



Editorial

Mohit Kumar Jolly^{1*}, Annapoorni Rangarajan¹, Erik W. Thompson² and Brett Hollier²

We would like to thank the Editor-in-Chief Prof. G. K. Ananthasuresh for giving us the opportunity to bring out this special issue of the Journal of Indian Institute of Science in its 100th Volume, themed 'Phenotypic Plasticity'. The idea of this issue originated from a SPARC (Scheme for Promotion of Academic and Research Collaboration) grant that we were awarded recently, to dissect the contribution of phenotypic plasticity in cancer metastasis using an integrated computational-experimental approach.

Phenotypic plasticity—the ability of cells or organisms to display more than one phenotype (a group of traits or characteristics that can be observed) in response to varying environments despite possessing the same genotype (genetic makeup of a cell)—is not something specific to cancer; instead, it is a universal property among many cells and living organisms in response to the dynamic and complex nature of their environments. It can generate variations in morphology, biochemistry, physiology, and the life history of an organism—from embryonic development to disease manifestations in adult life. Thus, phenotypic plasticity can be exhibited across scales of length, time, and biological organization.

This diversity in manifestations of phenotypic plasticity is being captured in constituent articles in this special issue, from those focusing on yeast metabolism and bacterial motility all the way to cancer progression and metastasis. Thematically speaking, the authors who have contributed to this special issue and their host institutions and departments—Prof. Paike Jayadeva Bhat (IIT Bombay), Prof. Shalmoli Bhattacharyya (PGIMER Chandigarh), Dr. Biplab Bose (IIT Guwahati), Dr. Riddhiman Dhar (IIT Kharagpur), Dr. Prashant Kumar (IoB, Bangalore), Prof. Annapoorni Rangarajan (IISc, Bangalore), Prof. Pritha Ray (ACTREC, Mumbai), Dr. Supreet Saini

(IIT Bombay), Dr. Varsha Singh (IISc, Bangalore), and Dr. Ankur Sharma (GIS, Singapore)—each have a very different research focus—from genome evolution to multistability in biological systems. Therefore, we sincerely believe that this interdisciplinary collection of articles will provide a unique perspective of various methods, tools, and techniques used to probe these fundamental questions related to mechanisms and implications of phenotypic plasticity in diverse biological systems. Thus, we would like to express our sincere gratitude to all authors who kindly agreed to share their expertise in this special issue, as well as peer reviewers of these manuscripts.

Moreover, we hope that this special issue will further foster an inter-disciplinary collaborative dialogue to tackle these open key questions in the role of phenotypic plasticity in development, evolution and human diseases. This special issue also embodies the inclusive spirit of scientific enquiry, as represented by diversity in gender and geography, besides diverse academic backgrounds.

Overall, these ten manuscripts provide an excellent review of the inter-disciplinary approaches used to decode the emergent principles of phenotypic plasticity operating across scales of biological regulation and evolution. We would like to thank everyone from the offices of the Journal of Indian Institute of Science and its publishers, the Office of Communications from the Institute as well as Springer, particularly Ms. Kavitha Harish and Mr. Abishek Sundaram, for their help and cooperation in bringing out the issue.

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Mohit Kumar Jolly is an Assistant Professor in the Centre for Biosystems Science and Engineering (BSSE) at Indian Institute of Science. His research interests are in developing mechanism-based mathematical models to decode the emergent dynamics of intracellular and intercellular regulatory networks driving cancer metastasis and therapy, with a specific focus on decoding the mechanisms and implications of phenotypic plasticity and heterogeneity, particularly related to epithelial-mesenchymal transition/plasticity (EMT/EMP).



Annapoorni Rangarajan is currently a Professor in the Department of Molecular Reproduction, Development and Genetics (MRDG) at the Indian Institute of Science (IISc). She is also an Associate Faculty with the Centre for Biosystems Science and Engineering at IISc. Her research interest is in understanding the molecular underpinnings and alliance among cancer stemness, EMT and anoikis-resistance that contribute to cancer heterogeneity and therapy failure.



Erik W. Thompson is the Associate Director of Institute of Health Biomedical Innovation (IHBI), Queensland University of Technology at the Translational Research Institute. He has made seminal contributions since 1980s in the field of epithelial mesenchymal plasticity (EMP), and co-founded The EMT International Association (TEMTIA) in 2003, was President in 2013, and convened the 2015 TEMTIA meeting in Melbourne, Australia. He has also served as President of International Metastasis Research Society (MRS) and convened the 12th International Congress of MRS in Brisbane, Australia.



Brett Hollier is Head of the Invasion and Metastasis Laboratory at Institute of Health Biomedical Innovation, Queensland University of Technology at the Translational Research Institute. His research focuses on prostate cancer progression and aims to better define the EMT program operating in cancer and its relevance to metastasis in order to identify novel biomarkers and therapeutic targets of EMT to better prognosticate and treat aggressive forms of cancer.