RGCB

RGCB
DISCOVERIES FOR A BETTER TOMORROW
OCT 2019
VOLUME:1; EDITION:3

Ceylon Slitwort / Thumba - the beginning of Onam

Coral Jasmine - The beginning of Autumn or the Festival Season

PULSE

RGCB PULSE wishes everybody Happy Festivities ....

Idol of Goddess Durga made of Terrakota (Burnt clay)

Photographed by Dr. Ananda Mukherjee, DBT-Ramalingaswami Faculty Fellow

RGCB PULSE

CONTENTS

DIRECTOR'S TAKE

The United Nations now celebrates International Day of Happiness on March 20. "Our relationships and how happy we are in our relationships has a powerful influence on our health" says Robert Waldinger, a psychiatrist and professor at Harvard Medical School. Taking care of your body is important, but tending to your relationships is a form of self-care too. That, I think, is the revelation.

Waldinger is the Chief Investigator of the Harvard Study of Adult Development an ongoing investigation that is considered one of the world's longest studies of adult life that began in1938 during the Great Depression. For the last 79 years, investigators tracked the lives of 724 men looking at their work, home and health. In addition to this information they were interviewed in their homes, their medical records regularly monitored, blood parameters checked and brains scanned.

Concludes Waldinger "After gaining tens of thousands of pages of research data based on these participants, the clearest message from the study is that "good relationships keep us happier and healthier." Further elaborating Waldinger said that when it comes to friends, it's not about the number of friends you have, but the quality of your close relationships that matters.

And my take on this is that ***it's not about where you work, it's about you working at RGCB***. Happiness guaranteed.

Jai Hind

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

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SPECIAL

FEATURE

RGCB LAUNCHES MSc PROGRAM IN BIOTECHNOLOGY

RGCB launched a highly innovative MSc Biotechnology Program with three unique specializations - Disease Biology, Molecular Diagnostics & DNA Profiling and Molecular Plant Sciences in August 2019. The MSc program of RGCB is affiliated to the Regional Centre for Biotechnology an "Institution of National Importance" providing education, training and research established by the Department of Biotechnology, Government of India under the auspices of the United Nations Educational, Scientific and Cultural Organization or UNESCO, a specialized agency of the United Nations (UN) based in Paris.

Dr Renu Swarup, Secretary to Government of India, Department of Biotechnology, India launched the program and welcomed forty one new students of first year MSc along with Shri B Anand, IAS, Additional Secretary; Dr Sudhanshu Vrati, Executive Director, Regional Centre for Biotechnology and Professor M Radhakrishna Pillai, Director RGCB.

SPECIAL FEATURE

RGCB LAUNCHES MSc PROGRAM IN BIOTECHNOLOGY

The forty one students were selected from all over the country after an entrance examination conducted in 17 centres across India. The MSc program at RGCB is unique as it covers the fundamentals of Biotechnology fundamentals of Biotechnology, while focusing on laboratory exercises and industrial as well as research applications. The students will be introduced to concepts of “Enterprise and Entrepreneurship”. This allows students who wish for a career beyond the laboratory in an existing biotechnology industry or for those who dream of starting a new biotechnology enterprise. Students get trained in a real business & technology development bio-incubator where startup companies function.

First Batch of MSc Biotechnology Students of RGCB.

RGCB
STRAIGHT FROM THE HEART

CONNECTING THE DOTS...

Budhaditya Basu
PhD Student
Neuro Stem Cell Biology Lab

What makes us conscious? There is no doubt that here I am, sitting in Trivandrum experiencing the world around me. You would ask me, "What is the proof that you exist?" The obvious reply is "I experience it." This is what inner subjective experience means and that is present always within us. Even when we are sleeping, we are still having conscious experience either by experiencing any dream or by experiencing blankness. It is undeniable that when our cognitive systems engage in audio-visual information processing, we have an auditory and visual experience. Note here that audio-visual information processing is a performance of a function of the sensory system and unknowingly that is being experienced by us. I am not asking how are these functions performed? Rather, I am eager to know why is this performance of function accompanied by experience?

Why is there inner subjective experience present always? Is my laptop conscious where I am writing this article? Is it experiencing the change in its storage when each letter is added to this article? David Eagleman in his famous book 'Brain: the story of you' asked the same question that "How does the biological wetware of the brain give rise to our experience...? What if I told you that the world around you, with its rich colors, textures, sounds, and scents is an illusion, a show put on for you by your brain? If you could perceive reality as it really is, you would be shocked by its colorless, tasteless silence. Outside your brain, there is just energy and matter. Over millions of years of evolution, the human brain has become adept at turning this energy and matter into a rich sensory experience of being in the world. How?" In philosophy, it is known as 'subjective idealism'. All of us remember Tagore's argument with Einstein on this very topic which has been a history in metaphysics. Where Einstein argued that the world is a reality independent of the human factor but the former had an inclination to the concept that the world as a unity dependent on humanity. Tagore's conviction is marvellously upheld in his poem 'Ami (Myself)': "With my senses' hues/ Emerald as green I muse And the coral as red/ As my sight I spread/ The sky is luminous..." Often in my childhood, I recited this poem but never understood its core meaning. Tagore further said that the scientific truth which is to be reached through the process of logic is nothing but the human organ of thought. The consciousness cannot belong to science as science deals only with appearances which appear to be true to the human mind by illusion.

In other words, there cannot be a science of consciousness because science by its very nature is objective whereas consciousness or awareness is subjective. But materialists believe consciousness is a product of the brain and its neuronal assembly. Even if the human brain's neurons and their assembly could be mapped in the near future, it's not clear that we would be any closer to understand how our brain generates subjective first-person experience. The Human Brain Project is an ongoing project with the goal of building a working simulation of a full brain. Still, the question remains: would a working simulation of the brain be conscious? Scientists had far more radical ideas that gave us the computational hypothesis of the brain. It simply says that biological neurons and other chemical matters are not important rather how they communicate is what matters most. If the computational hypothesis is true then a mind could live in a computer-which Artificial Intelligence (AI) scientists are continuously trying to make a machine that can think on its own. It is a fact that we are still quite distant from what has been promised. Truly sentient machine is still a dream. Here AI laments that the human brain is still

an enigma, far more to go to understand the mystery of mother nature. The philosopher David Chalmer thinks that consciousness can be included in science only if we expand the scientific territory. He gives an analogy of known laws of physics when electricity and magnetism were considered as separate fundamental force in nature. But when the time came, scientists had to include electromagnetism as a fundamental force along with other fundamental constituents. The same principle applies to consciousness too. According to him, the time has come to consider consciousness as a fundamental property of nature outside the laws of physics.

There is a need to study the fundamental laws that govern consciousness. I would do injustice if I don't mention the name of Sir Roger Penrose, who is an Oxford physicist, famous for his work with Stephen Hawking conceptualizing black holes and gravitational singularities. He believes that consciousness can only be understood by quantum physics and that quantum coherence happens in the microtubules of neurons. For this theory, he has gained enough criticism even from his old collaborator Stephen Hawking. Recently, I was reading Ashtāvakra Samhitā which is regarded as the jewel of the crown in non-dual Vedanta. It says: "Desire and aversion are of the mind/ the mind is never yours/ You are free of its turmoil/ you are awareness itself." -translated by Thomas Byrom. It reminds me that there is one common unchanging reality present every moment that is 'Icognition'.

I experience every moment; waking, dreaming, insults, pain, criticism, appreciation and the excitement in the mind while writing this article. From my childhood how many changes I have seen in my body and mind! I have seen their inconsistencies. But that 'I'-ness has remained the same. Vedanta says 'THAT THOU ART', meaning, you are that/ you are witness consciousness. The same truth has been hammered again and again throughout the whole Vedanta. It calls the consciousness in different names in different places: 'Satchidananda', 'Brahman', 'Turiya'. It says 'Brahman' alone is the reality, the world is an appearance (Brahma Satya, Jagat mithya). In 'Nirvana Shatakam' Adi Shankara is saying the same thing: "Neither am I the mind, nor the intelligence or ego……I am the ever-pure blissful consciousness (In Sanskrit- Satchidananda)". Whenever I hear any Indian name with 'Ananda', I am reminded of the same truth. We don't know as of now when this baffling puzzle of consciousness and its science will come to a conclusion but definitely, we know that we are conscious each moment without any effort. Now the question arises, 'Why consciousness is blissful?' Vedanta gives an analogy of waves in the water. Bigger waves might boast of their bigger stature or smaller waves might be zealous of the bigger waves. Vedanta asks us to realize that waves are nothing but water. The disparity is in our minds because of illusion. The moment you take refuge in your awareness every problem dissolves without the need to resolve it. "Whom to blame? /Blamer and blamed are one and the same."

MUSINGS OF A TREE

Dr. S Manjula
Scientist E-II
Plant Disease Biology & Biotechnology

I am a tree. I was nurtured with love and tenderness by my mother. She had all her children covered with coats that changed color with seasons and carried us on her arms. We had friends in the lush green woods that was our home. Mornings were lit up with sunlight which played hide and seek among the high branches and the fireflies brought lanterns for us in the dark. I remember looking down from the arms of my mother at the dancing patterns of sunlight on the green grass below and on dewdrops that sparkled like diamonds in rainbow hues. I was lulled to sleep by the breeze which

swayed my cradle with her gentle arms. But at times the winds howled and screamed and shook my world. The rain fell on us relentlessly and throttled us with her razor sharp nails, but my mother covered us with her green cloak and bent and swayed with the gale but kept her footing strong, while clutching us to her bosom to keep us safe and warm. I was always safe in her arms and lived in a world which was no less than a paradise.

Then one day they came along and pointing to us said we looked good in our colored attire and declared aloud that they will be back for us when our colors deepen to ruby red. We were heartbroken to part from our mother but she was happy, 'As that', she said, 'is the law of nature. They will only eat your coats, and will abandon you leaving you to start a new life of your own', she said. I never found this rule of nature fair, as separation brought pain and I couldn't understand why nature should work in its favor. 'This is a global truth and all life on this earth follows it', she said. 'Even if they don't take you away, I can't hold you for long as you get too heavy for me to carry and I have to drop you down or send you away with the birds and the squirrels, who'll make you free to start an independent life'. That was the hard truth.

So the day came when they returned with baskets into which we were packed and in no time we set off on our new journey- teary-eyed and longingly gazing back at our mother who was standing tall but bowing graciously and waving us good bye one last time. The journey was long and tedious. We were out of the woods and jolting up and down in an open carriage along a bumpy road to an unknown destination.

Somewhere down the road when the carriage took a sharp turn the basket I was in toppled and out I fell. I rolled down the slope at high speed till I hit a small rock and bounced to the side of the road before halting to a stop. The weather was hot and humid and the ground where I stopped was dry and mostly brown with very scanty, small green patches of vegetation. This piece of land has gone parched because there are no sufficient grass and trees to hold rain water - I suddenly remembered my mother's words when she was teaching us the value of self- worth, so that we will live with honor, our heads always held high. She believed that stooping and staring down reflect ignorance of your own worth, which provoke disrespect from the mean and fickle-minded who feed and thrive on your weaknesses. Those words gave me enormous courage and the spirit to fight. I survived for some more days without any difficulty because my coat was fresh and moist, but not for too long. The sun beat down mercilessly and my color was lost and my coat shrunk and shriveled. I faced the real world, alone and unarmed. The occasional short showers were a great relief.

Then, miraculously I got caught in a process of transformation as if in a trance. I was propped up by roots which searched deep into the earth for traces of water to keep me alive. I was kept alive by my own stored supplies which were however fast running out. I realized that I had to make my own food which I eventually did from the little water my tiny roots could hold and taking from nature her precious gifts of air and sunshine which she kindly showered on me in abundance.

Growing was slow but steady and it was a very hard and painful process. Sometimes, the sun, the wind and the rain, unmindful of my misery competed with each other to advertise their power and vanity. I held on for dear life but refused to succumb. I learnt that each struggle was a lesson that equipped me better and made me stronger. Many times I longed and searched in vain for the comfort and safety of a shade but I was destined to fight alone. None but nature bestowed on me the priceless gift of resilience. My roots ran deeper and leaves provided me food in plenty. I was covered in luxurious green glory that swayed in sheer joy.

Years rolled by and I spread out my branches aiming for the sky. Roots were running stronger and deeper down. A world of whole new life survived with me, surrounding me with happiness. Green grass and delicate herbs thrived, providing home and shelter for many more beautiful forms of life. Vines clung to me with their delicate arms and climbed on my branches to appreciate the world around. They broke into brilliant blossoms to ensure the uninterrupted flow of life. My own children too, lived the cycle of life learning the great lessons it taught and enjoying it to the full.

But all through these years of struggle, I was being closely watched. They let me struggle alone, never sparing an ounce of water to keep me alive. I am

grateful, for they taught me the lessons of life. They were vigilant to see that I don't trespass into the space of others, for now, the land that was plain and barren abounds in rich vegetation. Some they planted and tended with greatest care while some grew wild and untamed. They take pains to keep me under check by pruning my branches, but my resilience has helped me each time to instill the breath of new life on to my dead arms. They say we have no feelings, as our screams are silent to their ears and our tears are invisible to their eyes. Each time the axe was on me, I screamed in pain and tears flowed profusely. They failed to notice amidst the wind and the rain. They are far more intelligent and hence they have to see to believe. They will never have to know our pain.

Now I feel my time has come, as I sense in their eyes the shadow of ruthlessness and cold dispassion. I have no more wish to fulfill on this earth. I have learnt the cycle of life and will live on till the last spark of resilience dies within me.

RGCB IN LOG PHASE FOR EVER

MANOJ P, PhD
AGM (Technical) & RSO
Genomic services

I remember my first day in RGCB, dropped into the rented house at Jagathy with an appointment letter received after a late night practical test, an interview subsequent to a written test held at women's college. I was reluctant to leave my MAHYCO R&D job at Bangalore and also there was a pressure from parents to come to my home state. In one of the rooms of Jagathy office, office manager and Purchase officer were sitting. I asked them will it be a wise decision to leave my job and joining here. Immediately office manager told that if people like you join here, the institute will grow fast, I felt impressed. The comment from Purchase officer was "I left BARC job at Mumbai and came here, at least you are coming to your home state, and take wise decision". On my meeting with Director Dr M.R. Das, he commented that 'you so lucky to get in this institute'. All the comments influenced me and I took one month joining time to resign my job at Bangalore and joined RGCB on November 17, 1997.

My visit to RGCB after one month was totally a different experience. Few labs were shifted to new bulding (animal house building) at Melarannoor road. I could see huge pillars coming up and felt the vibrations of an upcoming dynamic institute. Having experience in plant molecular biology in my previous job I was asked to join with Dr N. S. Banerjee (presently he is in University of Alabama, at Birmingham, USA) who was a very tough person and started assigning my work the very first day itself. The lab was in a small room and many people like George Thomas, EV Soniya, Shaji Philip, V.V.Asha, and George Varghese were sitting there and I also joined them. From the day 2 the work become very hectic with plant DNA preparation from Piper longum plants, microsatellite development from black pepper, plant tissue culture, transformation and RAPD analysis. Meanwhile I got married and was a day scholar from Karunagappally and became very difficult to reach institute on time because of the latearrival train.

As the time progresses the number of plants were increasing, lot of DNA preparation, PCR and manual sequencing. Luckily we got a sex specific plant marker in Piper longum which got published in Current science (1999, Banerjee. N. S, Manoj. P & Das. M. R, male-sex associated RAPD markers in Piper longum, Current science, 77(5): 693-695), which published with editorial remarks on coverpage. It was the time I got relaxed for

few days. I could meet my Kamaraj University mate Saravanakumar and got many friends like Sanjay, Rajasekharan, Sudha, Bindu, Laiza, Indu, Ajith, Edwin, Unni and many more. I managed to get a rented house nearby with family and my busy days started again and slowly the first student Seetha Krishnan joined with N.S. Banerjee and it was a big relief to me and my works got divided. Slowly more scientists like Purushothama, Manjula, students like Deepthy, Nisha NJ, joined and the lab was suffocating for space.

Slowly the lab expanded and scientists started moving to own labs in different floors, meanwhile the first DNA sequencer (ABI 310 prism, single capillary sequencer) came, at that time Dr NS Banerjee decided to leave the institute to US. Dr M.R. Das asked me to take care of the DNA sequencer, and become a part of DNA Fingerprinting facility. Iam continuing my RGCB life with, little research, multicapillarry sequencers, and genomic services. The institute has profoundly grown up with all high end equipments, facilities, with multifaceted scientific community, awards, publications and patents. Especially I am so thankful to the institute, that I could get a PhD by working here.

We have maintained very good relations with the students all the time and all of them are working as RGCB ambassadors at various parts of the world. Whenever they visit their parent institute they take time to find us and meet. As of today the number of students drastically increased and many are totally strangers to us. Presently RGCB has become an institute of international standard. Let us continue work together to make RGCB to new heights.

WILL I SURVIVE?

Soumya Daniel
Research Intern, Computational Biology,
RGCB, KINFRA.

Why choose RGCB? Even though I have given the answer numerous times, let me repeat again: first of all as we all know it is one of the prestigious institutes in the state and India. Second, the field of interest that I want to work was found here (in Trivandrum, of course!). Third, Trivandrum is my home town and hence I want to stay here and do my work! But alas! How much I tried I failed in all the chances of getting inside RGCB.

When was the first time I met RGCB? It was when I came here for a JRF post interview. The green campus on the way to canteen (OMG!!! What scenery! It must be really good to work here! And also the food.) Even though I couldn't see the labs I was attracted to the infrastructure and the quiet environment, the scientists' profile that I was introduced to from the website. Oh how I wished to work here!!! But NO! That chance didn't work for me. Then there were the days where I continually visited RGCB, for job interviews that now the interview panel knew me and my post-graduation project! But still luck didn't favor me!

Then came the call letter for an interview for an internship at RGCB, KINFRA Campus. (OK! There is one more campus at Kazhakootam?). RGCB-BIC, KINFRA,

not as I expected! Totally different campus. I didn't know anybody! No need to wait longer! It was my turn for the interview! Totally nervous, I entered the AC hall. I saw a panel of 4-5 interviewers whom I haven't seen before! (OMG!! It's very cold inside! Somebody switch off the AC please!!). Then came the questions of self-introduction, application level questions. (God! I didn't understand it easily what they were talking!). That sir took a lot of effort to make me understand the question and give the right answer! (I found a relief in that sir as well and I think this is the reason why he identified me in the first day itself!) And then I was asked to go! I stepped out of RGCB that day saying to my father who accompanied me "Papa! I don't have the luck to be a part of RGCB! I won't get it. The interview was dumb!" This time I didn't go Alas! Call letter came one day that you have been selected for the internship! (Wow moment!)

Entered into the RGCB-BIC campus, well officially! It was a real new time experience for me. I have never been to an institute before. I entered my lab and I was introduced to my colleague, lab mates and the staffs. Oh my! One of my sirs was the one who interviewed me!! Oh no! I was nervous, tensed and my heart is beating faster! (Whenever I see him I get tensed! Don't know why!) Later, I realized that whenever he asked me questions I gave blunders! What a student am I!!! He then introduced us to his team and we started off our classes.

When the teaching and hands-on started it was not as I expected or what I had studied in my post graduation, it was a lot more!!!!!! There was only one thing that was very very difficult for me- getting up early in the morning and the 40 minutes journey to the campus and going back in the evening (I am getting tired, I just want to go to sleep!!) but I really enjoy the ride- I always want the window seat with those headphones playing music in your ears, and well a little bit of sleep!!!

Coming back to the lab experiences, let me start with the people around. Initial days were a bit of adjustment problem for me. I always thought that some students out here are so arrogant. They don't even smile! But I was wrong! One was cute friendly and lovely and a good teacher as well! (I completed that module in fear) Days, weeks, months passed, and now I got to know the people around. It was great to be part of RGCB celebrations and events too.

It was then I realized I already completed 6 months here. Now, it's the time for my project work. Oh no! What a hectic work. The days were like papers, papers, programs, papers, programs, errors, errors, programs, etc (ho!) if this was a case in 6 months project work, then what would be PhD! I thought I won't complete this work on time. I took a lot of time to run even a simple program and my weekly progress was very poor. (O my!) But then I completed my project and project presentation went on good as far as I expected.

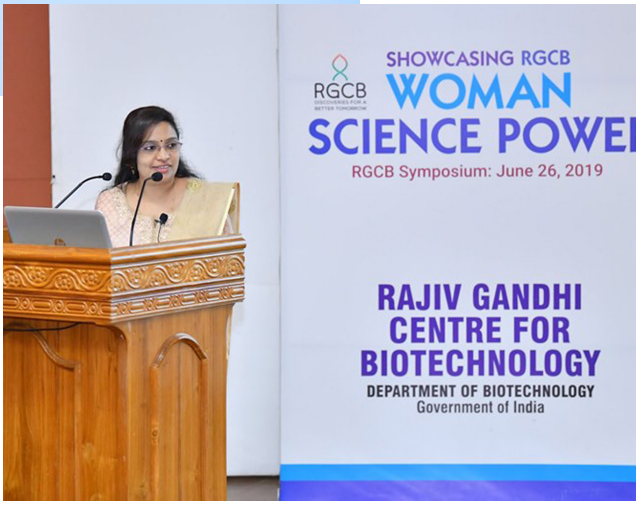
One year passed? I survived! I never thought that I would complete this year successfully. Seeing my initial days' struggle, my project work, the tiring to and fro journey, the less sleep hours….an year went fast. The people, the faculty and non faculty staff (especially, the canteen guys! Thank you for feeding me from day one with delicious food), students, lab mates, colleagues, experiences and time spent in and out RGCB with these people became memorable.

O my most favourite memorable moments will be the Onam celebrations, especially 'Shyamala', 'Lolithan', and 'Sathyasheelan' team. One thing I must say! I learnt patience and how to be patient! As one year gets over, I realized that if I could survive then anyone can!

RGCB
NEWS

WOMAN SCIENCE POWER

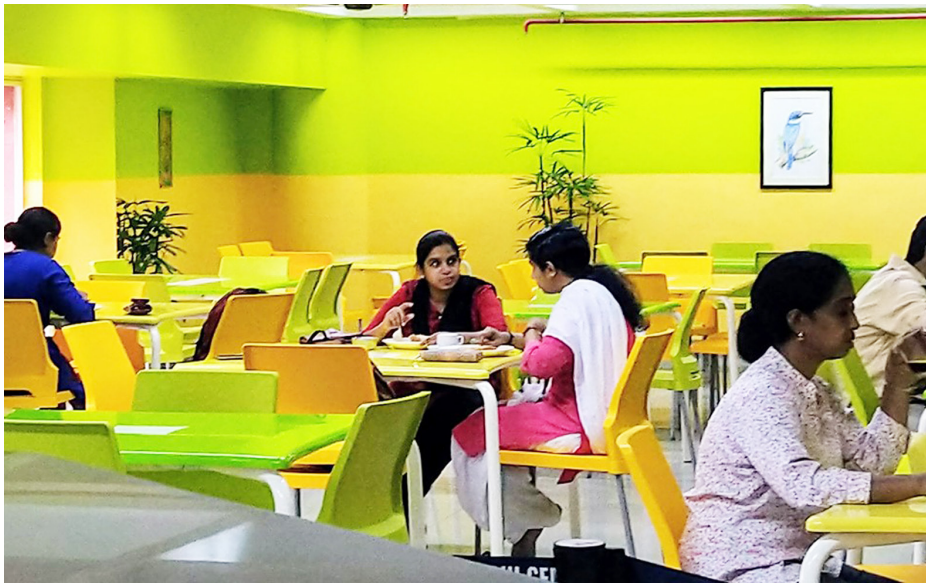
RGCB celebrated its woman workforce by showcasing its Woman Science Power in a one day symposium held on June 26, 2019. The passion and commitment of women to science is endorsed by endless discoveries. RGCB has always been a pillar of support for woman scientists. Of the 53 scientists, 23 are women. Of the 30 post doctoral trainees 19 are women. And finally of the 133 PhD students 95 are women. This seminar was a tribute to the performance of our women scientists. Nine women scientists presented their scientific journey and 17 women post docs and PhD students presented post docs.



RGCB NEWS

International Day of Yoga on June 21, 2019 was observed at RGCB

Recently renovated RGCB cafeteria, one of the coolest places to hang out in the campus!



RGCB Director, Professor M Radhakrishna Pillai honoring young investigators from University of Kerala, Dept. Of Computational Biology who did whole genome sequencing of Trichopus zeylanicus, an important medicinal plant whose IPR is owned by a tribal community of Kerala. An inspirational model for upcoming young scientists.

Independence Day celebrations at RGCB

Young Malayalam cinema heart-throb Tovino Thomas visits RGCB ahead of his upcoming movie on Forensic Science

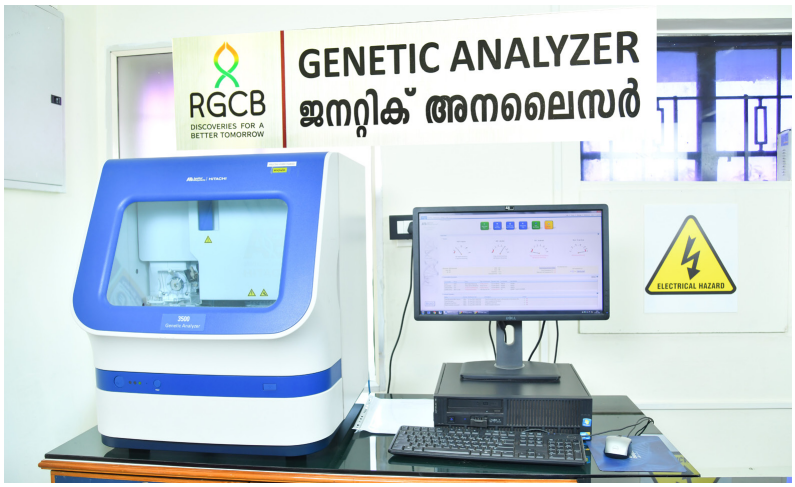
RGCB Medical Laboratory Services (MLS) has been given accreditation and certification by National Accreditation Board for Hospitals & Healthcare Providers (NABH).

MLS Centres:

RGCB Medical Laboratory Services District Hospital Nedumangadu, Thiruvananthapuram
RGCB Medical Laboratory Services General Hospital Neyyattinkara
RGCB Medical Laboratory Services General Hospital,Thiruvananthapuram
RGCB Medical Laboratory Services, Medical College, Thiruvananthapuram
RGCB Medical Laboratory Services, Medical College, Thiruvananthapuram
RGCB Medical Laboratory Services, Kerala State Secretariat, Thiruvananthapuram

The medical tests performed at these centres can be seen from the list given in the link
https://rgcb.res.in/mls-test.php

RGCB Regional Facility for DNA Fingerprinting has been granted certification under the Medical Laboratory Certification Programme by NABH.



RGCB NEWS

RGCB Sky Green vegetables grown and harvested from our own organic terrace garden was used for the Onam Sadya.

RGCB AWARDS

Professor M. Radhakrishna Pillai, Director, RGCB receiving the Management Leadership Award of the Trivandrum Management Association from The Honourable Governor of Kerala, Justice P. Sathasivam

Dr Soniya E V, Scientist G, being awarded the Best women scientist award, National Academy of Biological Sciences

Shivanshu Chandan Tiwari, PhD Student receiving best poster award for his work "Hypoxia induced survival signaling and dynamics resistance" at the First conclave of Department of Biotechnology, India TWAS Chennai

PhDs AWARDED

ROHITH KUMAR N

Title of thesis: *"Role of Fodrin in regulating mitosis and analysis of its interaction with Gamma-tubulin"*
Name of Mentor: Dr.Suparna Sengupta
Date: 03.06.2019

SABIRA MOHAMMED

Title of thesis: *"The Role Of Sphks/ S1p Axis In Innate Immune Response And Autoimmunity"*
Name of Mentor: Dr. Harikumar. B
Date: 21.06.2019

HEZLIN MARZOOK

Title of thesis: *"Role of upstream activators and downstream effectors of MTA1 associated tumor aggressiveness"*
Name of Mentor: Dr. M. Radhakrishna Pillai
Date: 06.06.2019

GREESHMA TOM

Title of thesis: *"Molecular mechanistic evaluation of the Anti-hepatocellular carcinoma activity of Glycopentalone from Glycosmis pentaphylla (Retz.) Correa and its Optimization using Nano-enabled drug delivery systems"*
Name of Mentor: Dr. V.V.Asha
Date: 11.07.2019

RAHUL SANAWAR

Title of thesis: *"Role of FAM171A1 in Triple Negative Breast Cancer."*
Name of Mentor: Dr.T.R. Santhosh Kumar
Date: 07.06.2019

SOUMYA A

Title of thesis: *"Molecular Evaluation of Interaction between Sperm Memberane Rafts and Zona Pellucida Proteins"*
Name of Mentor: Dr. Pradeep Kumar G
Date: 22.07.2019

PhDs AWARDED

JAYA MARY THOMAS

Title of thesis: *"Molecular mechanisms in the pathogenesis of cerebral Arteriovenous Malformation"*
Name of Mentor: Dr.Arumugam Rajavelu
Date: 29.07.2019

SAJITH RAGHUNANDAN

Title of thesis: *'Proteomic analysis of dormant and reactivated Mycobacterium tuberculosis, and characterization of Rv0474, a putative transcriptional regulator identified from reactivated bacterium'.*
Name of Mentor: Dr. Ajay Kumar
Date: 18.09.2019

MINAKSHI SAIKIA

Title of thesis: *"Identification of effective chemosensitizers for leukemia and melanoma chemotherapy".*
Name of Mentor: Dr. Ruby John Anto
Date: 08.08.2019

SMINI VARGHESE

Title of thesis: *"Molecular genetics behind the response of cultivated ginger (Zingiber officinale Roscoe) and the wild congener Z. zerumbet (L.) Smith to the soft rot pathogen Pythium myriotylum Drechsler"*
Name of Mentor: Dr. George Thomas
Date: 20.08.2019

Erratum: In the PULSE Vol.1 Edition 2 published in May 2019, the name of Revathy Nandhan is given incorrectly. The PULSE editorial team would like to correct the student's name. The editorial team apologises for any inconvenience that it may have caused. The correct name is Revathy Nandhan.

FLASH FROM THE PAST

Dr. Rakesh Sathish Nair
Division of Surgical Oncology,
College of Medicine,
The University of Illinois-Chicago

Currently work on primary and secondary assay development for HTS drug discovery for kinase inhibitors campaign-Target engagement- against Cancers- collaborative effort with UI Centre-Drug discovery.

Chicago is better known for 'deep' dish pizzas, 'jumbo' hot dogs and some of the 'tallest' buildings (including the Willis Tower, which was the tallest building in the entire Western Hemisphere for over 40 years!) in the US. I know this memoir shouldn't be about Chicago and trust me, it's not. I just wanted to mention the scale at which Chicago dreams, thinks and operates, and it is contagious! It has got into me and taught me how to think BIG and stay focussed!

At the Division of Surgical Oncology, here at the University of Illinois – School of Medicine, thinking BIG does mean flighting the Emperor of All Maladies (read, Cancer) all the time; but of course, not without coffee breaks! By the way, did I tell you that I am on a coffee break now? I know this nice cafeteria at the University is the best place for me to think and write down a few lines about my past, my times at RGCB!

They often say to know the present, one needs to explore the past. As a 13-year-old kid, who witnessed his uncle (diagnosed with cancer) suffering from radiation at the Medical College hospital, Trivandrum, I was completely shattered. I used to look at the tablet strips and note down the chemical compositions. The medicines and treatment couldn't even help him die peacefully, let alone the luxury of living. My small mind had no other option but to come in terms with the reality of death. I realised what was done wasn't enough to save my uncle. It wouldn't be wrong to say that this incident laid the seed for my future dreams. As I grew up, from Christ Nagar School to University College to CUSAT and finally to RGCB, this dream – a long cherished one – of researching Cancer, grew with me.

RGCB was indeed my gateway to the world of research. My mentor Dr. Priya Srinivas completely changed my way of thinking and gave me a global perspective. The feeling that you are also a part of global research community was something I have never experienced before. At RGCB, it was not only about research, research and more research. I still cherish those 10:30 am coffee sessions with lab mates, round table discussions, loose

FLASH FROM THE PAST

talks... Now, at this Cafeteria (where only intelligentsia talks reverberates) in Chicago, sadly realize all those were once in a life-time experiences. There is a long list of such experiences and memories at RGCB that lingers on in my memory forever. Onam celebrations at RGCB could be worth mentioning. I still remember, the cultural events that offered a great platform for us to showcase our talent/passions, those sarcastic skits, duet/group songs and lots of fun. I know that those beautiful times won't come again. Afterall, it's that longing what makes memories more valuable to us, isn't it?

Nonetheless, RGCB played a BIG role in shaping the researcher (with ethics, integrity and responsibility) that I am today. One of the proud moments that I remember from my RGCB days is related to a national emergency – H1 N1 outbreak. Even though that was not a great time for the country as a whole; as a researcher with RGCB, I believe I was able to do my part in helping the needy by (viral isolation and diagnosis). That was indeed a moment of truth for me, reaffirming the responsibility of a scientist towards the society. RGCB gave me not only science, but also taught how to be a responsible citizen. Proud that I am ex-RGCBite! What's more! If you are one of those budding scientists, I would ask you to make the most out of your time at RGCB, read more about your area of research, share your scientific experiences, feel free to ask shamelessly as ideas can come from anyone. Follow your dream and do not ever chain it up; try to think out of the box at dimensions and scales you have never thought of. Do not judge others and don't let others judge you! Be always modest and nimble, and keep in mind that you are not a part of an elite group, but just a bridge that helps the humanity to cross some of the biggest challenges in life.

There are lots of research support groups active on Facebook, LinkedIn and Research gate professional network. Try to be a part of all groups that can provide you wider visibility and exposure; do network with the right people. Before I bid adieu to this coffee break and leave for the lab, let me remind you that Chicago thinks BIG!

Think BIG and stay focussed!
Best!

KNOW ME BETTER

Mahendran K R, PhD
DBT-Ramalingaswamy Faculty Fellow
Interdisciplinary Biology

I grew up in Kozhinjampara, a small village in the Palakkad district, Kerala. My passion for science started in high school, where I had the opportunity to learn how molecules assembled to make larger structural and functional units. Biotechnology, in particular, became a special interest to me. This pushed me to pursue my Bachelor's studies in Biotechnology at Bharathiar University and I completed my Master's degree in Industrial Biotechnology at Bharathiar University. As a part of my Master's program, I got an opportunity to carry out my dissertation work in the Molecular Biophysics Unit at the Indian Institute of Science, Bengaluru. Here I was introduced to various biophysical approaches to gain structural insights into peptide toxins. My research at IISC laid the foundation for my subsequent doctoral studies on ion channels. My interest in biophysics led me to apply for a Ph.D. in the Laboratory of Biophysical Chemistry (Prof. Winterhalter and Prof Roland Benz) at Jacobs University Bremen, Germany (2006-2010). My doctoral research was funded by the Marie Curie research training network, and my doctoral thesis was closely related to this network, which facilitated me to gain entry into an international interdisciplinary network. Combining electrophysiology with microbiological assays, molecular dynamics simulation, and fluorescence spectroscopy, we could characterize the molecular basis of antibiotics permeation through outer membrane proteins of bacteria. This experience of working in an international collaborative environment not only fueled my scientific passion but also enriched me with different cultures around the world and their perspective of living.

After my Ph.D., I had the chance to expand my expertise into a new venture involving Prof. Mathias Winterhalter and Prof. Ulrich Keyser at the University of Cambridge, which was funded by the European Union (2010-2012). During my time at Cambridge in the Cavendish Laboratory, we developed a novel method of force spectroscopy combining biological nanopores with solid-state devices to characterize the translocation of biomolecules at single-molecule resolution in real-time. The University of Cambridge seminar series exposed me to seminal findings discussed by world-leading scientists, which greatly helped me shape my research career. During this time, I regularly taught Biophysical Chemistry courses to master students. I could also supervise 1 Ph.D. student independently right from initial design to both performance and implementation of experiments. This exposure in Cambridge further supported my scientific expertise but also provided me a life-long collaborator (both personally and scientifically), my wife Dr. Harsha Bajaj, whom I had met during this period.

I wanted to broaden my expertise and as a result, moved to the University of Oxford to work as a senior post-doctoral researcher in the laboratory of Prof. Hagan Bayley, a globally recognized and renowned scientist in the field of nanopore and chemical biology (2012-2016). The HB group works at the chemistry/ biology interface with a primary focus on membrane

KNOW ME BETTER

Dr. Mahendran (3rd from left) duing his PhD defence along with his PhD Committee at Jacobs University Bremen, Germany

channels and pores. Much emphasis has been laid to understand the fundamental science of these proteins and their applications. The group's multidisciplinary approach includes the use of chemical synthesis, protein engineering, and biophysical techniques. Remarkably, my studies opened up the possibility of using de novo designed α-helix barrels as components of single-molecule sensors or sequencers. During this time, I had an opportunity to interact with non-experts such as physicists, microbiologists to structural biologists; resulting in the generation of ideas for working projects and publications. Importantly, I have published research carried out at Oxford in leading journals such as Nature Chemistry, Nature Structural Molecular Biology, and Nature Protocols with my contribution as the lead author. My experience at Oxford made me look at research questions or problems from a very different perspective due to the dynamic and competitive nature of the lab.

Currently, I am working as a DBT-Ramalingaswamy faculty at Rajiv Gandhi Centre for Biotechnology, Trivandrum (Sep 2016-till date). My lab is equipped with high resolution single-channel electrical recording, which is a new technique introduced in India to study the structural and functional properties of membrane proteins. My research focus is to develop membrane protein pores for the single-molecule sensing to identify the size and chemical composition of biomacromolecules. Further, we engineer and build synthetic transmembrane pores and work on understanding the action of antimicrobial peptides, pore-forming toxins, and the design of pores with applications in nanobiotechnology. Currently, my group consists of 3 Ph.D. students and 3 Junior Research Fellows. More recently, our work on synthetic transmembrane peptide pores funded by Innovative Young Biotechnologist Award was published in JACS, one of the leading journals in Chemical Biology.

PEOPLE WHO MAKE RGCB A BETTER PLACE

Dileep Kumar R
Technical Assistant Grade 1 Gr II
Project Management Division

At RGCB, interviews are grand affairs, be it for the post of project fellows or PhD students. There are entrance examinations, followed by certificate verification and then discussions. Amidst the scores of interviewees and their guardians, one barely notices a young gentleman walking around with files, verifying certificates and facilitating the process. He is Dileep Kumar, who joined RGCB in 2007 after completing Bsc Physics and MBA in project management. Apart from support in the recruitment process, his major priority is maintaining files of Government of India funded grants of each Principal Investigator of RGCB. He also carries on his assumingly frail shoulders, the herculean task of maintaining files of each PhD student and Post doctoral fellows, disbursement of monthly salary to PhD students and Post docs from their respective funding agency, preparation of experience certificates, salary certificates and bonafide certificates for PhD Scholars. He is also involved in maintaining accounts of several of our service facilities. Dileep hails from Chempazhanty, where he stays with his wife, Divya, a Pharmacist in HLL and four year old daughter, Devaganga. He adores the work atmosphere at RGCB and has made several close friends from his associates. In his free time he enjoys watching 'Lalettan' (Mohanlal) movies and Sachin Tendulkar playing cricket.

Manoj Kumar R
Canteen Assistant

A Dubai returnee, Manoj is a familiar pleasant face in the RGCB Cafeteria. If you happen to walk across the Poojapura junction in the early mornings, you will see Manoj on his scooter rushing to procure farm fresh milk for our daily tea and coffee. When he is not in town purchasing meat, fish and vegetables that are not grown in Sky Green, he can be seen in the counter serving lunch and snacks. "The best part of my work is the interaction with students I have on a daily basis and they are all very friendly towards me" says Manoj who can also double up as a tea maker in the absence of Sivan, our regular 'chai-chettan' (chettan means big brother in Malayalam). All the canteen staff work for more than 12 hours a day, with only post breakfast Sunday as free time, which Manoj utilizes by playing cricket in the ground. He stays with his mother, wife and daughter, Manjima studying in eight standard.

PEOPLE WHO MAKE RGCB A BETTER PLACE

Meera NV
Assistant Librarian

Walk into the library and Meera pops up from behind the huge counters to help out with issue and return of books, journals and periodicals. A Master of Library Science from University of Kerala, Meera joined RGCB in 2003 when the first library was being set up in the present G N Ramachandran Faculty Seminar Hall. She was involved in the designing and cataloguing, when the library moved to the first floor and later to the third floor where it is currently located. Besides her duty at the circulation counter, she is also involved in displaying new arrivals on a weekly basis, technical processing of books, maintaining newspaper clippings related to important events, arranging books and journals for binding and also attending to the queries of the users and visitors of the library. She also provides help in checking plagiarized content of manuscripts, theses and grant applications. Meera is married to Rahul, Instrumentation Manager at RGCB and spends her free time in reading stories and autobiographies. True to her profession, she maintains a good collection of books in her home, where she lives with her husband and six year old daughter, Parvathy. Meera adores the silent atmosphere at RGCB and the efficient working team in the library, who do not hesitate to take over job commitments in the absence of one person.

Sajan IX
Manager-Technical Services

An electronic wizard who breathes and lives on a circuit board, Sajan joined RGCB in 2003 after serving on board a private biomedical engineering service provider for hospitals for seven years. His duties at RGCB involve installation of instruments and their repair and maintenance, preparation of technical specifications and requisites for the purchase of instruments and devices, Inventory management of instrument spares, installation & configuration of operating systems in computers.

Ask him about his hobbies and pat comes the reply, “electronics-designing”. This hobby of Sajan has been put to good use at RGCB, when he designed two stimulators, one of which was used for the discovery of natural antimicrobial peptides from skin secretions of Indian frogs and another in designing a sweat procurement collection equipment for breast cancer marker discovery using sweat proteomics. Sajan is also interested in repairing minor issues in the electrical circuits of certain instruments by using indigenously procured transistors and capacitors, which would otherwise result in expensive repair processes. A native of Ernakulam, Vypeen, Sajan moved to Tirumala in Thiruvananthapuram after joining RGCB, where he stays with his wife Anu, a staff at Kerala water authority and 8 year old daughter Anna Maria.

RGCB SCIENCE SPOTLIGHT

FASEB BioAdvances
RESEARCH ARTICLE | Open Access

Histone chaperone HIRA dictate proliferation vs differentiation of chronic myeloid leukemia cells

Aditi Majumder, Arya T. Dharan, Ishita Baral, Pallavi Chinnu Varghese, Ananda Mukherjee, Lakshmi Subhadradevi, Geetha Narayanan, Debasree Dutta

Journal of Global Antimicrobial Resistance
Volume 17, June 2019, Pages 187-188
ELSEVIER
Genome Note

Genome sequence of a multidrug-resistant *Klebsiella pneumoniae* ST78 with high colistin resistance isolated from a patient in India

Merin Paul [a], Lekshmi Narendrakumar [a], Arya R. Vasanthakumary [b], Iype Joseph [a], Sabu Thomas [a]

From the journal:
Biomaterials Science

Peptide decorated glycolipid nanomicelles for drug delivery across the blood–brain barrier (BBB)†

S. Meenu Vasudevan,[ab] N. Ashwanikumar[c] and G. S. Vinod Kumar *[a]

FEBS Letters
Research Article

Binding of alpha-fodrin to gamma-tubulin accounts for its role in the inhibition of microtubule nucleation

Jamuna S. Sreeja, Rohith Kumar Nellikka, Rince John, Krishnankutty C. Sivakumar, Easwaran Sreekumar, Suparna Sengupta

Papillomavirus Research
Volume 7, June 2019, Pages 75-81
ELSEVIER

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

Partha Basu [a], Richard Muwonge [a], Neerja Bhatla [b], Bhagwan M. Nene [c], Smita Joshi [a], Pulikottil O. Esmy [e], Usha Rani Reddy Poli [f], Geeta Joshi [g], Yogesh Verma [h], Eric Zomawia [i], Surendra S. Shastri [j], Sharmila Pimple [k], Devasena Anantharaman [l], Priya R. Prabhu [l], Sanjay Hingmire [c], Catherine Sauvaget [a], Eric Lucas [a], Michael Pawlita [m], Tarik Gheit [n], Kasturi Jayant [c], Sylla G. Malvi [c], Maqsood Siddiqi [o], Angelika Michel [m], Julia Butt [m], Subha Sankaran [l], Thiraviam Pillai Rameshwari Ammal Kannan [l], Rintu Varghese [l], Uma Divate [d], Martina Willhauck-Fleckenstein [m], Tim Waterboer [m], Martin Müller [m], Peter Sehr [p], Shachi Vashist [b], Gauravi Mishra [k], Radhika Jadhav [d], Ranjit Thorat [c], Massimo Tommasino [n], M. Radhakrishna Pillai [l], Rengaswamy Sankaranarayanan [q], for the Indian HPV vaccine study group

Contents lists available at ScienceDirect
Fungal Genetics and Biology
journal homepage: www.elsevier.com/locate/yfgbi
ELSEVIER

Genomic perspective of triazole resistance in clinical and environn *Aspergillus fumigatus* isolates without *cyp51A* mutations

Cheshta Sharma[a,1], Shijulal Nelson-Sathi[b], Ashutosh Singh[a], M. Radhakrishna Pillai[c], Anuradha Chowdhary[a,*]

frontiers in Veterinary Science
REVIEW
published: 27 August 2019
doi: 10.3389/fvets.2019.00283

Cytological Grading of Breast Tumors—The Human and Canine Perspective

*Krithiga Kuppusamy, Aarathi Rajan, Aarathy Warrier, Revathy Nadhan, Dipyaman Patra and Priya Srinivas**

RGCB SCIENCE SPOTLIGHT

Anim Biotechnol. 2019 Sep 25:1-10. doi: 10.1080/10495398.2019.1668402. [Epub ahead of print]

Investigations on the membrane interaction of C-terminally amidated esculentin-2 HYba1 and 2 peptides against bacteria

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SCIENTIFIC REPORTS
nature research

Chronic Pressure Overload Results in Deficiency of Mitochondrial Membrane Transporter ABCB7 Which Contributes to Iron Overload, Mitochondrial Dysfunction, Metabolic Shift and Worsens Cardiac Function

Vikas Kumar[1,3], Aneesh Kumar A.[1,3], Rahul Sanawar[2,3], Abdul Jaleel[1,3], T. R. Santhosh Kumar[1,2,3] & C. C. Kartha[1]

Cell Cycle
ISSN: 1538-4101 (Print) 1551-4005 (Online) Journal homepage: https://www.tandfonline.com/loi/kccy20

α-Fodrin is required for the organization of functional microtubules during mitosis

Rohith Kumar Nellikka, Jamuna S. Sreeja, Dhrishya Dharmapal, Rince John, Augusta Monteiro, Joana Catarina Macedo, Carlos Conde, Elsa Logarinho, Claudio E. Sunkel & Suparna Sengupta

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ELSEVIER
Research article
Neuroscience Letters
Volume 709, 14 September 2019, 134343

Alteration in the phosphorylation status of NMDA receptor GluN2B subunit by activation of both NMDA receptor and L-type voltage gated calcium channel

Mantosh Kumar [a, b, 1], Mathew John [a, 1], Mayadevi Madhavan [a], Jackson James [c], Ramakrishnapillai V. Omkumar [a]

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Article
Cite This: ACS Omega 2019, 4, 12808−12816
http://pubs.acs.org/journal/acsodf

Picolyl Porphyrin Nanostructures as a Functional Drug Entrant for Photodynamic Therapy in Human Breast Cancers

Betsy Marydasan,[*,†,§] Rajshree R. Nair,[†] P. S. Saneesh Babu,[†] Danaboyina Ramaiah,[‡] and S. Asha Nair[*,†]

ORIGINAL RESEARCH ARTICLE
Journal of Cellular Physiology WILEY

Adipocytes utilize sucrose as an energy source—Effect of different carbohydrates on adipocyte differentiation

Mahesh S. Krishna | V. M Revathy | Abdul Jaleel

BMC Microbiology
BMC Microbiol. 2019; 19: 146. PMCID: PMC6599329

Decoding the proteomic changes involved in the biofilm formation of *Enterococcus faecalis* SK460 to elucidate potential biofilm determinants

Karthika Suryaletha,[1] Lekshmi Narendrakumar,[1] Joby John,[2] Megha Periyappilly Radhakrishnan,[1] Sanil George,[3] and Sabu Thomas[*1]

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cancers
MDPI
Cancers (Basel). 2019 Aug; 11(8): 1193. PMCID: PMC6721458
Published online 2019 Aug 16. doi: 10.3390/cancers11081193 PMID: 31426393

Epigenetic Dysregulation at the Crossroad of Women's Cancer

Rakesh Kumar,[1,2,3,*] Aswathy Mary Paul,[1,4] Pranela Rameshwar,[2] and M. Radhakrishna Pillai[1]

RGCB BAZAAR

Ebrilive Health Care Pvt. Ltd.

Yummy GrowTM is a multivitamin gummy for children and adults. One of the main advantages particularly in children is compliance and easy administration of the supplements.

(a) (b)

(a) Soluble form; (b) Powder form

- Melanin is a group of natural pigments found in most organisms.
- It is basically insoluble in water.
- Melanin is produced through a multistage chemical process (melanogenesis), where the oxidation of tyrosine is followed by polymerization.
- Common uses are mainly in Cosmetic industry like. sunscreen lotions, suntan lotions, hair dyes, etc.
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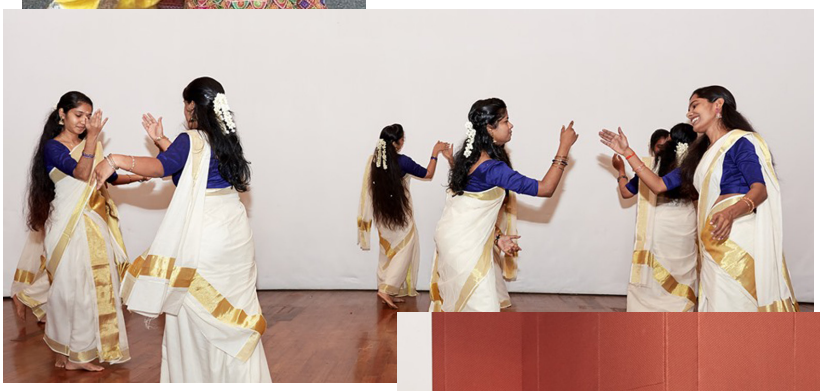
- The soluble melanin price is much less than chemically derived one.

Recommended dosage : 106 CFU per gram of feed for 30 days
Usage: Mix the entire content of bottle with 5KG of feed, Use within 6 months of packing

- The growth of aquaculture industry is hampered by pathogenic microorganisms.
- Bottleneck in intensive aquaculture and overcome by using antibiotics.
- The residuals resulted in the emergence of antibiotic resistant bacteria in aquaculture environments.
- Probiotics is one of the identified alternatives that can be an alternative to antibiotics for aquaculture industry.
- M/s Phytocom pharmaceutical Pvt. Ltd has formulated a feed probiotic for aquaculture using Lactobacillus plantarum MTCC 1407.

ONAM @ RGCB



'Athapookkalam' designed and created by the students and staff of the Mycobacterium Research Laboratory on the eve of Onam celebration at RGCB - The winning team

RGCB
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