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The Insight 'Frontiers in biology' aims to cover timely and important developments in biology, ranging from the subcellular to the organismal level, and including molecular mechanisms and biomedicine.

The collection begins with a discussion of state-of-the-art cancer-predisposition-gene discovery. Nazneen Rahman shows how these genes can provide insight into the mechanisms of cancer causation, and how their clinical use has had a substantial impact on diagnosis, optimized management and cancer prevention.

Next, Karl Deisseroth discusses how analysing brain function at the level of neural projections can be a fruitful approach towards understanding the basis of behaviours relevant to psychiatric diseases. Technical advances have allowed perturbation of the activity of specific components of neural circuits, enabling causal testing of their functions.

Adam Kepecs and Gordon Fishell go on to consider the organization of interneurons, which perform a crucial role in regulating inhibition within neural circuits. Owing to their diverse morphology, connectivity and physiology, interneurons have by and large defied generalized classification. Here, the authors explore data supporting an organization in which the cells are defined by a developmentally specified set of cardinal classes.

Sean Morrison and David Scadden highlight recent progress in our understanding of the haematopoietic stem-cell niche in bone marrow, and discuss how studying the involvement of the microenvironment in normal and disease physiology promises new approaches to treat haematological disorders.

Further advances, this time in genetics and systems-based approaches, have resulted in a renaissance in mitochondrial research. Jonathan Friedman and Jodi Nunnari discuss how this resurgence is both redefining and extending our knowledge about mitochondrial behaviour and communication.

In the penultimate Review, Pier Paolo Pandolfi and colleagues discuss the ways in which various forms of endogenous RNA species can interact with and alter the expression or stability of other RNAs.

Finally, Robert Ross, Molly Weiner and Haifan Lin discuss recent studies that hint at the intriguing roles of piRNAs — originally considered to be germline-specific regulatory RNAs — in somatic cells.

Francesca Cesari, I-han Chou, Angela K. Eggleston, Noah Gray, Deepa Nath, Sadaf Shadan & Magdalena Skipper
Senior Editors

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