

# An analysis of biographical information on National Bioscience awardees from 1999 to 2016

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*Three institutions, viz. Council of Scientific and Industrial Research, Indian Institute of Science (Bengaluru) and National Institute of Immunology (New Delhi) dominate the number of recipients of the National Bioscience Award. The analysis revealed that Jadavpur University (Kolkata) has not won the National Bioscience Award compared to the Council of Scientific and Industrial Research and the National Institute of Immunology. Indian Institute of Science (Bengaluru) is the most balanced. The mobility analysis showed that most of the National Bioscience awardees were mobile after obtaining their PhDs/MDs. Of all the 140 National Bioscience awardees between 1999 and 2016, 37 of them are also recipients of Shanti Swarup Bhatnagar Prize. Moreover, a large number of awardees also became fellows of national science academies in the period 0–5 years after receiving the National Bioscience Award.*

**Keywords:** S.S. Bhatnagar prize, career development, National Bioscience Award.

THE Department of Biotechnology (DBT) was set-up by the Government of India under the Ministry of Science and Technology in 1986 (ref. 1). The mandate of the department is to promote large scale use of biotechnology, support R&D in biology, set-up centres of excellence, to promote industry–academia interaction and to build a strong world class human capital. One of the human resource development initiatives being taken up by the department in 1999 is the institution of National Bioscience Award for Career Development. The award recognizes outstanding contributions of young scientists below 45 years of age in basic and applied research in the areas of biosciences and biotechnology including agricultural, biomedical and environmental sciences. The award recognizes research and development work carried out in India during the last five years of the career. Up to 10 awards are given annually, each carries a cash prize of two lakh rupees and an annual project research grant of rupees five lakh for three years. The award is considered as one of the foremost Indian science awards and as equivalent to the Shanti Swarup Bhatnagar (SSB) prize.

This article attempts to examine the institutional affiliation of the National Bioscience awardees at the point of time of they obtaining PhDs/MDs and at the point of time of they being awarded. The awardees' mobility

across the two time points has also been examined. A close look is also taken at the time lag between receiving the National Bioscience award and (i) winning the SSB prize, and (ii) selection to the Fellowship of national science academies, namely Indian Academy of Sciences (IASc), Bengaluru; National Academy of Sciences (NASI), Allahabad and Indian National Science Academy (INSA), New Delhi.

## Data source

The names of all National Bioscience awardees and their institutional affiliations are found on the Department of Biotechnology website, [www.dbtindia.nic.in](http://www.dbtindia.nic.in). One hundred and forty scientists have been awarded the National Bioscience Award from 1999 to 2016. In most cases, information on the affiliation where they obtained their PhDs/MDs was available on current institute web pages. In most cases, the websites [www.ssbprize.gov.in](http://www.ssbprize.gov.in), [www.insaindia.res.in](http://www.insaindia.res.in), [www.ias.ac.in](http://www.ias.ac.in) and [www.nasi.org.in](http://www.nasi.org.in) were the most important source of information<sup>2–5</sup>.

## Results and discussion

*Institutions with which the National Bioscience awardees were affiliated*

Table 1 lists universities/institutions at which National Bioscience awardees from 1999 to 2016 obtained their

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## GENERAL ARTICLES

**Table 1.** National Bioscience awardees affiliated with the listed institutes when they obtained their PhDs/MDs and were awarded the National Bioscience Award for Career Development (1999–2016)

University/institution affiliation	Career stage	
	PhD/MD obtained	Awarded National Bioscience award
Aligarh Muslim University, Aligarh	3	2
All India Institute of Medical Sciences, New Delhi	7	3
Australian National University, Canberra	1	0
Banaras Hindu University, Varanasi	2	0
Bose Institute, Kolkata	4	1
Burdwan University, Burdwan	1	0
California Institute of Technology, USA	1	0
Centre for DNA Fingerprinting and Diagnostics, Hyderabad	0	3
Cochin University of Science and Technology, Kochi	1	0
CSIR Central Drug Research Institute, Lucknow	2	4
CSIR Centre for Cellular and Molecular Biology, Hyderabad	0	2
CSIR Indian Institute of Chemical Biology, Kolkata	1	5
CSIR Indian Institute of Chemical Technology, Hyderabad	1	1
CSIR Indian Institute of Integrative Medicine, Jammu	1	1
CSIR Indian Institute of Toxicology Research, Lucknow	1	2
CSIR Institute of Genomics and Integrative Biology, Delhi	0	8
CSIR Institute of Microbial Technology, Chandigarh	1	8
CSIR National Botanical Research Institute, Lucknow	1	1
CSIR National Chemical Laboratory, Pune	0	2
Defence Research and Development Establishment, Gwalior	0	1
Devi Ahilya Vishwavidyalaya, Indore	1	0
HP Agricultural University, Palampur	1	0
Indian Agricultural Research Institute, New Delhi	3	4
Indian Association for the Cultivation of Science, Kolkata	1	0
Indian Institute of Science Education and Research, Mohali	0	1
Indian Institute of Science Education and Research, Pune	0	1
Indian Institute of Science, Bengaluru	24	19
Indian Institute of Technology Bombay, Mumbai	1	4
Indian Institute of Technology Delhi, New Delhi	0	1
Indian Institute of Technology Kanpur, Kanpur	1	3
Indian Institute of Technology Madras, Chennai	0	1
Indian Institute of Technology Roorkee, Roorkee	1	1
Indian Veterinary Research Institute, Bareilly	1	1
International Centre for Genetic Engineering and Biotechnology, New Delhi	0	3
Jadavpur University, Kolkata	10	0
Jamia Millia Islamia, New Delhi	0	1
Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru	0	4
Jawaharlal Nehru University, New Delhi	5	4
Jiwaji University, Gwalior	1	0
Karolinska Institute Stockholm, Sweden	1	0
Katholieke Universiteit Leuven, Belgium	1	0
L V Prasad Eye Institute, Hyderabad	0	1
Louisiana Tech University, Ruston, LA, USA	1	0
Madras Veterinary College, Chennai	0	1
Madurai Kamaraj University, Madurai	1	0
Malti Chem Research Centre, Vadodara	1	0
Manipal University, Manipal	1	0
Monash University, Australia	1	0
MS Swaminathan Research Foundation, Chennai	0	1
National Board of Examinations, New Delhi	1	0
National Brain Research Centre, Gurgaon	0	2
National Centre for Biological Sciences, Bengaluru	0	1
National Centre for Cell Science, Pune	1	4
National Institute of Cholera and Enteric Diseases, Kolkata	0	1
National Institute of Immunology, New Delhi	1	11
National Institute of Pharmaceutical Education and Research, Mohali	0	1
National Institute of Plant Genome Research, New Delhi	0	3

(Contd)

**Table 1.** (Contd)

University/institution affiliation	Career stage	
	Ph D/MD obtained	Awarded National Bioscience award
National Institute of Virology, Pune	1	0
Nizam's Institute of Medical Sciences, Hyderabad	1	0
Northwestern University, USA	1	0
Osmania University, Hyderabad	1	0
Panjab University, Chandigarh	3	0
Pondicherry University, Puducherry	1	0
Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram	0	2
Regional Cancer Centre, Thiruvananthapuram	0	1
Regional Centre for Biotechnology, Haryana	0	1
Rutgers University, USA	1	0
Saha Institute of Nuclear Physics, Kolkata	1	0
Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	0	3
Sarojini Naidu Medical College, Agra	1	0
Saurashtra University, Rajkot	1	0
Sikkim Government College, Gangtok	0	1
Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram	1	2
Sri Venkateswara University, Tirupati	1	0
St. George's Hospital Medical School, England	1	0
Tata Institute of Fundamental Research, Mumbai	1	2
Tezpur University, Tezpur	0	1
The Energy and Resources Institute, New Delhi	0	1
Translational Health Science and Technology Institute, Faridabad	0	1
University of Adelaide, Australia	1	0
University of Bristol, England	1	0
University of Calcutta, Kolkata	7	1
University of Calgary, Canada	1	0
University of Delhi, Delhi	9	3
University of Geneva, Switzerland	1	0
University of Hyderabad, Hyderabad	1	1
University of Iowa, USA	1	0
University of Kerala, Kerala	2	0
University of Liverpool, England	1	0
University of Madras, Chennai	2	1
University of Nevada, USA	1	0
University of North Bengal, Siliguri	1	0
University of Rajasthan, Rajasthan	1	0
University of Utah, USA	1	0
Utkal University, Orissa	1	0
Visva-Bharati University, Santiniketan	2	0
West Bengal University of Animal and Fishery Sciences, Kolkata	1	1
Yale University, USA	1	0
Count	98	98
Sum	140	140
<i>P</i> -index	0.80	0.77

Ph Ds/MDs and at which they were associated at the time of the award. The table also shows that 24 National Bioscience awardees obtained their Ph Ds/MDs from Indian Institute of Science (IISc), Bengaluru; 10 from Jadavpur University, Kolkata; 9 from University of Delhi; 8 while working at CSIR laboratories; 7 each while working at All India Institute of Medical Sciences (New Delhi) and from University of Calcutta (Kolkata); 5 from Jawaharlal Nehru University (New Delhi); 4 from Bose Institute (Kolkata); 3 each from Aligarh Muslim University,

Indian Agricultural Research Institute and Panjab University; and 2 each from Banaras Hindu University (Varanasi), University of Madras (Chennai), University of Kerala (Thiruvananthapuram) and Visva-Bharati University (Shantiniketan).

Table 1 shows that CSIR laboratories having apparently the best conditions for promoting a National Bioscience awardee with 34 scientists, followed by IISc with 19; National Institute of Immunology (NII), New Delhi with 11; National Centre for Cell Science (NCCS), Pune,

Jawaharlal Nehru Centre for Advanced Scientific Research (Bengaluru), Indian Agricultural Research Institute (New Delhi), Jawaharlal Nehru University, Indian Institute of Technology Bombay (Mumbai) each with 4 scientists; Indian Institute of Technology Kanpur (Kanpur), All India Institute of Medical Sciences, New Delhi, Centre for DNA Fingerprinting and Diagnostics (Hyderabad), International Centre for Genetic Engineering and Biotechnology (New Delhi), National Institute of Plant Genome Research (New Delhi), Sanjay Gandhi Postgraduate Institute of Medical Sciences (Lucknow) and University of Delhi each with 3 scientists, Aligarh Muslim University (Aligarh), National Brain Research Centre (Gurugram), Sree Chitra Tirunal Institute for Medical Sciences and Technology (Thiruvananthapuram), Tata Institute of Fundamental Research, Mumbai and Rajiv Gandhi Centre for Biotechnology (Thiruvananthapuram) each with 2 National Bioscience awardees.

Figure 1 shows the relationship between National Bioscience awardees against the university/institution from where they obtained their PhDs/MDs as scatter plot. Though Jadavpur University produces PhDs, it has not produced a single National Bioscience awardee. However, CSIR and NII have produced many awardees. The performance index<sup>6</sup> (*p*-index) is also calculated which strikes the balance between quantity (total PhD/MD obtained) and quality (awarded the National Bioscience Award). These coefficients indicate that the awardees are more equally distributed among the institutions at the time point where the National Bioscience awarded (*p*-index = 0.77) than the institutions where the PhDs/MDs were obtained (*p*-index = 0.80). Obviously, certain institutions are able to recruit potential PhDs/MDs entrants offering productive environment for early successful career in biological sciences.

### National Bioscience awardees mobility

The institutions were counted at the time point of obtaining PhD/MD and at time point of being awarded the National Bioscience Award. The mobility of awardees across the two time points has been examined. Table 2 shows that: (i) The awardees were affiliated with one institution across the two carrier stages (PhD/MD, National Bioscience Award). (ii) The awardees obtained PhD/MD at one institution and then moved to another institution and received the National Bioscience Award. (iii) The awardees obtained PhD/MD at foreign institution and received the National Bioscience Award.

Table 2 shows clearly that only 12.15% of the awardees remain at the same place during their career. The rest were mobile after obtaining their PhDs/MDs.

Of all the 140 National Bioscience awardees between 1999 and 2016, only 37 of them are the recipients of SSB prize; 59 are Fellows of IASc, 70 are Fellows of NASI

and 51 are Fellows of INSA. Table 3 shows the distribution of time lag between receiving the National Bioscience Award and (i) winning the SSB prize, and (ii) being elected as fellows of national science academies. Over one fourth of the total National Bioscience awardees have also been conferred with the SSB prize. The data indicate that a majority of them have won the SSB prize within the time span of 0–5 years, whereas 6 won prior to receiving the National Bioscience Award. The proportion of awardees to the Fellowship of IASc, NASI and INSA is 42.12%, 50% and 36.42% respectively. Overall, we observe relatively large share of awardees in the period 0–5 years after receiving the National Bioscience Award.

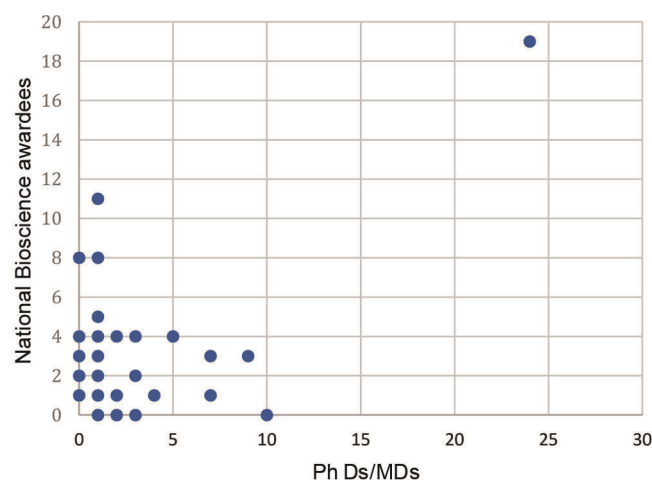
### Conclusion

Over the past few years, the number of researchers has increased significantly and so has the number of awards. It is therefore important to explore how educational background shapes researcher’s future recognitions. In this study we looked at the institutions where National Bioscience awardees did their PhDs/MDs and were later awarded the National Bioscience Award for career development. Moving or staying of a scientist from one place to another could be a topic for future studies.

A purely descriptive approach is taken to study the time lag between receiving the National Bioscience Award and (i) winning the SSB prize, and (ii) selection to the fellowship of the three national science academies. As

**Table 2.** National Bioscience awardees changes of affiliation

Type of mobility	Total	Percentage	Cumulative percentage
1	17	12.15	12.15
2	105	75	87.15
3	18	12.85	100



**Figure 1.** National Bioscience awardees versus institutions/universities from where they obtained PhDs/MDs.

**Table 3.** Time taken by the National Bioscience awardees to get (i) SSB prize and (ii) fellowship IASc, NASI, INSA

Time taken (in years)	SSB	IASc	NASI	INSA
-10 to -6	–	1	–	–
-5 to -1	6	3	16	–
0-5	30	38	49	17
6-10	1	15	5	24
11-15	–	2	–	8
16-20	–	–	–	2
	37	59	70	51

30 of National Bioscience awardees have also become ‘SSB laureates’, a highly coveted status, all young scientists of India aspire to win within the time span of 0–5 years, indicating that the National Bioscience Award may be considered as a SSB prize’s wind vane. It is also worth noting that relatively large share of National Bioscience awardees became fellows of national academies at a later stage of their career.

1. The Department of biotechnology, GoI, India; <http://www.dbtindia.nic.in>
2. The Shanti Swarup Bhatnagar Prize for Science and Technology, CSIR, India; <http://www.ssbprize.gov.in>

3. The Indian National Science Academy, New Delhi, India; <http://www.insaindia.res.in>
4. The Indian Academy of Sciences, Bengaluru, India; <http://www.ias.ac.in>
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6. Prathap, G., *Scientometrics*, 2009, **86**(2), 239–244.

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