RGCB

RGCB
DISCOVERIES FOR A BETTER TOMORROW
MAY 2019
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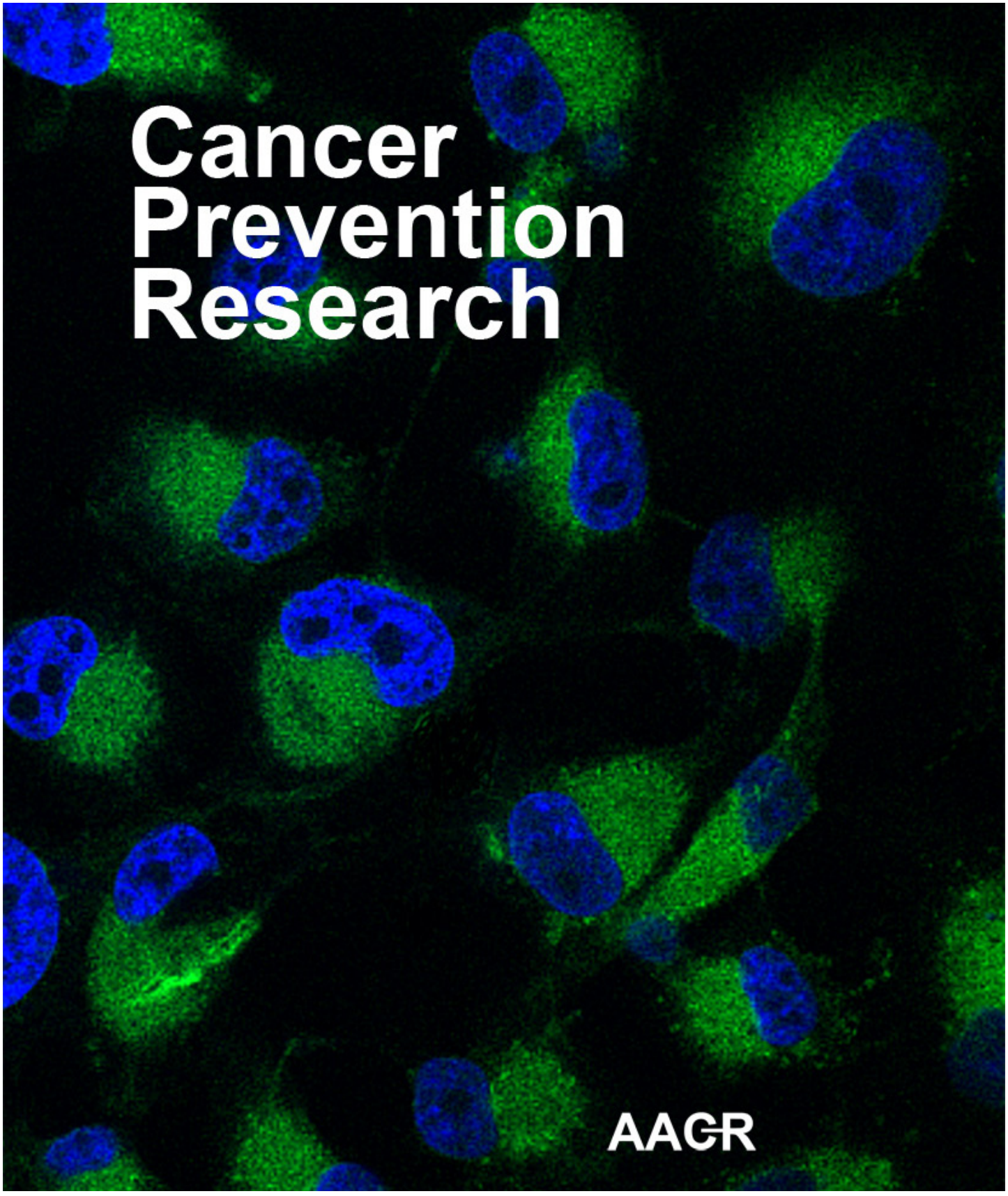
PULSE

THRISSUR POORAM

Thrissur Pooram is the most colourful of all the temple festivals of Kerala. It is celebrated in Thrissur at Vadakkunnathan temple in the malayalam month of Medam. Thrissur Pooram was the brainchild of Raja Rama Varma known better as Sakthan Thampuran, erstwhile Maharaja of the state of Kochi (1790 – 1805). He took a decision to bring together 10 temples situated around Vadakkunathan Temple and set stage for the celebration known as Thrissur Pooram. The concept involves deities of the ten temples coming to Vadakkunathan Temple to pay obeisance to Lord Vadakkunnathan (Lord Siva), the presiding deity.

Pooram is a magnificent spectacle with night long fireworks, colourful 'Kudamattom' (exchange of different types of parasols), the famous 'Elanjithara Melam' and a splendid elephant procession. The best elephants from various temples in Kerala are sent to Thrissur and participate in the grand eight day Pooram Festival. The celebration on the final day commences with a procession of fifteen elephants marching from Thiruvambadi temple nearby to the Vadukunnathan temple. The main elephant of the group carries the Devi with Lord Krishna's "Kolam" and Devi's "Thidambu". At the same time another group of 15 elephants will start from Paramekavu Bhagavathy temple. The leader of this group will carry the idol of the goddess. This group of thirty decorated elephants stand facing each other in two rows in the Tekkinkadu maidan, the venue of the festival while traditional drums and "nadaswarams" (a bugle like instrument) create a crescendo of music.

DEVI SARASWATI



A study by Dr Ruby John Anto and colleagues demonstrating encapsulation of curcumin in chitosan nanoparticles adorns the cover page of the April Issue of Cancer Prevention Research

Image description on page 27

RGCB PULSE

CONTENTS

DIRECTOR'S TAKE

I am delighted to present the second issue of PULSE with lots of good news for RGCB and some sadness as well. RGCB received excellent reviews from NITI Ayog in the national assessment of scientific institutions, so much so, that we were placed along with ISRO and DRDO in the translational sciences category. We have been recognized for our translation of laboratory sciences to strengthen cancer prevention, children's immunization and support to clinical care. Our scientists have received national awards and recognition while our students have done very well in obtaining doctoral degrees and awards at various platforms.

RGCB also became the first of 16 autonomous institutions of the Department of Biotechnology to begin a unique Masters program in Biotechnology offering three specialty options - Molecular Plant Science, Molecular Diagnostics and Disease Biology. I must place on record here the support from our Chairperson in the Governing Council & Secretary to Government of India, Department of Biotechnology, Dr. Renu Swarup, all the members of the Governing Council as well as Dr. Sudhanshu Vrati, Director and Dr. Deepika Bhaskar, Registrar of the UNESCO-Regional Center for Biotechnology. RGCB is therefore on a roll leading R&D, human resource development and providing public health services to the state and country.

With rapid advances and easy access to the Internet, we have seen in recent times re-emergence of fake news. This is essentially false information or propaganda published on platforms that appear genuine. Fake news websites and channels push such false information to mislead and deceive the public. One of the more colorful definitions of fake news comes from PolitiFact: "Fake news is made-up stuff, masterfully manipulated to look like credible journalistic reports that are easily spread online to large audiences", many of whom then unwittingly forward links.

Resorting to "fake news" and sensationalism to the extent of imagination is neither surprising nor new. Our scriptures describe very eloquently about fake news. The "Asura" King Mahabali with his excellent administrative skills, honesty and statesmanship became so famous that he earned envy of the "devas". Led by Lord Indra, the devas spread fake news about an imminent attack and take over of the devas kingdom by Mahabali. Everyone knows what subsequently happened. In more recent times, an example of the notoriety of fake news is during the United States presidential election in 2016. Many forecasters, politicians and the general public confessed subsequently that the widespread of fake news surely helped sway the election outcome.

As explained in the New York Review of Books by Robert Darnton, selling lies for monetary gain, political advantage or often only due to simple jealously dates back in modern history to the late 19-century, when the phenomenon of "Yellow journalism" was rampant. Why the color yellow, is not clear. Perhaps it had to do with the color of the ink used in those publications. Or perhaps a reflection of the yellow kid in the popular comic strip from the New York World and later the New York Journal, the two publications engaged in bitter rivalry of a circulation war. Joseph Pulitzer is recognized as the dubious craftsman of tabloid journalism. Though today his name is associated with the highest honor bestowed for original writing (through the installation in his will of the Pulitzer Prize), when alive, he had a distinct reputation.

If one considers 10 of the maximum-shared reports on health, seven provided misleading or false information. Of these, the news "Federal Study Finds Marijuana 100 Times Less Toxic than Alcohol, Safer than Tobacco" stands out. It apparently was shared more than a million times. Many government agencies world over have warned that fake news pedaled on social media create false fears about vaccinations, putting children at risk. The resurgence of measles in USA, Europe and India is an excellent example.

It is more difficult to handle slanderous false news with vested interest targeted against individuals. Many individuals including me prefer to ignore such slander since they feel that the public will understand and see through vested interests. However, in the current world where forwarding of Facebook and WhatsApp posts is done spontaneously without thought or reason, there will be some collateral damage to the concerned individuals and sadly their families. Peddlers of false news play on the weakness of individuals who are often not keen or interested in pressing for criminal charges or get visibly upset and hurt.

An online news channel carried vicious and fictitious reports on RGCB and some of its employees. This so called media establishment has to date not even once called anyone in the RGCB management to verify its news sources. I personally am least bothered or concerned with these kinds of slander since such events have been part of every institution's growth trajectory. For RGCB also there is a consistent pattern to these fake news releases. It always happens at critical points such as when the Union Government was moving the take over of RGCB and then at each time that an important leadership or research event occurs for the institute.

Many senior colleagues asked me for a formal enquiry on the news and its perpetuators. RGCB's access to highend technology quickly provided us details on internet telephone calls and communication trails behind the fake news broadcasts. However I see all of this in the background of philosophy used by our grandmothers who always insisted smearing black dyes on the faces of beautiful fair babies and hanging a painted ugly face in front of a newly built home. My grandmother would say: "ഇത്ര സുന്ദരമായ ഒരു വസ്തുവിൽ നീച ദൃഷ്ടി പതിക്കുന്നത് തടയാൻ മാത്രമാണ് ഇത്" (translated in hindi as "यह केवल बुरी नजर को

इतनी सुन्दर वस्तु पर गिरने से रोकने के लिये है and in English: It's only to prevent the "evil eye" falling on such a beautiful object").

This combined with the realization that urchins only throw stones on a mango tree filled with fruit makes one look at such events in a lighter vein. My senior colleagues continue to insist on legal avenues and institute procedures required for this. I see the episode very simply with a verse from the Mahabharata: ചത്തത് കീചകനെങ്കിൽ കൊന്നത് ഭീമൻ തന്നെ (अगर ये सच है कि कीचक को मार दिया गया है, तो वह केवल भीम ही है जो इसे कर सकता है - If it is true that Keechakan has been killed, then it is only Bheema who can do it). When RGCB moved beyond its established domain into business development using its huge expertise and brand name, many small time and big time players in the arena naturally were unnerved and anxious. An institute growing at huge pace always creates disequilibrium in the micro and macro-environment for those who cannot understand or fathom or feel threatened at this speed.

Judgment of RGCB is not made by a small online news channel or fake news planted by disgruntled elements but by the people and government of this country. RGCB is now a national phenomenon recognized internationally for its contribution to the development of the state and country. I pray that it will become an even bigger institution in the years to come. But again with such an excellent talent pool of young scientists, support personnel and dedicated staff, prayers are only an additional fuel for this.

Jai Hind

Professor M. Radhakrishna Pillai
FRCPath, PhD, FAMS, FNA, FASc, FNASc

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SPECIAL FEATURE

Justice K. T. Thomas bids adieu to **RGCB Human Ethics Committee**

The **RGCB Institute Human Ethics Committee (IHEC)** comprises a panel of distinguished luminaries in various professional and social fields. This committee, for over a decade, was chaired by Justice K. T. Thomas, former Honorable Judge of the Supreme Court of India. Presently 83 years old, the Justice retired from his position as chairman of the RGCB IHEC expressing his inability to undertake the travel. With greatness comes humility; this is exemplified in our Justice's personality.

Justice K. T. Thomas has an illustrious track record. He was directly recruited from the Bar as District Judge and after eight years elevated as High Court Judge. After being judge of the Supreme Court for six years he retired in 2002. After retirement he was appointed Chairman of different Commissions such as, for fixing fees in professional colleges, for recommending reforms of police performance, for recommending reforms in the law regarding prevention of destruction of public properties and lastly the Commission for National Law School Bangalore. It was the Supreme Court bench headed by Justice K.T. Thomas that awarded death sentences for Perarivalan, Murugan, and Santhan in the Rajiv Gandhi assassination case. The Supreme Court in 2000 confirmed death sentences of the three men, but commuted the capital punishment to life in prison for Nalini Sriharan primarily on the basis of Justice K.T Thomas's judgment. He was honoured with Padma Bhushan by the Government of India.

Justice K. T. Thomas has eloquently chronicled his reminiscences as Judge spanning twenty-five years in his book "Honey bees of Solomon". The narratives are all recollected from memory but includes only true facts. He however remarked to PULSE that "not all truths" have been cited to avoid personal pain and embarrassment to many people.

When asked about his experience as the Chair of the IHEC, he confided that he had learnt more regarding the workings of science through this exercise. He conceded that every trip to RGCB had been a learning experience and owed thanks to his fellow members! Coming from someone who has been instrumental in instituting a new statute that removes all clauses conferring legal injustice towards leprosy patients', this statement is humility exemplified.

RGCB NEWS

RGCB hosts 10th RNA Group Meeting

The RNA Group Meeting in India was initiated more than a decade ago, and so far 9 meetings have been organized at different Institutes across India. This meeting serves as the largest platform for RNA biologists in the country for sharing their ideas, develop collaboration, communicating from faculty to students to elaborate on new developments in diverse areas that RNA covers. The tenth meeting of the RNA Group was hosted by Dr. Rakesh Laishram and Dr. Arumugam Rajavelu in Thiruvananthapuram.

BioNest is our unique facility in Kochi designed to provide infrastructure and scientific support to enable researchers and entrepreneurs looking to transform biology, medical based technologies and innovations into real and mature big business. The Department of Biotechnology has sanctioned a grant of Rupees four crores to BioNest for infrastructure development.

RGCB will lead Indian Association of Cancer Research for the next triennium (2019-2022). Professor M. Radhakrishna Pillai as President, Dr. Priya Srinivas as Secretary and Dr. K. B. Harikumar as Treasurer.

International Women's Day 8 March 2019 at RGCB

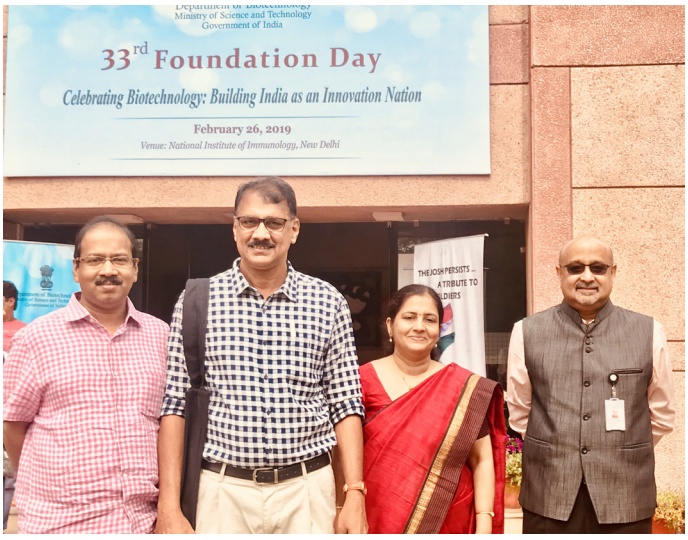
Nurturing is the basic instinct of all women! All campuses of RGCB celebrated womanhood by planting saplings, because when you plant a tree, you grow life.

33rd Foundation Day of the Department of Biotechnology

Department of Biotechnology in the Ministry of Science and Technology, Government of India, celebrated its 33rd Foundation Day in New Delhi with the theme "Celebrating Biotechnology: Building India as an Innovation Nation". The Honorable Union Minister for Science & Technology, Dr. Harsh Vardhan gave away the Biotechnology Research Innovation and Technology Excellence (BRITE) awards.

The Union Minister emphasized the role of Department of Biotechnology during the last 33 years in creating a large scale impact across multiple sectors by development and commercialization of affordable solutions for healthcare, improved crop varieties, animal diagnostics and technology for generation of clean energy. The Honorable Minister announced key missions at the foundation day ceremony including Atal Jai Anusandhan Biotech Mission - Undertaking Nationally Relevant Technology Innovation (UNaTI), which is expected to transform Health, Agriculture and Energy sectors during the next 5 years. The Secretary, Department of Biotechnology, Dr. Renu Swarup, in her opening address laid impetus on strengthening the research and translation base ensuring sustainability.

The Secretary highlighted the role of BIRAC in promoting and nurturing innovation and entrepreneurship over the years which has resulted in support to more than 500 startups and 35 bioincubators spread across the country. Among this is the RGCB BioNest. RGCB was represented at the Foundation Day by Professor M. Radhakrishna Pillai, Dr. K. Santoshkumar, Dr. T. R. Santoshkumar and Dr. E. V. Soniya.



National Science day 2019

RGCB Thiruvananthapuram celebrated National Science Day 2019 by opening its gates to excited young students from schools of Thiruvananthapuram.

Dr Jinesh K. B, Associate Professor, Indian Institute of Space Science and Technology, Trivandrum delivering the Science Day lecture on "Seeing and playing with atoms: the evolution of microscopes"

Scores of children celebrated science with correct aptitude, creativity and temperament.

Gifted students of the Travancore National School Vattavila, Poojapura a leading learning hub for special kids spent an exciting day at RGCB on February 24

Professor M. Radhakrishna Pillai, RGCB Director hoisted the Indian National Flag on the 70th Republic Day. Jai Hind.

Dr. Malini Laloraya, Scientist F was elected to The National Academy of Sciences, India (NASI) for her contributions in Animal Sciences. She was also conferred the Fellowship in Reproduction and Endocrinology 2019 by SRBCE, India.

RGCB and PHD chamber of Commerce and Industry, in collaboration with the Office of the Controller General of Patents, Designs and Trademarks, Ministry of Commerce and Industry, Government of India, conducted a One-day awareness programme on Importance of Intellectual Property Rights. The program was hosted by the Office of Technology Ventures, RGCB.

Dr. Moinak Banerjee, Scientist G has been elected as the President of the Indian Society of Human Genetics.

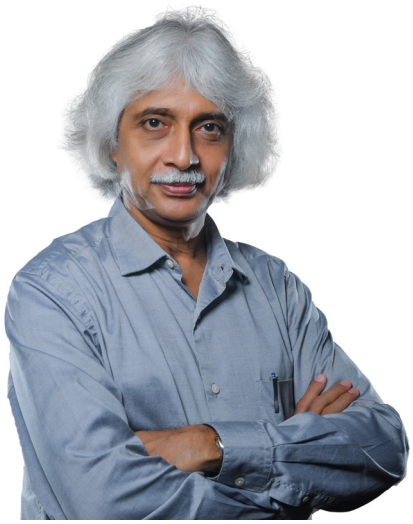
RGCB AWARDS

Dr. Arumugam Rajavelu, DST INSPIRE Scientist at RGCB was awarded the Kerala State Young Scientist Award by the Honorable Chief Minister of Kerala, Shri. Pinarayi Vijayan.

Appreciation Award for poster presentation by Ms. Aditi Majumder, PhD student of Dr. Debasree Dutta at Manipal Academy of Higher Education (MAHE) Research Colloquium held in April 2019. She presented her work on “Histone chaperones in Cellular Transition”.

RGCB AWARDS

Dr. Pradeep Kumar. G, Scientist G received the 19th Royan International Research Award



ROYAN INTERNATIONAL RESEARCH AWARD
Reproductive Biomedicine & Stem Cell

Dr. Pradeep Kumar. G, India

Best research project in **Genetics (shared winner)** field Epigenetic Regulation of Coding and Non-coding RNA Expression During the 1st Wave of Spermatogenesis.

Cardiovascular Diseases & Diabetes Biology Research group swept away awards at the International Association of Cardiovascular Sciences-India Section's International Conference on Translational Cardiovascular Sciences held at NIMHANS Bangalore in February 2019.

Dr. Kalaivani receiving Suresh Tyagi Young Investigator award and Ms. Vinitha. A receiving the Naranjan S Dhalla Best Poster Award from Professor Chandrasekharan Kartha, President of International Academy of Cardiovascular Sciences - India Chapter.

PhDs AWARDED

REVATHY NANDHAN

Title of thesis: "*βHCG and BRCA1 in Gestational Trophoblastic Diseases*"
Name of Mentor: Dr. Priya Srinivas

ANNU JOSEPH

Title of the thesis: "*Molecular Determinants in Pancreatic Sustenance: Implications in Type 1 Diabetes*"
Name of Mentor: Dr. Malini Laloraya

PHILIP LITTO THOMAS

Title of the thesis:"*Molecular Mechanism of cell differentiation and pluripotency*"
Name of Mentor: Dr. Malini Laloraya

DIVYA M. P

Title of the thesis:"*A study on environmental Vibrio parahaemolyticus with special emphasis on its pathogenicity*"
Name of Mentor: Dr. Sabu Thomas

HARITHA. H. NAIR

Title of the thesis:"*Mechanistic evaluation and In vivo validation of Synergestic combinations of curcumin and resveratrol with chemotherapeutics used in breast cancer treatment*"
Name of Mentor: Dr. Ruby John Anto

ASHA. R

Title of thesis: "*Effect of PEGylation and fatty acid acylation on the membrane perturbation activity of AMP*"
Name of Mentor: Dr. K. Santhosh Kumar

KARTHIKA. S

Title of thesis:"*Comprehensive analysis of biofilm forming bacterial communities in chronic diabetic ulcer and identification of biofilm associated genes in Enterococcus faecalis*"
Name of Mentor: Dr. Sabu Thomas

VIKAS KUMAR

Title of thesis: "*Molecular basis of metabolic switch in response to hemodynamic stress in aging heart*"
Name of Mentor:
Dr. T. R. Santhosh Kumar

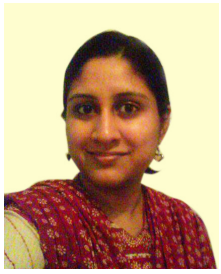
PhDs AWARDED

DEVI A. N

Title of thesis: "*Expression profiling and functional characterization of Nephrocystin in relation to Spermatogenesis*"
Name of Mentor: Dr. Pradeep Kumar. G

CHIDAMBARESWAREN MAHADEVAN

Title of thesis:"*An integrated systems biology approach for the molecular elucidation of Piper nigrum L.-Phtophthoracapsici Leonian phytopathosystem*"
Name of Mentor: Dr. S. Manjula



SUMITRA SHANKAR

Title of thesis:"*Application of synthetic nucleases for the HPV gene editing*"
Name of Mentor:
Professor M. Radhakrishna Pillai

SREEJA. E. NAIR

Title of thesis:"*Molecular alterations in central nervous system in mouse models of chikungunya virus neurovirulence*"
Name of Mentor: Dr. E. Sreekumar

PRASANTH NARAYAN

Title of thesis:"*Evaluating the role of FOXP3 (scurfin) during embryo implantation, an immune privileged instance*"
Name of Mentor:
Dr. Malini Laloraya

ANN MARY ALEX

Title of thesis:"*Control of monoamine Bio Synthetic pathway in Autism Phenotypes*".
Name of Mentor: Dr. Moinak Banerjee

FLASH FROM THE PAST

Hello everyone! I am, Indu. S, a PhD student in the RGCB PhD Batch 2006; currently doing Post-Doctoral Research at New York Medical College in the Empire State, New York, U.S.A.

One of the delirious moments in my life was when I enrolled into the RGCB PhD program which fine tuned my approach towards research. Thanks to Dr. Pradeep Kumar G, Scientist G for giving me the opportunity. Dr Pradeep Kumar is a highly renowned internationally well-recognized scientist in the field of reproduction research with immense scientific vision, who puts his research passion to motivate students, accelerate their research, moulding them into independent scientists like me. Currently, I am fortunate to work with Professor Ashok Kumar who is an internationally acclaimed scientist in Molecular Genetics Research and an alumni member of the Nobel laureate Professor Har Gobind Khorana's laboratory. When I peacefully sit at the Hudson riverside looking at skyscrapers, I feel lucky to be at the prime dream destination to several researchers for their career and success. However, at times, nostalgia takes over and all memories become alive about RGCB.

Looking back, I would like to recollect days of my doctoral studies those of meticulously planning experiments and working diligently as a team. I cannot forget the days I spent in standardizing experiments which upon success, earned me great appreciation from my mentor.I used to prepare every year for the annual PhD student presentations and present my work before eminent scientists and enthusiastic students of RGCB. The scientific deliberations and interactions that followed these presentations equipped me with skills to cope up with the international scientific community. I recall the good times and support from Dr. Malini Laloraya.

My PhD days used to be entertaining and amusing with the lab mates and friends at RGCB. I really miss

those cheerful jokes during gatherings which made us laugh aloud, going for movies after work, birthday parties when we explored new restaurants, playing badminton, Christmas friend games, pizza parties, relishing Maggi with friends at midnight in the hostel and so on... The bonds of friendship I gained from RGCB are always treasured. Get-together with RGCB alumni in and around New York are always filled with fun memories about RGCB.

The food at RGCB reminds me of the customized tea/ coffee and the smiling faces of the cafeteria staff. I always cherish the fond memories in the cafeteria, the place where we used to relieve our work stress and rejuvenate to move ahead. The Onam programs followed by the sumptuous sadya, games and the happiness when our team won the tug of war are all unforgettable memories. I often liked to spend some time in the evening at the RGCB library to update myself about scientific advancements made by scientists globally. Beyond the quest for knowledge as it is true for most of us, even sitting silently in the library and immersing in thoughts brought me ideas to solve scientific problems of the day.I would applaud for the support provided by the core instrumentation facility and project management cell to students.

To dear graduate students; dare to dream, pursue your passion and you will achieve them. This is the time to learn, interact, keeping your hopes high even when the road is uphill and progress tenaciously with unflinching courage. Always be positive, and at the same time, please don't forget to bag in some good memories too. At times, when the experiment doesn't work as expected, I also thought some years ago, "How am I going to complete my Ph.D.". Now, I realize that those experiences have paved the foundation bricks so strongly as a researcher that I am daring to take up any research project I am assigned. I am greatly thankful to all distinguished scientists, staff, and colleagues who helped me to emerge as a successful scientist. Thank you for the opportunity to share my closely-knit memories at RGCB.

14th RGCB SAC UPDATE

Members of the14th RGCB - Scientific Advisory Council (SAC)

Standing from left to right: Professor P. N. Rangarajan, Professor Subrata Sinha, Dr. Debashish Mitra, Dr. Satyajit Rath, Dr. Robin Mukhopadhayay, Professor Grant Pierce, Professor Rakesh Kumar, Dr. Ajay. K. Parida, Dr. Arvind Duggal, Professor Sudhanshu Vrati, Professor Joshy Jacob, Dr. R. V. Sonti, Dr. Dinabandhu Sahoo, Dr. B. Ravindran.

Sitting from the left to right: Professor Vijayalakshmi Ravindranath, Dr. Chandrima Shaha, Professor K. P. Gopinathan, Professor Nirmal Kumar Ganguly, Professor M. Radhakrishna Pillai, Professor Umesh Varshney, Professor Apoorva Sarin.

The 14th meeting of the RGCB Scientic Advisory Council was designed as a symposium that integrated invited lectures from eminent scientists from different fields of expertise along with presentations by RGCB scientists on progress of their research projects. The meeting was chaired by Professor Nirmal Kumar Ganguly.

RGCB SAC UPDATE

Professor Grant Pierce, University of Manitoba, Canada presented his work on dietary Flax Seed and cardiovascular health.

Professor T. Rajkumar, Cancer Institute (WIA), Chennai, presented his work on Immune dysregulation and phase 2 Dendritic cell vaccine trial in Stage IIB cervical cancer.

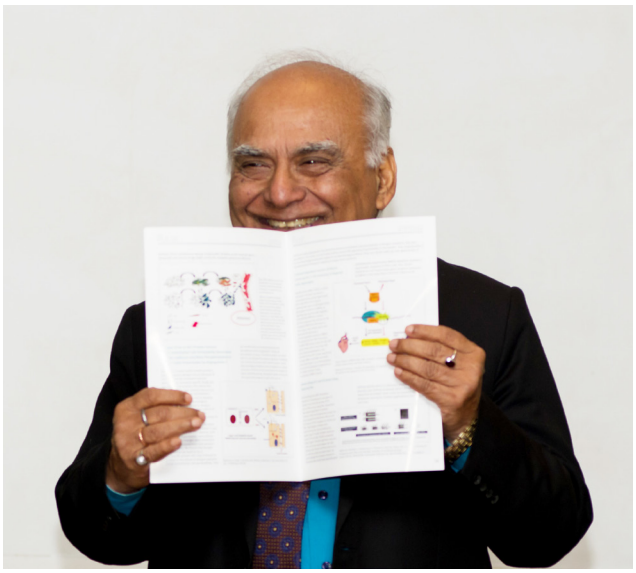
Dr. R. V. Sonti, National Institute Plant Genetics and Research (NIPGR), New Delhi, presented his work on marker assisted selection in crop improvement particularly in rice varieties.

Professor Usha Vijayraghavan, Indian Institute of Science (IISc), Bangalore presented her work on genetic codes for making of a rice flowering stem: functions for some evolutionary conserved transcription factors.

RGCB SAC UPDATE

Professor Joshy Jacob, Emory University, USA, presented his work on the origin of somatic mutants.

Professor P. N. Rangarajan, Indian Institute of Science (IISc), Bangalore spoke about contribution to development of biotechnology based products with a major focus on patent issues and technology transfer difficulties.



An important event marked the 14th SAC where the Chairman of Scientific Advisory Committee, Professor N. K. Ganguly formally launched release of the first RGCB Newsletter, "PULSE".

KNOW ME BETTER

A Meandering tale...

Radhika Nair

I was born in Thiruvananthapuram India but studied mainly in Mumbai and Delhi moving around in a nomadic fashion courtesy my father's naval career. I was interested in science right from my school days where I initially nurtured dreams of being an astrophysicist till physics started making no sense to me! I was very fortunate to have some very inspiring teachers such as Mrs Srinivasan and Mrs George who I still remember fondly today.

During my undergraduate studies at St Xaviers college in Mumbai, I was part of a small but very dynamic group in the microbiology department. Though I was always a last bencher and people often thought I was in Arts as I spent a lot of time in their midst, I was once again fortunate to have Mrs Amonkar (the Department Head) who thought I had some potential. I realized while doing projects on AIDS for the Honours program that the practical aspect of science held a certain fascination for me.

My desire to actively pursue research as a career came during my stint with Professor Shobhona Sharma at TIFR when I was selected for the visiting research scholars program. I overstayed my welcome and continued to moonlight in the lab while doing my Masters at the Institute of Science in Biochemistry. I was part of the first trials for the putative malarial vaccine and I was hooked!

I did my PhD at the National Institute of Immunology under Dr Chandrima Shaha. It was a great adventure (for me at least!) and besides the science, a wonderful journey where I made life-long friends. My work on the apoptotic pathways in germ cells I feel was preparing me for the research topic I would ultimately choose in the future - for in some ways cancer is the opposite side of the coin of apoptosis.

I had my greatest "non scientific" achievement too during my PhD when I had my son Rohan in my final year. As Dr Shaha said to a colleague, "This year is very tough - I have Radhika's thesis and Radhika's son to manage!!" It takes a village to raise a child and that has never been truer than for me with a child while I actively pursued my career. My greatest cheerleaders have been my parents who have stood by and supported all my decisions.

I took a two year career break after submitting my thesis in order to be with Rohan and then started the torturous process of switching my brain from diaper changes and mother toddler groups to science in 2005. I was awarded the Career Development Fellowship by the Medical Research Council at Cambridge and spent the two most amazing years of my career in the MRC surrounded by the most brilliant minds where truly our imagination was the only limit. I was very particular that I wanted to widen my horizons in my post doctoral training by

KNOW ME BETTER

learning molecular biology which I felt was key to understanding cancer if I decided to pursue this line. My work involved understanding a bacterial toxin antitoxin pair which was found to play a key role in homeostasis in the mammalian system too and we uncovered a fascinating aspect of its biology during my stay at the MRC cancer unit. I think I spent the first few weeks with my mouth forever dropping open when a Nobel laureate just casually sauntered by- I will never forget the sheer scientific energy at Cambridge and Oxford!

At this point we moved to Australia and I was fortunate to meet Professor Alexander Swarbrick who turned out not only to be my mentor but a wonderful colleague and friend over the years. We shared students and the lab for seven of the most productive years of my life. It was at this stage of my career that I focused on what would ultimately be the question I wanted to ask. My dear friend Nidhi Kadir who was a neurosurgeon passed away at the young age of 30 to breast cancer and I hoped one day to make a difference to the many who suffer from the “emperor of all maladies”.

During the course of my years at the Garvan institute of medical research in Sydney (where I was also affiliated with the Kinghorn cancer center and Faculty of Medicine, University of South Wales, Sydney), I was fortunate to work with wonderful people who were also brilliant scientists. We worked on multiple cutting edge projects and I was part of multi institutional international collaborative efforts like Promis. I started crystallizing my objective to work in the field of metastasis as the spread of cancer is still unfortunately a death sentence to patients.

Around this time for personal and professional reasons, we decided to move back to India. I was awarded the Ramanujan Fellowship by the Government of India and returned to RGCB to set up my laboratory in 2015 with Professor Pillai’s support. While there have definitely been challenges setting up the laboratory, I would prefer to focus on my wonderful little IISER (they are all students from there!) team who have worked very hard to set up our research space at the Bio Innovative Center. We are currently in the fourth year and it is a good time as our work is coming together. I hope 2019 will bring the students their well deserved rewards in terms of publications. We pursue the fundamental question of how cancer cells move to different organs from the primary tumor which ultimately is the cause of mortality for patients. We have found a cell intrinsic program that predisposes cells to metastasise to the lungs and are exploring the effect of the microenvironment using novel ex vivo systems.

So you can see my meandering journey from TIFR (Mumbai) - NII (Delhi) - MRC (Cambridge) - Garvan (Sydney) - RGCB (Thiruvananthapuram) mirrors the circuitous passage of metastasis that cancer cells take and encompasses my personal as well as professional voyage to date!

Radhika Nair, PhD
Ramanujan Faculty Fellow
Bio-Innovation Centre
Rajiv Gandhi Centre for Biotechnology,
KINFRA Video Park, Thiruvananthapuram.

PEOPLE WHO MAKE RGCB A BETTER PLACE

Indu Ramachandran
Senior Manager (Technical Services)

Besides a swanky Flow Cytometer instrument in the common instrumentation facility of RGCB sits a petite and pleasant Indu, officer in charge for the BD FACS Aria. She joined RGCB soon after post graduation in Medical Biochemistry and has spent 20 years serving the institute. She has trained fourteen young individuals on the FACS machine and all of them have made a mark in this field holding credible positions in institutions such as JNCASR, companies such as BD as well as Universities in USA, including Harvard. She is all praise for the lovely ambience and work ethos of RGCB. One of her most memorable experience she recollects is the opportunity to save the life of a bone marrow transport patient at AIMS Kochi. "The facility officer in charge at AIMS was on leave and I was asked to go and carry out the bone marrow and blood analysis. The patient was then immediately posted for transfusion surgery and survived," she said recalling the eventful day. Married to Nithin, Assistant Secretary at the Kannur Panchayat, she is mother to 12th grader Avani who aspires to be an architect. Her hobbies include reading autobiographies of Paramahamsa Yogananda to pure Dan Brown fiction!

Vishnu. P
Office Assistant

Spot a leak or a patch to be repainted or require new office cabinets, we head to the administration to contact Vishnu aka "Building Vishnu". A native of Kottarakara and single child to his parents, Vishnu completed his degree in Commerce and is presently pursuing MBA as part of Kerala University distance education program. He reports to the General Manager and apart from dealing with construction related issues in the main campus also assists the general administration in RTIs and other legal issues. A hard core Saurav dada fan, he enjoys playing cricket and reading novels.

He has recently entered blissful matrimony. RGCB wishes him good luck!

PEOPLE WHO MAKE RGCB A BETTER PLACE

Gopakumar. G
Library Assistant

Dial P for Print and one can recall only Gopan aka Gopakumar in the RGCB library. He is the faculty's favorite during grant applications and every PhD students delight at submission time. Serving RGCB since 1998 Gopan, joined as an animal house assistant soon after completing his Pre degree. It was in 2002 that he was moved to the library which he says changed his career forever. He enjoys the friendly atmosphere here and is always ready to help the students with their photocopying and printing tasks. In the library he devours newspapers while back at home he tends to his home grown organic vegetable garden. He lives with his wife, Saritha who works in the social security mission of the State Government and has two school going children, Devika and Jayadeep.

Harikumar. S
Driver

Hari is the first ever driver to be appointed in RGCB during its formative years in 1992. He has served as the personal driver of all Directors of RGCB! This is one person who among a selected few have seen and admired the growth of RGCB from a small rented building to the three present campuses. He has two daughters of which one will be entering matrimony shortly.

RGCB SCIENCE SPOTLIGHT

Lipid profile of Mycobacterium tuberculosis undergoes significant changes during dormancy and reactivation.

Nearly one-third of world's population is infected with Mycobacterium tuberculosis (Mtb), the bacterium that causes tuberculosis (TB). WHO estimates that nearly nine million people develop TB, and almost two million die of it every year. The bacterium can remain in a dormant state, and can get reactivated when the immune system of the host becomes weak to cause the disease. Mtb is very rich in lipids and mycolic acid is a major component of the cell wall. Our goal in this study was to track the changes in the lipid profile of the bacterium during simulated dormancy and reactivation from dormancy. Employing Ultra-Performance Liquid Chromatography/mass spectrometric analysis we found a significant degradation of lipids during dormancy and their gradual restoration during reactivation. This study throws light on distinct lipid metabolic changes that Mtb undergoes to maintain its cellular energetics during dormancy and reactivation.

Reference
Raghunandanan S, Jose L, Gopinath V1, Kumar RA Comparative label-free lipidomic analysis of Mycobacterium tuberculosis during dormancy and reactivation. Scientific Reports. 2019 Mar 6;9(1):3660. doi: 10.1038/s41598-019-40051-5.

Role of FAM171A1 in Triple Negative Breast Cancer.

Among breast cancers, triple-negative breast cancer (TNBC) is the most aggressive subtype. TNBC cells lack all three important recepors (ER, PR and HER2) along with a complex heterogeneous nature. The study analyzed published microarray datasets to identify unique genes associated with TNBC status in both TNBC cell lines as well as TNBC tumors and identified a single TNBC-specific gene, called as FAM171A1. The authors reported that FAM171A1 contributes to the invasiveness and stemness of TNBCs. In addition the study identified an underlying strong inverse correlation between FAM171A1 and ERα in publically available datasets which was confirmed by wet-lab studies. Mechanistically the authors explored the role of ERα and its newly identified target miR590-5p, in the regulation of FAM171A1 expression. The study, concluded that FAM171A1 is a novel biomarker for TNBCs and can provide a basis for future strategies in developing novel TNBC-directed therapeutic approaches.

Reference
Sanawar R, Mohan Dan V, Santhoshkumar TR, Kumar R, Pillai MR. : Estrogen receptor-α regulation of microRNA-590 targets FAM171A1- a modifier of breast cancer invasiveness Oncogenesis. 2019 Jan 9;8(1):5. doi: 10.1038/s41389-018-0113-z

Building synthetic membrane pores for nanobiotechnology

Engineered membrane protein pores have demonstrated applications in biotechnology. However, the formation of large synthetic transmembrane peptide has not been shown previously as the target peptides form a complex reaction mixture in the membrane environment. In their report, a transmembrane peptide pore was assembled from 40 aminoacid α-helical synthetic peptides based on the membrane protein of the bacterium, Corynebacterium jeikeium. Biochemical and biophysical techniques, defined structural composition of the pore and elucidated its assembly mechanism in the membrane. The peptide pore is ion selective, functional and capable of conducting ions and binding blockers. Such designed synthetic transmembrane pores are useful for applications in biotechnology for sequencing of nucleic acid fragments, polysaccharides and peptides at single-molecule resolution. Also, these findings shed light on the mechanism of action of antimicrobial peptides in bacterial membranes.

Reference:
Krishnan R S, Satheesan R, Puthumadathil N, Kumar KS, Jayasree P, Mahendran KR. (2019). Autonomously Assembled Synthetic Transmembrane Peptide Pore. Journal of the American Chemical Society. 141 (7), 2949-295.*

Two-dose recommendation for Human Papillomavirus vaccine can be extended up to 18 years – updated evidence from Indian follow-up cohort study

The current WHO recommendation for HPV vaccination to prevent cervical cancer schedule is dependent on age of recipient at the time of vaccine administration. While a 2-dose schedule (0, 6 months) is recommended for girls les than15 years at the time of first dose, a 3-dose schedule (0, 1-2, 6 months) is recommended for girls over 15 years at the time of first dose. The study showed that the seven month L1-binding antibody titres of 15-18 year old two-dose recipients were non-inferior to 15-18 year old and 10-14 year old three-dose recipients. None of the girls receiving two or three doses had persistent infection from vaccine-targeted types. These findings support the concept that two doses of HPV vaccine can be extended to girls aged 15-18 years .

Reference:
Basu P, Muwonge R, Bhatla N, Nene BM, Joshi S, Esmy PO, Poli URR, Joshi G, Verma Y, Zomawia E, Shastri SS, Pimple S, Anantharaman D, Prabhu PR, Hingmire S, Sauvaget C, Lucas E, Pawlita M, Gheit T Jayant K, Malvi SG, Siddiqi M, Michel A, Butt J, Sankaran S, RameshwariAmmal Kannan TP, Varghese R, Divate U, Willhauck-Fleckenstein M, Waterboer T, Müller M, Sehr P, Vashist S, Mishra G Jadhav R, Thorat R, Tommasino M, Pillai MR, Sankaranarayanan R; Indian HPV vaccine study group.Two-dose recommendation for Human Papillomavirus vaccine can be extended up to 18 years – updated evidence from Indian follow up cohort study. Papillomavirus Research. 2019 Jan 31

Role of phospho–ezrin in differentiating thyroid carcinoma

Thyroid carcinoma is 3–4 times more prevalent in women than in men. It is clearly demonstrated that like breast and ovary, thyroid is also an estrogen responsive tissue. Ezrin, an ERM protein has an exclusive role in cells undergoing metastasis. In this study, it was found that ezrin was activated to phosphoezrinby estrogen in both in vitro and ex vivo experiments. In patient samples, overexpression of phospho-ezrin were seen in Follicular thyroid carcinoma (FTC) and follicular variant papillary thyroid carcinoma (FVPTC) while, it was completely absent in follicular adenoma (FA). This finding might have an implication to reduce the dilemma of differentiating follicular neoplasms in which, the cytologic features overlap among these lesions and the differential diagnosis is problematic for clinicians. We observed 100% sensitivity, specificity and diagnostic accuracy for phospho-ezrin in the histological correlation of FTC and FVPTC with FA which enables us to suggest phospho-ezrin as a diagnostic marker to differentially diagnose the follicular neoplasms.

Reference:
Lathika L M, Nair J K K M, Saritha V N, Sujathan K, Sreeja S. Role of phospho-ezrin in differentiating thyroid carcinoma. Scientific Reports 2019 Apr 17;9(1):6190. doi: 10.1038/s41598-019-42612-0.

Chitosan Encapsulation Enhances the Bioavailability and Tissue Retention of Curcumin and Improves its Efficacy in Preventing B[a] P-induced Lung Carcinogenesis

Chitosan Encapsulation Enhances the Bioavailability and Tissue Retention of Curcumin and Improves its Efficacy in Preventing B[a]P-induced Lung Carcinogenesis.

Recent reports indicate a high correlation between fast food intake and lung cancer incidence. Benzo[a] pyrene (B[a]P) is a potent carcinogen abundantly present in grilled and deep-fried food and in tobacco smoke. Efficacy of curcumin, a known dietary chemopreventive agent, in B[a]P-induced lung carcinogenesis is well established. However, the poor pharmacokinetic profile of the compound hampers its potential for clinical use. A study by Dr Ruby Anto and colleagues demonstrates that encapsulation of curcumin in chitosan nanoparticles improves cell uptake and prolongs tissue retention of curcumin, thereby increasing the compound's chemopreventive activity. Bioavailability studies using healthy Swiss albino mice showed drastic enhancement in lung localization of chitosan nanocurcumin compared to free curcumin. Toxicologic evaluation confirmed the pharmacologic safety of the formulation, which, even at a dose equivalent to one-fourth that of free curcumin, exhibited higher efficacy in reducing tumor incidence and multiplicity than free curcumin. These results underscore the supremacy of chitosan–curcumin formulation over free curcumin and establish its potential as an oral supplement to prevent B[a]P- and other environmental carcinogen-induced cancers. The image on page 3 depicts intracellular uptake of chitosan nanocurcumin (equivalent to 25 µM curcumin) in H1299 lung cancer cells.

Reference:
Chitosan Encapsulation Enhances the Bioavailability and Tissue Retention of Curcumin and Improves its Efficacy in Preventing B[a] P-induced Lung Carcinogenesis. Vinod Vijayakurup, Arunkumar T. Thulasidasan, Mohan Shankar G, Archana P. Retnakumari, C. Devika Nandan, Jannet Somaraj, Jayesh Antony, Vijai V. Alex, Balachandran S. Vinod, Vijayasteltar Belsamma Liju, Sankar Sundaram, G. S. Vinod Kumar and Ruby John Anto. Cancer Prev Res April 1 2019 (12) (4) 225-236; DOI: 10.1158/1940-6207.CAPR-18-0437

RGCB BAZAAR

AqueSense and Aquesense -C

from Klonos Lifesciences, BioNest, Kochi

The research team of Klonos Life Sciences Pvt.Ltd, based at Biotechnology Incubation Park (RGCB-BioNest), at Kochi have developed two products namely "AqueSense", a detection kit for coliform bacteria and "AqueSense-C", a detection kit for cholera bacteria in drinking water

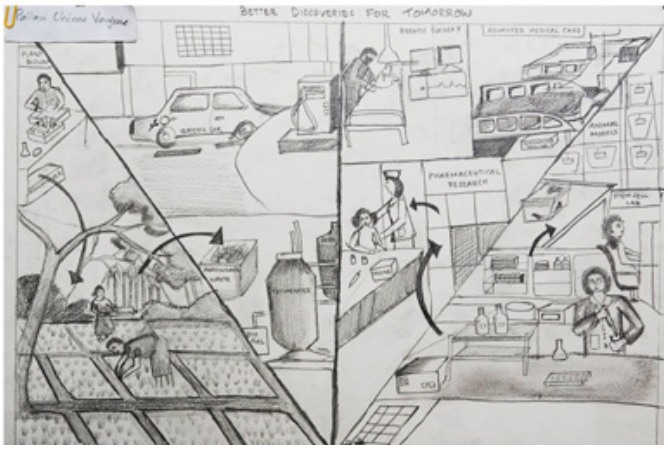
The products developed by Klonos Life Sciences effectively and accurately detects coliform and cholera bacteria in drinking water system. The company focuses on translating innovative ideas to useful products for human welfare and there by contributing to the economic and technological development of the state and nation.

The USP of this product is its ease of use and affordability. Any layman would be able to check water contamination at home as this product is made available in compressed tablet form. There are very few water testing kits available in the market today, and typically not very affordable. However, AqueSense and Aquesense-C provides cost effective and accurate result which is 5 times sensitive than conventional test methods says Dr.K.S Rishad, Director of Klonos Life Sciences who actually conceived this idea. The team consisting of Dr.K. S Rishad and Bineesh Skaria, Directors of Klonos Life Sciences have more products in their company pipeline for domestic market in the next couple of months related to food safety.

Klonos Life Sciences is also planning to expand their business in manufacturing of Clinical Diagnostic kits, for testing Occupational Health & Environmental safety and bio-industrial products.

“Discoveries for a better tomorrow”

Award winning drawings by the students on the theme “Discoveries for a better tomorrow” as part of National Science Day painting contest



The new RGCB campus at Aakulam with upcoming research block and a swanky new student residency. Photographed on an iPhone from 5000 feet above.

RGCB lights up for the Republic Day celebrations. Photographed by Dr. Ananda Mukherjee

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