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THE MICROCOSM

Department Of Microbiology

School Of Health Sciences

*The Assam Kaziranga
University*

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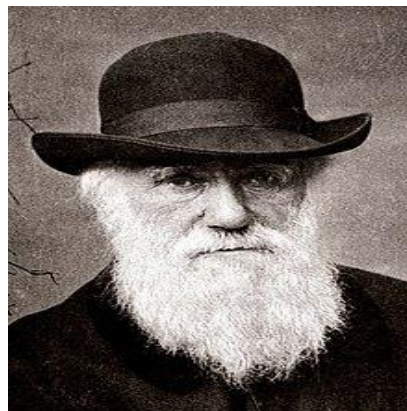
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“We cannot fathom the marvelous complexity of an organic being; but on the hypothesis here advanced this complexity is much increased. Each living creature must be looked at as a microcosm--a little universe, formed of a host of self-propagating organisms, inconceivably minute and as numerous as the stars in heaven.”

~Charles Darwin

EDITORIAL

It is with immense pleasure and pride that we are presenting the 1st edition of “The Microcosm” to the esteemed readers. “The Microcosm” is a quarterly newsletter of Department of Microbiology, School of Health Sciences The Assam Kaziranga University. It is an initiative taken to impart information and facilitate communication related to latest discoveries in the incredible field of Biology. The main motto of this newsletter is to cultivate scientific research aptitude within the postgraduate students and to highlight the efforts put forwarded by the students of the Department.

I want to thank all of the members of the Editorial Board who have contributed immensely for this newsletter.

I am also highly thankful to our Respected Associate Dean Dr. Suryakanta Swain and our HOD Dr. Pinky Moni Bhuyan for their inspiration and guidance, without which the newsletter would not have been a reality.

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MESSAGE FROM THE VICE CHANCELLOR

In varied ways, Kaziranga University has been distinct from day one: enlarging the scope and delivery of higher education so as to meet the needs of emerging and aspiring middle class, embracing an updated urban culture instead of confining itself to the same old school of traditional learning, and incessantly striving to grow with focus on nurturing an entrepreneurial spirit in students.

As you explore the university, you will discover the content and joy that we experience each and every day: faculty and staff enthused about their work, proud of the superiority of the University, excited about the opportunities at work, and - above all - dedicated towards preparing students for rewarding and impactful careers.

Helping students gain real-world knowledge that employers of today look for in their teams at work is our tradition, and boosting the overall capability of every student is one of our values.

As you look around KU, you will observe an astonishing diversity of programs, with people exploring new ideas, adopting new skills, pursuing new knowledge, creating new benchmarks, and filling the classrooms with a vibrancy that is backed by our commitment towards promoting research, novel discoveries, creativity, and vigorous intellectual exchange.

And this isn't all. We continue raising the quality bar and have set a tangible target that we can assess – through the success of our students in classroom, through those who graduate and are employed in their field of study, through employers who tell us that the graduates of Kaziranga University are prepared to excel in the workplace and also through alumni and donors who support our mission.

Kaziranga University strives to have a positive and enduring impact on the communities we serve and to help students become professionals and leaders of tomorrow.

I appreciate your interest in learning more about the prestigious learning hub, KU. Please explore our website, visit our campus, or speak with our students or alumni to get the full story.

Dr. P.K. Mishra
Vice Chancellor
The Assam Kaziranga University



MESSAGE FROM THE REGISTRAR

Spring is full of forethought and prospect, particularly true in 2021 during our continued combat against the COVID-19 pandemic. When reflecting on 2021, we are immensely proud of the tremendous achievements of the Department of M.Sc. Microbiology students & staff. I express my sincere gratitude to the Associate Dean (School of Health Sciences), faculty, staff, and trainees in the Department for their dedication to teaching, research, service, and learning. I also appreciate the continuous support from the University and School leadership and our generous students and staff. The Department of Microbiology students has achieved remarkable success despite unprecedented challenges in the 2020-2021 worldwide COVID-19 pandemic. In November 2020, our faculty and instructors rapidly adapted to the virtual or hybrid teaching model to ensure effective and safe learning for our M.Sc. Microbiology students.

Furthermore, through our tireless service and devotion to Health Sciences, Departmental faculty, staff, and trainees actively engage in and significantly contribute to the regional, national, and international research community. With our team effort in the Department, we are confident that we will reach brighter prospects in 2021-22. I encourage you to read the newsletter to recognize the accomplishments of our students, staff, and faculty and enjoy the stories of our M.Sc. Microbiology students and staff. I appreciate what you do for our Department!

Dr. Diganta Munshi
Registrar
The Assam Kaziranga University



MESSAGE FROM THE ASSOCIATE DEAN

I am pleased to present the first volume of the Newsletter of the Department of Microbiology, School of Health Sciences, The Assam Kaziranga University "THE MICROCOSM". The newsletter excites me with innovative work. Times have not been good for the past few months. Nevertheless, students with utmost passion and dedication solved the virtual hurdles and have come up with the eye-pleasing content ever. The Journey to achieve excellence continued despite pandemics and lockdown. The faculty, staff, and students continued their undeterred endeavors to achieve academic excellence and serve society and humanity. The dynamic leadership of our Hon'ble Vice-Chancellor and our Respected Registrar kept us motivated to fight against all odds and give our best despite adversities. After getting used to the online teaching method and learning, it was reasonable for students to showcase their creativity. So in this regard, this newsletter is a step forward for our students. I would like to appreciate the Head of the Microbiology Department, Dr. Pinky Moni Bhuyan, for her dedication and mentorship to the students, guiding them through these tough times, and bringing out the best.

Dr. Suryakanta Swain
Professor and Associate Dean
School of Health Sciences
The Assam Kaziranga University

LOTUS (*Nelumbo nucifera*) SILK

Lotus fabric is one of the rarest fabric in the world, produced on small scales across Myanmar, Cambodia, and very recently in Vietnam. Lotus silk is a kind of vegan silk, which is considered the most expensive fabric in the world. In Vietnam, the *lotus* is considered a national flower.

Rising above the muddy water gives the lotus flower and its silk the persona of how one can rise over hard times in life.



Image Source – businessinsider.com

Extracting fiber from lotus stems has been in practice since 1910. Later during the 90's, designers of Japan set up workshops to create a foreign market for their fabric. But, due to low demand in Japan, lotus fiber remains a rare and handmade textile.

The fabric looks like a blend of linen and silk, posing wrinkle-resistant and breathable qualities given by the molecular make-up of the lotus plant. Lotus fabric is known to cure the wearer of – *headaches, heart ailments, asthma, and lung diseases*. Lotus fabric is 100% organic, environment-friendly, and free from any kind of animal cruelty.

~Panchi Borthakur

“Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world. Science is the highest personification of the nation because that nation will remain the first which carries the furthest the works of thought and intelligence.”

~Louis Pasteur

Strobilanthes recurva: A NEW ADDITION TO THE FLORA OF MANIPUR, INDIA



Image Source –flowersofindia.net

“*Strobilanthes*” is a perennial under-shrub. It is distributed in the tropical regions of Asia. The name “*Strobilanthes*” is derived from the Latin word “*Strobilos*” meaning cone and “*anthos*”, meaning flower and shoot. The genus was first described by Christian Gottfried Daniel Nees Von Esenbeck in the 19th century.

In 1948, while surveying floral diversity in Manipur, a new species of “*Strobilanthes*” was discovered by F. Kingdon Ward, who also discovered the famed Shirui lily. This new floral species couldn't initially be identified. Later Professor John RI Wood identified the flower as “*Strobilanthes recurva*.” It is now commonly known as Manipur Coneflower. It is a rare, softly velvet, hairy undershrub. It is about 1.5 feet tall. The leaves are ovate, pointed, toothed and the lower leaves have long stalks.

Flower size 1.25 inches long, tubular – trumpet-shaped and is nearly straight. They are borne in loose cylindrical spikes 5 cm long and 1.2 cm wide.

As it is found in only one region of Manipur, it should be assessed for threat status using categories of IUCN, and take necessary conservation action.

~Nikita Chetia

CAN VIRUSES SURVIVE IN OUTER SPACE

Outer space is often depicted as a harsh environment. It's effectively an airless vacuum, and anything residing there would be subjected to high amounts of cosmic radiation and frigid temperatures.

The current circumstances surrounding COVID-19 have raised some particularly interesting questions surrounding how viruses and other microbes survive in outer space.

Firstly, in all spacecraft missions, the workers and the ship they build are carefully sterilized during production. After a mission is completed, it may enter an extreme sterilization process called dry heat sterilization. This is exactly what it sounds like – the object in question is loaded into a room where it can be baked to 120° Celsius (or 248° Fahrenheit) for up to 30 hours to kill as many bacterial spores as possible.

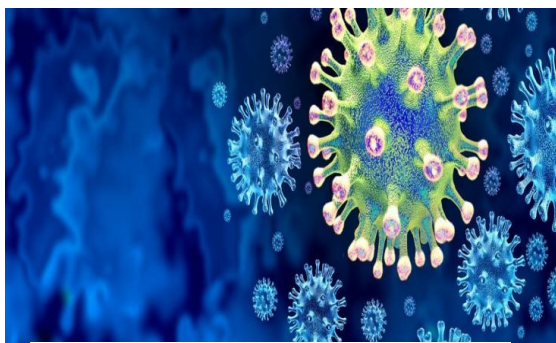


Image Source – Olhar Digital

In some cases, other methods are used, but no matter the method used, it's virtually impossible to eliminate all microbes.

As for viruses, viruses need a host to survive, and most viruses can only survive for about a week without a host under the best possible conditions. In outer space, there are no hosts, and the harsh environment is a far cry from "the best possible conditions." That said, viruses don't last long in space at all – and almost certainly not long enough for a spacecraft to reach another world.

~Darshana Gogoi

PHYSIOLOGY & TOXICITY OF FLUORIDE

Fluoride has been described as an essential element needed for normal development and growth of animals and extremely useful for human beings. At high levels it has been known to cause dental and skeletal fluorosis. Fluoride concentrations of specialized body fluids differ from those in plasma. The fluoride concentration of human milk is less than 50% of that of simultaneously collected plasma. Therefore, mother's milk is a negligible source of fluoride in breast-fed infants. The fluoride concentration in saliva is variable and higher than that in plasma because topically applied fluoride is retained in the mouth.

Fluoride-containing chewing-gums can be regarded as slow-release vehicles of active fluoride compounds that dissolve rapidly in saliva. Use of fluoride gums provides repetitive topical application of low levels of fluorides prolongs the elevation of salivary fluoride levels and simultaneously stimulates the salivary flow rate, clearance of carcinogenic substrates and increase of the salivary and plaque pH value. Use of fluoride-containing gums requires caution, since some individuals may be in the habit of using larger quantities of chewing gum.



Image Source – Sabka Dentist

Fluoride is naturally present at low concentration in most fresh and saltwater sources and may also be present in rainwater. Fluorine, in the form of fluoride, is considered to be a micronutrient for human health, necessary to prevent dental cavities, and to promote healthy bone growth.

~Juri Kalita

PROTOZOOLOGY

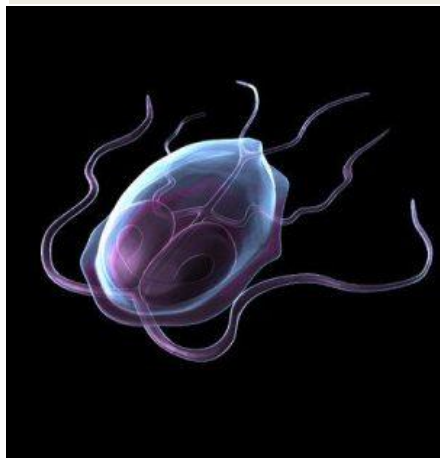


Image Source – wordpress.com

“PROTOZOOLOGY” is a branch of zoology that is concerned with the study of protozoa. Protozoa is a microscopic eukaryote that either exists as parasite or free living organisms.

Protozoology as a field of study is divided into following branches:

- Soil Protozoology.
- Medical Protozoology (Parasitic protozoa).
- Veterinary Protozoology.

The study of protozoans had its beginning in the latter half of the 17th century when “Antonie van Leeuwenhoek” first observed protozoans by means of his invention, the microscope.

They are common and are of particular interest as they cause several diseases like malaria, amoebic dysentery and African trypanosomiasis (sleeping sickness) etc. in humans.

Not only this, certain protozoa named Foraminifera, have extensive fossil records and are useful to geologists in locating petroleum deposits.

Protozoans also serve as experimental organisms in many studies of cell and molecular biology.

~Rashmi Dubey

Do you know!

In 1918,
influenza virus
killed more
people than
those who died
in World War I.

GOLDEN RICE (*Oryza sativa*)



Image Source – golden rice/time.com.com

Golden rice is an artificially altered variety of rice developed by a German Scientists in late 1990s. It is produced through genetic engineering which consists of beta carotene and vitamin A. Using *Agrobacterium* the entire beta synthesis pathway was transformed into rice endosperm which results in the formation of yellow endosperm and acquired the name golden rice. The yellow colour of the rice is due to beta carotene formed in the endosperm.

Golden rice acts as a precursor of Vitamin-A deficiency that causes childhood blindness and kills under- 5 years old children globally. Consumption of golden rice causes many health benefits in young children and mother because of the presence of beta carotene and vitamin A whereas white rice lacks beta carotene and vitamin A. As rice is the essential food crop for half of the world population, the Golden rice project was started to genetically modify rice to increase its nutrition value.

~Ankita Rajkhowa

NEW SPECIES OF MUSHROOM FOUND IN MEGHALAYA

In the monsoon of 2020, a team of scientists from India and China visited Assam to study the diversity of fungal species found in the region. Many species of fungi were spotted, some were new to science. During their visit they heard of unique light-emitting mushroom species spotted in Meghalaya; locals call it “electric mushroom”. As such, the team headed to West Jaintia Hill District of Meghalaya. It was night and a local guide took the team to a bamboo forest and asked them to turn off their flashlights. After some time, the group was amazed by what they saw; amid darkness, a green glow emerged from the dead bamboo sticks that were surrounded by tiny mushrooms. The fungus emits its own light- a phenomenon known as bioluminescence.



Image Source – indiaindian.com

This new species is one among the world’s 97 glowing species of mushrooms and was named “*Roridomyces phyllostachydis*”. This is the first species of the genus to be found in India. It was first sighted on wet August night near a stream

in Mawlynnong in East Khasi Hill District and later in West Jaintia Hill District. Interestingly, the residents use the glowing bamboo stick as a natural torch to navigate the forest at night.

Later, a detailed examination of the fungus revealed that it grew only on specific dead bamboo (*Phyllostachys mannii*). Samantha Karunarathna, a senior mycologist at the Chinese Academy of Sciences said more research is needed to understand the physiology of the fungus.

~Porikhit Borpujari

AMAZING FACTS

Some Amazing facts!!!

Our body has more microbes than human cells.

Microbes outnumber all other species and make up most living matter (~60% of the earth’s biomass)

Antibiotics can cause asthma and obesity.

Amazing facts of Fungi

Mushrooms and other fungi release an incredible amount of spores into the atmosphere every year and contributing up to 50 million tons of particulates.

In contrast to plants, fungi do not have chlorophyll, lack leaves, and roots and never form flowers, fruits, or seeds.

Amazing facts of Bacteria

There are around 40 million bacteria in a gram of soil.

There are around as many bacteria cells in a human body as there are human cells.

~Mridusmita Rabha

VARIOLATION & VACCINATION



Image Source – nytimes.com

Variolation was a primitive method of immunizing people against smallpox by intentionally injecting them with the dried crusts derived from smallpox pustules that were either inhaled or inserted into small cuts in the skin. According to sources the variolation was first practiced by the Chinese as early as the 15th century. They practiced variolation by nasal insufflations. In 1718, Lady Mary Wortley Montagu the wife of the British ambassador in Constantinople observed the positive effects of variolation on the native Turkish population and had the technique performed on her child.

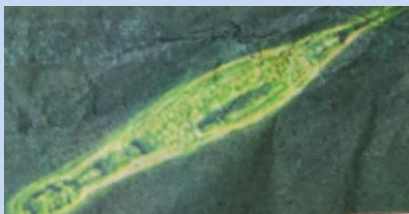
Despite its successes, variolation wasn't a cure-all. In many cases, variolated people simply spread smallpox to other people. Here is where vaccination came into the picture. The first successful vaccine -the smallpox vaccine was introduced by Edward Jenner in 1799. Awareness of Edward Jenner's pioneering studies of smallpox vaccination led Louis Pasteur (1822-1895) to propose that vaccines could be found for all virulent diseases.

Vaccines are the most effective way to prevent infectious diseases. They prevent up to 3 million deaths worldwide every year. Today we are amid covid-19 pandemic which is caused by the family of viruses *Coronaviridae*. So vaccines are a critical new tool in the battle against covid-19 and it is hugely encouraging to see so many vaccines going into development.

~Anuska Sarmah

NEWS: RECENT DISCOVERIES/RESEARCH

Small creature that have been gathering in the snow for 24,000 years have life.



Source – Dainik Janambhumi Newspaper, 10th June, 2021.

A very small organism has re-emerged after 24,000 years of snow-packed vast soil in north-eastern Siberia throughout the year. This small organism is known as worm. They propagated without reproduction. This is the only organism that has been living for the longest time in the snow.

The world's tiniest lizard discovered.



Source – www.isbglasgow.com

Researchers found smallest reptile known as *Brookesia nana* which is scarcely larger than a fingernail. It is found in the mountain rainforests of Madagascar. It is a member of Chameleon family which does not change colour.

Creation of Human Organism.



Source - www.isbglasgow.com

Scientists from Massachusetts General Hospital and Harvard Medical School have discovered how to regenerate the function of human heart tissue through adult skin cells. Through stem cells, humans can grow another organ. This is associated with the regenerative nature of living organism.

Collected by: Priya Subadar

“Humanity shares a common ancestry with all living things on Earth. We often share especially close intimacies with the microbial world. In fact, only a small percentage of the cells in the human body are human at all. Yet, the common biology and biochemistry that unites us also makes us susceptible to contracting and transmitting infectious disease.”

~Brenda Wilmoth Lerner

BLACK FUNGUS

Black fungus, also known as *Mucormycosis* is a dangerous infection. It is caused by groups of molds called mucormycetes and often affects the sinuses, lungs, skin and brain.

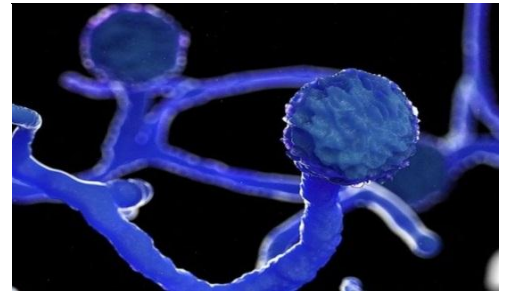


Image Source- BBC

Some of the symptoms of

Mucormycosis will depend on where in the fungus is growing. They may include: fever, cough, chest pain, headache, diarrhea etc.

It is also known as *Zygomycosis*. It also includes some complications like blindness, thrombosis.

People who are at high risk include patients who are already patients of COVID-19, diabetes, iron overload, cancer, kidney problems, organ transplant etc.

~Rashmi Dubey.

Spirulina: A SUPERFOOD CUM ALCOHOLIC BEVERAGE ADDITIVE

Spirulina is a type of blue-green algae which is believed to be one of the oldest life forms on Earth. Often hailed as a super food, Spirulina is a non-toxic species of *Arthrospira* bacteria. It has secured GRAS (Generally Regarded as Safe) for use as food at a level of 0.5–3 g per serving. Spirulina was first used by the Aztecs as an endurance-booster.

Spirulina has been widely used to brew beer in many microbreweries around the world. In the U.S, some



Image Source- Abode Stock

microbreweries produce seasonal beer, called “green beer” for St. Patrick’s Day. Captain Lawrence Brewery in New York also brews green beer named “Gimmicky Green”. The Freetail Brewing Company in San Antonio brewed a Belgian-style wheat beer using powdered Spirulina, named “Spirulina Wit” that tastes semi-sweet. Red Dot Brew house in Singapore and Mandalay Brewery in Myanmar also produce the Spirulina beer year-round. The alcohol content in their beer is 5%, and Spirulina extract content is approximately 0.5%. A new technique for Spirulina patented in Chinese wine uses ethanol and water to extract chlorophyll, carotenoids, and phycocyanin from Spirulina powder twice. Spirulina has been recognized as a nutritious and balanced food. The main ingredient is called phycocyanobilin which makes up about 1% of Spirulina.

It contains a variety of essential nutrients, such as β -carotene, vitamin B12, γ -linolenic acid and the blue pigments inhibit cancer cell growth and strengthens the immune system.

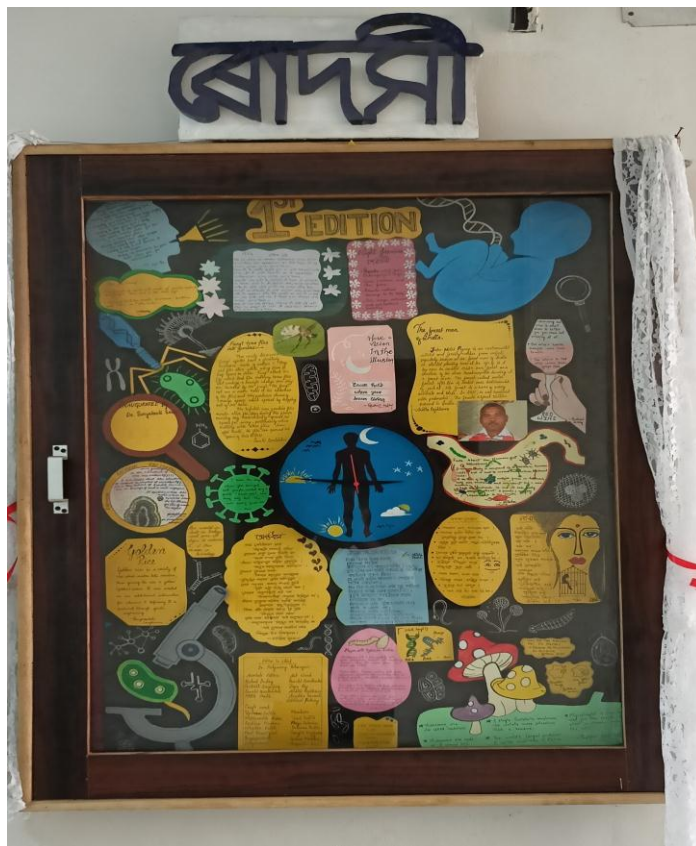
~Dr. Pinky Moni Bhuyan

STUDENT'S ACHIEVEMENTS

INAUGURATION OF THE DEPARTMENTAL WALL MAGAZINE



Cutting of ribbon by Respected Associate Dean, School of Health Sciences and Respected H.O.D, Department of Microbiology, School of Health Sciences.



1st Edition of the Wall Magazine of Department of Microbiology, School of Health Sciences.



Students of M.Sc. Microbiology (2nd Semester) with Respected Associate Dean and Faculties of School of Health Sciences.



M.Sc. Microbiology (2nd Sem) students with Dr. Pinky Moni Bhuyan, H.O.D, Department of Microbiology, School of Health Sciences.

STUDENT'S PARTICIPATION IN VARIOUS COMPETITIONS



STUDENT'S PARTICIPATION IN VARIOUS COMPETITIONS

 **KAZIRANGA UNIVERSITY**
KNOWLEDGE & BEYOND

CERTIFICATE

This is to certify that Ms Panchi Borthakur of School of Health Sciences, The Assam Kaziranga University, Jorhat has secured First place in art competition held on The World Environment Day, 5th June-2021. Congratulations for the active participation.


Dr. Shome S. Bhunia
Event Coordinator



Prof. (Dr.) Suryakanta Swain
Professor & Associate Dean
School of Health Sciences




 **KAZIRANGA UNIVERSITY**
KNOWLEDGE & BEYOND

CERTIFICATE

This is to certify that Ms Rashmi Dubey of School of Health Sciences, The Assam Kaziranga University, Jorhat has secured Third place in essay writing competition held on The World Environment Day, 5th June-2021. Congratulations for the active participation.


Ms Ibasiewdor Mawlein
Event Coordinator


Prof. (Dr.) Suryakanta Swain
Professor & Associate Dean
School of Health Sciences



 **KAZIRANGA UNIVERSITY**
KNOWLEDGE & BEYOND

CERTIFICATE

This is to certify that Ms Chayanika Bora of School of Health Sciences, The Assam Kaziranga University, Jorhat has secured Second place in essay writing competition held on The World Environment Day, 5th June-2021. Congratulations for the active participation.


Ms Ibasiewdor Mawlein
Event Coordinator


Prof. (Dr.) Suryakanta Swain
Professor & Associate Dean
School of Health Sciences




STUDENT'S PARTICIPATION IN VARIOUS WEBINARS



STUDENT'S PARTICIPATION IN VARIOUS WEBINARS




CERTIFICATE OF PARTICIPATION
 This is to certify that
Ms. Sumita Barik
 participated in the webinar on "Opportunities for Innovation and Entrepreneurship"
 organized by The School of Basic Sciences, The Assam Kaziranga University
 in association with Bio-Nest NIPER-G Incubation Centre.

 **Dr. Sonali Roy**
 Incubation Manager
 Bio-Nest NIPER-G
 Incubation Centre

 **Dr. Jayanta K Sarmah**
 Prof. & Dean
 School of Basic Sciences
 The Assam Kaziranga University

 **Dr. Diganta Munshi**
 Registrar
 The Assam Kaziranga University






Certificate of Participation
 This is to certify that
Rashmi Dubey
 participated in the Awareness Program on "Cancer Prevention & Healthy Lifestyle"
 organised by Sanjeevani – Life Beyond Cancer in association with Department of Social
 Work, Kaziranga University on 11th January, 2021.

 **Anil Ahluwalia**
 Co-Founder, Sanjeevani - Life beyond Cancer

 **Aditya Bhatta**
 Assistant Professor (Social Work)
 Kaziranga University

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www.youtube.com/user/Sanjeevani @Sanjeevani_LBC <https://www.facebook.com/SLBCMain/>




 This is to certify that
Rashmi Dubey
 Has Participated In Webinar On **Shapeshifters In Cancer : How Do Tumor Cells Switch Among Different Cell States to Drive Metastasis & Drug Resistance?** on 24 June 2021.

 **Prof. M. V. Krishna Sastry**
 Project Co-ordinator & Principal Investigator, Scientist G
 NCCS, Pune

 **Dr. Nagaraj Balasubramanian**
 Principal Investigator, Associate Professor,
 ISER, Pune

 **Dr. Anamika Krishampal**
 Principal Investigator, Senior Domain Specialist,
 Persistent LABS, Pune


 HOLISTIC REPRESENTATION OF HUMAN BODY



STUDENT'S PARTICIPATION IN VARIOUS WEBINARS





CERTIFICATE OF PARTICIPATION

This is to certify that
Rashmi Dasgupta

participated in the webinar on "Opportunities for Innovation and Entrepreneurship"
organized by The School of Basic Sciences, The Assam Kaziranga University
in association with Bio-Nest NIPER-G Incubation Centre.


Dr. Sonali Roy
Incubation Manager
Bio-Nest NIPER-G
Incubation Centre


Dr. Jayanta K Sarmah
Prof. & Dean
School of Basic Sciences
The Assam Kaziranga University


Dr. Diganta Munshi
Registrar
The Assam Kaziranga University





CERTIFICATE OF PARTICIPATION

This is to certify that
Prashant Boruah

participated in the webinar on "Opportunities for Innovation and Entrepreneurship"
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Dr. Sonali Roy
Incubation Manager
Bio-Nest NIPER-G
Incubation Centre


Dr. Jayanta K Sarmah
Prof. & Dean
School of Basic Sciences
The Assam Kaziranga University


Dr. Diganta Munshi
Registrar
The Assam Kaziranga University

