

c. Statement of research achievements, if any, on which any award has already been received by the applicant. Please also upload brief citation(s) on the research work(s) for which the applicant has already received the award(s) (not to exceed 2000 words).

Dr. Mukhopadhyay has received following awards based on her research work on “*Effect of reactive oxygen species (ROS) on immune system and modulation of protective immune response of host during tuberculosis*”.

- 1. National Young Woman Bioscientist Award (2007)** by the Department of Biotechnology (DBT), Govt. of India.
- 2. National Bioscience Award for Career Development (2008)** by the Department of Biotechnology (DBT). Govt. of India.
- 3. Kshanika Oration Award (2009)** by the Indian Council of Medical Research (ICMR), Govt. of India.
- 4. Basanti Devi Amir Chand Prize (2011)** by the Indian Council of Medical Research (ICMR), Govt. of India.
- 5. Chaturvedi Ghanshyam Das Jaigopal Memorial Award (2015)** by the Indian Council of Medical Research (ICMR), Govt. of India.
- 6. TATA Innovation Fellowship (2017-2018)** by the Department of Biotechnology (DBT). Govt. of India.
- 7. J.C. Bose National Fellowship (2022)** by the DST-SERB, Govt of India

Detail Research Work:

Reactive oxygen species (ROS), generated during the innate immune response are considered to be important anti-microbial agents. However, in some infectious diseases like tuberculosis, overproduction of ROS ‘per se’ do not kill Mycobacterium bacilli but rather are involved in exacerbating the disease, indicating that ROS may actually favor pathogen survival by dampening the host’s protective immune responses. During the quests to understand the molecular basis of such intrigued function of ROS, Dr. Mukhopadhyay demonstrated and established an immunoregulatory role of ROS. Her group for the first time demonstrated an existence of a dichomotomous regulation between the production of free radicals/ROS by ‘macrophages’ and ‘T

cell priming responses'. Her research in this area revealed that excessive free radicals/ROS generated in body due to high oxidative stress during chronic infection like tuberculosis and other patho-physiological disorders like cancer can directly hamper the protective immune responses of the body by inhibiting the Interleukin-12 induction and consequently T-helper 1 T cell response to trigger immunosuppression (*Khan et al.,[2006] Blood 107:1513; Boddupalli et al.,[2007] Free Radical. Biology and Medicine 42:68*). This is considered to be a significant finding in the field of immunology, because it addresses the issue of the relationship between the production of antimicrobial ROS and that of IL-12, an immunoregulatory cytokine that activates NK and T cells for inducing cell-mediated immunity against intracellular pathogens like tuberculosis or fighting against cancer. The data suggest use of antioxidants to combat these patho-physiological disorders (*J. Immunol[2010]*). Further studies by her indicate that the T-cell activation and priming responses is also suppressed by free radicals. The ROS are also found to inhibit antigen processing and presentation without affecting the costimulatory signaling, thus can greatly influence T cell proliferation and effector responses. All these observations provide some critical clues to understand the molecular mechanism of immunosuppression during tuberculosis and/or infections by other intracellular pathogens. This part of work received **National Young Woman Bioscientist Award (2008) and National Bioscience Award for Career Development (2008)** by DBT, Govt of India. These may also augur well to understand other immunosuppression related diseases like cancer where IL-12/Th1-dominated immune response is important to mount a protective immune response. Thus an approach is initiated to tailor macrophages for increased IL-12 induction and Th1 response which could be a better therapeutic tactic to control tuberculosis and other pathophysiological disorders. Dr. Mukhopadhyay showed that manipulation of glutathione-redox status towards reducing environment (using cell permeable glutathione ethyl ester [GSH-OEt] or N-acetyl cysteine [NAC]) can increase IL-12 induction and improve anti-BCG Th1 response in PBMC cultures obtained from active TB patients (*Alam et al.[2010] Journal of Immunology 184:2918*). This study provide valuable insights on pharmacologically regulating IL-12 induction and anti-BCG Th1 response by manipulating glutathione-redox balance in macrophages. These studies provide novel angle that will be helpful in designing meaningful strategies for activation of immune response to cure and prevent a large spectrum of diseases including infectious, metabolic, and neoplastic diseases (*Das and Mukhopadhyay[2011] Endocrine, Metabolic & Immune Disorders - Drug Targets 11:23*). This study received the **Kshanika Oration Award**,

(2009) by ICMR, Govt. of India’. Part of the work by which *M. tuberculosis* can dampen the adaptive (CD4 Th1 and CD8) T cell response is recognized by ICMR, Govt. of India by bestowing the ‘**ICMR Basanti Devi Amir Chand Prize (2011) and Chaturvedi Ghanshyam Das Jaigopal Memorial Award (2015)**’. This Scientific contribution is well recognized by the ‘American Society of Hematology (ASH), USA, 2007’ and ‘The American Association of Immunologists (AAI), USA, 2011’ by electing her as member of these prestigious societies and by ‘The National Academy of Sciences of India (NASI)’, 2010’; ‘The Indian Academy of Sciences, Bangalore, 2013’; ‘The Indian National Science Academy, New Delhi, 2016’ and ‘The Telangana Academy of Sciences, Telangana, 2016’ by electing her as a ‘Fellow’

In the area of tuberculosis research, Dr. Mukhopadhyay has major leads in understanding the toll-like receptor 2 (TLR2) signaling in the pathogenesis of tuberculosis. She showed that PPE18 (Rv1196) protein of *M. tuberculosis* is a strong anti-inflammatory protein that activates IL-10 and subsequently inhibits the protective IL-12 and tumor necrosis factor-alpha (TNF- α) cytokines and skews the T cell response towards the Th2-type during tuberculosis. Results from her experiment indicate that PPE18 specifically interacts with LRR 11~15 domain of TLR2 to increase IL-10 induction and a skewed-Th2 response. Thus TLR2 11~15 domain is targeted to design small molecule inhibitors to block interaction of PPE18 and other similar protein in order to block excess Th2-type response. This part of the work is awarded with the prestigious **TATA Innovation Fellowship (2017-2018) by DBT, Govt of India. Her contribution in Immunology and Infection disease biology (tuberculosis) is recognized by awarding her with J.C. Bose National Fellowship (2022) by DST-SERB, Govt of India.**

RESEARCH GRANT AGREEMENT (RGA) NO. 02-371 RG/BIO/AS

Date: 1 August 2003

The Third World Academy of Sciences (TWAS) (hereinafter referred to as TWAS) hereby awards a research grant amounting to US\$7,000.00.- to Dr Sangita MUKHOPADHYAY (hereinafter referred to as the Principal Investigator (PI)) of the Laboratory of Molecular and Cellular Biology, Centre for DNA Fingerprinting and Diagnostics, ECIL Road, Nacharam, Hyderabad - 500 076, India (hereinafter referred to as the Administering Institute (AI)) according to the specifications and conditions outlined in Sections A), B) and C) below.

A) Project and Grant Outline

- Principal Investigator:** Dr Sangita MUKHOPADHYAY
- Administering Institution:**
Laboratory of Molecular and Cellular Biology, Centre for DNA Fingerprinting and Diagnostics, ECIL Road, Nacharam, Hyderabad - 500 076, India
- Project title:**
Effect of oxidative stress on macrophage effector-APC functions
- Project description**
Several pathophysiological conditions like aging, infection etc. lead to elevated production of reactive oxygen species (ROS) which have pronounced effect on the immune system. Although, during infection, production of ROS by macrophages is normal, chronic stimulation, leading to excess production of ROS, may outweigh the beneficial outcome of the innate immunity. Though direct effect of ROS on T-cell functions is documented, least is known about their effects on macrophage effector functions which in turn may affect subsequent adaptive immune responses. Again, certainly, nature has a subtle chord of balance so that excess ROS does not end up with suicidal killing of the host cells themselves. Therefore, it is tempting to speculate existence of feedback inhibitory loops between ROS production and the immune responses. In these directions, recently we observed a dichotomous regulation between 'T-cell priming' and 'nitric oxide production by macrophages'. Our preliminary studies showed that H₂O₂ downregulated expression of various costimulatory molecules on macrophages and these molecules strongly regulate subsequent magnitude of T-cell responses. The proposed project aims at investigating whether H₂O₂ can act as immune-effector molecule and interfere with the signals regulating various macrophage effector and APC functions and whether persisting states of macrophage activation culminate to an undesirable state of immunity.
- Project duration:** up to 18 months from the date specified above.
- Amount of grant:** US\$7,000.00.-
- Breakdown of costs:**

Equipment	US\$5,000
Expendable laboratory supplies	US\$2,000
Literature	US\$—
Total	US\$7,000.00.-

Condition(s) N/A

B) Entry into force and Signatures

The grant will enter into force upon signatures of the Executive Director of TWAS, the Principal Investigator and the Head of the Administering Institute.

1. TWAS Executive Director

TWAS will engage itself in the project for a period of up to 18 months commencing on the date specified below and subject to the conditions specified in Sections A) and C) and to the availability of funds.

Name: M.H.A. Hassan

Signature

Date: 2003-08-01

2. The Principal Investigator

I accept the grant and undertake to carry out the research project as specified in Section A); to submit the final report and to abide by the conditions expressed in Sections A) and C). I plan to commence the project on the date: _____

Name: Dr S. Mukhopadhyay

Signature

Date

3. Head of the Administering Institute

We undertake to administer the project as specified in Section A), and in accordance with the conditions expressed in Sections A) and C).

Name: Dr. Seyed E. Hasnain

Signature

Date

Email**Sangita Mukhopadhyay**

AAI Regular Membership Application

From : members@aai.org

Wed, Nov 18, 2009 12:42 AM

Subject : AAI Regular Membership Application**To :** kashbon@yahoo.com, sangita@www.cdfd.org.in**Cc :** members@aai.org

Dear Sangita Mukhopadhyay,

This is the final step in applying for membership with the American Association of Immunologists. Please confirm the accuracy of the information you have provided by using the 'reply-to' function of your e-mail program and including the entire text of this message and any corrections to the information below; also 'attach' to your e-mail message a word processor file containing your current CV.

You named Dr. Jeremy M. Boss as your AAI sponsor. We have asked Dr. Boss to confirm support for your AAI Membership Application by e-mail (eic1@aai.org). Your Membership Application is complete when we receive both your and Dr. Boss's replies. The AAI Membership Committee will review your membership application during the next quarterly review.

You submitted the following information.

You obtained your Ph.D. degree from Utkal University, Bhubaneswar, India in 1998. Currently you have an official position as Staff Scientist IV at Centre for DNA Fingerprinting and Diagnostics (CDFD).

Your mailing address is:

Dr. Sangita Mukhopadhyay
Centre for DNA Fingerprinting and Diagnostics (CDFD)
Department (Division) of Molecular Cell Biology
Bldg. 7, Gruhakalpa
5-4-399/B, Nampally
Hyderabad, AP India 500001

Your phone number is +914024749423; and your facsimile number is +914024785447

Your current publications include:

1. S. Nair, P.A Ramaswamy, S. Ghosh, D. C Joshi, N. Pathak, I. Siddiqui, P. Sharma, S. E. Hasnain, S. C. Mande and S. Mukhopadhyay* (2009) The PPE18 of Mycobacterium tuberculosis interacts with TLR2 and activates IL-10 induction in macro-phage.
Journal of Immunology, 183: 6269-81

* Corresponding Author

Your specialties include:

Immunobiology of infectious disease; Macrophage biology

Your professional activities include:

A. Elected member of American Society of Hematology (ASH), USA, Member ID No: 1014285

B. Indian Science Congress Association, India (Life member), Member ID No: L11364

C. Indian Immunology Society, India (Life member),

D. Molecular Immunology Forum, India (Life Member)

E. ASCI Association Life Membership, India (Life member)

F. Ph.D. Supervisor of MAHE University, Manipal, India

G. Currently guiding 6 Ph.D. students and One student received Ph.D. degree.

H. Principal Investigator of several Government funded research projects.

Thank you for applying for membership with the American Association of Immunologists.

We look forward to welcoming you as a member.

Sincerely,

Jennifer Woods

AAI Membership Coordinator



INDIAN IMMUNOLOGY SOCIETY

Head Quarters : National Institute of Immunology, New Delhi 110067

Mailing Address : Prof. R. K. Saxena, Secretary, IIS

School of Life Sciences, JNU, New Delhi-110067

President

Prof. N. K. Ganguly

Vice President

Prof. P. V. Subbs Rao

Secretary

Prof. R. K. Saxena

Treasurer

Dr. S. Sinha

Jt. Secretary

Dr. A. K. Chakrabarty

Members

Dr. U. Chattopadhyay

Dr. S. Chiplunkar

Dr. A. K. Khar

Prof. R. Pitchayen

Ex Officio Members

Dr. S. G. Gangal

Dr. S. N. Upadhyay

Special Invites

Dr. S. K. Basu

Prof. N. K. Mehra

Prof. Indira Nath

Prof. G. P. Talwar

CERTIFICATE

This is to certify that *Ms. Sangita Mukhopadhyay* of National Institute of Immunology, New Delhi, was awarded Apeejay Trust Award for her poster entitled "Immunological characterization of a conserved protective carbohydrate filarial antigen", presented during the XXIII Annual Conference of the Indian Immunology Society, held from Dec. 12 to 15, 1996, at Andhra University, Visakhapatnam.

Prof. R. K. Saxena
Secretary, Indian Immunology Society



THE INDIAN SCIENCE CONGRESS ASSOCIATION

14, Dr. Biresw Guha Street, Kolkata - 700 017, INDIA

Prof. Asis Datta

Ph.D., D.Sc., FNA., FNA Sc., FTWAS

General President

ISCA/2004/YWBP/424
25-9-2003

Dear Dr. Mukhopadhyay,

I have great pleasure in informing you that the Ninety-first (91st) Session of the Indian Science Congress, being co-hosted and co-organized by Panjab University, Chandigarh and Institute of Microbial Technology, Chandigarh, will be held at Chandigarh from January 3-7, 2004. The focal theme of the 91st Science Congress is: **"Science and Society in the Twenty-First Century: Quest for Excellence"**. We have approached the Hon'ble Prime Minister of India to inaugurate and address the 91st Session of the Congress.

This year the Organizing Committee decided to have a special session on **"Young Women Bioscientists of Promise"** in which the promising young women scientists below 40 years of age will deliver a lecture on her work and Prof. Kasturi Datta has been requested to organize this session during 91st Indian Science Congress.

I have great pleasure in informing you that you have been selected as one of the speakers in the panel **"Young Women Bioscientists of Promise"** for your valuable scientific contribution.

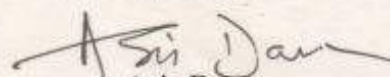
A number of eminent scientists from India and abroad are likely to attend the session besides other academics, policy-planners, etc.

The organizers would be able to defray your travel expenses and extend local hospitality.

I look forward to having your acceptance of the invitation and the title of your talk so as to plan to schedule the talk.

Please accept my greetings and good wishes on this occasion.

Yours sincerely,


Asis Datta

Dr. Sangita Mukhopadhyay
Staff Scientist III,
Centre for DNA Fingerprinting & Diagnostics(CDFD),
4-87/1 ECIL Road, Nacharam,
Hyderabad 560 076
E-mail:sangita@cdfd.org.in/kashbon@yahoo.com

Address for Correspondence

Director, National Centre for Plant Genome Research
Aravali International Guest House, J.N.U. Campus, Post Box No. 10531,
New Delhi-110067, (India)

Ph. : 91-11-26187224, 26167557 Ext. 4133; Lab. : 26715267, 26167557 Ext. 4560 Fax : 91-11-26167394
(R) 91-11-26715263, 26106437, 26185196; Email : ncpgr02@bol.net.in



Government of India
Ministry of Science and Technology
Department of Biotechnology

PRESENTS

**NATIONAL YOUNG WOMEN BIOSCIENTIST
AWARD 2007**

TO

DR. SANGITA MUKHOPADHYAY
CENTRE OF DNA FINGERPRINTING & DIAGNOSTICS, HYDERABAD

in recognition of her pioneering work in understanding the mechanism of feed-back regulatory role of free radicals on the immune system. Dr. Mukhopadhyay has demonstrated that free radicals, produced in excess during stress, have an immuno-modulatory function that involves downregulation of IL-12 through inhibition of c-rel translocation.

Given this Day the 8th of March 2008 at the function organized in connection with the International Women's Day.

SMT. PRATIBHA DEVISINGH PATIL
HONORABLE PRESIDENT OF INDIA



सत्यमेव जयते

Government of India
Ministry of Science and Technology
Department of Biotechnology

PRESENTS

NATIONAL BIOSCIENCE AWARD FOR
CAREER DEVELOPMENT 2008

TO

DR. SANGITA MUKHOPADHYAY
CENTRE FOR DNA FINGERPRINTING AND DIAGNOSTICS,
HYDERABAD

in recognition of her pioneering work on modulation of macrophage signaling and immune-effector responses when challenged with infection/stress. Her research work include understanding the signaling pathways involved in regulation of cytokines and free radicals in activated macrophages and how candidate virulent proteins of Mycobacterium tuberculosis modulate these signaling pathways favoring survival of the bacilli inside host.



K. VIJAYRAGHAVAN
SECRETARY
DEPARTMENT OF BIOTECHNOLOGY



S. JAIPAL REDDY
MINISTER FOR SCIENCE & TECHNOLOGY
AND EARTH SCIENCES



Indian Council of Medical Research

ICMR Kshanika Oration Award

CERTIFICATE

*This is to certify that
Dr Sangita Mukhopadhyay, Centre for DNA Fingerprinting and
Diagnostics, Hyderabad has been awarded ICMR Kshanika Oration
Award for her research work in the field of Biomedical Sciences
for the year 2009*



(Dr V.M. Katoch)

Secretary, Department of Health Research
MOH&FW, Government of India & Director-General, ICMR, New Delhi



Indian Council of Medical Research

Basanti Devi Amir Chand Prize

CERTIFICATE

This is to certify that
Dr Sangita Mukhopadhyay, Centre for DNA Fingerprinting
and Diagnostics, Hyderabad
has been awarded Basanti Devi Amir Chand Prize
for her research work in the field of Biomedical Sciences for the Year 2011


(Dr. Soumya Srinaminathan)
Secretary, Department of Health Research
MOHFW, Government of India & Director-General, ICMR, New Delhi





Indian Council of Medical Research

ICMR Chaturvedi Ghanshyam Das Jaigopal Memorial Award

CERTIFICATE

*This is to certify that
Dr. Sangita Mukhopadhyay, Centre for DNA Fingerprinting and
Diagnostics, Hyderabad has been awarded ICMR Chaturvedi
Ghanshyam Das Jaigopal Memorial Award for her research work in the
field of Immunology for the Year 2015*

(Dr Soumya Swaminathan)

Secretary, Department of Health Research

MOH&FW, Government of India & Director-General, ICMR, New Delhi

Email**Sangita Mukhopadhyay**

Congratulations

From : Guha Research <guharescon2015@gmail.com>

Thu, Dec 17, 2015 12:28 PM

Subject : Congratulations**To :** Dr Sangita Mukhopadyay <sangita@cdfd.org.in>

Dear Dr. Mukhopadhyay,

We are pleased to inform you that you have been elected as member of the Guha Research Conference during its meeting in December 2015, and look forward to your active participation in the GRC.

Best wishes,

Saman and Shahid
(Convenors, GRC-2015)

THE NATIONAL ACADEMY OF SCIENCES, INDIA



DR. SANGITA MUKHOPADHYAY

has been elected

FELLOW

of

The National Academy of Sciences, India

in the year 2010

for his contributions in the field of

IMMUNOLOGY/TUBUCULOSIS (INFECTION)/CELL SIGNALING.

Krishna Misra

Interchiz Khurana

GENERAL SECRETARIES

Asis Datta

PRESIDENT

NASI; 5, Lajpatrai Road, Allahabad



INDIAN ACADEMY OF SCIENCES
FELLOWSHIP

This is to certify that

Sangita Mukhopadhyay

was elected to the Fellowship

of the Indian Academy of Sciences

in the year 2013 in recognition of

outstanding contributions to science.

Amrita V. Venish
Secretaries

Chandrasekhar
President

भारतीय राष्ट्रीय विज्ञान अकादमी

Indian National Science Academy



FOUNDED IN 1935

Sangita Mukhopadhyay

has been elected

Fellow of

the Indian National Science Academy

at

the Annual General Meeting

on October 14, 2015

Muttal

R. Satapathy

Telangana Academy of Sciences

Osmania University Campus, Hyderabad, Telangana, India



Elects

Dr. Sangita Mukhopadhyay

CDFD, Hyderabad

as

Fellow

of the Academy in recognition of her
contributions to Science & Technology

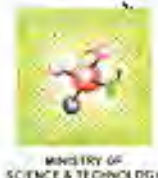
1st July 2017


Dr. Ch. Mohan Rao
President


Prof. K. Narasimha Reddy
Hon. Secretary



सूचना का
अधिकार



भारत सरकार
विज्ञान और प्रौद्योगिकी मंत्रालय
बायोटेक्नोलॉजी विभाग
ब्लॉक-2 7 वां तल, सी० जी० आर० कॉम्प्लेक्स
लोदी रोड, नई दिल्ली-110003
GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY
Block-2, 7th Floor C.G.O. Complex
Lodi Road, New Delhi-110003

Dr. Arun Kumar Rawat
Director
Ph. 011-24369614 (O)
Email: akrawat@dbt.nic.in

D.O. NO. BT/HRD/35/01/03/2018

Dated: 18.05.2018

Dear Dr. Mukhopadhyay,

I am pleased to inform that you have been selected for the prestigious Tata Innovation Fellowship of the Department of Biotechnology, Government of India for the year 2017-18 in recognition of your outstanding research contributions. The fellowship is meant to honour and encourage scientists involved in translational research dedicated to finding solutions by innovative scientific knowledge and platform technologies.

As per the terms of the Award, to begin with you will receive a fellowship amount of Rs. 25,000/- per month (in addition to the regular salary from your institute) and a contingency grant of Rs. 6.00 lakhs per year, for a period of three years.

On behalf of the Department of Biotechnology and on my personal behalf, please accept our heartiest congratulations and best wishes. Terms and conditions for availing the fellowship are enclosed. Kindly send your acceptance before the formal sanction order is issued along with signed terms & conditions and bank details.

With regards,

Yours sincerely,

A.K. Rawat

(A.K. Rawat)

Encl: As above.

Dr. Sangita Mukhopadhyay
Staff Scientist VI and Group Leader,
Laboratory of Molecular Cell Biology,
Centre for DNA Fingerprinting and Diagnostics,
Inner Ring Road,
Uppal, Hyderabad- 500039

Copy to:

The Director,
Centre for DNA Fingerprinting and Diagnostics,
Inner Ring Road,
Uppal, Hyderabad- 500039

A.K. Rawat

(A.K. Rawat)



विज्ञान और इंजीनियरी अनुसंधान बोर्ड

(विज्ञान और प्रौद्योगिकी विभाग, भारत सरकार का एक सांविधिक निकाय)

SCIENCE & ENGINEERING RESEARCH BOARD

(A Statutory body of Department of Science and Technology, Govt. of India)

प्रो० संदीप वर्मा

सचिव

Prof. SANDEEP VERMA

SECRETARY

JCB/2021/000035

15-02-2022

Subject: The J.C. Bose Fellowship.

Dear Dr. Sangita Mukhopadhyay,

I am delighted to inform you that Search-Cum-Selection Committee has recommended you for the award of J C Bose Fellowship. Kindly accept my heartiest congratulations. This fellowship is given to you in recognition of your outstanding performance in your area of specialization. The J C Bose Fellow will receive a fellowship amount of Rs.25,000/- p.m, and a research grant of Rs.15.00 lakh p.a, and it is provided initially for a period of 5 years or upto the age of 68 years, whichever is earlier. I have pleasure in inviting you to accept this prestigious fellowship.

You will receive further instructions and information in this regard soon from Dr. Monika Agarwal, Scientist-F, SERB (monika@serb.gov.in). You may please contact her directly for all fellowship related matters in future.

With best regards,

Yours sincerely,


(Sandeep Verma)

Dr. Sangita Mukhopadhyay
Staff Scientist VII and Group Leader,
Molecular Cell Biology,
Centre for DNA Fingerprinting and Diagnostics,
Inner Ring Rd, Survey Colony,
Industrial Development Area, Uppal,
Hyderabad-500039, Telangana