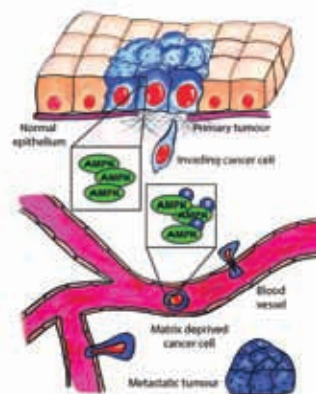
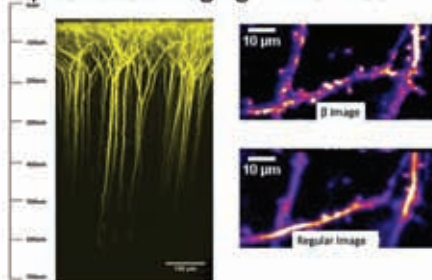


Cancer cells overcome natural cell death to transit through the circulatory system and metastasize. The study shows that these cancer cells are protected by detachment-triggered phosphorylation (P) and activation of AMPK (Sundararaman A, Amirtham U and **Rangarajan A**. Calcium-Oxidant Signaling Network Regulates AMP-activated Protein Kinase (AMPK) Activation upon Matrix Deprivation. *Journal of Biological Chemistry*. 2016. 291: 14410-14429).



β contrast imaging in live mice



The saturation dynamics of the photo physical process occurring in the fluorophore helps us generate a new contrast that depends on the local environment. This allows us to tease apart the dendritic spines in a neuron. (Kumar S, Singh A, Singh VR, George JB and **Balaji J**. Saturation Dynamics Measures Absolute Cross Section and Generates Contrast within a Neuron. *Biophysical Journal*. 2016. 111:1328-1336).

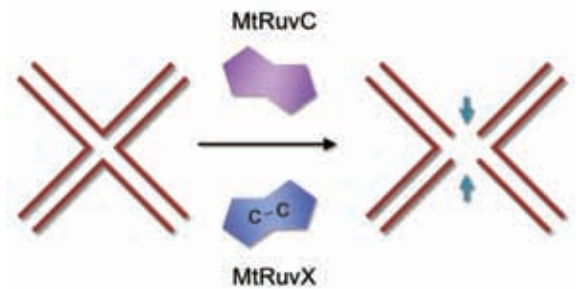


A foetus with anencephaly, a fatal condition in which a child is born without a brain, or only residual brain. This study discovered TRIM36 as the causative gene for anencephaly (Singh N, Kumble Bhat V, Tiwari A, Kodaganur SG, Tontanahal SJ, Sarda A, Malini KV and **Kumar A**. A Homozygous Mutation in TRIM36 Causes Autosomal Recessive Anencephaly in an Indian Family. *Human Molecular Genetics*. 2017. ddx020).



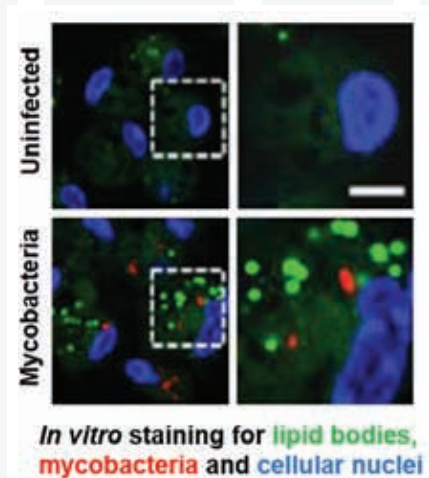
RESEARCH SNAPSHOTS 2016

Mycobacterium tuberculosis uses an unprecedented mechanism for the assembly of the Holliday junction resolvase (Nautiyal A, Rani PS, Sharples GJ and **Muniyappa K**. *Mycobacterium tuberculosis* RuvX is a Holliday Junction Resolvase Formed by Dimerisation of the Monomeric YggF Nuclease Domain. *Molecular Microbiology*. 2016. 100(4):656-74).



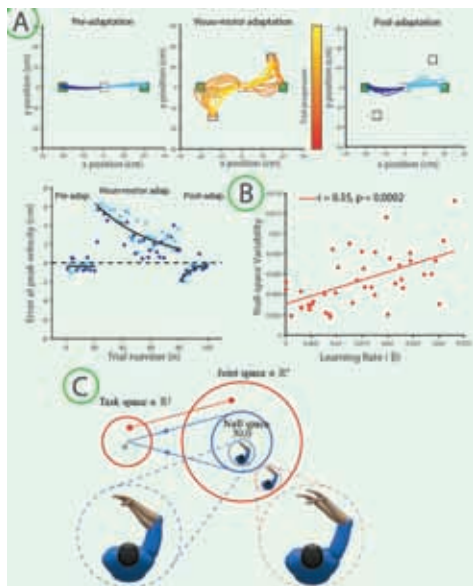
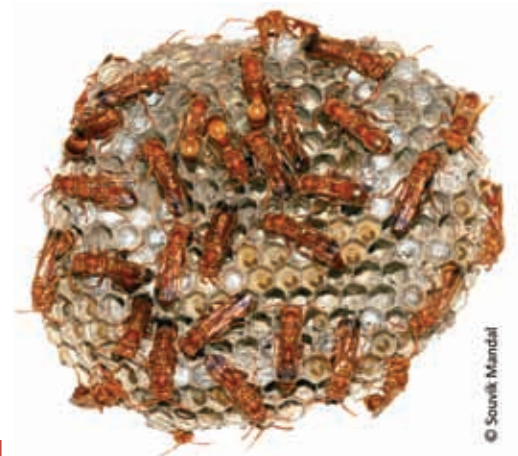
A pair of blackbuck at the Great Indian Bustard sanctuary, Maharashtra. The study found that wild blackbuck use even tiny refuges to persist in a human-dominated landscape (Krishna CY, Kumar A and **Isvaran K**. Wild Ungulate Decision-Making and the Role of Tiny Refuges in Human-Dominated Landscapes. *PLoS One*. 2016. 11(3): e0151748).

Tuberculosis infection results in epigenetic changes, leading to lipid accumulation in the host (Holla S, Prakhar P, Singh V, Karnam A, Mukherjee T, Mahadik K, Parikh P, Singh A, Rajmani RS, Ramachandra SG and **Balaji KN**. USASHI-Mediated Expression of JMJD3, a H3K27me3 Demethylase, is Involved in Foamy Macrophage Generation During Mycobacterial Infection. *PLoS Pathogens*. 2016. 12(8):e1005814).



Protein families can be grouped into higher hierarchical schemes depending on their structural and evolutionary closeness. Many of these families unable to connect through natural linkers (red dots) are bridged through computational protein sequence design (blue and white dots) (Vishwanath S, Sukhwal A, Sowdhamini R and **Srinivasan N**. Specificity and stability of transient protein-protein interactions. *Current Opinion in Structural Biology*. 2017. 44:77-86).

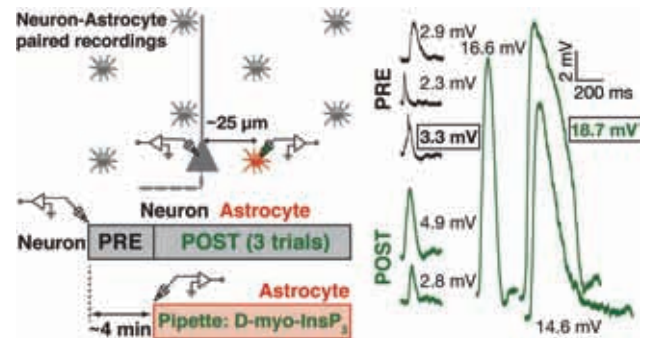
A nest of *Ropalidia marginata*, a wasp species in which, a new study argues, altruistic behaviour cannot always be explained by kin selection theory (**Gadagkar R.** Evolution of Social Behaviour in the Primitively Eusocial Wasp *Ropalidia Marginata*: Do We Need To Look Beyond Kin Selection? *Philosophical Transactions of the Royal Society B.* 2016. 371:20150094).



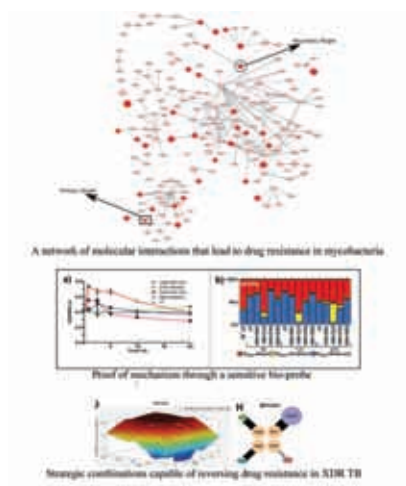
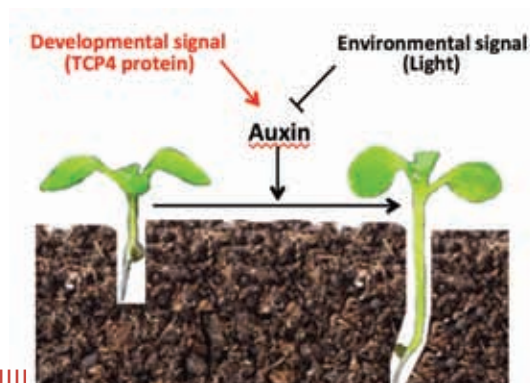
The ability to learn a novel visuomotor task (A) is predicted by the degree to which subjects explore null space-variability (B), an aspect of motor variability due to joint redundancy (C) (Singh P, Jana S, Ghosal A and **Murthy A.** Exploration of joint redundancy but not task space variability facilitates supervised motor learning. *Proceedings of the National Academy of Sciences.* 2016. 113(50): 14414-14419).



In paired astrocyte-neuron electrophysiological recordings, infusion of inositol trisphosphate into the astrocyte resulted in large-amplitude, long-duration plateau potentials in neurons (Ashhad S and **Narayanan R.** Active Dendrites Regulate the Impact of Gliotransmission on Rat Hippocampal Pyramidal Neurons. *Proceedings of the National Academy of Sciences (USA).* 2016. 113(23): E3280-E3289).



Developmental signals in a plant, like environmental signals, lead to the production of auxin, which spurs growth (although each signal leads to growth in different ways) (Challa KR, Aggarwal P and **Nath U**. Activation of YUCCA5 by the Transcription Factor TCP4 Integrates Developmental and Environmental Signals to Promote Hypocotyl Elongation in Arabidopsis. *The Plant Cell*. 2016. tpc.00360.2016).



Reversal of drug resistance in tuberculosis: Deciphering resistance mechanisms, identifying and targetting the Achille's heel of drug-resistant bacteria with new drug-combinations (Padiadpu J, Baloni P, Anand K, Munshi M, Thakur C, Mohan A, Singh A and **Chandra N**. Identifying and Tackling Emergent Vulnerability in Drug-Resistant Mycobacteria. *Infectious Diseases* 2016. 2(9): 592-607).

RESEARCH HIGHLIGHTS

The Division of Biological Sciences consists of the Departments of Biochemistry, Microbiology & Cell Biology, Molecular Reproduction, Development & Genetics, Molecular Biophysics Unit, Ecological Sciences, Centre for Neuroscience, Centre for Infectious Disease Research and Central Animal Facility including Primate Research Laboratory.