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REVIEWS

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GENETICS

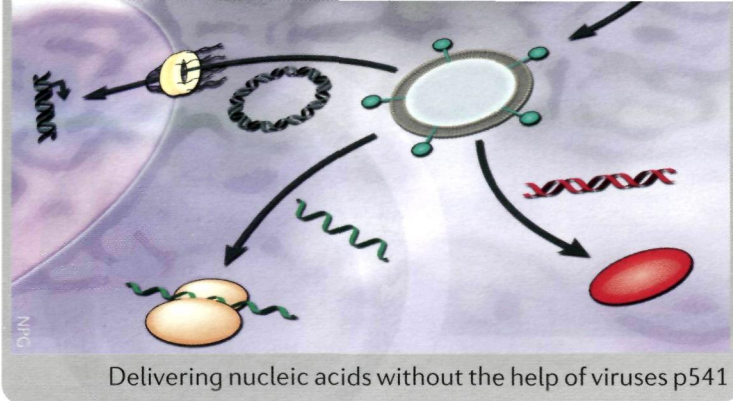


POTENT RODENTS

Comparative genomics of rodent species for studies of ageing and cancer

Cancer genomics

Bioinformatic tools to identify and characterize somatic mutations



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517 The role of genomic imprinting in biology and disease: an expanding view



Jo Peters

Imprinted genes influence a wide range of biological processes, the effects of which extend from prenatal stages to adulthood. This Review discusses the role of imprinted genes, with a focus on postnatal and adult phenotypes, and their contribution to common diseases such as intrauterine growth restriction, obesity, psychiatric disorders and cancer.

531 Comparative genetics of longevity and cancer: insights from long-lived rodents



Vera Gorbunova, Andrei Seluanov, Zhengdong Zhang, Vadim N. Gladyshev and Jan Vijg

Among rodent species, there is a wide diversity in lifespans and cancer susceptibilities, which makes comparative studies of rodents an attractive strategy for identifying molecular mechanisms that underlie ageing and cancer. This Review describes the various biological insights provided by comparative rodent genomics, including those from whole-genome sequencing of long-lived and highly cancer-resistant species. Such progress has potential implications for understanding and modulating human disease.

541 Non-viral vectors for gene-based therapy

Hao Yin, Rosemary L. Kanasty, Ahmed A. Eltoukhy, Arturo J. Vegas, J. Robert Dorkin and Daniel G. Anderson

This Review introduces the biological barriers to gene delivery *in vivo* and discusses recent advances in material sciences, nanotechnology and nucleic acid chemistry that have yielded promising non-viral systems for the delivery of DNA, mRNA, small interfering RNAs and microRNAs, some of which are currently undergoing testing in clinical trials.

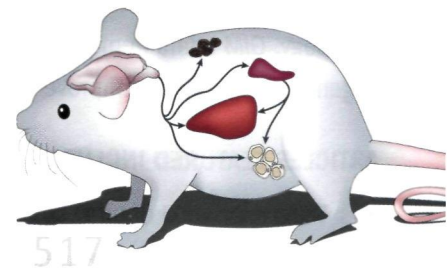
556 Expanding the computational toolbox for mining cancer genomes

FEATURED ARTICLE



Li Ding, Michael C. Wendl, Joshua F. McMichael and Benjamin J. Raphael

The field of cancer genomics has been transformed by recent advances in sequencing and the development of new computational methods. This Review outlines the available cancer genomics software and describes recent insights gained from the application of these tools.



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Jean Hausser and Mihaela Zavolan

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Jared L. Stenbeckert, Peter Reinhardt and Hans R. Schöler

Advances in the profiling of DNA modifications: cytosine methylation and beyond

Nongluk Plongthongkum, Dinh Diep and Kun Zhang

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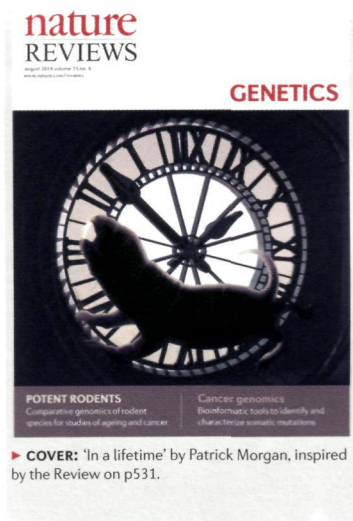
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Key points provides a bullet-pointed summary of the main topics covered in each article.

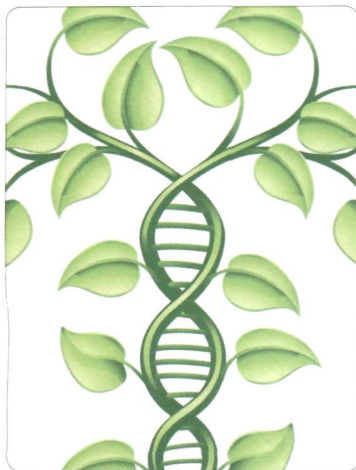
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