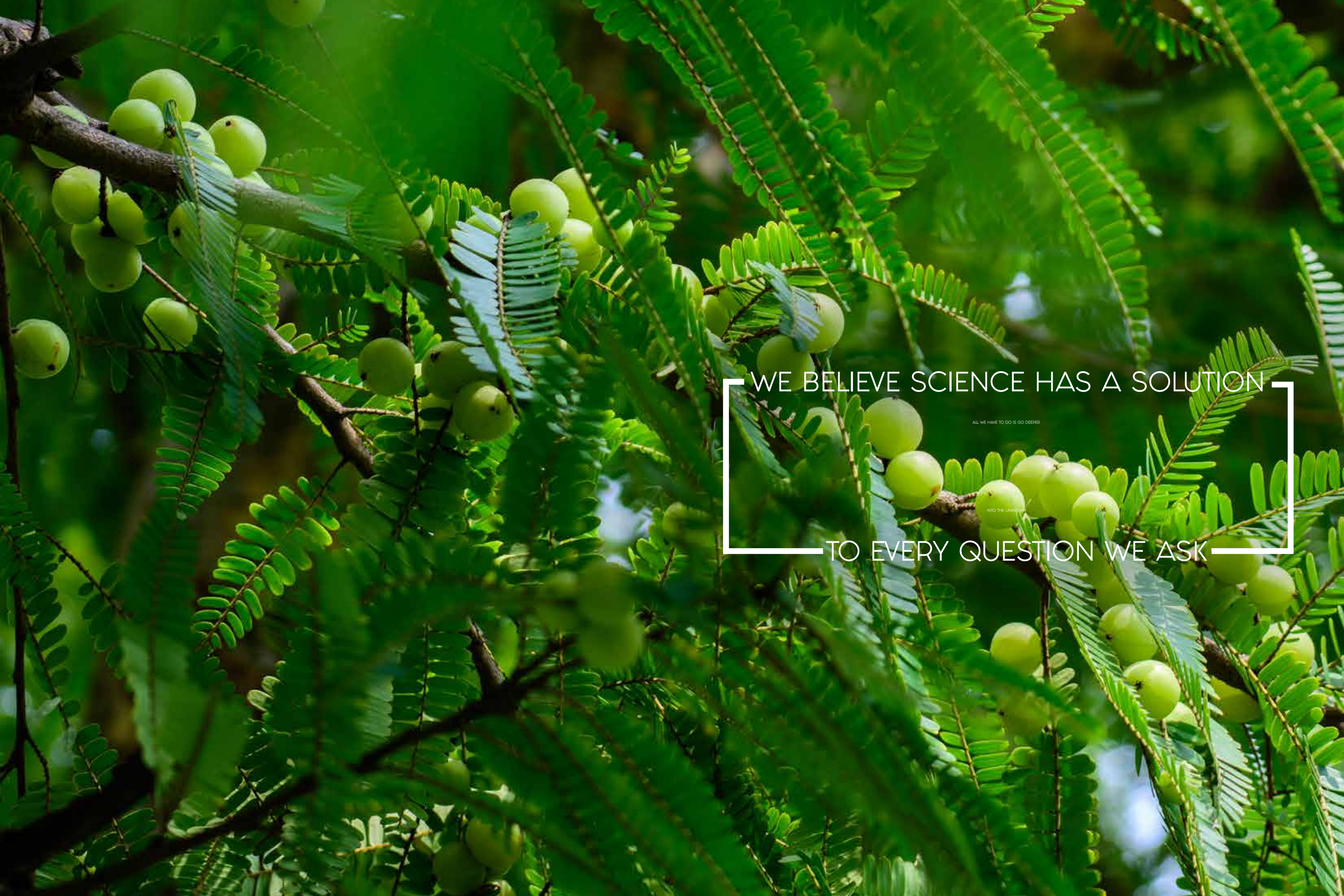
RGCB

DISCOVERIES FOR A BETTER TOMORROW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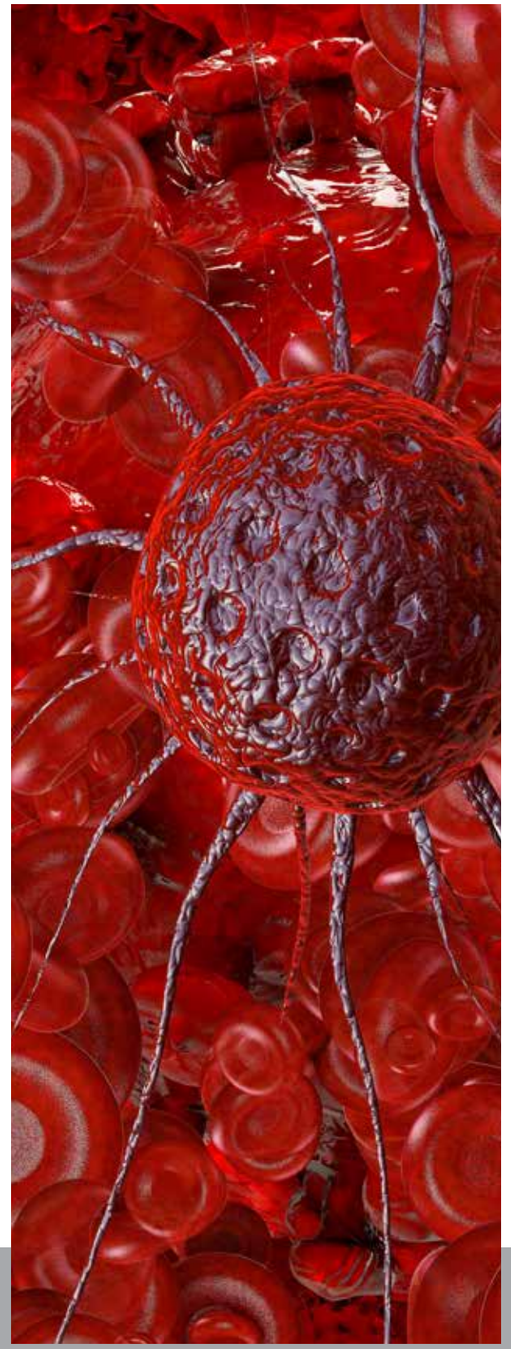
A NEW DAY.
A NEW DISCOVERY.

At Rajiv Gandhi Centre for Biotechnology (RGCB), our todays are committed to making discoveries that lead to a better tomorrow. RGCB prides itself for its innovative research that integrates theory, modelling, simulation, experimental and human science. Our research is focused on understanding disease biology, and processing this knowledge for better management and potential therapeutics.

The trademark feature of RGCB is the collaborative and interdisciplinary approach we bring to everything we do. All these facets of RGCB are evident in the myriad discoveries that we make. Turn the page to get a glimpse of some of our findings that are testaments to RGCB's single-mindedness in making the world a better place to live in. The bottom line is that we do not just report research, but actually live it.

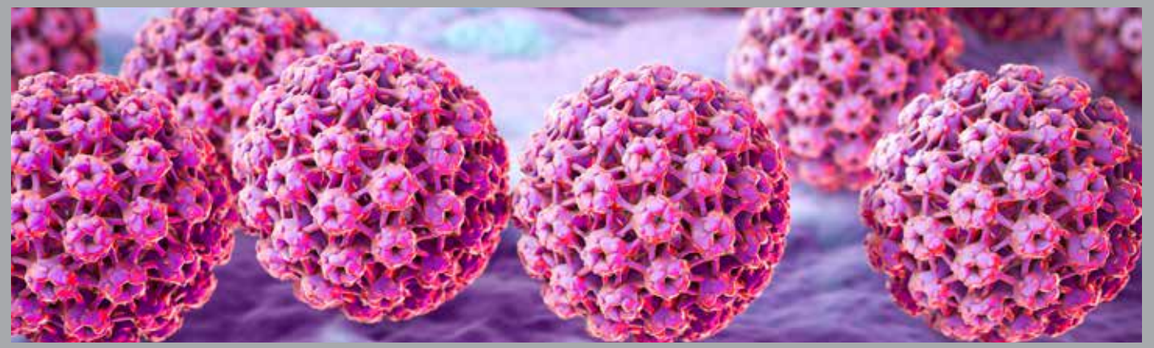


DISCOVERIES. ACHIEVEMENTS.

Since its founding, RGCB has received national and international recognition for leading discoveries in medical and plant biotechnology. Here are some achievements that have contributed to making RGCB one of the leading research centres in the country.

ON THE PATH TO CURING CANCER

RGCB was one of the eight labs in India responsible for designing of a drug called Disarib which induces death of cancer cells. 24 researchers from eight labs across the country came together for this tremendous breakthrough with contributions from Indian Scientists at University of Liverpool, UK. This collaborative effort produced the first home-grown targeted cancer therapy that does not set off any apparent side effects *(Biochem Pharmacol, 2016 Dec 15;122:10-22)*



SAVING OUR WOMEN FROM DEADLY CANCER

About 132,000 new cervical cancer cases are diagnosed annually in India with at least 74,000 deaths. This accounts for nearly one third of all cervical cancer deaths in the world. Prolonged infection by high-risk types of human papillomaviruses (HPV) causes cervical cancer. RGCB successfully analyzed immune responses in a clinical trial involving 20,000 girls, comparing two doses versus three doses of a HPV vaccine. Unequivocal evidence to use two doses separated by six months or more for vaccination of young girls was demonstrated. This has now become a WHO recommendation. *(Lancet Oncology 2016 Jan;17(1):67-77)*

UNRAVELLING THE GOODNESS OF GOOSEBERRY

In classical Ayurveda, the over 5000 year old Indian system of medicine, “Rasayanas” are best known as rejuvenators. The gooseberry (Phyllanthus emblica or Amalaki) is one such rejuvenating agent. In classical Ayurveda, the over 5000 year old Indian system of medicine, “Rasayanas” are best known as rejuvenators. The gooseberry *(Phyllanthus emblica or Amalaki)* is one such rejuvenating agent. RGCB delved into the secrets of Ayurveda to demonstrate how Amalaki Rasayana protects the heart from effects of ageing and pressure overload while also reversing changes in structure and function of heart in old age. *(Scientific Reports, 2017, 7: 8588, DOI:10.1038)*

GARGLE FOR PAIN RELIEF

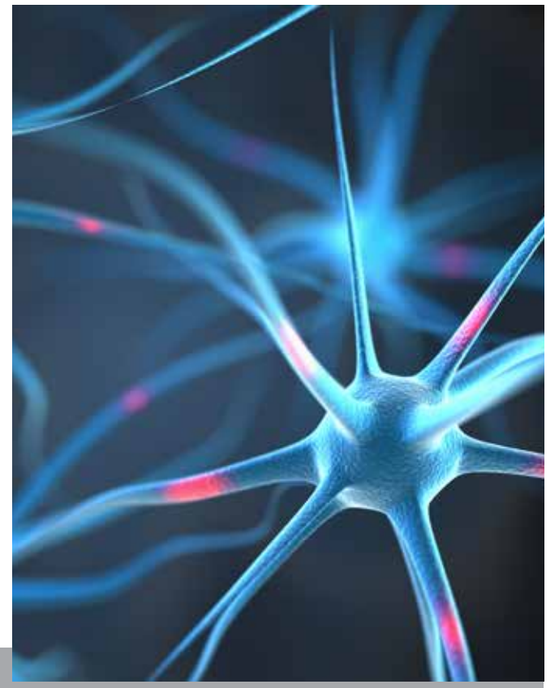
RGCB along with collaborators at the Cancer Centre developed and evaluated, in a clinical trial, the effectiveness of a mouthwash made from five herbal ingredients to show how it prevents severity of mucositis in oral cancer patients undergoing radiation therapy. *(International Journal of Radiation Oncology, 2013, 87; S143 – S144)*

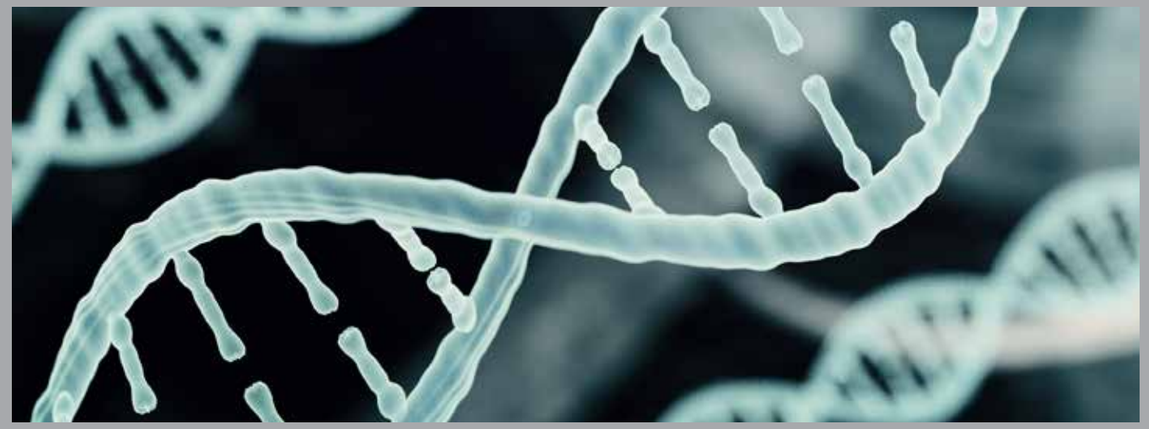
A BLOOD MARKER FOR VASCULAR DISEASE ASSOCIATED WITH DIABETES

RGCB discovered that a higher level of plasma cyclophilin A is an indicator for coronary artery disease in patients with diabetes. The importance of this discovery is that diabetes would be the seventh leading cause of death by 2030. Such patients have a four fold rise of atherosclerosis and upto eight fold rise of myocardial ischemia.
(Cardiovascular Diabetol 2014; 13: 38)

MAINTENANCE OF NEURAL STEM CELLS DURING DEVELOPMENT

Brain development requires continuous maintenance of neural stem cell pool from which neurons and other cells of the brain are generated. RGCB demonstrated with embryonic stem cell derived neural progenitors that Hes-1 expression can be regulated by alternate signalling pathways independent of canonical Notch signalling.
(Journal of Neurochemistry, 2010; 113: 807-818)





IMPROVING CELLULAR REPROGRAMMING

Changes at the DNA level of a cell were demonstrated during cellular reprogramming and that a molecule called APLF increased the pace and enhanced the efficiency of reprogramming by 20 times. *(Journal of Cell Science, 2016; 129, 4576-4591)*

A TREASURE TROVE OF DRUG DISCOVERY

RGCB discovered that the leaves of Aegle Marmelos or the Bael tree contains an enzyme that can catalyze biosynthesis of high therapeutic value compounds. These studies show that the plant is a natural bio-factory for new drug discovery.
(Journal of Biological Chemistry, 2013, 288: 7271-7281)

INTERPRETING TUBERCULOSIS

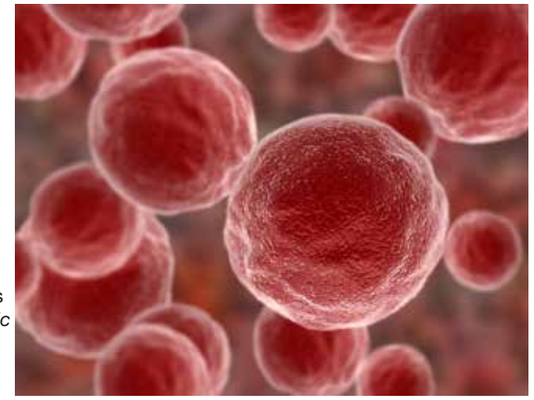
RGCB discovered how Mycobacterium tuberculosis uses acetylation of histones as a mechanism to suppress immune response.
(The FEBS Journal, 2016, 283; 265–281)

GRANDMA'S REMEDY WORKS:
TURMERIC DERIVED CURCUMIN PREVENTS CANCER IN HUMANS

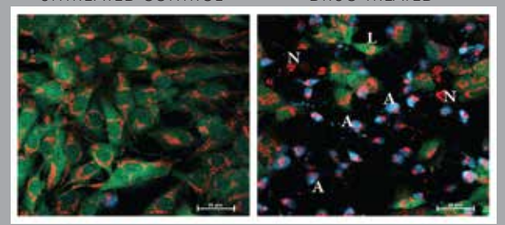
A clinical trial established oral curcumin derived from turmeric as an oral cancer chemopreventive agent. Combined clinical and histologic response assessment indicated a significantly better response with curcumin. The treatment also did not raise any safety concerns. Treatment of oral leukoplakia with curcumin thus was well tolerated and demonstrated significant and durable clinical response.
[Cancer Prevention Research 9(8)683-691, 2016].

HUNTING DOWN TUMOR CELLS THAT HIDE DURING SURGERY

Treatment outcome after surgery for oral cancer is often not optimal because we lack accurate methods to confirm if the entire tumor is removed. A method was developed to detect any such left over tumor cells in an animal model using a specially designed peptide attached to a colored dye. The sensitivity of the detection was so high that even lymph nodes that harbored dispersed tumor cells can be detected *[Scientific Reports, Nov 9; 6:36726, 2016].*



UNTREATED CONTROL DRUG TREATED



A- APOPTOTIC CELLS, N- NECROTIC CELLS, L-LIVE CELLS

LENDING COLOR TO FIGHT CANCER

An easy identification of potential cancer drugs using a sohisticated FRET based microscopy imaging by which cells can be seen changing colour from green to blue when tested compounds exhibit anti-cancer activity. This method can be used for screening large numbers of potential compounds in an easy and rapid manner. The approach is expected to accelerate cancer drug discovery efforts by pharmaceutical industries and academic institutions
(Cell Death Discovery 2017 Jan 23;3:16101)

A PREGNANCY HORMONE CAN IGNITE TUMOR DEVELOPMENT IN SUSCEPTIBLE BREAST TISSUE

Hereditary breast cancers harbor germline mutations in BRCA1 while in the sporadic breast cancers, the BRCA1-defect could arise from a functional deficiency of BRCA1 due to hyper-methylation of its promoter. Tumor progression in BRCA1 defective condition cannot be controlled by inhibiting estrogen receptors. A major reason for the aggressiveness and drug resistance in BRCA1 mutated breast cancers is the expression of β-hCG, which is a pregnancy hormone. Inhibiting β-hCG could prove to be an effective therapeutic strategy for chemotherapy in BRCA1 mutated breast cancer patients.
(Oncogenesis, 2017 Sep 4;6(9):e376; Journal of Proteome Research, 2017; DOI: 10.1021/acs.jproteome.7b00562).

A NATURAL PRODUCT AS DRUG CANDIDATE FOR LIVER CANCER

Uttroside B a natural compound isolated from the medicinal plant Solanum nigrum L showed specific anti tumor activity against liver cancer cells. In experimental systems it displayed exceptional anti cancer effects in liver cancer cell culture models comparable to sorafenib, the only FDA-approved drug for liver cancer. *[Scientific Reports, Nov 3; 6: 36318, 2016]*

PROTECTING THE KING OF SPICES

Kerala is known as spice country and black pepper is a king among spices. The production of pepper is severely limited due to a devastating quick wilt disease caused by a fungus called Phytophthora capsici. Using advanced molecular research strategies such as next generation sequencing, the first leaf transcriptome of black pepper was documented. Furthermore cloning and high throughput sequencing analysis led to the first large-scale characterization of micro RNA candidates that have significant regulatory role in black pepper. *(Frontiers in Plant Science; 2016 7:767. doi: 10.3389/fpls)*. Novel proteins were also discovered that are produced by the plant in response to fungal infection *(Frontiers in Plant Sciences; 2016 7:785. doi: 10.3389/fpls.2016.00785).*

GINGERS (ZINGIBERACEAE): CHANGING REPRODUCTIVE STRATEGY TO COMBAT SURVIVAL PRESSURES

Breeding behaviour, genetic diversity and response to the soft-rot pathogen Pythium in four species of ginger(Zingiberaceae) revealed that hemiclonals, the species with an intrinsic potential to reproduce by both sexual and asexual means, have remarkable survival potential. By following sexual reproduction, a hemiclonal generates new genetic variants by genetic recombination. They also expand an emerged adaptive variant clonally so as to evade the dilution effect imparted by genetic recombination. Species with hemiclonal potential may have a fair chance to survive ecological undulations *(Frontiers in Plant Science, 2016; 7:1913. doi:10.3389/fpls.2016.01913)*

FROG SKIN'S "DEATH KISS" FOR THE FLU VIRUS

No prince delivered here from this frog kiss, but a lethal weapon against a pathogen. Influenza, commonly known as "the flu," is an infectious disease caused by influenza viruses. Influenza normally spreads around the world in yearly outbreaks, resulting in up to three to five million cases of severe illness and upto 500,000 deaths. RGCB and Emory University, USA identified and characterized a peptide from the skin secretion of an endemic frog species found in Western Ghats that was shown to kill the Influenza virus by causing it to burst open. This candidate molecule now needs to be taken through pre clinical and development studies *(Immunity, 46: 2017, 587–595).*

RE-EMERGENCE OF SEVERE DENGUE: ARE NS1 PROTEIN MUTATIONS THE KEY?

Dengue is a tropical mosquito-borne disease that lack specific treatment and preventive vaccines. In patients with dengue there is a high level of a viral protein NS1 in the circulation, which is an early diagnostic marker for the disease. RGCB established complete genomes of two dengue virus isolates from Kerala and identified novel mutations in the NS1 protein. Whole genome sequencing identified key mutations in the NS1 protein wing domain which may affect NS1 secretion

(Infect Gen Evol, 2017, 52:34-43).

EPIGENETICS AND SCHIZOPHRENIA

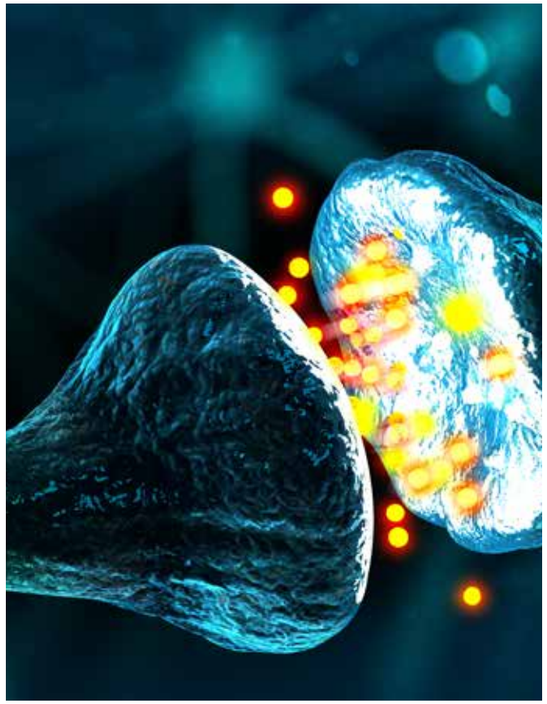
Schizophrenia is characterized by thoughts or experiences that seem out of touch with reality, disorganized speech or behavior and decreased participation in daily activities. Classes of genes called DNA methylransferases maintain methylation events. Genetic variants in DNA methyltransferases were themselves associated with schizophrenia, an important finding since these genes will determine the threshold of environmental insults *(PLoS One, 2014; 9(5):e98182).*

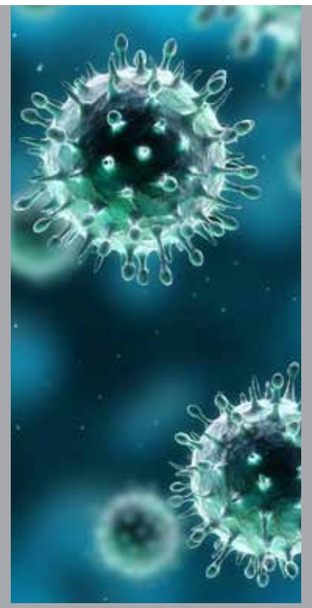
MUTATIONS IN AN IMPORTANT GENE CAN LEAD TO VARICOSE VEINS

Varicose veins are enlarged and twisted veins with an impaired blood flow. Complications of this disease range from throbbing pain and cramps to skin pigmentation and ulcers – affecting quality of life for many. RGCB analyzed 6350 patients with complications of varicose veins and found 85% of these patients have a strong family history. Analysis of the genetic basis of this disease led to the finding of key mutations in FoxC2 gene in patients with varicose veins *(PLoS ONE 2014; 9(3): e90682)*. Individuals carrying two or more of these mutations in FoxC2 gene had seven-fold higher risk to get varicose veins than others. Further studies demonstrated that arterial endothelial genes are highly expressed in affected veins *(Laboratory Investigation 2016; 96:399-408)*.

NEURONAL CALCIUM SIGNALING PROTEINS IN LEARNING AND MEMORY

Synaptic plasticity is a cellular mechanism underlying learning and memory. Among the protein molecules that participate in this phenomenon, the NMDA-type glutamate receptor (NMDAR) and calcium/calmodulin dependent protein kinase II (CaMKII) play important roles. NMDAR is an ion channel present on cell membrane that allows influx of calcium. The calcium signal activates CaMKII present inside the cell and causes it to translocate and bind to NMDAR. Crucial biochemical properties in CaMKII were shown *(Biochem. J., 2009, 419,p123-32)*. These changes in CaMKII make it capable of storing information in a stable manner with minimal expenditure of energy *(PLoS One 6. 2011, 3 e16495).*





H1N1: KEEPING PACE WITH A GLOBAL THREAT

Inuenza, commonly known as “the flu” is the most common recurring respiratory disease in humans. According to World Heath Organization each year, inuenza outbreaks affect 5-15% of the world’s population. Recent data *(Genome Announcements, 2017;5:e00598)* compared pandemic and post pandemic complete genome of H1N1 isolates from Kerala and identied key mutations in the HA protein receptor binding site which could lead to escape of the strain from host immune response mechanisms. Indeed effectiveness of current infuenza vaccination in elderly. Found only 50% sero-protection in these group of individuals.

ESTROGEN RECEPTOR CAN BE FAVORABLY MODULATED BY AN EXTRACT FROM POMEGRANATE

Selective estrogen receptor modulators (SERMs) are estrogen receptor (ER) ligands exhibiting tissue-specific agonistic or antagonistic bio-characteristics and used in hormonal therapy for estrogen-dependent breast cancers. The tissue-specific estrogenic and anti-estrogenic activity of extracts from pericarp of pomegranate (PME). Inhibited the binding of [^{3}H] estradiol to ER and suppressed the growth and proliferation of ER-positive breast cancer cells. After PME binds to ER, down-regulation of The transcription of estrogen-responsive reporter gene was seen along with selected estrogen-responsive genes. A significant finding was that unlike the commonly used approved drug tamoxifen, PME did not increase the uterine weight and proliferation and its cardio-protective effects were comparable to that of 17β-estradiol.
(Journal of Nutritional Biochemistry, 2012; 23, 725-32).

IDENTIFYING MECHANISMS INVOLVED IN ESTROGEN RECEPTOR ALPHA ACCELERATION OF TUMOR DEVELOPMENT AND ITS SIGNIFICANCE IN PREGNANCY.

Nuclear interactome (interacting proteins) analysis of ERα in an embryo implantation model revealed an association between a protein called “chicken tumor virus no. 10 regulator of kinase (CrkL) with ERα. By associating with estrogen receptor alpha, CrkL directly enhances its cancer causing potential. Thus, the molecular signaling set off by ERα and CrkL association may have a central role in both pregnancy and cancer, two events that share many parallels in growth, invasion, and immune tolerance.
(Molecular Endocrinology, 2011; 25(9)
: 1499 -1512)

INCREASING INCIDENCE OF TYPE 2 DIABETES MELLITUS IN YOUNG ADULTS

In India it is estimated that 70 million adults (age 20 years and above) have T2DM, which translates to approximately 1 in 12 adults. Along with increasing prevalence of type 2 diabetes, age of disease is falling and more and more young people (below the age of 45 years) are becoming diabetic patients, termed as Early Onset T2DM. Early onset T2DM is considered a distinct and more aggressive phenotype compared to usual onset T2DM. A recent study on a population aged 20 years and above showed that 48.4% of diabetic patients belong to early onset T2DM category. These early onset T2DM patients have adverse cardiovascular risk profiles poor glycemic control, microvascular and macrovascular complications compared with usual onset T2DM patients. *(Metabolic Syndrome and Related Disorders, 2017 Nov, 15(9),458-464)*

DEVELOPMENT OF NOVEL HERBAL FORMULATIONS AGAINST VIBRIO CHOLERAE BIOFILM

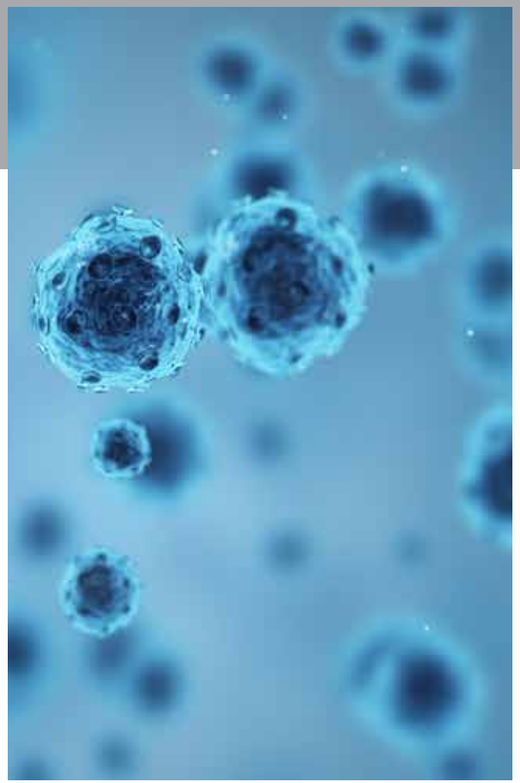
Vibrio cholerae, causative agent of the waterborne disease cholera, still threatens a large proportion of world's population. Novel multiple mutations in the topoisomerase gene of Haitian variant V.cholerae isolated from Kerala, were responsible for increased resistance against quinolone antibiotics *(Antimicrobial Agents & Chemotherapy, 2014, 58(8):4982-3).* Identification of safe and effective herbal compounds targeting the biofilm of V. cholerae would decrease the shedding of the organism to the environment, Effective anti-biofilm activities were evedent using Centella asiatica, Elephanto pusscaber, Camellia sinensis and Holarrhena antidysenterica The extracts down-regulated aph A and aph B, two major regulator genes modulating both virulence and biofilm formation. *(Journal of Food Protection, 2017 Oct 20:1933-1940).*

IN PURSUIT OF QUESTIONS

RGCB works towards asking the right questions and answering them to gain insightful and essential results. For this, state-of-the-art research programs are in place.

CARDIOVASCULAR DISEASES AND DIABETES BIOLOGY

This unique program at RGCB is designed to investigate molecular mechanisms involved in human cardiovascular diseases and diabetes to develop strategies for better diagnosis and therapy.



CANCER RESEARCH

Cancer research is RGCB's flagship program. It is currently led by 15 investigators to understand the fundamentals of cancer biology and to develop effective management strategies for cancer.

PATHOGEN BIOLOGY

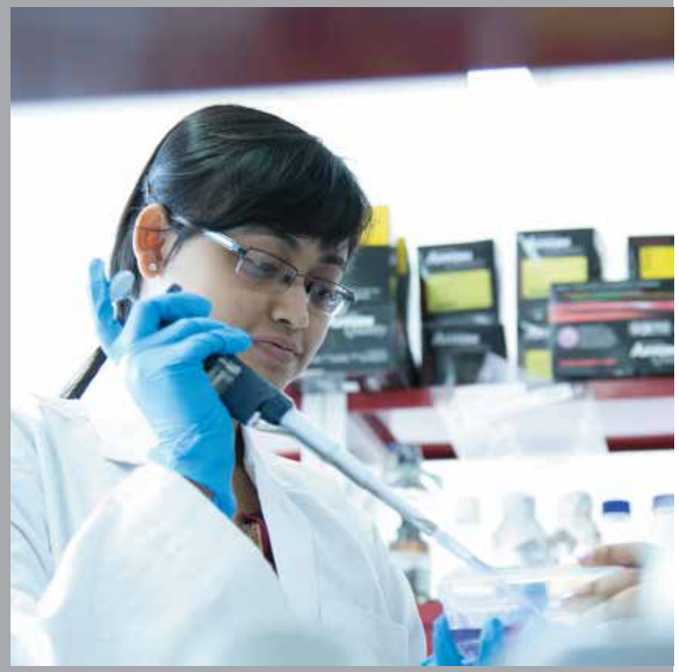
RGCB's Pathogen Biology program includes the study of infectious diseases in humans and animals, vector biology, identification and early-stage development of antimicrobial agents, antimicrobial drug resistance, population studies on distribution and transmission of infectious agents, infection biology and response to vaccines.

REGENERATIVE BIOLOGY

Regenerative Biology has two major goals. The first is to understand basic mechanisms by which tissues can be repaired and restored. The other aspect examines possibility of using this basic knowledge to medicine with the goal to clinically repair damaged tissues. RGCB'S regenerative biology program includes two major laboratories: Neuro-Stem Cells & Disease Biology and Stem Cells & Disease Models.

PLANT BIOTECHNOLOGY AND DISEASE BIOLOGY

RGCB's Plant Biotechnology & Disease Biology program has important research strategies in Spice Genomics as well as Metabolic and Molecular Biology of Medicinal Plants. The institute has a long and established track record in this specialized area of Plant Biotechnology that is critical to the local cash crop economy and the important industry of herbal medicine and Ayurveda.



INTERDISCIPLINARY BIOLOGY

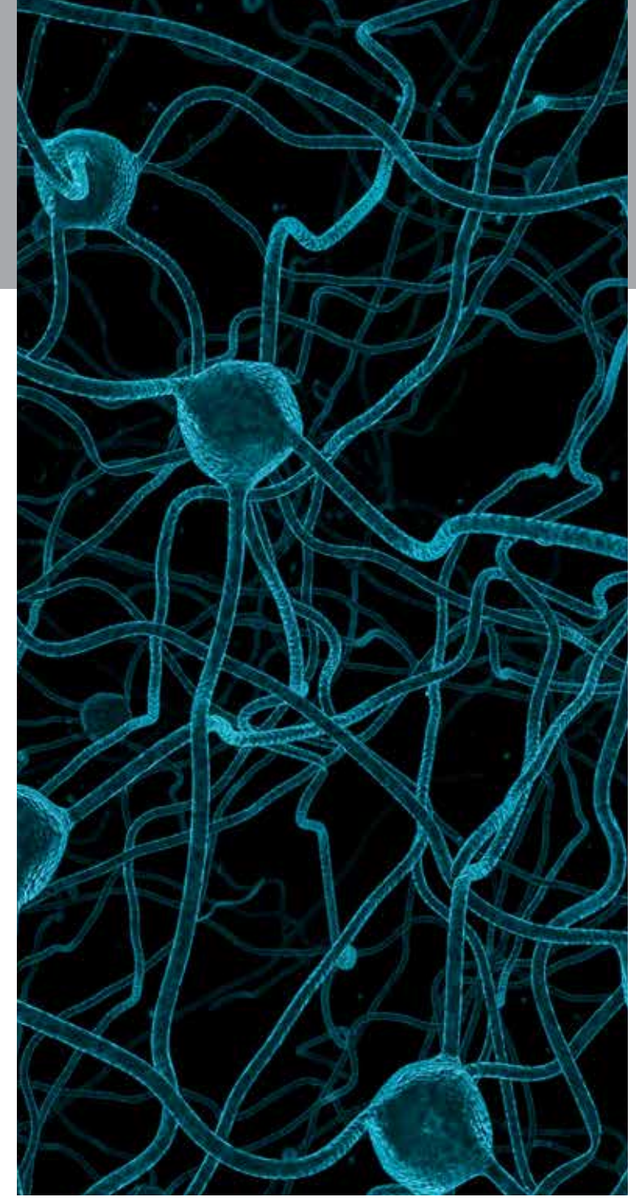
The ultimate goal for biology is to become a science that formulates understanding of subcellular, cellular and multicellular systems validated by rigorous principles of physical & chemical sciences and mathematics. RGCB's well-coordinated Interdisciplinary Biology Program is led by six teams from different horizons with the spirit to foster new collaborations within biological domains and across the usual disciplinary divide.

NEUROBIOLOGY

RGCB's Neurobiology Program includes two laboratories, one working on spatiotemporal patterns of molecular events responsible for diversity in functional outcomes of calcium signaling in neurons and the other investigates phenotypic effects of gene polymorphisms associated with neurodegenerative diseases.

REPRODUCTION BIOLOGY

RGCB has two laboratories working on Reproduction Biology. One works on germ cell development and differentiation in mammalian testis, exploring how genome integrity is preserved in germline stem cells and attempts to trans-differentiate such cells. The second laboratory focuses on understanding events crucial for successful pregnancy including uterine receptivity, adhesion, invasion, tissue remodeling and immune tolerance as well as role of polycystic ovarian disease and diabetes type 1 as factors involved in sub fertility.



IN SEARCH OF KNOWLEDGE

RGCB boasts up-to-date academic programs and activities including the graduate school, post doctoral training, core research facilities and award programs.

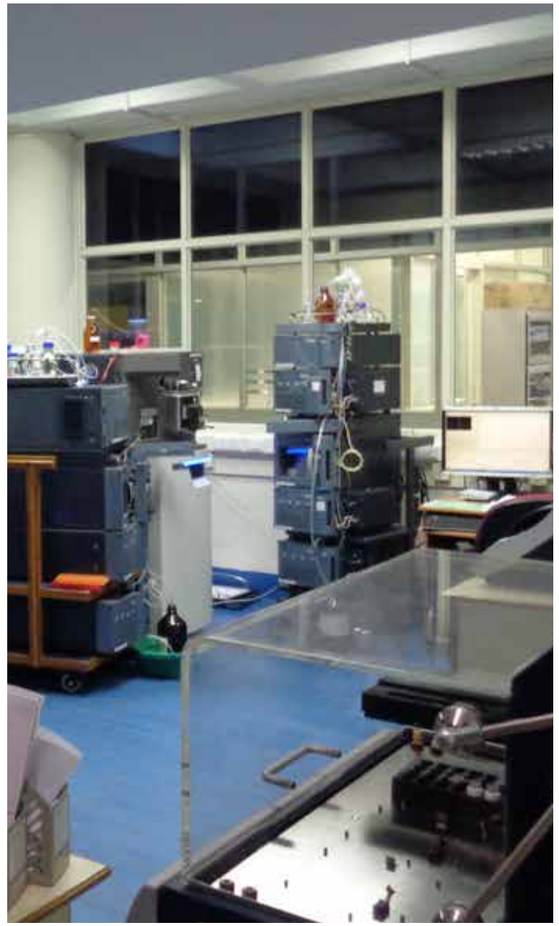
RGCB GRADUATE SCHOOL

RGCB's PhD program is one of the best and most competitive in the country. RGCB is also credited with an exclusive PhD in Translational Science & Medicine (TSM) designed to train candidates with terminal degrees in medicine, dentistry, veterinary sciences and pharmacy to become leaders of the next generation of translational science.

RGCB also has also another "first" among biotechnology institutes by offering a Biotechnology Skills Development Program where large number of graduate, post graduate, medical and engineering students train at RGCB in highly specialized and front line areas of Biotechnology methodology.

CORE RESEARCH FACILITIES

- ❖ Mass Spectrometry and Proteomic Core Facility
- ❖ Bio-imaging facility
- ❖ Genomics Facility
- ❖ Research Engineering Services
- ❖ Animal Research Facility
- ❖ Comprehensive Central Library



RGCB MERIT AWARDS FOR STUDENTS

Research Excellence Award for outgoing PhD students: This award will be given to any outgoing student for excellent overall performance in the PhD program and submit their thesis within 5 years. Performance is measured in terms of quality of publications in peer reviewed journals, international & national patents and best poster/paper awards at research conferences. The award includes a gold medal, a citation and a cash award of Rs. 25,000/-.

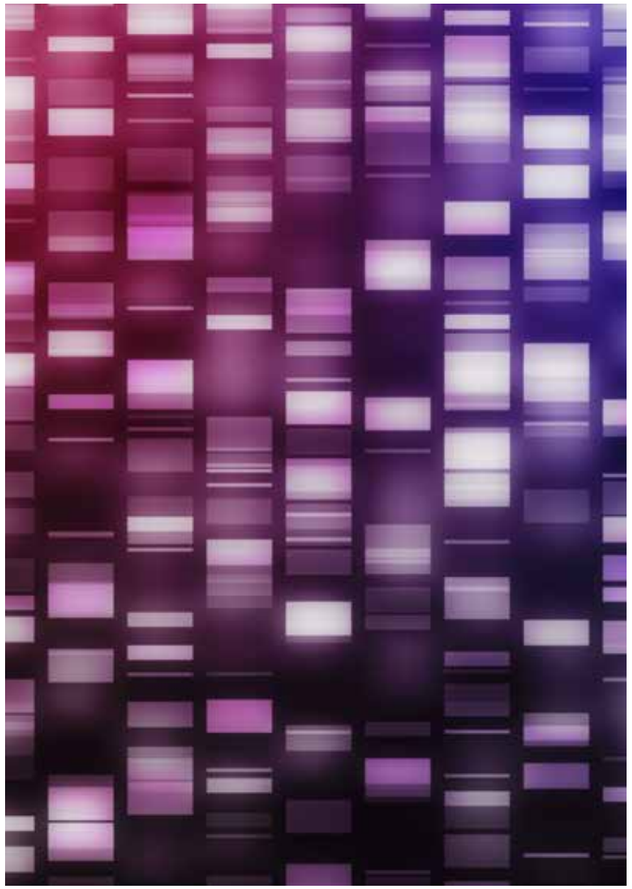
Merit award of the year: This will be a competitive award granted to the best research work presented by senior PhD students at an open competition held on RGCB Foundation Day. The award will be a citation and cash prize of Rupees 20,000/-

RGCB POST DOCTORAL TRAINING & YOUNG INVESTIGATOR AWARDS

RGCB provides Young Investigator Awards, to nurture outstanding young Post Doctoral Trainees with innovative ideas and pursuing research in frontier areas of Biotechnology.

TRANSLATING BIOTECHNOLOGY FOR THE PEOPLE

- ❖ Molecular Forensics and DNA technologies
- ❖ Laboratory Medicine and Molecular Diagnostics
- ❖ Research Consultancy Services and Molecular Platforms
- ❖ Medical Laboratory Services



BIONEST:

BIONEST is a biotechnology incubator to assist startup enterprises in accelerating development and commercialisation of new technologies. It also provides incubator space and state-of- the-art ‘plug and play’ laboratories.

SKY GREEN – IN TUNE WITH NATURE

RGCB has significant genetic engineering expertise with access to the most modern tools to re-design genetic assembly of plants and animals. However we only see this asset as tools in our armamentarium to fight diseases in plants, animals and humans, and not to come into conflict with nature. RGCB’s ‘Sky Green’ is an intensive terrace based organic gardening effort. We recognize the importance of providing to our staff and students safe, nutritious and environmentally friendly fruits and vegetables. Here it is all about gardening without using artificial or synthetic pesticides, insecticides, or fertilizers. RGCB works with nature, for nature and within nature, respecting every element of nature during organic gardening.

ART OF SUPPORTING SCIENCE
(ACCOUNTABILITY, RESPONSIBILITY, TRANSPARENCY)

ADMINISTRATIVE ART

Officers in administration and finance divisions have always the unenviable task of balancing demands of scientists who understandably seek extensive academic freedom with interpretation and enforcement of government mandates and procedures. The RGCB Administrative and Finance Divisions do this job with precision and skill. The results are there to see, reflected in growth of the institution and un-paralleled social benefits that the employees enjoy.

RESEARCH ENGINEERING ART

RGCB has a comprehensive engineering group, which performs installation, testing, maintenance, repair and calibration of instruments including IT infrastructure. This service extends its expertise to scientists in modifying or customizing instruments for specific scientific requirements, as well as design and fabrication of indigenous parts and modules to cater for diversifying requirements in biotechnology research

TECHNICAL SUPPORT ART

RGCB Technical Support team includes highly skilled and dedicated personnel providing essential support for biological, chemical, physical, computational and life science research. They do sampling, testing, measuring, recording, data mining and analyzing of results as part of a scientific team. These personnel manage core research facilities and equipment ensuring effective functioning, adhering to correct procedures and safety guidelines. Major facilities supported by the technical team include Mass Spectrometry & Proteomic Core, Animal Imagers, Confocal Laser Scanning Microscopes, High Speed Flow cytometer sorter systems, Super Resolution Microscope, Next generation genetic sequencing systems and Animal Research Facility

ACADEMIC AFFAIRS ART

The Office of Academic Affairs is responsible for all academic services; provides leadership in development of academic programs, policy formulation, program planning, and evaluation; keeps abreast of trends and changes in higher education; works for institutional vision, survival, stability, growth, and excellence; provides a connection between administration and faculty; serves as catalyst to create a climate conducive to scholarly research in an atmosphere committed to the mandates of the institute and the Department of Biotechnology. The Office of Academic Affairs is also responsible for supporting all academic programs of the institute, supporting RGCB faculty with planning and implementation of PhD student admissions, PhD course work, examinations, transcripts, etc. In addition to this, the Office of Academic Affairs conducts screening tests and examinations for selection of various project and institute personnel.

CATCHING THEM YOUNG

This is a unique pet project at RGCB for school students in 8th, 9th and 10th grades. Groups of students are selected from all over the state, given a scholarship and then allowed to do a three-month project at RGCB. All students then make presentations of their work and the top three teams get a citation and cash awards.

RGCB 2018-2021: MOVING FORWARD WITH TEAM DRIVEN SCIENCE

RGCB is establishing a new campus located close to major hospitals in the city. Located in a pristine vegetation covered hill top location, the campus will be the bio-innovation face of RGCB running distinct translational and clinical research programs for the country.

COMPREHENSIVE CANCER RESEARCH CENTRE INCLUSIVE OF :

- ❖ National Facility for Disease Models and Translational Sciences
- ❖ National Facility for Drug Target Design and Development
- ❖ RGCB Spin Off Companies and Bio Incubators
- ❖ Ideal blend of biologists, physician-scientists, engineers and technologists

RGCB – A NATIONAL HUB FOR DISEASE BIOLOGY AND BIOTECHNOLOGY

- ❖ Demonstration of true translation and application of basic science.
- ❖ Leading Biomarker based clinical trials.
- ❖ Discoveries with clinical impact (patents, formulations, technology transfer and follow up trials).
- ❖ Trusted partner in “Make In India” biotech efforts.
- ❖ Significant infrastructure.
- ❖ Significant contribution to development of biotech start ups – BIONEST INCUBATOR FACILITY
- ❖ Outstanding PhD and training programs
- ❖ Significant contribution to the society through public services.

KERALA –
GOD'S OWN COUNTRY

With its palm lined beaches, backwaters, network of canals and scenic hill stations, Kerala is also known for:

- ❖100% Primary school education
- ❖Highest Human Development Index of 0.712
- ❖Highest Life expectancy of 77 years
- ❖Highest sex ratio of 1084 women to 1000 men

THIRUVANANTHAPURAM –
A HUB FOR INNOVATIVE RESEARCH

The capital city of Kerala is home to several noted research institutions. In addition to RGCB, Thiruvananthapuram has the National Institute for Interdisciplinary Sciences & Technology (CSIR-NIIST), Vikram Sarabhai Space Centre (VSSC), Sree Chitra Thirunal Institute of Medical Sciences and Technology (SCTIMST), Regional Cancer Centre (RCC), Indian Institute of Space Technology (IIST), Indian Institute for Science, Education & Research (IISER), Centre for Earth Science Studies (CESS), Jawaharlal Nehru Tropical Botanical Gardens Research Institute (JNTB-GRI), Agency for Non-Conventional Energy Rural Technology (ANERT), and National Transportation Planning & Research Centre (NATPAC). It is truly the appropriate place for a state-of- the-art research centre to call home.

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