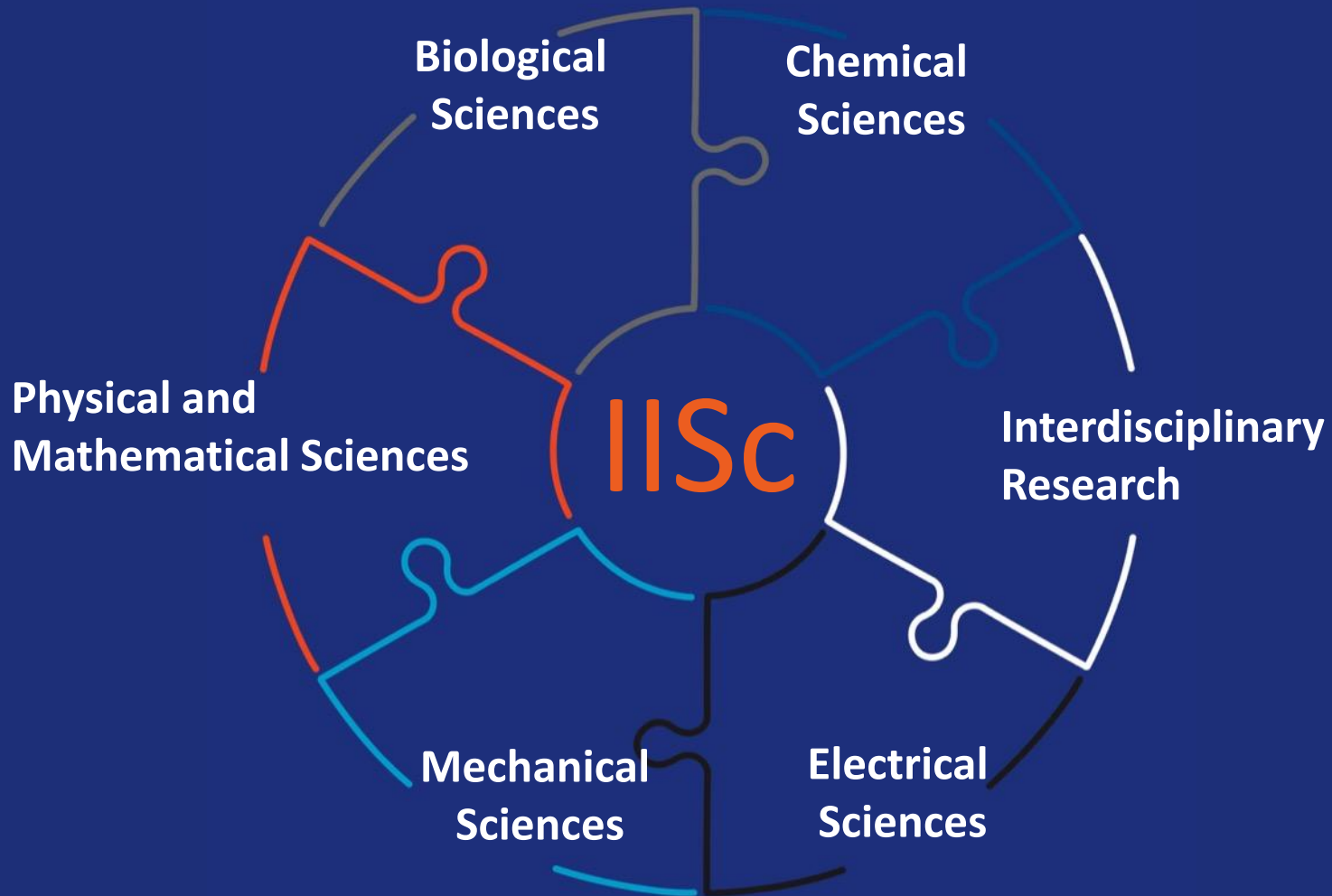


INDIAN INSTITUTE OF SCIENCE (IISc) Bangalore



IISc: THE DIVISIONAL STRUCTURE



Division of Biological Sciences

(76 Serving faculty members) (>250 publications/year)

Biochemistry (1921) Prof. C. Jayabaskaran	Microbiology and Cell Biology (1941) Prof. U. Vijayraghavan	Molecular Biophysics Unit (1971) Prof. N. Srinivasan
Centre for Ecological Sciences (1983) Prof. R. Balakrishnan	Molecular Reproduction, Development and Genetics (1989) Prof. S. Visweswariah	Centre for Neuroscience (2009) Prof. A. Murthy
Central Animal Facility (1971) Prof. K. Somasundaram	Centre for Infectious Disease Research (2014) Prof. D. Nandi	

**~60 PhDs
graduate
each year**

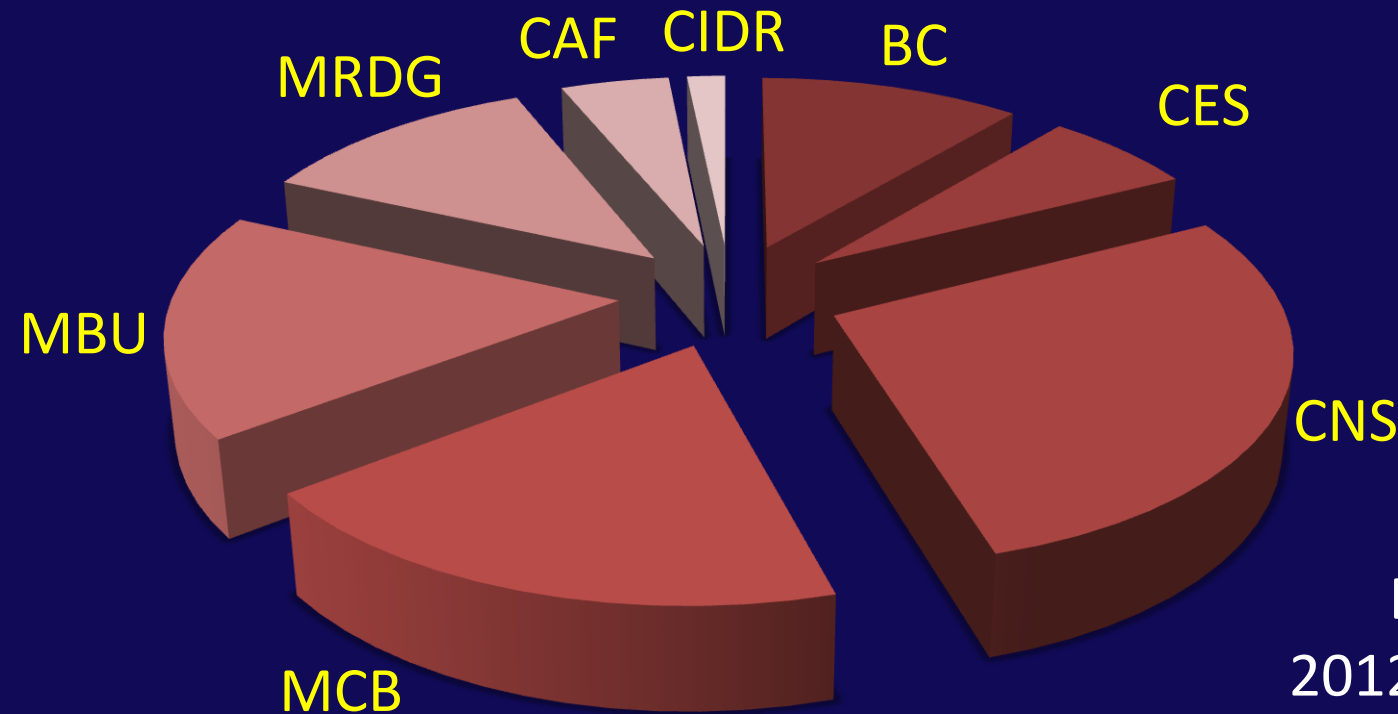


Other Centres for Interdisciplinary Research

1. Centre for Biosystems Science and Engineering (BSSE)
2. Centre for Nano Science and Engineering (CeNSE)
3. National Mathematics Initiative (IISc node; Math-Bio@IISc)
4. Centre for Brain Research (CBR)

Funding generated by the Departments/Centres in the Division of Biological Sciences (2014-18)

Total: INR ~402 crores (US\$~57 million)
(Excludes IISc and DBT-IISc Funds)



DBT-IISc Funds
2012-2018: ~70 crores
2019-2021: ~78 crores

Funding sources



Indo-Swedish grant

Indo-Australia grant

Indo-Israel grant

Indo-Russian grant

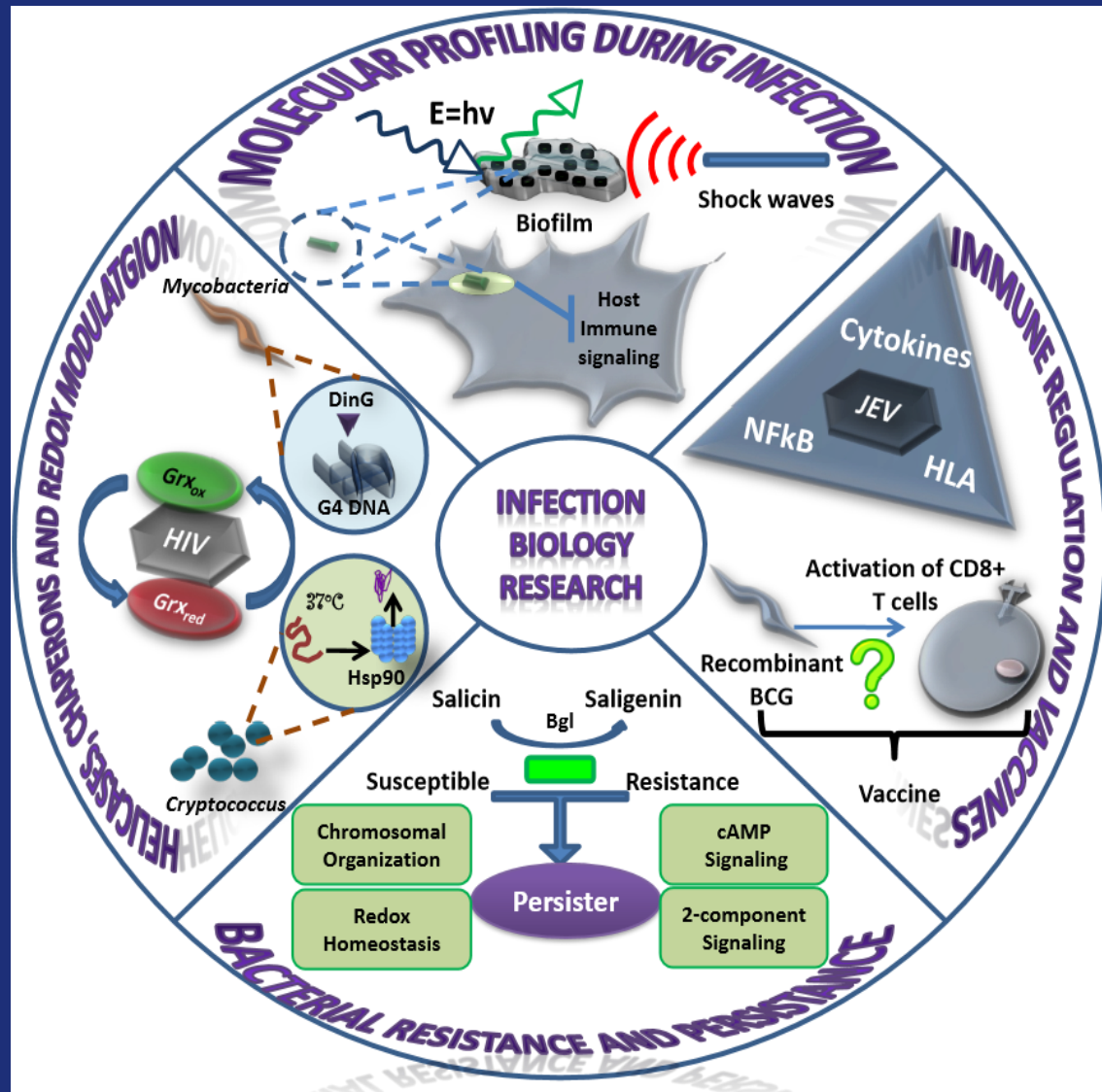


1. Disease Biology

1.1 Infectious disease biology (Viruses, bacteria and fungi)

Principal Investigators from DBS:
Dipshikha Chakravorty, S. Vijaya,
K. N. Balaji, P. Ajitkumar, Amit
Singh, S. Mahadevan, N. Ganesh,
Dipankar Nandi, Saibal
Chatterjee, and Utpal Tatu.

Co-investigators from other
divisions: Jagadeesh Gopalan
(Aerospace Engineering), Ashok
Raichur (Materials Engineering),
G. Mugesh (Inorganic Physical
Chemistry), and S. Umapathy
(Inorganic Physical Chemistry).

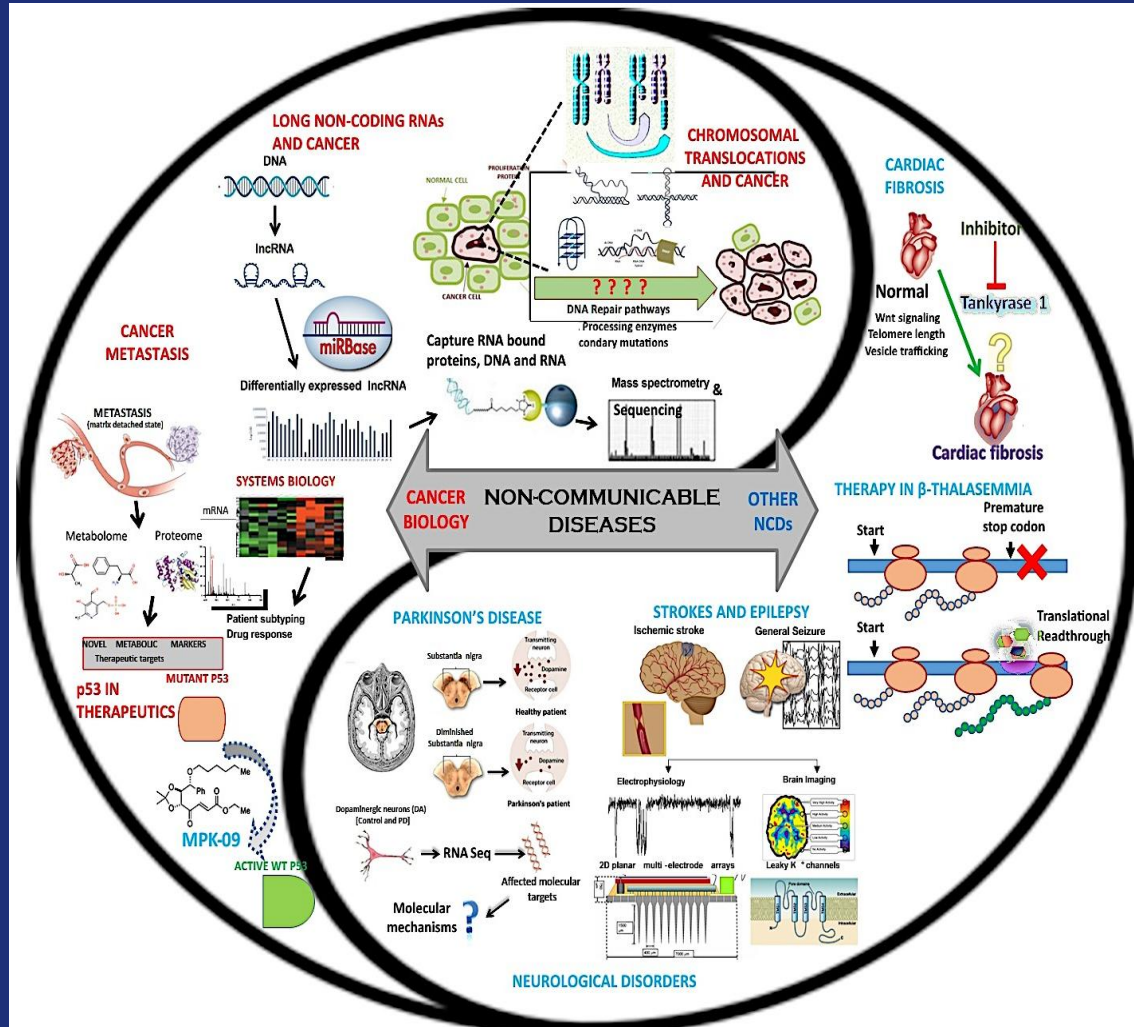


1. Disease Biology

1.2 Non-communicable diseases (Cancer, neuronal disorders, cardiac and other disorders)

Principal Investigators from DBS: Kumar Somasundaram, Satheesh Raghavan, Paturu Kondaiah, Annapoorni Rangarajan, Sujit Sikdar, Vijayalakshmi Ravindranath, Ravi Sundaresan, Sandeep M. Eswarappa, and Nagasuma Chandra.

Co-investigators from other divisions: K. R. Prasad (IPC), Debnath Pal (CDS), H. S. Atreya (NMR Centre), Bharadwaj (ECE), and G. Rangarajan (Mathematics).



2. Biological function and form through complex interactions

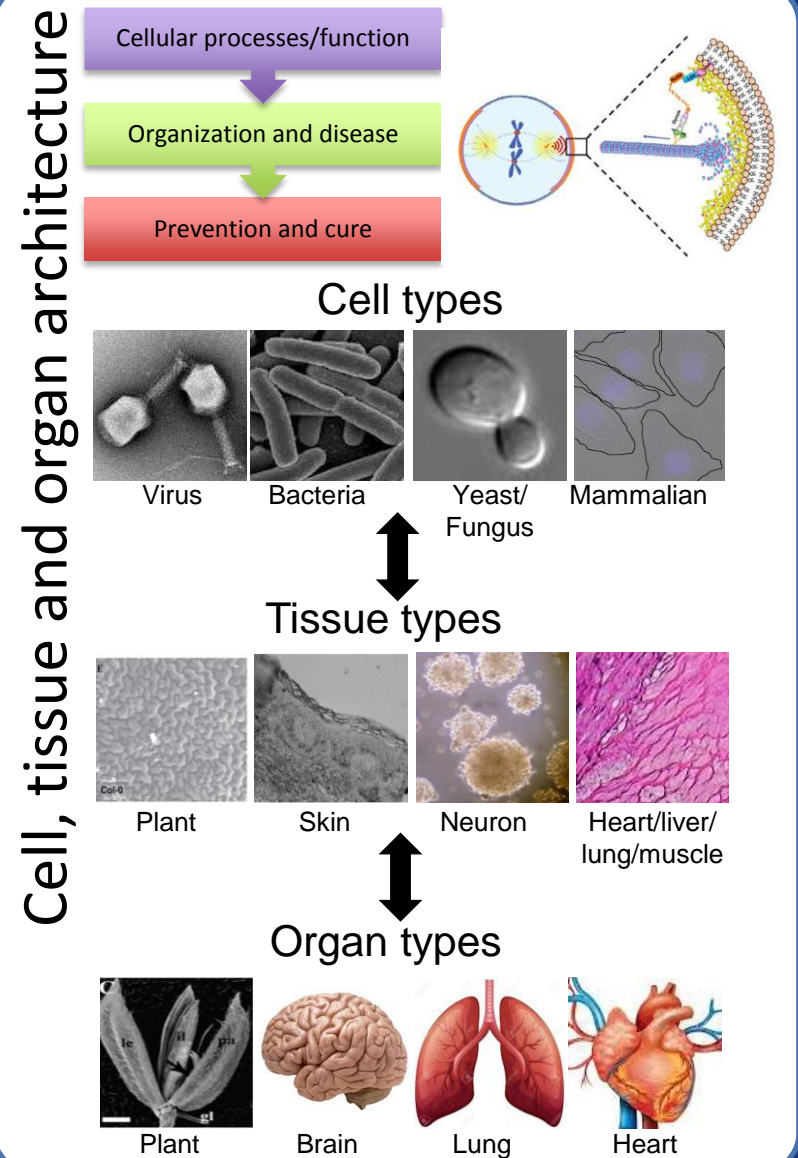
2.1 Cell, tissue and organ architecture

Principal Investigators from DBS:

Sachin Kotak, Purusharth I. Rajyaguru, P. N. Rangarajan, Deepak Nair, G. Subba Rao and Ramray Bhatt.

Co-investigators from other divisions:

Perna Sharma (Physics), Ambarish Ghosh (CeNSE)



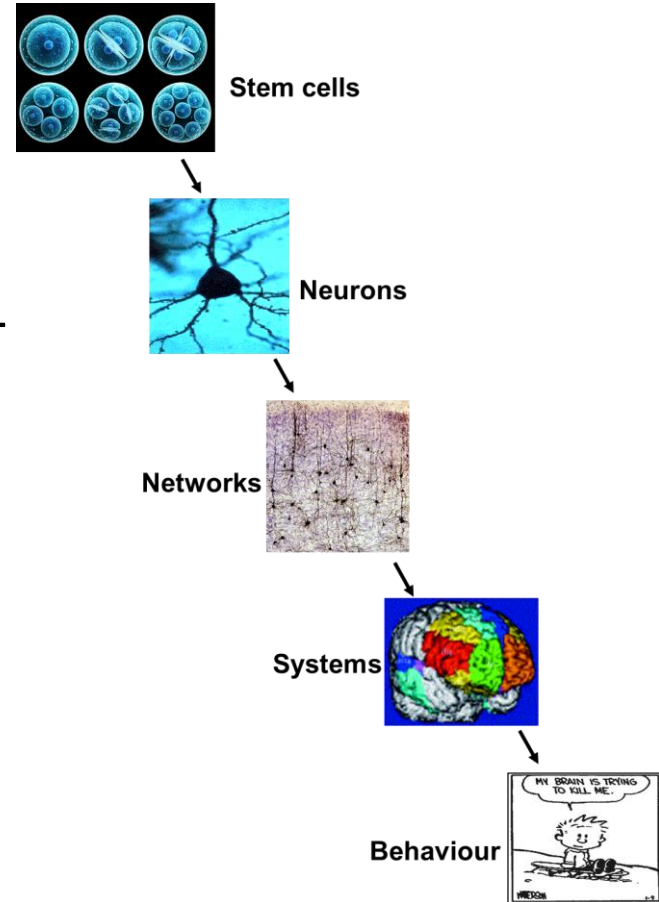
2. Biological function and form through complex interactions

2.2 Networks in development and behavior

Principal Investigators from DBS: Utpal Nath, Usha Vijayraghavan, Polani Seshagiri, Rishikesh Narayanan, Balaji Jayaprakash, Supratim Ray, Aditya Murthy, S. P. Arun, and Sridharan Devarajan.

Co-investigators from other divisions: Rajesh Sundaresan (ECE), Ramesh Hariharan (CSA), G. K Ananthasuresh (ME), Ashitava Ghosal (ME), Radhakant Padhi (AE), Sriram Ganapathy (EE), G. Rangarajan (Mathematics), Varun Raghunathan, (ECE), Supradeepa, (CeNSE), K. V. S Hari (ECE), Partha Talukdar (CDS), Sriram Ganapathy (EE)

Networks in Development and Behaviour



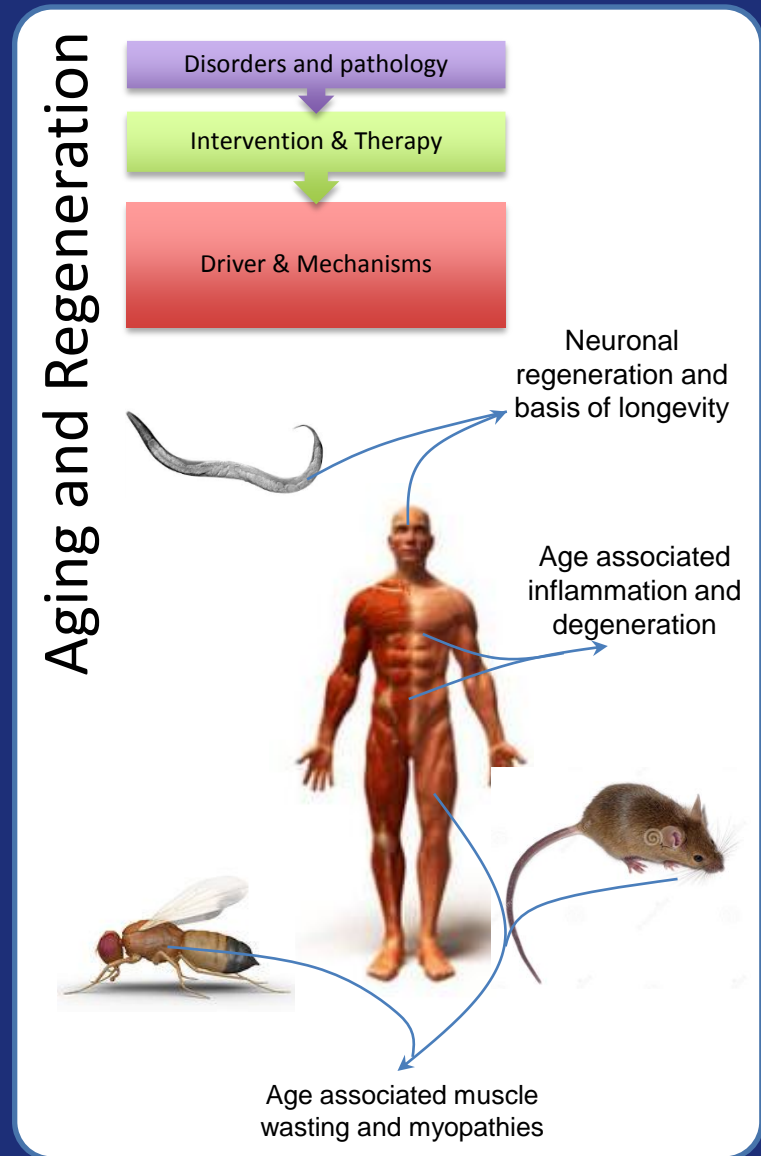
2. Biological function and form through complex interactions

2.3 Aging and regeneration

Principal Investigators from DBS:

Deepak Saini, Narendra Ramanan, N Ravi Sundaresan, Varsha Singh, Upendra Nongthomba

Co-investigators from other divisions: Ambarish Ghosh, Manoj Verma, Rudra Pratap (CeNSE), S. Umapathy (Inorganic and Physical Chemistry), Kaushik Chatterjee (Materials Engineering) and A. Muthuvel (Electrical Engineering)



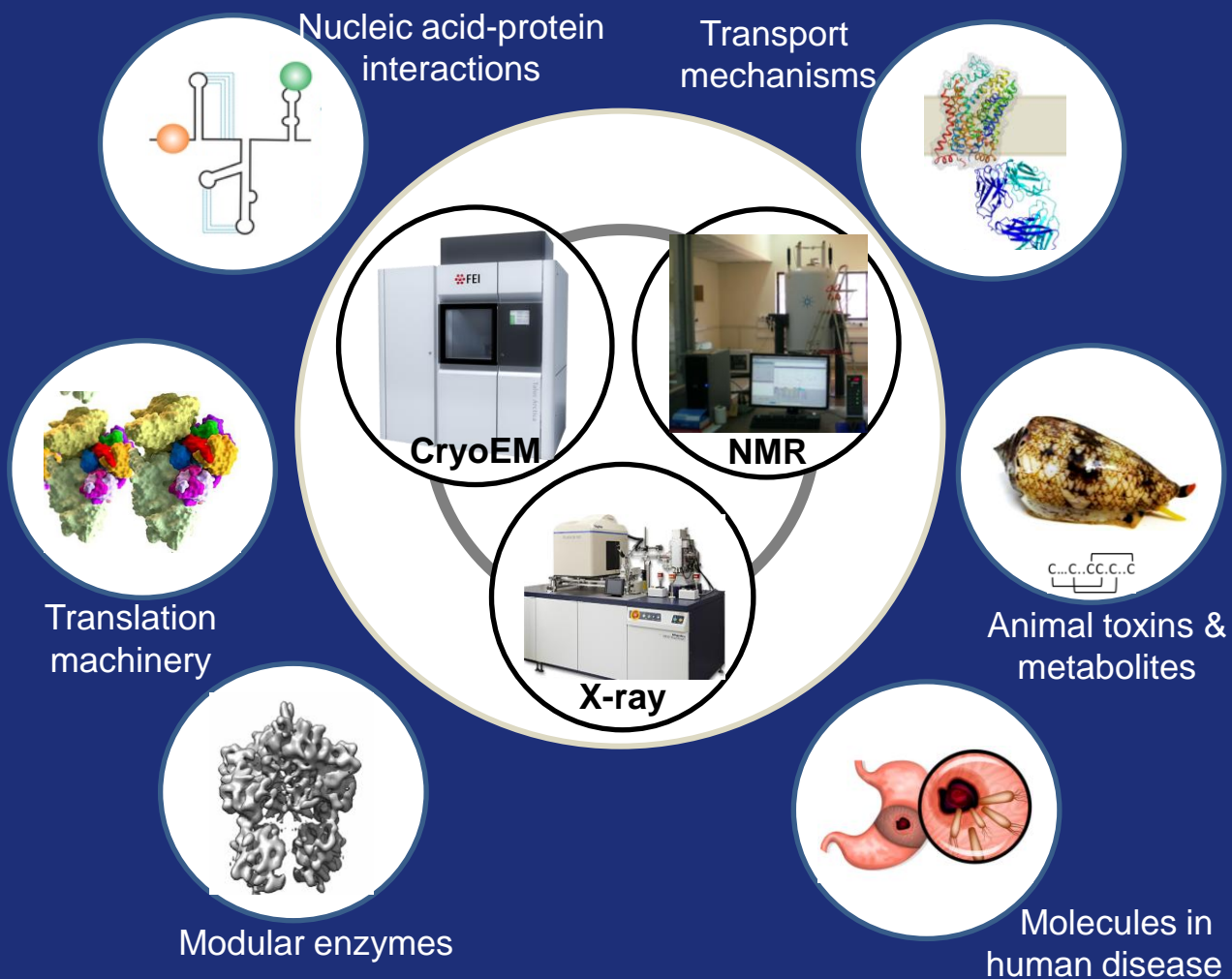
3. Biomolecular structure, function and design

3.1 Structure elucidations and functional studies

Principal Investigators from

DBS: B. Gopal, Mahavir Singh, K. Suguna, Tanweer Hussain, Siddhartha P. Sarma, Somnath Dutta, Aravind Penmatsa, Umesh Varshney, D. N. Rao, C. Jayabaskaran, Patrick D'Silva, and Shikha Laloraya.

Co-investigators from other divisions: G. Mugesh (IPC), Santanu Bhattacharya (OC).

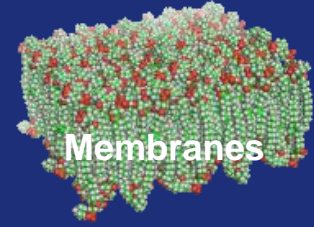
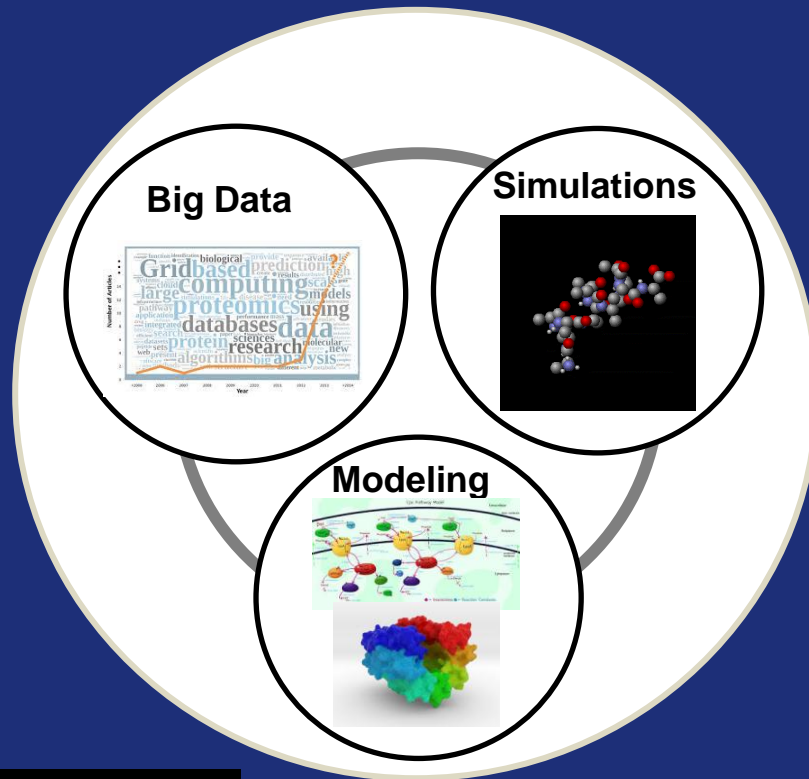


3. Biomolecular structure, function and design

3.2 Computational biology and bioinformatics

Principal Investigators from DBS:
N. Srinivasan, A. Srivastava, and Nagasuma Chandra.

Co-investigators from other divisions: Narendra Dixit (Chemical Engineering).



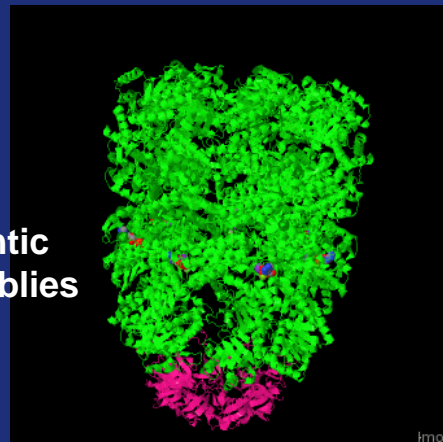
Membranes



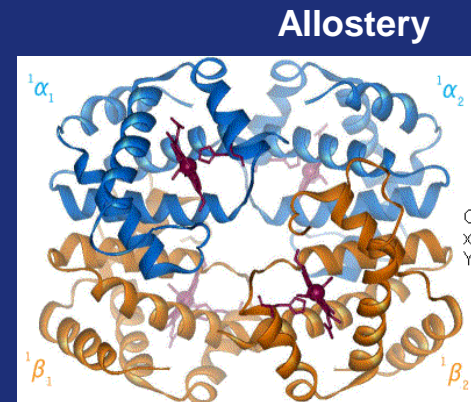
Viral entry



Genomes, proteomes



Gigantic assemblies



Allostery



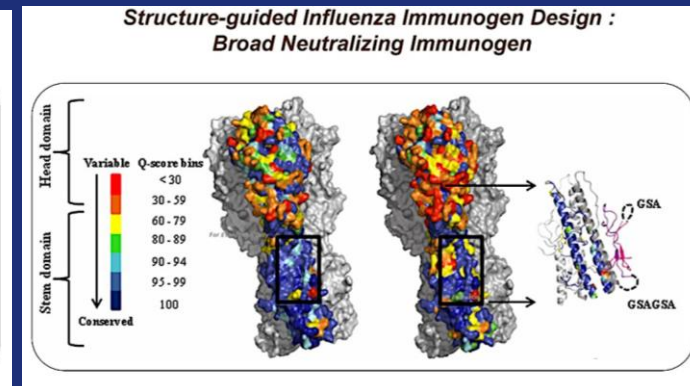
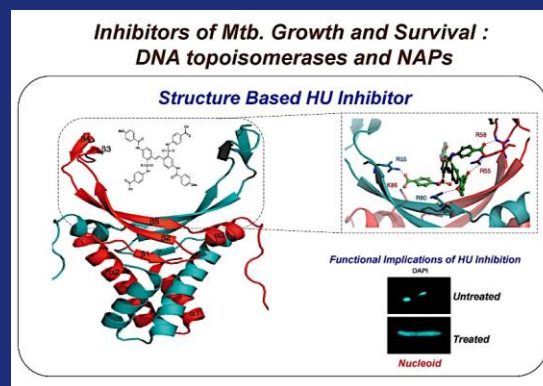
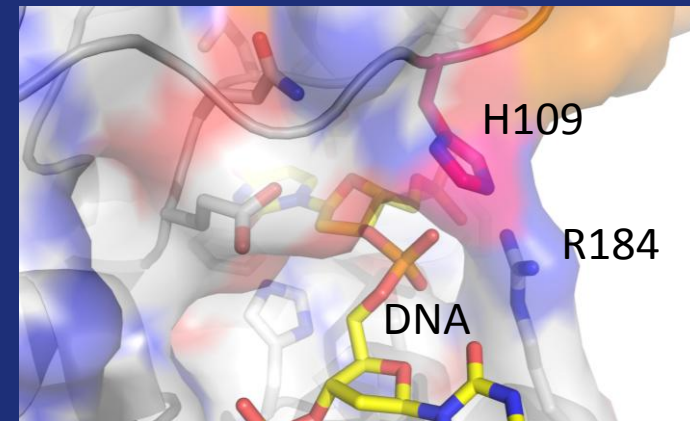
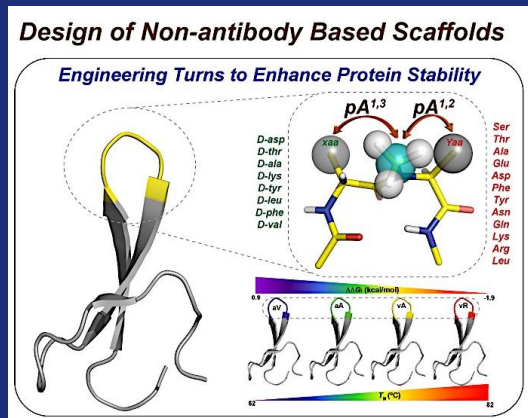
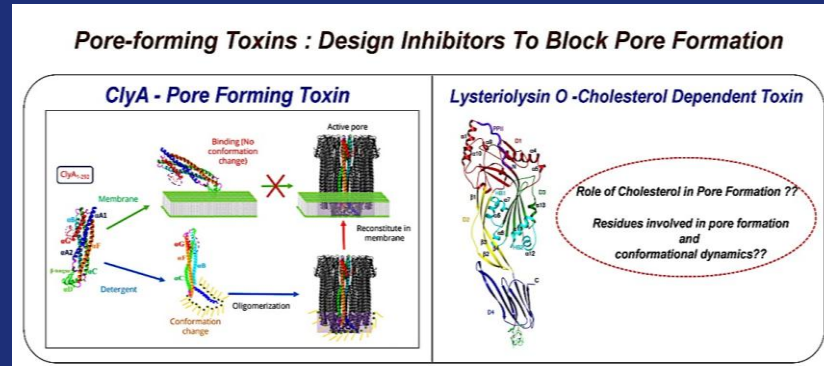
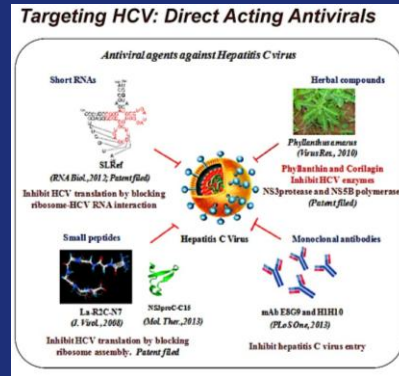
Diseases & drugs

3. Biomolecular structure, function and design

3.3 Molecular design

Principal Investigators from DBS: V. Nagaraja, Sandhya Visweswariah, Raghavan Varadarajan, Saumitra Das, and Jayanta Chatterjee, A. Srivastava.

Co-investigators from other divisions: Ganapathy Ayappa (Chem. Eng.), Jaydeep Basu (Physics), Vijay Natarajan (CSA), Siddharth Jhunjhunwala (Bioeng), Rahul Roy (Chem. Eng.), N. Jayaraman (OC), and Ashok Raichur (ME)



4. Ecological and evolutionary processes

4.1 Form, function and adaptation: From evolutionary innovations to bio-inspired design

Investigators from DBS: Maria Thaker, Rohini Balakrishnan, Kavita Isvaran, Vishwesh Guttal, Kartik Shanker, Renee Borges, Siddhartha Sarma, Varsha Singh, S. Mahadevan, and Utpal Tatu.

Co-investigators from other divisions: Rudra Pratap (CeNSE), Namrata Gundiah (Mechanical Engineering), Sriram Ramaswamy (Physics), Manoj Varma (CeNSE), and Tejas Murthy (Civil Engineering).



Structure-Function Relationships and Optimisation in Animal Signals and Signalling Behaviour



Using termite mounds as models to understand bio-cementation



Aerial view of moving black buck herd



Insect Ears as Ecological Adaptations & as Models for Miniature Microphones



From Bacterial Swarms to Fish Schools: Decoding the Rules of Collective Movement and Applying these to Swarm Robotics

4. Ecological and evolutionary processes

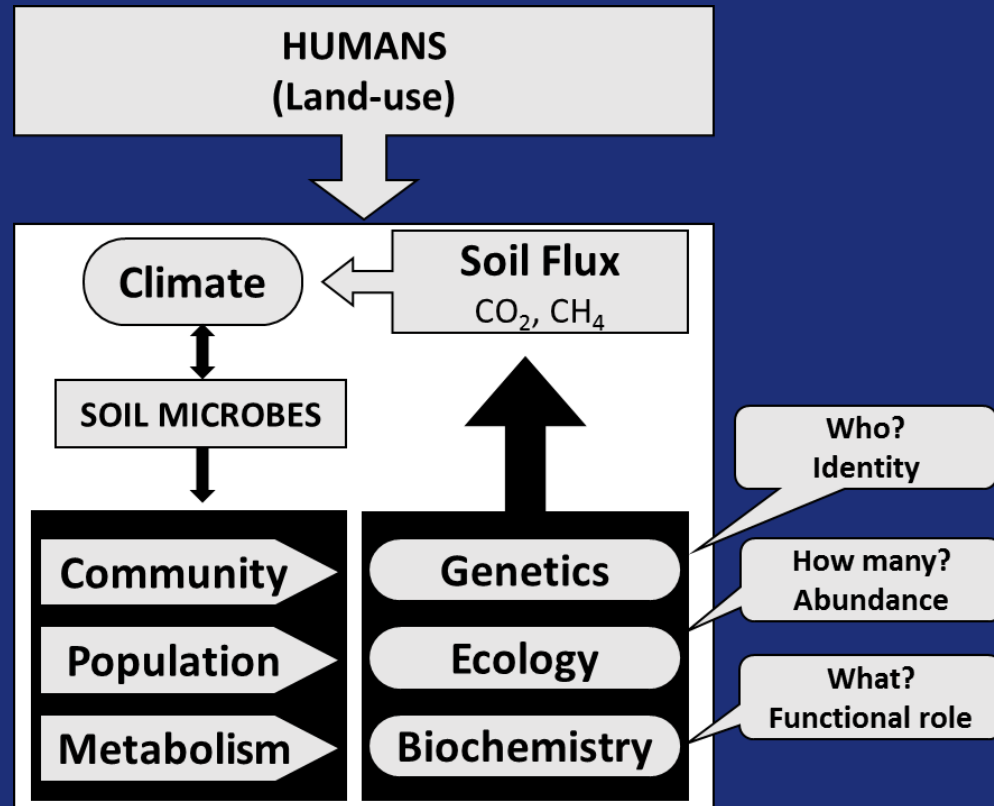
4.2 Microbial ecology

Investigators from DBS: Sumanta Bagchi, Praveen Karanth, R. Sukumar, Renee Borges, D. N. Rao, Utpal Tatu, Dipshikha Chakravortty, S. Mahadevan

Co-investigators from other divisions: Devanita Ghosh (Earth Sciences)

Microbes in the Service of Mutualisms?

Examining the role of internal microbes and microbial compounds in Fig-Fig wasp mutualisms and in termite-produced fungicides



Linking Soil Microbe Community Composition with their Functional Roles in Carbon and Nitrogen cycling in different Ecosystems



Number of Publications 2014-2018 (Nov.)
PubMed /Web of Science/Google Scholar
Journal publications

Departments	2014	2015	2016	2017	2018	Total
Biochemistry	57	64	57	56	56	290
Centre for Ecological Sciences	39	36	25	37	45	182
Centre for Neuroscience	07	13	16	21	15	72
Microbiology and Cell Biology	52	50	48	47	57	254
Molecular Biophysics Unit	66	75	65	55	66	327
Molecular Reproduction, Development and Genetics	42	53	43	28	29	195
Total	263	291	254	244	268	1320

Number of Publications 2014-2018 (Nov.)
PubMed /Web of Science/Google Scholar
Book publications

Departments	2014	2015	2016	2017	2018	Total
Biochemistry	-	01	04	01	03	09
Centre for Ecological Sciences	02	05	09	04	00	20
Centre for Neuroscience	02	-	-	-	-	02
Microbiology and Cell Biology	-	02	-	02	02	06
Molecular Biophysics Unit	-	02	02	-	06	10
Molecular Reproduction, Development and Genetics	-	-	01	03	03	07
Total	04	10	16	10	14	54

Number of Publications 2014-2018 (Nov.)

PhDs Awarded

Departments	2014	2015	2016	2017	2018	Total
Biochemistry	13	14	15	14	22	78
Centre for Ecological Sciences	05	06	05	04	08	28
Centre for Neuroscience	-	-	01	03	09	13
Microbiology and Cell Biology	12	12	16	12	20	72
Molecular Biophysics Unit	16	19	19	19	08	81
Molecular Reproduction, Development and Genetics	05	08	09	11	04	37
Total	51	59	65	63	71	309

RESEARCH OUTCOME

Jan 2014 TO Nov 2018

S. N.	Particulars	Jan 2014 to Nov 2018
1	Number of Ph.D. awarded	309
2	Number of journal and (books) publications	1320 (54)
3	Patents filed/granted	18

Services to the Editorial boards of journals

Nucleic Acids Research



Current Opinion in Structural Biology

ECOLOGY LETTERS

Journal of Ethology

Current Opinion in Insect Science

Bioinformatics

BioEssays

Journal of Chemical Ecology

Conservation Biology 

Tuberculosis

BIOLOGICAL SCIENCES

Awards/honors to the *serving faculty*

Name of the Award/Fellowship	No. of Recipients
Padmashree	1
S. S. Bhatnagar Prize	9
G. N. Ramachandran Gold Medal for Excellence in Biol Sci & Technol	3
TWAS Fellowships	5
National Bioscience Career Development awards	11
JC Bose fellowships	13
INSA fellows	15
IAS fellows	16
NASI fellows	13
Others	46

DBS Alumni over the years

(partial data)

Occupation	Numbers
PDF	275
Independent PI	205 (>50 in the US & Europe)
Entrepreneur & Industry	90
Science Education & Journalism	7
Total	577

Publications in Life Sciences & Medicine (2014–2018): Count, quality and comparison with comparable Indian institutions

Institution	Scholarly Output (Total publications)	Publications in Top 25 Journal Percentiles (%)	Publications in Top 25 Journal Percentiles (#)	Publications in Top 10 Journal Percentiles (%)	Publications in Top 10 Journal Percentiles (#)	Publications in Top 5 Journal Percentiles (%)	Publications in Top 5 Journal Percentiles (#)	Publications in Top 1 Journal Percentiles (%)	Publications in Top 1 Journal Percentiles (#)
Indian Institute of Science Bangalore	2345	57.2	1235	30	648	14.8	319	1.9	42
Indian Institute of Technology, Bombay	1239	52.6	574	25.1	274	12.9	141	2.1	23
Indian Institute of Technology, Delhi	1378	50	606	22.5	273	11.4	138	1.1	13
Indian Institute of Technology, Kanpur	695	50.5	317	26	163	13.2	83	2.2	14
Indian Institute of Technology, Kharagpur	1646	50.2	735	24.7	362	9	132	1.4	20
Indian Institute of Technology, Madras	1146	50.2	497	26.7	265	12.5	124	1.6	16
Tata Institute of Fundamental Research	1083	62.7	649	37.6	389	19.1	198	2.6	27

Ratio between IISc and closest competitor

1.42

1.68

1.67

1.61

1.56



#1

#2

Data from SciVal, QS Benchmarking

Citations/faculty in Life Sciences & Medicine: Comparison with comparable Indian institutions

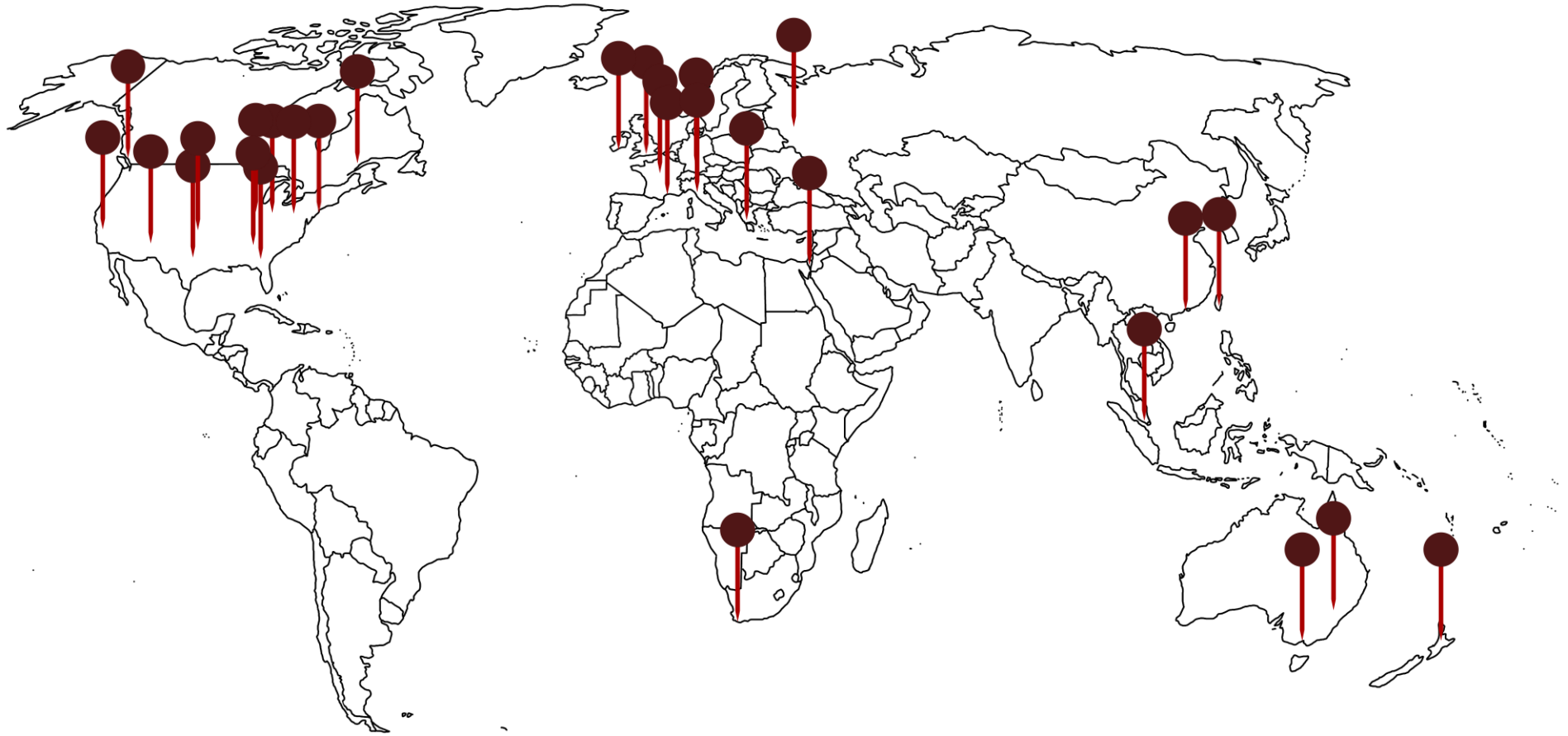
Institution	Citations per publication (2012-2016)	Citations per publication (2014-2018)
Indian Institute of Science Bangalore	12.3	6.9
Indian Institute of Technology, Bombay	13.8	6.1
Indian Institute of Technology, Delhi	10.7	5.7
Indian Institute of Technology, Kanpur	15.3	6.4
Indian Institute of Technology, Kharagpur	12.2	6.5
Indian Institute of Technology, Madras	10.1	5
Tata Institute of Fundamental Research	13.5	6.3



#1

#2

International collaborations of DBS faculty



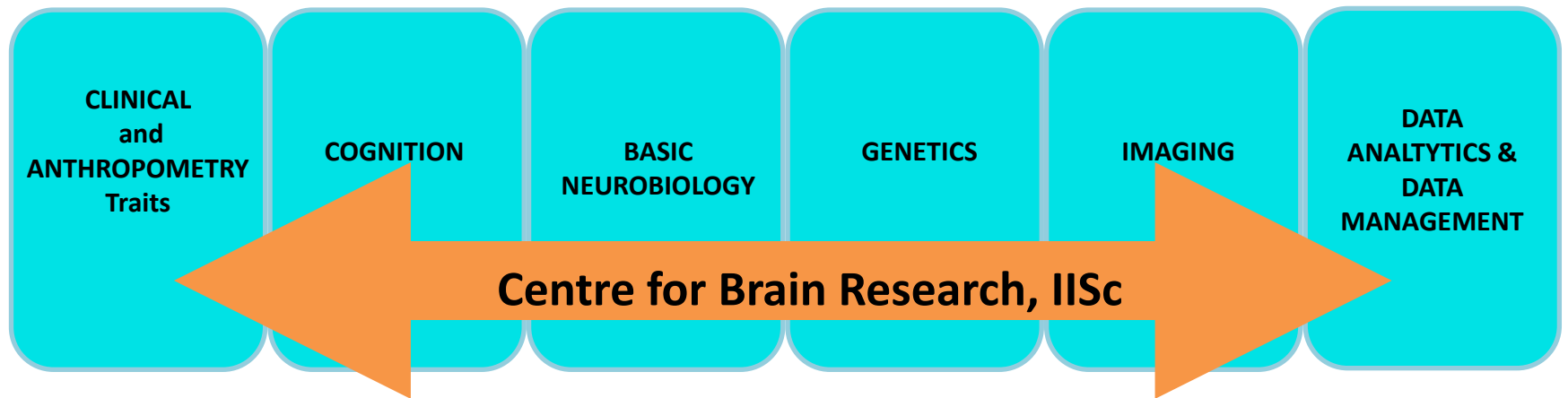
CENTRE FOR BRAIN RESEARCH@ IISc

- Kris Gopalakrishnan, co-founder of Infosys, has gifted 225 crores for establishment of CBR in addition to the cost of the building.
- CBR is an autonomous centre of IISc. Will be housed in new building within IISc.
- **Aging brain & Dementia**
- How do we protect and restore the functioning of our brains as we age?



Major research areas at Centre for Brain Research, IISc

Faculty recruitment is going on



Vision

- To evolve into a centre of advanced scientific research and a premier centre in the international context to undertake the most challenging, high risk and large-scale initiatives.
- To provide special emphasis on interdisciplinary research, scientific output (publications, patents, technology development and its transfer), human resource development (award of Ph.D. degrees, training of post-doctoral fellows and project staff).
- To promote,
 - Integrated research (networking and collaborations)
 - Application of research findings



Thank You

