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FRONTIERS IN BIOLOGY

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The Nature 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. In this Insight the reviews discuss the role of innate immune signalling in tissue homeostasis and the response to infection, how understanding the DNA damage response has guided the development of inhibitors and helped to establish new principles for treating cancer, the potential therapeutic promise of patient-derived pluripotent stem cells, the forces that govern tumour evolution and the impact of mouse genetics on the study of bone physiology.

Richard Flavell and colleagues provide a timely overview of the activation and function of different inflammasomes. These are protein complexes that sense microbes and signs of tissue damage by responding to exogenous and endogenous signals. They can be beneficial and detrimental in a diverse set of inflammatory and metabolic diseases.

Christopher Lord and Alan Ashworth discuss how understanding the different response pathways to DNA damage has led to a multipronged approach to cancer therapy. Inherent mutations of the cancer cell and repair-enzyme inhibitors are used to synergistically target multiple repair pathways to enhance the cell killing effect.

Daisy Robinton and George Daley highlight the recent progress in the derivation of induced pluripotent stem cells, outline the functional assessments of pluripotency and discuss whether induced pluripotent stem cells equal embryonic stem cells, and thus may be a suitable alternative for research and therapy.

Mel Greaves and Carlo Maley consider our current knowledge of clonal evolution in cancer. Tumours and metastases evolve through the successive accumulation of genetic and epigenetic alterations and clonal selection within the adaptive environment. This leads to phenotypic and functional heterogeneity of cancer cells within a tumour. Although therapy can eliminate most cancer cells, it can drive the selection of resistant clones.

Finally, Gérard Karsenty and Mathieu Ferron discuss how recent evidence has changed our view of the skeleton and revealed an intimate connection between bone and the regulation of metabolism.

Alex Eccleston, Angela Eggleston, Marie-Thérèse Heemels, Barbara Marte & Ursula Weiss
Senior Editors

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