Society of Biological Chemists INDIA 1930

SBC(I) NEWSLETTER

Vol. No. 114 April 2021 Email: sbcihq@gmail.com http://www.sbcihq.in

Dear friends,

While I am writing this piece, our country is probably witnessing its worst health crisis. The virus is spreading faster than before and choking life out of our fellow citizens. Health infrastructure has nearly collapsed in all major cities and experts feel even though some cities are nearing their peak, India is still far away from getting out of this situation. Furthermore, a third wave is also expected. Many researchers across the globe are now trying to understand the reasons behind such an unprecedented surge despite the fact that many reports pointed towards herd immunity in many metropolitan cities. The situation can be attributed to many factors, such as the emergence of highly infectious variants, unrestricted mass gatherings, indulgence into covid inappropriate behavior and very low vaccine coverage. Pandemics have always brought challenges across public and health sectors, but the scale at which COVID-19 has affected our lives is unimaginable. Even though this phase might pass soon, there is absolutely no scope for being complacent, until the entire population is vaccinated. The lacunae in our health system stands exposed. India needs to ramp up the health infrastructure to manage any such future crisis. It all stands in the hands of the health and scientific experts and the center and state governments should listen to the warnings presented before them.

Nonetheless, troubled times always script new success stories. With the COVID-19 pandemic around, Indian science also reached new heights, with indigenously developed home-based testing kits and oxygen concentrators soon to hit the markets. We also made unprecedented progress in developing 'Swadeshi Vaccines'. Covaxin supplies are increasing steadily. While Covishield, an AstraZeneca product manufactured by Pune-based Serum Institute of India still has to meet the majority of the demand, the good news is that we will soon have a couple of new made-in-India vaccines which also includes mRNA-based vaccine being developed by Gennova Biopharmaceuticals, Pune against Covid-19 that will be available to our population.

The pandemic also brought new challenges in our scientific lives. Not only we went to an online teaching platform, but also shifted all other scientific interactions on such platforms. In the SBC(I) context, all our executive meetings were well-conducted online with perhaps more regularity and increased attendance. In one instance, the SBC(I) headquarter organized an executive meeting not only with its core members but also with all the SBC(I) local chapter convenors. The meeting was well attended. It was decided that SBC(I) would, on a limited case-by-case basis, provide financial assistance to support local chapter activities. In normal times, organizing such a meeting would have been rather cumbersome. One wonders if traveling is really needed

Kindly note the change in the website address: http://www.sbcihq.in

for such meetings. I vote for an environment-friendly virtual platform and that should become our 'New Normal' even after the pandemic.

The biggest fall out of the pandemic was that our so well-attended annual meetings could not be held. But to keep the tradition going, thanks to Dr. K Satyamoorthy, the Director, Manipal School of Life Sciences (MSLS), Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, we were able to co-host the 89th annual meeting of SBC(I) along with the 8th Annual Symposium of the Coastal Karnataka Chapter. During this meeting, which was held in November 2020, we hosted the prestigious SBC(I) award lectures for 2020. The award winners included Dr. N. Ganesh, IISc, Bangalore for Dr. Sreenivasaya Memorial Award; Dr. Maitrayee DasGupta, University of Calcutta, Kolkata for Dr. IS Bhatia Memorial Lecture Award and Dr. Susanta Kar, CDRI, Lucknow for Dr. AN Bhaduri Award. The virtual symposium, and the award lectures were well attended by more than 200 researchers and students from coastal Karnataka and various institutes all over India. This year's 90th annual meeting at Amity University Haryana is scheduled for December 2021 but due to the prevailing pandemic, any decision of holding it virtually or as a normal meeting remains pending. I hope that we are able to take a call on this by the coming summer months (June-July). This year's prestigious award lectures include M Shadaksharaswamy Endowment Lecture Award, PB Rama Rao Memorial Award, CR Krishna Murti Award, and A Krishnamurthy Award. Most likely, the nominations for the SBC(I) lecture awards will be invited this year as well and the selected awardees will be requested to give award lectures in the 90th annual SBC(I) meeting planned for December 2021 on whatever platform feasible around that time.

SBC(I) membership has been witnessing a steady increase which now has reached 4390 active members, majorly life members. Our SBC(I) membership remains impressive but if we can encourage more of our students to become members that would enhance our outreach to real stakeholders.

Dr. Subba Rao Gangi Setty, Indian Institute of Science, Bangalore attended the International Conference of KSMCB during October 5-7, 2020 through an online platform on behalf of SBC(I).

I have communicated with you through SBC(I) Newsletter already twice (2019-20). Normally, the President's tenure is only for two years but again due to the current unprecedented situation, our terms were extended by another year. I sincerely hope by the end of the year we are all immunized against COVID-19 and are back to OLD normal and the SBC(I) can also have a new President.

Prof. Rajendra Prasad
President
Society of Biological Chemists (India)

90th SBC(I) Annual Meeting

Metabolism to Drug Discovery:
Where Chemistry and Biology Unite

Dates: 16th to 19th December 2021

Venue: Amity University Gurugram, Haryana

Organizer: Prof. Rajendra Prasad, Director,
Amity University Haryana, Manesar,
Gurgaon, Haryana 122413

Please refer our website sbcihq.in for more information

Report on the 8th Annual Symposium of the Coastal Karnataka Chapter & The 89th Annual Meeting of the Society of Biological Chemists (India)

Hosted by Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal

The 8th Annual Symposium of the Coastal Karnataka Chapter and the 89th Annual Meeting of the Society of Biological Chemists (India) (SBC(I)) was virtually inaugurated by Dr PLNG Rao (Pro-Vice-Chancellor - Faculty of Health Sciences, MAHE, Manipal) in the presence of Dr Usha Vijayaraghavan (IISc, Bengaluru; Vice-President, SBC(I)) and Dr K Satyamoorthy (Director, Manipal School of Life Sciences (MSLS), MAHE, Manipal) on November 18, 2020. The annual meeting was organized and hosted virtually by MSLS jointly with MAHE, Manipal and the Society.

In his presidential address, Dr Rao motivated the online audience on the importance of youngsters identifying their areas of scientific interest and contributing to the society through their research work, supported by the senior scientists in the field. Local meetings such as these help in their motivation and facilitating interactions. Dr Usha Vijayaraghavan provided insights into the activities of SBC(I) and its chapters. Earlier, Dr Satyamoorthy welcomed the gathering and reiterated the contribution of the scientific community in unraveling the pathogenesis of this current pandemic as the need of the hour. He pointed out the crucial role played by local chapters of SBC(I) in promoting Indian science. Dr Manjunath Joshi (Associate Professor, MSLS) proposed the vote of thanks.

This one-day symposium included a series of lectures and discussions on various topics related to biological sciences, delivered by renowned researchers from different part of India and the coastal Karnataka region. As part of the 89th Annual Meeting of SBC(I), the symposium hosted the several prestigious SBC(I) award lectures including the Dr. Sreenivasaya Memorial Award, Dr. IS Bhatia Memorial Lecture Award and Dr. AN Bhaduri Award. The virtual symposium was attended by more than 200 researchers and students from coastal Karnataka and various institutes all over India.

NOMINATIONS FOR 2021 SBC (I) AWARD

This year Prof. M Shadaksharaswamy Endowment Lecture Award, P.B. Rama Rao Memorial Award, C. R Krishna Murti Award, and A. Krishnamurthy Award (best paper published in an Indian Journal) will be given at the Annual Meeting to be held at Amity University, Gurgaon, Haryana. Please send nominations in a single consolidated PDF including cover letter addressed to Hon. Secretary, SBC(I) along with membership status and brief resume of the nominee to sbcihq@gmail.com

All nominations must be submitted online by 30th September 2021.

CRITERIA FOR 2021 AWARDS

PROF. M SHADAKSHARASWAMY ENDOWMENT LECTURE AWARD	Year of Commencement : 1982 Frequency : Once in three years Value : Rs.10,000/- with a citation **Eligibility:** 1. Eminent teachers in Biological Chemistry & Allied Sciences at the postgraduate level in Indian Universities, deemed Universities and Institutions of higher learning for their contributions in teaching and research 2. No age limit 3. The eligible person must be nominated by life member of the society and self-nomination is not accepted. 4. The recipient of the award should give a lecture at the time of annual meeting of SBC(I) on a topic of his/her choice.

P. B. RAMA RAO MEMORIAL AWARD	Year of Commencement : 1983 Frequency : Once in three years Value : Rs.10,000/- with a citation Field of research : Original research contributions in Plant Biochemistry, Molecular Biology & Allied Sciences **Eligibility:** 1. The award is for the best work done in the field of Biochemistry and Allied Sciences in India (suggested areas are nutrition, as related to cell and membrane biology, neurochemistry immunology, cancer research, biochemistry of brain etc.) 2. The award is open to all scientists working in India irrespective of their membership in the Society. 3. No age limit. 4. The eligible person must be nominated by life member of the society and self-nomination is not accepted. 5. If nominations are not received before the scheduled date, the awards committee can itself nominate a suitable candidate for the award. 6. A lecture will be scheduled at the Annual Meeting of SBC(I) and presentation will be made at that time.

C. R. KRISHNA MURTI AWARD	Year of Commencement : 1995 Frequency : Once in three years Value : Rs. 10,000/- with a citation **Eligibility:** 1. The award is for the best work done in the field of Biochemistry and Allied Sciences in India 2. The award is open to all Indian Scientists who must be member of the Society for at least two years or life member. 3. No age limit. 4. The eligible person must be nominated by life member of the society and self-nomination is not accepted. 5. A lecture will be scheduled at the Annual Meeting of SBC(I) and presentation will be made at that time.

A. KRISHNAMURTHY AWARD	Year of Commencement : 1976 Frequency : Annually Value : Rs. 2,000/- with a citation **Eligibility:** 1. The recipient of the award should be below 30 years of age on January 1st of the year of the award. 2. The paper should be in the area of Biological Chemistry and Allied Sciences and the work should have been carried out in India. 3. The paper published in any Indian Scientific Journal in the previous year will be considered for the award. 4. In the case of multiple authorship, the senior author can nominate one of the authors or could be shared by all the eligible authors.

Here's is an opportunity to be very creative and show your Talent!

Put your creations in the form of cartoons, science comics, comic strips, limericks, excerpts from the conference you attended! Anything to do with Science, commentaries on new exciting developments is also welcome.

We are looking for young talents who can contribute to the SBC(I) Newsletter, which we are planning to bring every few months. Submit your contributions to us, and of course, the best contribution will be rewarded!

We will accept the contributions throughout the year but hurry up to see your contribution in the next Newsletter.

Don't wait! Pen down your excellent creative thoughts and reach us at

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Bangalore 560 012
Phone 91-080-23601412, Email sbcihq@gmail.com
Send us a hard copy by post and a soft copy by an E-mail

2020 ANNUAL AWARDS

The Society announced the Annual Awards for the year 2020 at its Annual Meeting held virtually at MAHE, Manipal on November 18, 2021. This year three awards were given, and the Society congratulates all the awardees and wishes them good luck in pursuing their goals. A brief description of the research interest as provided by the awardees is given below:

SREENIVASAYA MEMORIAL AWARD

Dr. N. Ganesh
IISc, Bangalore

Ganesh Nagaraju is a Professor at the Department of Biochemistry, Indian Institute of Science, Bangalore, India. He obtained his Bachelors (1994) and Masters in Biochemistry (1996) from University of Mysore, and Ph.D. (2003) from Dept. of Biochemistry, Indian Institute of Science, Bangalore, India. Subsequently, he did his postdoctoral studies at Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, USA before joining as a faculty member at the Indian Institute of Science in 2007. His laboratory is majorly focused on understanding genes and their mechanisms that regulate DNA damage and replication stress responses to maintain genome integrity and suppress tumorigenesis.

Germline mutations in the genes that regulate homologous recombination (HR) and genome integrity cause various genetic disorders including Fanconi anemia (FA). Mammalian RAD51 plays a key role in HR and genome maintenance. Mammalian genome encodes five RAD51 paralogs (RAD51B, RAD51C, RAD51D, XRCC2 and XRCC3). Germline mutations in *RAD51* paralogs cause FA-like disorder and breast and ovarian cancers. Using genetic, cytogenetic and cell biological as well as biochemical approach, his group demonstrated that *RAD51C (FANCO)* is indeed a novel gene in the FA pathway of DNA interstrand cross-link (ICL) repair. His group showed that RAD51C plays a downstream role in the FA pathway ICL repair. More interestingly, they find that RAD51C regulates intra-S-phase checkpoint and repair distinctly. These findings have implications for FA and breast and ovarian cancer susceptibilities. Their group identified that XRCC3 S225 is a novel phosphorylation target of ATM and ATR kinases crucial for DNA double-strand break (DSB) repair by HR and intra-S-phase checkpoint regulation.

Replication forks are susceptible for breakage if unprotected when the forks stall due to template damage, various secondary structures and DNA bound proteins. BRCA2 tumor suppressor and FA pathway proteins are known to protect the stalled forks. His group showed that RAD51 paralogs in distinct complexes protect and restart the stalled forks. They demonstrated that RAD51 paralogs protect the stalled forks in a non-epistatic manner to BRCA2. The restart of the stalled forks is dependent on ATP hydrolysis by CX3 complex. Notably, the pathological mutants of RAD51C were defective for fork protection, implying the tumor suppressor and essential functions of RAD51 paralogs in genome maintenance. His recent study identified a novel function of XRCC2 in regulating replication fork progression during dNTP alterations. This work has implications in understanding how a normal cell can become cancerous and how XRCC2 can protect the genome from replication stresses and prevent tumorigenesis. His recent work showed that two of the RAD51 paralogs; XRCC2 and XRCC3 are distinctly activated by ATR kinase to maintain genome stability.

Gene amplification is commonly found in various types of cancer and the mechanisms underlying such amplifications/duplications are largely unclear. Moreover, the role of FANC-J helicase in the FA pathway of ICL/DSB repair is less understood. Their group demonstrated that FANC-J helicase suppresses gene duplication/amplifications during repair of DSBs by sister chromatid recombination. Mechanisms underlying FANC-J mediated DSB repair by HR are unclear. Recently, his group identified a novel function of FANC-J helicase in DNA end resection via loading of CtIP to the sites of DSBs.

Dr. Ganesh is a recipient of K.V. Giri Memorial award for best Ph. D thesis (2003), B. M. Birla Science Prize (2013), National Bioscience award for Career Development (2015), Sir. C.V. Raman Young Scientist award from Government of Karnataka (2015) and Shanti Swarup Bhatnagar prize in Biological Sciences (2018). He is an elected fellow of National Academy of Sciences (2018) and Indian National Science Academy (2021).

I S BHATIA MEMORIAL LECTURE AWARD

Dr. Maitrayee DasGupta
University of Calcutta, Kolkata

Evolution of Nitrogen fixing root nodule symbiosis

The ability to undertake nitrogen fixing intracellular root nodule symbiosis is restricted to plants belonging to a monophyletic clade of four related orders Fabales, Fagales, Rosales, and Cucurbitales—collectively known as the nitrogen-fixing clade indicating that the predisposition to form this symbiosis may have evolved only once in plants. This ability allows the competent plants to overcome the nonavailability of key nutrients like nitrate or ammonia as nitrogen sources. Therefore, there is a great interest in tracking the origin of nodulation for engineering this trait in crop plants which is a long-term vision in sustainable agriculture. In most symbiosis competent plants, rhizobia enter through infection-threads and nodule primordium in the cortex is induced from distance. But in some plants, for example in dalbergoid legumes, rhizobia directly invade cortical cells through epidermal cracks to generate the primordia. Since crack invasion resembled the invasion and colonisation of endophytic bacteria, which is an ancient phenomenon in plants, such plants were intuitively assumed to have the simplest genetic make up for being predisposed to symbiosis (*Sharma et al., 2020* Plants **9**: 276). The putative predisposition event however did not involve nitrogen fixing clade-specific gene gains or losses suggesting recruitment and adaptation of preexisting modules for evolving symbiosis.

To obtain insight into the molecular-genetic changes underlying evolution of root nodule symbiosis, we investigated the symbiosis in *Arachis* hypogea, a representative member of the dalbergoid clade and have now demonstrated it to have a minimal mechanism for supporting symbiosis. Looking for putative orthologues of symbiotic genes indicated homologues for several genes *(RPG, SymCRK, DNF2)* to be absent in *A. hypogaea* genome and symbiotic orthologues for several others *(FLOT4, ROP6, RR9, NOOT, SEN)* to be undetectable. Comparative symbiotic transcriptome of *A. hypogaea* and infection thread supported *M. truncatula* indicated (i) absence of early induction of symbiosis responsive transcription factors (NIN and NSP2), (ii) insignificant expression of symbiosis responsive ankyrin repeat protein *(VPY)* required for infection thread formation and the Nod factor receptors (NFR1 and NFR5) (iii) significantly high expression of transcription factors like ERF1, bHLH476, EIN2 and divergent PR-1 genes that produce CAPE peptides (*Karmakar et al., 2019* MPMI **32**: 271-285). In tune to the low expression of Nod Factor dependent LysM receptors in *Arachis*, we have noted both Nod factor dependent and Nod factor independent nodulation in this legume. The diversity of symbiotic associations of Arachis has never been probed exhaustively and therefore is still an open question. (*Guha et al., 2016* Environmental microbiology **18**: 2575-2590).

We also probed how existing genes/modules were adapted in the nitrogen fixing clade using *Arachis*. CCaMK signaling module is adapted from late-stage anther development module as a master regulator of nodule organogenesis. Knockdown of CCaMK derepressed the otherwise repressed apical meristem in the determinate nodules of *Arachis* giving rise to nodular roots which interestingly is a common feature in actinorhizal plants. Further, the terminally differentiated spherical symbiosomes start dividing giving rise to dyads, triads tetrads resembling microsporogenesis indicating *Arachis* to be highly plastic in its symbiosis associated developmental processes (*Sinharoy and DasGupta, 2009*, MPMI **22**: 1466-1475). SYMRK, a LRR receptor kinase, on the other hand has important roles in both rhizobial invasion and nodule development. Phosphorylations critical for rhizobial invasion was detected in legumes but not

in nonlegumes whereas phosphorylations critical for nodule development was detected in both (*Samaddar et al., 2013 FEBS letters* ***587****: 2972-2979; Paul et al., 2014 FEBS letters 588: 2881-2889; Saha et al., 2014 Plant Physiology 166: 1699-1708; Saha et al., 2016 Plant Physiology 171: 71-81; Bhattacharya et al., 2019 Biochemistry 58: 2419-2431*). Thus, a finer adaptation of this receptor kinase for evolving a beneficial bacterial invasion without triggering defense response. ENOD40, a lnc RNA was found to function as a SENSE-ANTISENSE pair and the Antisense DONE40 interact with ASHR3 a member of Trithorax family. Since TrX family has a role in optimizing cell proliferation and reprogramming in both animals and plants the interaction of *DONE40* with ASHR3 appear to evolve for adapting the nodule organogenesis program for legumes. Finally, Sugar and phytohormonal signalling along with WOX module appear to have been adapted for the development of nodules in response to C:N ratio in the symbiosis competent plants (*Kundu et al., 2020 bioRxiv: 830661*). Together it is a brick by brick understanding of how the preexisting modules in angiosperms were recruited for evolving a beneficial intracellular symbiotic interaction.

A N BHADURI AWARD

Dr. Susanta Kar
CDRI, Lucknow

During the last 10 years of his research career, Dr. Susanta Kar has tried to address fundamental issues pertaining to macrophage biology that have helped uncover conceptual leads towards identifying new chemotherapeutic targets in macrophage-associated diseases. Using visceral leishmaniasis (VL) as the model macrophage disease, he identified specific host molecules regulating immune cell signalling that are manipulated by *L. donovani* for survival. He reported that *L. donovani* exploits host toll interacting protein (Tollip) to neutralize TLR/IL-1R signaling during early infection (J Immunol, 2018) and also induces host histone methyl transferases/ demethylases (J Immunol, 2020) and SOCS proteins at later stages to sustain parasite-protective anti-inflammatory responses (J Immunol, 2020) and impair macrophage-T cell cytokine crosstalk, respectively. These studies have opened up an exciting area of research, which will further help in devising novel interventions, making it particularly important in developing countries.

In India, VL is a major disease prevailing in states of Bihar, West Bengal, Uttar Pradesh and Jharkhand. So far, attempts made by Kala Azar elimination program to eradicate VL from India have been rendered unsuccessful. Drugs used for in VL therapy including antimonials as first-line and amphotericin B and miltefosine as second-line drugs have serious side effects that limit their clinical application. Towards the endeavour of designing effective strategies against VL, his lab is actively involved in the antileishmanial drug discovery programme of CSIR-CDRI (aligned with "Healthy India" mission) with the long-term goal of providing more affordable and effective treatment options for VL patients. His group provided the first evidence for the mechanism of action of AS101, a non-toxic tellurium base immunomodulator and 15d-PgJ2 with excellent safety profile and reported their promising therapeutic potential against experimental VL (Cell Mol Life Sci, 2018, J Mol Med, 2016). Additionally, he recently identified novel chemical scaffolds pertaining to pyrazolopyridine derivatives, quinoline–metronidazole hybrids and β-amino acid derivatives that demonstrated commendable efficacy against animal model of VL (J Med Chem, 2017, J Med Chem 2019, Eur J Med Chem. 2019). This research is novel and holds value in the field of basic and applied sciences, as it has consistently led to the identification of critical regulatory molecules exploited during host-parasite interaction to curb defence responses. Understanding the immunoregulatory circuitry triggered by the parasite will ultimately allow the discovery of clinically relevant targets. Over time, this approach will be useful in replacing or supplementing existing therapies available not just for leishmaniasis but a wide range of other macrophage-associated infectious diseases.

Report on 2020 International Conference of the Korean Society of Molecular and Cellular Biology (KSMCB)

Dr. Subba Rao Gangi Setty
Indian Institute of Science, Bangalore

With an honor from SBC(I), Bangalore, I have attended the International conference through online mode. This conference was organized by KSMCB and held physically at Jeju, Korea during 5-7 October 2020. Due to international travel restrictions, I was not able to attend the meeting physically. The society distributed the talks in to six parallel sessions having specified topic in Molecular and Cell Biology.

My talk was scheduled on 6th October 2020 in the symposium 18, namely Post-Translational Modification and Proteostasis: from function to therapy. This session was chaired by Young Joo Jeon and Hyun Kyu Song with several talks pertaining to proteostasis pathways. I have presented my laboratory work with a title: Alternative cues to restore the intracellular trafficking defects in lysosome storage disorders. I have highlighted the work in 15 min as a prerecorded video, where the organizes presented through their portal. I highly grateful to SBC(I) for nominating me to attend this wonderful international conference.

BRANCH ACTIVITIES 2020

NORTH EAST CHAPTER

Convener: Dr. B. G. Unni
Activities (April 2020 to February 2021)

Title of the topics	Speaker	Place
Tele Physiotherapy Approaches in Cardiac Rehabilitation	Thiagarajan Subramanian	Jalandhar
Swallowing dysfunction and respiratory consequences in Oncology Patients	Dr. Jayaprakash Jayavelu	Gurugram
Virtual rehab in Intensive Care Units	Dr. Parth Trivedi	Gandhinagar
Constraint Induced Movement Therapy	Dr. Rishabh Sharan	Navi Mumbai
Impairments of Carvical Spine & Strategies of Rehabilitation: a discussion of Evidences	Dr. Himanshu Mathur	Jaipur
Kinetic Chain Approach for shoulder rehabilitation	Renata Ago	Hungary
Functional Manipulation for Movement Dysfunction in the Rehab Continuum	Gonzalo Velasquez	Chile
Cardiac Rehabilitation	Amanda Grace	Malaysia
Prevention and treatment of hamstring strains in athletes	Dr. Monstantinos Fousekis	Greece
Introduction on WSH approach towards stroke rehabilitation and prevention	Dr. Syed Mohammad Waris	UK
Traumatic brain injury and cognitive disorder	Houssam Yassine	Lebanon
ACL Injury Prevention in athletes	Angelopoulos Pavlos	Greece
Lower back pain from osteopathic point of view	Thae' Bilal Abukhurmeh	Jordan

Traction V/S Spinal Decompression therapy	Dinesh Verma (PT)	Singapore
FDM: Clinical and Theoretical Application of the Fascial Distortion Model in the Ankle Strain Injuries	Christien Villella	Christien Villella, Switzerland
Advanced neuromuscular & technological practices in multiple Sclerosis (MS)	Dr. Hina Garg	USA
Simulation Based Nursing Education: Current use in undergraduate education	Ms. Maheswari Thapa	Kolkata
The expanding role of simulation in obstetrics and Gynecological nursing	Dr Seeta Devi,	Pune
Simulation: A training resource for quality care and improving patient safety	Ms. Rakhi Mishra	Rishikesh
The role of Science and Technology in the time of War, Pandemic and Natural Disaster	Dr. G. Narahari Sastry	Jorhat Assam
Quality in conducting research and its social implications: Some thoughts	Dr. Apurbba Kumar Sharma	Roorkee
Low-Cost Technology Upgradation In Some Core Sectors To Contribute Towards Refueling Distressed Indian Economy - An Engineer's View	Dr. Nayan Sharma	UK
Impact of Agricultural Research in Societal Development	Dr. Dwipendra Thakuria	Meghalaya
Ovarian Cyst and Fertility	Dr. Daradi Das	Jorhat, Assam
Challenges and Opportunities in International Business in Post COVID Scenario	Dr. Abijit dey	Singapore
Plant Proteases; Sources and application on Milk Protein Hydrolysis for Nutritional and functional Significance	Dambar B. Khadka	Nepal
Science is for the society and for our basic needs	Dr. B G Unni	Kerala
Impact of COVID 19 an education, training, research and patient diagnosis and treatment	Dr. Arun Chougule	Jaipur
Cancer & Covid-19	Dr. Mouchumee Bhattacharyya	Guwahati, Assam
Infectious diseases: Experiences from a tertiary care hospital in Central India".	Dr. Rajpal Singh Kashyap	Nagpur
Teaching for flying-a conceptual approach in Modern education	Dr. U.S.N Murty	Guwahati, Assam
Chemistry &Technology: Multifunctional additives for lube oil	Prof. (Dr.) Pranab Ghosh	Darjeeling
Nanoscale materials assisted removal of arsenic, fluoride, and other contaminants from water	Dr. P.K Raul	Tezpur, Assam
Challenges of delivering quality care to patients and overcoming it	Dr. Anita Prakasam,	Punjab
Research opportunity on bioresources of NE India for rural technology generation and societal benefit	Dr. N.C. Talukdar	Guwahati, Assam

PANTNAGAR CHAPTER

Convener: Dr. Ashutosh Dubey

1. For the year 2020 the membership at Panatnagar chapter of SBC(I) was as followed:
   a. 5 new life members
   b. 51 life members

2. Society of Biological Chemists (India): Pantnagar chapter Organized a competitive group discussion to commemorate National Science Day' 2020 - "Women in Science".
   a. The topic for the discussion was "Biochemistry based Nobel awards for the year 2019"

Students presetnation on the occasion of National Science Day' 2020 - "Women in Science".

1) Due to the COVID 19 situation organization of symposium was not feasible. Instead, a series of webinars on various relevant topics were organized under SBC(I), Pantnagar chapter. In these webinars more than 1200 students / Research scholars / professors/ scientists/ industry persons/ farmers got registered and attended.

SN	Topic for Webinar	Date
i	Role of neutraceuticals and functional foods in human health	30th June 2020
ii	Emerging potential of biotechnology in agroforestry, an accessible prospect for sustainable future	18th July 2020
iii	Utilization of agricultural / forest residues in renewable energy for sustainable development	30th July 2020

2) One international scientific talk was also organized on the topic ""CRISPR – Cas 9 platform: A molecular tool to cure genetic diseases" by Dr. Tripti Gaur, Director, Preclinical and Translational Sciences, Mustang Bio, Worcester, MA on 11th Dec. 2020 at 9:00 AM (IST).

3) This talk was very well received as 200 participants from different academic institute registered and attended.

KOLKATA CHAPTER

Convener: Dr. Tanya Das

Biennial Report (2019 – 2021)

The Society of Biological Chemists (I) Kolkata Chapter, one of the largest chapters of the Society of Biological Chemists of India, has been routinely holding several events including organizing an Annual Meeting every year and publishing a quarterly Newsletter to ensure active information sharing as well as participation and engagement of its members for the promotion of Biological Chemistry. In the last two years (2019-2020) it continued to sustain this trend through various activities including the (i) Annual Meeting in Puri, Odisha (April 18-21, 2019), (ii) One-Day mini-Symposium in CSIR-Indian Institute of Chemical Biology -IICB (September 21, 2019) on 'Bridging Chemistry & Biology for Human Health and Disease' and (iii) bi-monthly

talks from young and experienced scientists. Additionally, it also organized outreach programs for college students familiarizing them with the prospects and excitement of research in Biological Chemistry to attract them to the field. Although the Annual Symposium for 2020 was arranged in Darjeeling (West Bengal) in May along with a One-day Symposium on 'Chemical Biology of Health and Diseases' in the National Institute of Biomedical Genomics, Kalyani (scheduled for April 10, 2020), both the events had to be unfortunately canceled due to the declaration of the national lockdown following the emergence of the present pandemic. Now, with the restoration of partial normalcy, the Chapter has organized its Annual Meeting for 2020 in Shankarpur, Digha (West Bengal) during March 19-21, 2021 with over 100 participants already registered for the event.

The Annual Meeting in Puri was held in the Hotel Holiday Resort, on the shores of Puri Beach during April 18-21, 2019. The aim of the meeting was to offer young research scholars a platform to orally present their work to a large audience. Thirty-five research scholars presented their talks in this meeting with 112 delegates under the broader theme of 'Frontiers in Biological Chemistry' and specialized subject heads of Cancer Biology, Drug Action, Infection & Pathobiology and Neurobiology (kindly refer to the attached Abstract book). The meeting also encouraged scholars to hold discussions amongst themselves as well as with various mentors on their problems and prospects of their work as well as future careers. The one-day Mini Symposium on 'Bridging Chemistry & Biology for Human Health and Disease' held in CSIR-IICB, Kolkata on September 21, 2019, also witnessed an overwhelming response from young researchers as this provided an open platform for the presentation of their work through posters and flash talks. Overall, 135 research scholars and students participated in this meeting along with 36 faculty members. A selected number of posters were also picked up for flash talks before the valedictory session (please see the attached program for the symposium for more details).

Dr. Subhra Ghosh Dastidar delivering his talk in the CSIR-IICB, TRUE Campus, Kolkata

Encouraging both young and established scientists pursuing research in the field of biological chemistry to show-case their work is also imparted significant importance in the activities of the SBC (I) Kolkata Chapter. To accomplish this, bi-monthly talks are held in different institutions where chosen young scientists deliver talks on their ongoing work to the research scholars and members of the chapter. During 2019-2020, four such emerging scientists, Dr. Partha Sarathi Bhattacharya, Pulmonologist, Institute of Pulmocare & Research, Kolkata, Dr. Subhra Ghosh Dastidar, Bioinformatics Centre, Bose Institute, Kolkata, Dr. Jayati Sengupta, Division of Structural Biology & Bioinformatics, CSIR Indian Institute of Chemical Biology, Kolkata and Dr. Ashima Mukhoadhyay of the Tata Medical Centre, Kolkata were the chosen speakers from April 2019 to March 2020.

Besides these activities, the Chapter had been diligently publishing its Newsletter 'Biochem News" quarterly and has not failed to bring out a single issue in the last 20 years and even during the trying times of this pandemic. Copies of the last three issues of the Biochem News are attached for kind perusal.

NORTH EAST CHAPTER

Convener: Dr. B. G. Unni

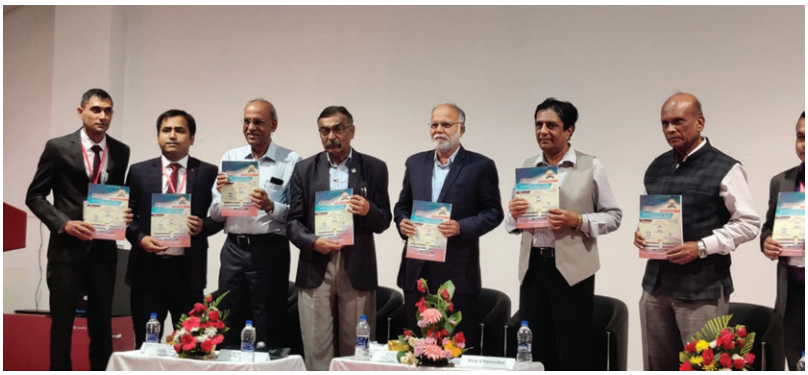
Meeting Report

A two day long national conference on "Bio exploration for Human Welfare- An integrative approach" (BEHW).

A two-day long national conference was organized by the Faculty of Science of Assam downtown University in collaboration with, Institute of Advanced Studies in Science and Technology (IASST) & Society of Biological chemists (India), North east chapter Jorhat, on 8th& 9th of November'2019 at its University premise. The theme for the conference was "Bio exploration for Human Welfare- An integrative approach" (BEHW). The conference contained five sub themes, namely: Biochemistry and Molecular Biology of Plants and Microbes, Agriculture Science, Environmental Science and Biodiversity, Food and Nutrition Sciences, Biomedical Science and Bioinformatics and lastly an Industry-academia Session. The inaugural session began with the welcome address of Dr B. G. Unni, Chairman, BEHW in which he said that the conference brought together researchers from widely varied disciplines, thus, providing a platform for knowledge-sharing. Sharing knowledge freely among peers is a hallmark of a great society. He also mentioned that the technical program was rich and varied with Plenary, keynote speeches, invited talks within the following sub themes such as Biochemistry and Molecular biology of plants & Microbes, Agriculture science, environmental science & Biodiversity, Food & nutritional sciences, Biomedical sciences and Bio informatics and a special industry -Academia interactive session too. The introductory talk was delivered by Dr. N. C Talukdar, Director, IASST, Guwahati. The session was followed by the speeches from Vice-Chancellor Prof Amarjyoti Choudhury. The session highlight was the talk from the keynote speaker Prof. D. Karunagaran, Department of Biotechnology, IIT Madras, Chennai, who emphasized on the role of micro-RNA's and enlighten the gathering regarding the recent development in cancer Biology. The abstract book containing 40 odd abstracts was released and applauded by the gathering.

Inauguration of the Conference and Felicitation

Inaugural speech by the Vice Chancellor & welcome address by Chairman (BEHW) Dr.BG Unni



Release of the Souvenir/Abstract

Participants of the conference

The session on Agriculture science, Environmental Science and Biodiversity witnessed scientific talks from Dr. Samarendra Hazarika, Principal Scientist (soil), HOD, NRM, ICAR Research Complex for NEH Region, Umiam, Meghalaya, who emphasized on the climate change and hill agriculture of North East India and highlighted the required initiative, such as NEI declared as a drought reason that faced severe consequence of flood at different labels over the last 10 years or so. He also stressed that this has drastically affected the tea production in Assam. The talk emphasized crop-based approaches like development of heat tolerant, drought tolerant, submergence tolerant verities which respond positively intern of growth and yield under

changing climate condition to overcome this challenge apart from adopting intensive integrated farming strategy. Transfer of such technology helps to maintain soil health, promotes conservation and recycling rainwater, generates employment opportunities and there by promotes food and nutritional security under changing climatic condition. The presentation emphasizes on technological innovations in climate resilient agriculture (NICRA) and also brief the gathering on various research facility develop in his centre. Dr. N.C Talukdar gave a talk on "Bio-exploration of Northeast India". He spoke on the scope of Northeast in ethnic food marketing in global scenario, value addition to indigenous crops which has some exclusively unexplored or demerits in direct use such as Naga King Chili. He emphasized the importance of edible insects which could be turned into global industry. In addition, he mentioned about the upcoming "Centre for Ethnic Heritage alcohol and Foods in North East India". The talk on "Crop Bio fortification: Current status and prospects for utilization to meet challenges of food and nutritional security" was delivered by Prof. Nikhil K Chrungoo, Department of Botany, NEHU Shillong, Meghalaya. He started the talk with concept of multi-institutional consortia for research in Northeast India. He gave an idea on fortification of crops which are deficient in some essential amino acids. This modification of crops would be taken from uneconomical plants and make the economical crop self-efficient in nutrients. A brilliant example is the rice fortification with common buck wheat plant. Later, Prof. A. B. Kunnumakkara, IIT, Guwahati, gave a talk on "Role of Phytochemicals in the Prevention and treatment of Chronic Diseases". He presented a global status on the use of curcumin: an active phytochemical of turmeric plant. It is the most researched plant for phytochemical with daily publications rate of 14000 papers. This plant is also used as commercial product in Japan as turmeric bath as it has anticancer property and for healing and cosmetic use. The talk on "Exploration and functional characterization of culturable micro flora associated with Tea for plant growth promotion and disease suppression" was delivered by Dr. Debajit Thakur, Associate Professor of IASST. He discussed on increasing tea plant defense system against various pathogens which effects its production. He showcased the findings from his experimental work on inoculation of streptomycin for enhancing tea plant defense mechanism.

In the parallel session, Dr. Sabitry C. Bordoloi, Professor & Scientist G (Retd.), IASST Guwahati, delivered a talk on "West and Its Management". The talk highlighted various types of wastes namely industrial, solid, aquatics. She put forwarded her view on Phytoremediation and Bioremediation for management of hazardous hydrocarbon contaminated soil near oil installations in Assam. She also emphasizes on the use of weeds such as Cyprus Rotendus, Ageratum Species, Cynodondeetylon and Paspalum sp. for degrading hydrocarbons and expressed her hope on Paspalumsp as the most potent candidate.

The last talk of the session was delivered by Dr. Mridul Buragohain, Assistant Professor, Department of Chemistry, Lakhimpur Girls' College, North Lakhimpur, that enlighten the gathering about the findings of foldscope as a tool for identification of bacteria's apart from imparting scientific orientations among the students. He also stated the success of this government initiative.

A poster session was held that witnessed 40 odd poster presentations from participants across the North Eastern Reason. A poster entitled "Seroprevalence of legionella pneumophila, chlamydia pneumoniae and mycoplasma pneumoniae in patients with lower respiratory tract infection attending a tertiary care hospital" was awarded the best poster award and suitably rewarded during the prize distribution ceremony.

The evening shift witnessed a packed scientific parallel session, where one of theme was Food and Nutrition Science and the first talk was delivered by Prof. S. Dave Advisor, Food Safety and Standards Authority of India (FSSAI), New Delhi. He spoke on the current scenario on the guidelines and amendments that happened to FSSAI over a period of time. Dr. Charu Lata Mahanta, Professor and Dean, Department of Engineering & Technology, Tezpur University, delivered a talk on "Encapsulation and Delivery of Bioactive Compounds in Functional Food" and enumerated the incidents of disease like diabetics, cardiovascular disease, obesity, cancer and problems associated with nerve. She focused on the protocol to retain / enhance the bioactivity of these compounds. Dr. Ruma Bhattacharyya, Professor, Food Science and Nutrition, Assam Agricultural University, spoke on triple burden of Malnutrition. She highlighted the rising trends in over nutrition and associated non communicable diseases. The triple burden of presentation under nutrition, micronutrient deficiency and rising over nutrition are the resultant outcome of the ongoing economic, social, lifestyle, demographic, nutrition, and health transitions.

The other parallel session was on Bio Medical Science and Bio Informatics. Dr. S. Medhi from GUIST delivered a talk on the role of various proteins – protein interaction analysis besides unrevealing the cultural mechanism behind at the molecular level. The indebt knowledge and the beauty of bioinformatics left the audience spell bound. It was followed by the talk from Dr. P Manna from IASST, who highlighted the therapeutic potential of vitamin K against impaired lipid home statics associated with hyperlipidemia pathophysiology. The results of his study highlighted a novel protein cGas6 and VK were significantly lower in hyperlipidemia subjects. The final talk of the session was delivered by Dr. R. Sarmah, Dean Faculty of Science, AdtU on target proteins of helicobacter pylori and probable plant derived natural compounds from plants of North- East India against bacterium. He spoke on molecular docking and emphasize on the folklore use of the plants Centella Asiatican

and houttuyniacordata and analyzed their bioactive compounds.

The day two of the event was started by the introductory talk by Mr. Prasad Kumar P, General Manager, Sun Pharmaceutical Industries limited, Guwahati. The keynote lecture by Dr. Bidyut Kr. Sarmah, Director, DBT-AAU Centre, Assam Agriculture University who spoke on the possibilities, initiative by Government and need for entrepreneurship and briefs the gathering on various government initiative in this direction. The industry academic session had four talks on bridging the gap between industries and academic as well as research institute. Prof. Probodh Borah, AAU, Khanapara spoke on the Insilco designing of drugs, and hinted on how this technique are reducing the time frame for developing a new drug. Computer-aided drug research and development area of research s finding skilled, experienced people to manage all the bioinformatics tools available to us. Dr. Ashish Kar from TERI, Guwahati, emphasized on the rich ethno botanical knowledge of indigenous tribes has received resonation by scientist, policy maker, Pharmaceutical Company, and academics. He highlighted the current work of his institute. Mr. S. Kandukuri from BIOCON brief about the process of crystallization and showed the initial stages of downstream processing and successively contribute in purification of peptide. He said that the laboratory scale development of a preparative crystallization projects roles on setting pattern, crystal morphology and yield trends asses the outcome of executed experiment. The last talk of the session was delivered by Mr. Monjoy Choudhury, Founder Ayursurgence who emphasized on the need for industrialization of medical treatment by using basic science striking the balance and hence reducing the dependency of patients to the drug which are toxic in nature. He put forward his views about the use of natural drugs in understanding a complex metabolic disease such as diabetics.

In addition to that, there was a poster session and oral presentation, best poster and best oral presentation were selected and the certificate along with cash prizes in the name of 'Chairman's Awards" were also given and awarded at the valedictory function.

Obituary for Dr. Bhabatarak Bhattacharyya

Professor Bhabatarak Bhattacharyya, fondly known by his nickname "Bablu", passed away on 6th May 2021. Prof. Bhattacharyya was a distinguished biophysicist and made stellar contributions in understanding the biophysical and pharmacological properties of tubulin, the eukaryotic cell division protein. Originally a chemist, Prof. Bhattacharyya set out to build his career on applying biochemical and biophysical techniques to address the fascinating mysteries of biology, specifically the eukaryotic cytoskeleton. For more than four decades, Prof. Bhattacharyya led the investigation of several aspects of the cytoskeletal protein tubulin primarily on tubulin-drug interactions, folding and unfolding pathways of tubulin, and chaperone-like activity of tubulin.

Prof. Bhattacharyya had both Bachelor's and Master's degrees in Chemistry from Calcutta University, West Bengal. Intrigued by biology, yet drawn to chemistry, he went on to pursue his doctoral work– investigating the interaction of small molecules with DNA, under the guidance of Prof. Umashankar Nandi (whose lab was first at the Indian Association for the Cultivation of Science (IACS), Jadavpur and then at Indian Institute of Science, Bangalore.) He then joined the laboratory of Prof. J. Wolff at the National Institutes of Health, Bethesda, USA as a postdoctoral fellow. Dr. Bhattacharyya utilized his physical chemistry expertise to understand colchicine-tubulin interaction. Colchicine is a widely used antimitotic agent for understanding mitosis and the role of microtubules in cell division. Dr. Bhattacharyya discovered that colchicine strongly fluoresces upon binding to tubulin. Using the development of colchicine fluorescence upon tubulin binding, he elucidated several interesting characteristics of colchicine binding to tubulin. This provided a method to study tubulin-colchicine interaction without using radioactivity. Even today, researchers use this technique to discover colchicine analogs and to understand the interactions of colchicine site agents with tubulin. He was also able to purify and polymerize membrane tubulin. This highly interesting discovery of the polymerization of the membrane tubulin was published in Nature. Even with all the prospects of a full-time research career in the USA, Dr. Bhattacharyya did not deviate from his long-term dream of nurturing the development of science and research in India. He established his lab at the Biochemistry department of Bose Institute, Kolkata, India. His lab was the first tubulin laboratory in the country and he was lovingly known as the microtubule-organizing center of India. Several of his graduate students are now leading microtubule laboratories in India. Microtubules formed by the polymerization of the tubulin dimer of alpha and beta subunits, provide the structural framework to the cells to carry out important processes such as cell division, cell polarity, and cell motility. Prof. Bhattacharyya showed that the C-terminal tails of tubulin, previously thought only to associate with microtubule-associated proteins (MAPs), also had an important role in the association between alpha and beta-tubulin subunits.

Tubulin is an important drug target. A large number of anti-cancer drugs, such as vincristine, target tubulin. Prof. Bhattacharyya studied the interaction of several of such drugs with tubulin, including analogs of colchicine. Prof. Bhattacharyya and his group published a detailed study of the thermodynamics of B-ring analogs of colchicine-tubulin Interactions to understand the role of the C-7 substituent on the B-ring of the colchicinoids for tubulin-colchicine binding. Colchicine exerts its antimitotic property upon binding to a high-affinity site on the tubulin heterodimer. It is composed of a trimethoxybenzene ring (A-ring), a methoxytropone ring (C-ring), and a seven-membered ring (B-ring), which anchors the A- and C-rings. His structure-activity studies indicated that the A- and C-rings of colchicine comprise the minimum structural features of the molecule necessary for its high-affinity binding to tubulin. The role of C-7 substituents on the B-ring were not known. His group determined the thermodynamic parameters for the binding reactions of four B-ring analogs of colchicine with tubulin: deacetamidocolchicine (DAAC), I deacetylcolchicine (NH2-DAAC), demecolcine (NHMeDAAC), and N-methyldemecolcine (NMe2-DAAC) using steady-state fluoresce spectroscopy. The study indicated that the presence of B-ring per se did not affect the entropic contribution significantly, as binding of both AC and DAAC were enthalpy-driven reactions. It is the amino substituent at the C-7 position in the B-ring that converts an enthalpy-driven reaction into an entropy-driven reaction. Thermodynamic data of colchicinoid-tubulin interactions suggest that the C-7 substituent on the B-ring of the colchicinoids studied here make additional contact(s) with the dimeric tubulin molecule.

Prof. Bhattacharyya is well-known for his research on the pharmacological properties of tubulin. However, one of his significant contributions to tubulin research was the discovery of the chaperone-like activity of tubulin. Molecular chaperones are specialized classes of proteins that assist the folding of cellular proteins by protecting their structures under stress conditions. Only a small number of molecular chaperones have been identified in eukaryotic cells so far and they are known to assist the folding of only a limited subset of proteins. Therefore, it is an open question how the vast majority of proteins are folded in cells. Tubulin is a highly abundant multi-subunit protein with several hydrophobic patches and unstructured regions. These features are commonly found in many chaperones. Prof. Bhattacharyya conceptualized the idea that tubulin could play important roles in protecting cellular proteins during their structural organization or folding. His group convincingly demonstrated that mammalian tubulin stabilizes several proteins and enzymes from heat or chemically-induced aggregation. Tubulin assists other cellular proteins to refold and restore their biological activities during renaturation. His work also demonstrated that tubulin interacts with the substrate proteins in their unfolding or refolding intermediate states. Interestingly, his work also revealed that charged C-terminal tails of tubulin play an important role in imparting this function. These findings could have meaningful and far-reaching implications. Protein misfolding and aggregation are causal factors for numerous diseases, including Alzheimer's, Parkinson's, and cancer. Functions of several well-established molecular chaperones have been implicated to be closely linked to tubulin and microtubules. For example, heat shock protein 90 (HSP90), an abundant chaperone in mammalian cells, functions in concert with microtubules/tubulin and is trafficked along the microtubule. Interestingly, later studies from the Bhattacharyya lab revealed that microtubule-associated protein MAP2 also possesses chaperone-like activity. It will be interesting in the future, to investigate whether or not the chaperone activities of microtubule proteins are exhibited in vivo, the answer of which may uncover new cellular pathways of protein folding.
Dr. Bhattacharyya's contributions were recognized by several awards and fellowships of several Academies. He received the Shanti Swarup Bhatnagar award in 1989 from the Council of Scientific and Industrial Research (CSIR), Government of India. He was an elected fellow of all the National Science Academies of India, National Academy of Sciences, Indian Academy of Sciences, Indian National Science Academy, and a fellow of the World Academy of Sciences. He also received the prestigious Ramana fellowship.
Undoubtedly, Prof. Bhattacharyya contributed immensely to the growth of protein science in India. However, we must not fail to acknowledge his caring side and highly effective mentorship. His peers would describe Bablu Bhattacharyya as a kind and friendly person while his 24 graduate students----several are now faculty members in several top institutes like IITs, IISERs and renowned universities----would unanimously agree about his inspiring demeanor. He was an excellent researcher, philosopher, and most importantly an inspirational teacher. One of his good qualities was that he truly appreciated good research, irrespective of the status of the person who was doing it. He encouraged young people to do good science. He was instrumental in making Bose Institute a prominent center of Biophysical research. We will deeply miss Bablu, and he will always be in our memories for his patience, simplicity, and pleasant personality.

Dulal Panda
Tapas Manna
Gopal Chakrabarti
Siddhartha Roy

CAMA MEMORIAL TRAVEL GRANT

Scientists attending and presenting a paper in an International Congress or FAOBMB meeting held once in 2 years or at infrequent intervals may apply for the award.

The candidate should be a member of SBC(I) for at least two consecutive years.

The candidate should have obtained partial support from other agencies and there should be a proof to that effect.

Applicants are invited to respond appropriately to the details informed in the advertisement. The application should reach the following address before 1st April of the year of the award.

Hon Secretary
Society of Biological Chemists
Indian Institute of Science
Bangalore 560 012

FELLOWSHIPS FOR YOUNG SCIENTISTS

The Society of Biological Chemists (India) has instituted a "financial support for research" scheme to support young research workers to carry out short term training/research activities in well-established laboratories/ institutions in India. The value of the fellowship is fixed at Rs. 5,000/- per term per selected fellow, and the total number of fellowships awarded every year will be up to 10.

Terms and Conditions;

1. Funding Rs. 5,000/- per fellow for periods up to 6-8 weeks.
2. The grant of Rs. 5,000/- will be awarded in the form of Rs.1,000/- for the fellow as personal maintenance/allowance for a minimum period of 6 weeks and Rs. 4,000/- as contingencies for the purchase of laboratory items, including stationery, preparation of reports, photographs, and other expenses related to the research work.
3. The Research/Training may be conducted in any of the leading research institutions/ laboratories/universities, with approval from SBC(I).
4. The candidate should be below the age of 32 years at the time of application.
5. The SBC(I) Membership is compulsory for eligibility for the fellowship award.
6. The fellowship amount will be released by the SBC(I) to the research supervisor by the 2nd or 3rd week of the training program.
7. The application should be forwarded through the investigator-in-charge of the laboratory in which the candidate proposes to undergo training.

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One travel fellowship of Rs.15,000/- per quarter (Two awards per year) will be awarded

* Award period	** Last Date for receipt of application
I. Jan- Mar	……Dec 31 Previous Year
II. Apr-June	……Mar 30
III. July-Sept	……June 30
IV. Oct-Dec	……Sept 30

For example, those who wish to attend an International meeting scheduled to be held during July–Sept 2019, should submit the application by 30 June 2019.

*Award period refers to the period during which the meeting is scheduled to take place.
** The Committee will meet on these days to decide on the award.
This award is meant for Ph.D. students only.

The applicant should currently be a member of the SBC(I) and should have been a member for at least two consecutive years.

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I wish to become a **Student Member/Ordinary Member/Life Member** of the Society. I enclose herewith Membership fee Rs. ..... (Cash / Demand Draft / Cheque / Online payment) as my membership contribution.

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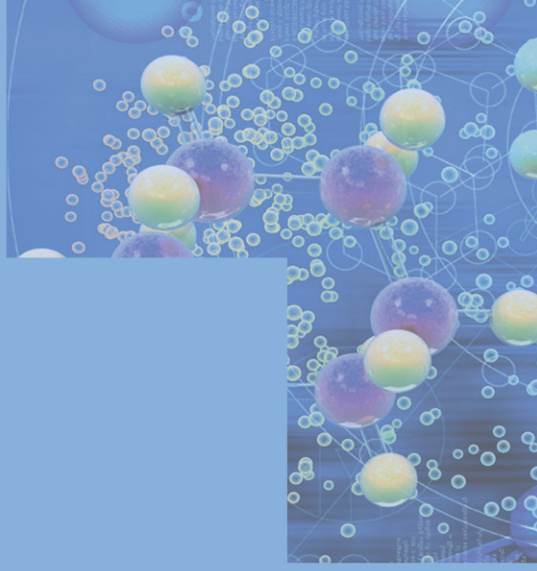

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