation as well.

Many national and international conferences, webinars and symposia have been organized in the last five years. Department has been conducting three lecture series in the names of 3 prominent professors who served the department, namely Prof. C.V. Ramakrishnan lecture series, Prof. Telang memorial lecture series and Prof. L.J. Parekh memorial lecture series. Several eminent international and national scientists have delivered lectures in these series over the years including Nobel laureates Dr. Venkatraman Ramakrishnan and Dr. Ada Yonath.

VISION AND MISSION

The K. G. Naik Memorial Department of Biochemistry is committed to impart knowledge in Biochemistry and allied sciences through excellent teaching and conduct quality research of international standards. All our academic programs have been designed with the solitary goal of attaining excellence. It is our mission to train competent professionals in Biochemistry with the knowledge and problem-solving skills required to address the emerging needs in academics, research, and industry. Invited lectures of our faculty in international scientific meetings and distant collaborations are a testimony of our success and we are constantly looking forward to outperforming ourselves in this area.

Courses Offered by the Department:

The department offers two M.Sc. programmes and a Ph.D. programme.

M.Sc. IN BIOCHEMISTRY

Level	Postgraduate
Duration of course	2 Years (Four Semesters)
Admission by Open test?	Yes
Sanctioned Intake	30
Regular /Part time	Regular
Grant in aid/Higher payment	Grant in aid (24) + Higher Payment (6)
Eligibility	B.Sc. with Life Sciences/ Chemical Sciences or allied subject. B. Pharm, B. Tech in Biotechnology with minimum 50% (General), 45% (SEBC), 47% (Physically handicapped) or Pass marks (SC/ST).

M.Sc. IN MEDICAL BIOTECHNOLOGY

Level	Postgraduate
Duration of course	2 Years (Four Semesters)
Admission by Open test?	Yes
Sanctioned Intake	24
Regular /Part time	Regular
Grant in aid/Higher payment	Higher payment
Eligibility	B.Sc. with Life Sciences/ Chemical Sciences or allied subject. B. Pharm, B. Tech in Biotechnology with minimum 50% (General), 45% (SEBC), 47% (Physically handicapped) or Pass marks (SC/ST).

COURSE STRUCTURE

M. Sc. in Biochemistry

	THEORY SEMESTER - I	CREDITS	Course Code
PAPER I	Basic Biochemistry	03	BCH2101C01
PAPER II	Protein Structure and Function & Basic Enzymology	03	BCH2102C02
PAPER III	Cell Biology	03	BCH2103C03
PAPER IV	Biophysical techniques and Biostatistics	04	BCH2104C04
PAPER V	Basic Molecular Biology	03	BCH2108C08
	Practical-I	09	BCH2106C06
	Viva (Internal)	01	BCH2107C07
	Total Credits	26	
	THEORY SEMESTER - II	CREDITS	Course Code
PAPER I	Metabolism I	03	BCH2201C08
PAPER II	Advance Cell Biology	03	BCH2202C09
PAPER III	Enzymology	02	BCH2209C16
PAPER IV	Basic Physiology	03	BCH2204C11
	Practical-II	09	BCH2206C13
	Viva (Internal)	01	BCH2207C14
	Seminar	01	BCH2208C15
	TOTAL CREDITS	22	
	THEORY SEMESTER - III	CREDITS	Course Code
PAPER I	Basic Immunology	03	BCH2301C01
PAPER II	Metabolism-II	03	BCH2302C02
PAPER III	Molecular Biology-II	03	BCH2303C03
PAPER IV	Endocrinology	03	BCH2304C04
PAPER V	Basic Pharmacology (Optional Paper- I)	03	BCH2308C08
PAPER V	Advanced Plant Biochemistry (Optional Paper- I)	03	BCH2309C08
PAPER V	Biochemical Toxicology (Optional Paper- I)	03	BCH2310C08
	Practical-III	09	BCH2305C05
	Viva (Internal)	01	BCH2306C06
	Seminar	01	BCH2307C07
	Total Credits	26	
	THEORY SEMESTER - IV	CREDITS	Course Code
PAPER I	Genetics	03	BCH2401C09
PAPER II	Genetic Engineering, Genomics and Bioinformatics	03	BCH2402C10
PAPER III	Biochemical basis of diseases (Optional Paper 1)	03	BCH2406C14

PAPER III	Microbial Adaptive Biology (Optional Paper I)	03	BCH2407C14
PAPER III	Structural Biology (Optional Paper- I)	03	BCH2408C14
PAPER IV	Neurochemistry (Optional Paper- II)	03	BCH2409C15
PAPER IV	Nutrition and Developmental Biology (Optional Paper- II)	03	BCH2410C15
	Practical -IV	04	BCH2403C11
	Viva (External)	01	BCH2404C12
	Project Work	06	BCH2405C13
	TOTAL CREDITS	23	

M.Sc. in Medical Biotechnology

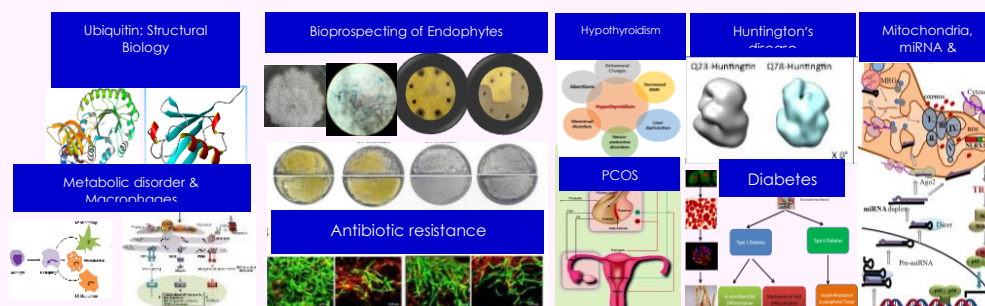
	THEORY SEMESTER - I	CREDITS	Course Code
PAPER I	Basic Biochemistry	03	MBT2101C01
PAPER II	Protein Structure and Function & Basic Enzymology	03	MBT2102C02
PAPER III	Cell Biology	03	MBT2103C03
PAPER IV	Biophysical techniques and Biostatistics	04	MBT2104C04
PAPER V	Basic Molecular Biology	03	MBT2108C08
	Practical-I	09	MBT2106C06
	Viva (Internal)	01	MBT2107C07
	Total Credits	26	
	THEORY SEMESTER - II	CREDITS	Course Code
PAPER I	Mammalian biochemistry	03	MBT2201C08
PAPER II	Advance Cell Biology	03	MBT2202C09
PAPER III	Enzymology	02	MBT2209C16
PAPER IV	Basic Physiology	03	MBT2204C11
	Practical-II	09	MBT2206C13
	Viva (Internal)	01	BCH2207C14
	Seminar	01	BCH2208C15
	TOTAL CREDITS	22	
	THEORY SEMESTER - III	CREDITS	Course Code
PAPER I	Infection and Immunity	03	MBT2301C01
PAPER II	Clinical Biochemistry and Ethical Aspects	03	MBT2302C02
PAPER III	Gene Expression and Modulation	03	MBT2303C03
PAPER IV	Hormone regulation and diseases	03	MBT2304C04
PAPER V	Medical Microbiology	03	MBT2305C05
	Practical-III	09	MBT2306C06
	Viva (Internal)	01	MBT2307C07
	Seminar	01	MBT2308C08
	Total Credits	26	
	THEORY SEMESTER - IV	CREDITS	Course Code
PAPER I	Human Genetics, Stem Cell and Regenerative Biology	03	MBT2401C09
PAPER II	Recombinant DNA Technology and Information Biology	03	MBT2402C10
PAPER III	Molecular Medicine	03	MBT2403C11
PAPER IV	Neurobiology and Neurological disorders (optional Paper I)	03	MBT2407C15
PAPER IV	Medicinal Drug Discovery and design (Optional Paper- I)	03	MBT2408C15
	Practical -IV	04	MBT2404C12
	Viva (External)	01	MBT2405C13
	Project Work	06	MBT2406C14
	Total Credits	23	

FACULTY MEMBERS OF THE DEPARTMENT

Prof. C. Ratna Prabha	Professor and Head
Prof. Pushpa Robin	Professor
Prof. Rajesh Singh	Professor
Dr. Shashikant Acharya	Associate Professor
Dr. Laxmipriya Nampoothiri	Associate Professor
Dr. Devesh Suthar	Assistant Professor
Dr. Ravi Vijayvargia	Assistant Professor
Dr. Sanjeev Upadhyay	Assistant Professor (UGC-FRP)

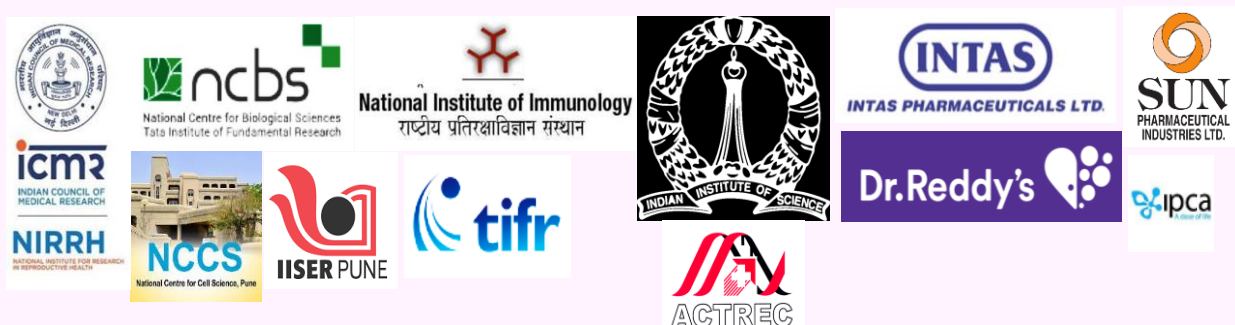
THRUST AREAS OF RESEARCH

- Structure of proteins of ubiquitination pathway, Pup proteasome system, Bap1 and Gal7 in relation to their functions, Biosensors and Nanobiotechnology
- Stress responses in plants
- Development of recombinant antibiotics
- Autophagy and cell death. mitochondrial metabolism and ubiquitin system
- Reproductive endocrinology and toxicology
- Applied microbial enzymology, cellulase microbiology and biochemistry
- Huntington's disease and therapeutic targets
- Metabolic engineering in yeast, bioprospecting of microbial endophytes and antibiotic resistance
- Metabolic disorders, neurodegeneration



Placement Profile of Students

- ❑ Top Biotech & Pharma companies such as Sun Pharma, Dr. Reddy's Laboratories, INTAS Pharmaceuticals, Aurobindo Pharma, IPCA Labs, etc.
- ❑ Leading research Institutes across the country, such as IISc, NCBS Bangalore, TIFR, ACTREC, Mumbai, NCCS, IISER-Pune, NII Delhi, etc.
- ❑ Ph.D. or Post-doctoral positions at leading universities in abroad countries such as USA, Canada, Germany, etc.



Facilities available at Department

- ❖ Seminar hall & 2 Lecture rooms equipped with LCD projectors
- ❖ Central instrumentation lab with high end equipment
- ❖ Well-equipped M. Sc. labs
- ❖ Department library facility
- ❖ Research Labs for every Faculty member
- ❖ Animal House facility
- ❖ Common area for students

Instruments available in Central Instrumentation room

- | | |
|--------------------------|----------------------------------|
| ❑ Digital Droplet PCR | ❑ Lyophilizer |
| ❑ Fluorescent Microscope | ❑ UV-visible Spectrophotometer |
| ❑ Multimode Reader | ❑ Fluorescence spectrophotometer |
| ❑ HPLC | ❑ Sonicator |
| ❑ Cell culture room | ❑ 2D-PAGE |

Instruments available in the Department



Droplet Digital PCR



Sonicator



Lyophilizer



Fluorescence Microscope



Multimode Reader

Events and activities of the Department

Distinguished speakers at *Prof. C. V. Ramakrishnan Lecture series 2021-22*

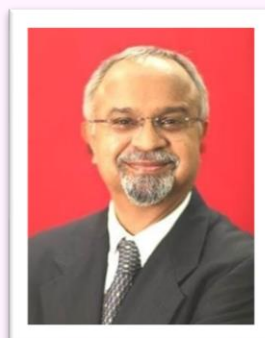


Dr. Venkatraman Ramakrishnan
(Nobel Laureate in Chemistry, 2009)
MRC Laboratory of Molecular Biology,
Cambridge Biomedical Campus, UK

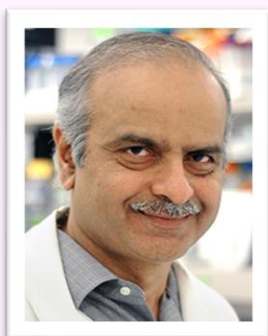
Distinguished speakers at the “*International Conference on “Celebrating Proteins on the Birth Centenary of Dr. G. N. Ramachandran” 3-4 March, 2023*”



Prof. Desirazu N. Rao
Department of Biochemistry,
IISc, Bangalore



Prof. Kini R. Manjunatha
Department of Pharmacology,
Yong Loo Lin School of Medicine,
NUS, Singapore



Prof. B. V. Venkataram Prasad
Department of Molecular Virology
and Microbiology, Baylor College
of Medicine, Houston, Texas, USA



Prof. Siddhartha P. Sarma
Molecular Biophysics Unit,
IISc, Bangalore

