GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY
INVITES

NOMINATIONS FOR BIOTECH PRODUCT, PROCESS DEVELOPMENT AND
COMMERCIALISATION AWARD 2017
(TO BE PRESENTED ON TECHNOLOGY DAY, 11TH MAY 2017)

From scientists/innovators/entrepreneurs/institutions/companies both in public as well as private sector for outstanding contributions for development and commercialization of a process/technology or a product in the areas of biotechnology and biological sciences including agriculture, medical and environmental sciences

PROFORMA FOR NOMINATIONS

For individuals
1. Name of the Nominee (in case of a team, brief particulars of the team members should be given):
   ANIRBAN BASU
2. Date of Birth: 16th November, 1968
3. Present position/designation: Scientist VI
4. Address with Tele/Fax/E-mail: National Brain Research Center, Manesar, Haryana-122 051
   91-124-2845225 (office); 91-124-2338910/28 (Fax), anirban.nbrc@gmail.com
   anirban@nbrc.ac.in
5. Academic qualifications (in the form of a table from Bachelor's degree onwards including particulars such as subject, class/division, names of institutions, year, rank/prizes, etc.):

<table>
<thead>
<tr>
<th>Degree</th>
<th>University</th>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc. (Hons)</td>
<td>Viswa Bharati University, Santiniketan</td>
<td>1991</td>
<td>Life Science/Physics/Chemistry</td>
</tr>
<tr>
<td>M.Sc.</td>
<td>Viswa Bharati University, Santiniketan</td>
<td>1993</td>
<td>Life Science</td>
</tr>
<tr>
<td>Ph. D.</td>
<td>Indian Institute of Chemical Biology, Kolkata</td>
<td>1998</td>
<td>Immunology</td>
</tr>
<tr>
<td>Post-Doc Research Work</td>
<td>Penn State University, Hershey, USA</td>
<td>1999-2004</td>
<td>Neuro-immunology</td>
</tr>
</tbody>
</table>
6. Positions held (In chronological order):

<table>
<thead>
<tr>
<th>Period</th>
<th>Place of Employment</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-2008</td>
<td>National Brain Research Center, Manesar, India</td>
<td>Scientist III</td>
</tr>
<tr>
<td>2008-till date</td>
<td>National Brain Research Center, Manesar, India</td>
<td>Scientist IV</td>
</tr>
<tr>
<td>2011-2016</td>
<td>National Brain Research Center, Manesar, India</td>
<td>Scientist V</td>
</tr>
<tr>
<td>2016-till date</td>
<td>National Brain Research Center, Manesar, India</td>
<td>Scientist VI</td>
</tr>
</tbody>
</table>

7. Current area of Research (Not more than 200 words)

Acute Encephalitis Syndrome (AES) resulting from infection of neurotropic RNA viruses like Japanese Encephalitis Virus (JEV) and Chandipura Virus (CHPV) has been reported in India every year during the monsoons. Both JEV and CHPV are arboviruses differing in their genomic structure. Neuronal death following JEV and CHPV infection result from both direct neuronal killing by the virus as well as by a bystander method mediated by microglial activation and massive inflammatory attack.

It has been previously established that both these enveloped viruses manipulate the host cholesterol metabolism in brain at some point of their life cycle to facilitate their survival within the host. Hence, it may be postulated that statins might have an answer against the pathogenesis of these viruses and evade the development of AES. In our preliminary studies we explored the efficacy of atorvastatin (AT) calcium trihydrate in both CHPV and JEV infection mice models. AT calcium trihydrate is a well-established statin drug that is prescribed by medical practitioners against hypercholesterolemia.

Apart from its established role, AT has been implicated as an anti-oxidative and anti-neurodegenerative agent. AT can cross the blood brain barrier (BBB) showing promising results in our preliminary studies providing symptomatic relief and enhancing the survival of the infected animals. At present project we are exploring the role of AT in the pathogenesis of JEV and CHPV and focus on the repurposing of this drug in AES.

We have also initiated a collaboration with Sun Pharmaceuticals Advanced Research Center (SPARC) to develop newer generation of anti virals from plant extracts. We are screening the antiviral potential of this particular plant derived compound for several neurotropic virus like Japanese Encephalitis Virus (JEV), Chandipura virus (CHPV), and West Nile Virus (WNV).

8. (a) List of publications in indexed journals.

**Publication summary:**

Total No. of peer reviewed publications: **127**

Research Impact: $h$ index = **36**; Total citations: **4256** [Google scholar]


77. K L Kumawat, D K Kaushik, and A Basu (2014) Acute exposure to lead acetate activates microglia and induces subsequent bystander neuronal death via caspase-3 activation. *Neurotoxicology*; 41C:143-153


63. D K Kaushik, R Mukhopadhyay, K L Kumawat, M Gupta and A Basu (2012) Therapeutic targeting of Kruppel like factor 4 abrogates microglial activation. *Journal of Neuroinflammation* 9(1), 2012:57 (Recommended article by Faculty of 1000)


42 D Nandi, M K Mishra, A Basu, and B Bishayi (2010) Protective effects of Interleukin-6 in Lipopolysaccharide (LPS) induced experimental endo-toxemia are linked to alteration in hepatic anti-oxidant enzymes and endogenous cytokines. *Immunobiology* 215: 443-451


Astrogliosis is not solely depend upon activating the type 1 Interleukin-1 receptor. *Journal of Neuroinflammation* 3:15 (*co first author)*


(b) List of books /reviews written

Reviews:


**Editorial/Commentary:**


**Book Chapter:**


4) K Dutta, S Ghosh, and A Basu (2016) Infections and Inflammation in the Brain and Spinal

(c) Overseas Visits (indicate the duration of the visit with dates, name of the institute/laboratory/organization and country, purpose etc.):

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Duration From DD/MM/YY To DD/MM/YY</th>
<th>Institute and the country of visit</th>
<th>Purpose of visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>22.06.2006 26.06.2006</td>
<td>University of Kyoto, Japan</td>
<td>Invited speaker in 8th Neurobiology and Neuroinformatics Workshop</td>
</tr>
<tr>
<td>2.</td>
<td>02.11.2007 09.11.2007</td>
<td>San Diego, USA</td>
<td>a) To attend Society for Neuroscience meeting; b) Invited speaker at BD Biosciences R&amp;D facility</td>
</tr>
<tr>
<td>6.</td>
<td>03.03.2012 07.03.2012</td>
<td>Baltimore, USA</td>
<td>To attend 43rd Annual meeting of American Society for Neurochemistry.</td>
</tr>
<tr>
<td>7.</td>
<td>28.05.2012 30.05.2012</td>
<td>Valencia, Spain</td>
<td>Invited speaker in 9th International Symposium on Polymer Therapeutics: From Laboratory to clinical practice</td>
</tr>
<tr>
<td>9.</td>
<td>23.08.2014 26.08.2014</td>
<td>Kaohsiung, Taiwan</td>
<td>Symposium organizer, speaker, and session chair. Asian-Pacific Society for Neurochemistry meeting</td>
</tr>
<tr>
<td>10.</td>
<td>09.10.2014 11.10.2014</td>
<td>Athens, Greece</td>
<td>17th International Symposium of Molecular Medicine. Speaker and session chair</td>
</tr>
</tbody>
</table>

(d) Particulars of memberships of academies/scientific societies/professional bodies:

1) **Elected Fellow of the National Academy of Sciences, India (NASI)**-2011
2) **Elected Fellow of the West Bengal Academy of Science and Technology**, 2012
3) **Elected Fellow of the Indian National Science Academy (INSA)**-2017
(e) Awards won (give full particulars such as title, awarding agency / organization, the achievements for which award was conferred etc.):

1) National Bioscience Award for Career Development - (Department of Biotechnology, Government of India), 2010.

2) Vasvik Industrial Research Award (Biological Sciences and technology)-2011

3) J B Srivastav Oration Award (ICMR)-2011

4) Rajib Goyal Prize (Life Sciences)-2012-13

5) NASI- Reliance Industries Platinum Jubilee Award for Application Oriented Innovations in Biological Sciences-2013.

6) Tata Innovation Fellowship (Department of Biotechnology)-2015

7) Senior Scientist Oration Award (Indian Immunology Society)-2015

Member of Editorial Boards (include full Journal name)

2012-present Editorial Board, Scientific Reports (Nature Publication Group) [IF: 5.5]

2012-present Editorial Board, Journal of Neuro-inflammation (Biomed Central) [IF: 5.4]

2012-present Editorial Advisory Board, F1000 Research.

2012- Present Faculty member in the Faculty of 1000 in the section Neurological Disorders- Infectious Diseases of the Nervous System.

2013: Guest Editor, Clinical and Developmental Immunology; for a special issue “Microglia in Development and Disease”.

2014-present Academic Editor PLoS One. [IF: 3.5]

2014- present Handling editor, Journal of Neurochemistry. [IF: 4.2]

2015-present editorial board, Metabolic Brain Disease [IF: 2.5]

2015-present editorial board, Frontiers in Molecular Neuroscience [IF: 4.2]

(f) List of Patents taken/applied:

The author of 1 invention in the field of Microbiology/ New drug discovery:


9. Details not exceeding 500 words including

(a) Title, Summary & Justification for being awarded of the Biotech Product & Process Developed during the past five years in the areas of biosciences/ biotechnology
Absence of safe, efficient as well as cost effective vaccine and anti-viral drug prompts Dr Basu and his group to explore the potential of neuroprotective and/or anti-inflammatory/and or anti-viral compounds as a therapeutic strategy for JE. By exploring the pathways which are involved in inflammation, Anirban’s laboratory has identified several anti-inflammatory compounds with therapeutic potential in an experimental model of JE. One of this compound is Minocycline. Minocycline is an approved drug with a long standing record of acceptable safety and has a similar spectrum to Doxycycline, both for bacterial infections as well as for Rickettsia.

Based upon pre-clinical study undertaken in the laboratory of Dr Basu at National Brain Research Center, recently a Phase III clinical trial has been completed at King George Medical University (KGMU), Lucknow, where minocycline has been used as a therapy for Japanese Encephalitis patients and the patients with Acute Encephalitis Syndrome (AES). This trial showed that there was a significant advantage for patients who survived their first day in hospital. There was an advantage in all the other parameters where Minocycline was used, w.r.t. the placebo arm. These findings could form the basis for planning a larger study and possibly including minocycline in the management of AES and JE. [BMC Infect Dis. 2016 Feb 4;16(1):67].

Based upon our pre-clinical work another trial has been conducted recently by Dr Anita Mehta of Dept. of Pediatrics, BRD Medical College Institute, Gorakhpur on the use of Minocycline, this time in specific cases of Japanese Encephalitis (JE) [International Journal of Pediatric Research, May, 2016/ Vol 3/ Issue 5]. Here again there was a significant advantage with Minocycline in terms of hospital stay, and Minocycline arm does better in the study.

Altogether, findings from two trial strongly indicate the possibility of including minocycline as a part of the management for JE and AES patients.

(b) Status of its commercialization including the name of the industry to which transferred:
At present NBRC and DBT is working with Director General Health Services, Ministry of Health and Family Welfare, ICMR and National Vector Borne Diseases Control Program to consider minocycline for AES patients in a pilot project. NBRC is also in touch with several state governments like Uttar Pradesh and Odisha to introduce Minocycline in the management of JE and AES.

(c) Status of patent obtained/applied and
Minocycline is an off patent drug, and at this moment the new indication of an old drug is not patentable in India.

(d) Production figures of product and cost realized during last five years for which the nominee is recommended for the award:
Several pharmaceutical company in this country makes minocycline. Unimark Remedies from Mumbai has manufactured the minocycline formulations for the clinical trial.
10. Any other relevant information in support of the nomination:
For the findings related to the development (repurposing) of minocycline as a novel therapy for Japanese Encephalitis and Acute Encephalitis syndrome, Dr Basu has been awarded several Industry sponsored awards which are specifically marked for the application/product development related discovery. Two most important of them are i) Vasvik Industrial Research Award for the Biological Sciences and technology, and ii) NASI- Reliance Industries Platinum Jubilee Award for Application Oriented Innovations in Biological Sciences. Acknowledging his deep commitment to find innovative solutions to this major health problem in the country, Department of Biotechnology conferred him highly competitive TATA Innovation Fellowship.

11. Aadhar No: 3630 1736 7047

Date: 18/07/2017
Place: NBRC, Manesar, Haryana.

(Signature of the Nominee)

Certificate by the sponsor
This is to certify that the above information given by the Nominee is correct. I recommend him/her for consideration for the Biotech Product, Process Development and Commercialization Awards 2017 of the Department of Biotechnology, Ministry of Science and Technology, Government of India.

Date:
Place:

(Signature of the sponsor*)
Prof. Subrata Sinha
निदेशक / Director
राष्ट्रीय मनोविज्ञान अनुसंधान केंद्र National Brain Research Centre मनोविज्ञान-122 051 / Manesar-122 051 हरियाणा / Haryana