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REVIEWS

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GENETICS

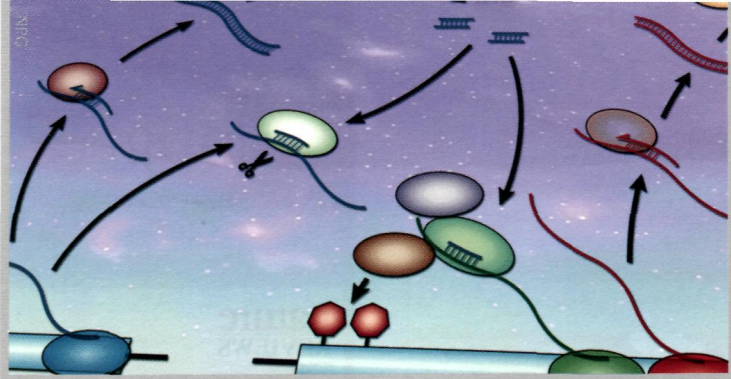


WHOSE GENOME?

Breaching and protecting privacy
of personal genetic data

Signatures of infection

How exposure to pathogens shapes
the evolution of our genomes



RNA-directed DNA methylation: roles and mechanisms p394

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REVIEWS

367 X chromosome regulation: diverse patterns in development, tissues and disease

Xinxian Deng, Joel B. Berletch, Di K. Nguyen and Christine M. Disteché

The complex mechanisms that regulate the X chromosome lead to evolutionary and physiological variability in gene expression between species, the sexes, individuals, developmental stages, tissues and cell types. This Review discusses the causes and consequences of variability in X-linked gene expression.

379 Natural selection and infectious disease in human populations

Elinor K. Karlsson, Dominic P. Kwiatkowski and Pardis C. Sabeti

The impact of various infectious agents on human survival and reproduction over thousands of years has exerted selective pressure on numerous regions of the human genome. This Review describes how such signatures of selection can be detected and integrated with data from complementary approaches, such as genome-wide association studies, to provide biological insights into host-pathogen interactions.

394 RNA-directed DNA methylation: an epigenetic pathway of increasing complexity

FEATURED ARTICLE

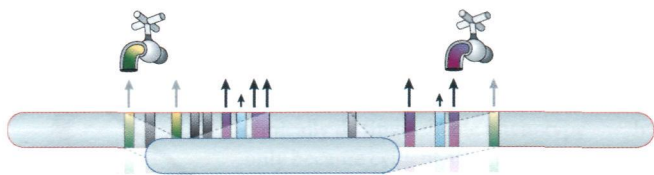
Marjori A. Matzke and Rebecca A. Mosher

RNA-directed DNA methylation (RdDM) is a major mechanism of transcriptional gene silencing in plants that is mediated through small interfering RNAs (siRNAs) and plant-specific RNA polymerases. This Review summarizes our latest understanding of RdDM, including its genomic targets, molecular mechanisms (such as emerging non-canonical pathways) and diverse biological roles.

409 Routes for breaching and protecting genetic privacy

Yaniv Erlich and Arvind Narayanan

Data sharing in genetics is essential to ensure research progress. However, concerns about the impact on privacy of data originators have been raised. This Review summarizes privacy breaching strategies and potential mitigation methods for privacy-preserving dissemination of sensitive data, and highlights different cases that are relevant to genetic applications.



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On the web www.nature.com/reviews/genetics

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Insights into RNA structure and function from genome-wide studies

Stefanie A. Mortimer, Mary Anne Kidwell and Jennifer A. Doudna

The dawn of evolutionary genome engineering

Csaba Pál, Balázs Papp and György Pósfai

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Melissa A. Kotterman and David V. Schaffer

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Links to further information

The full text of articles includes author biographies, links to glossary terms and links to websites and databases with relevant information.

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

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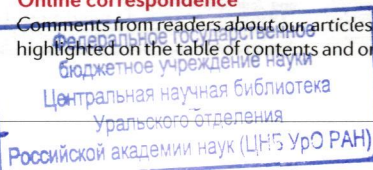
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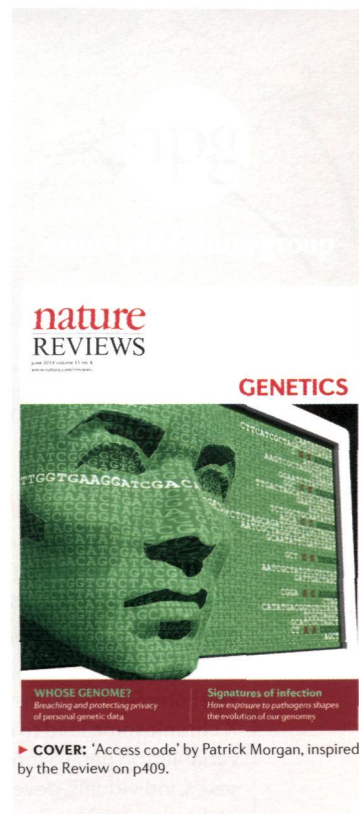
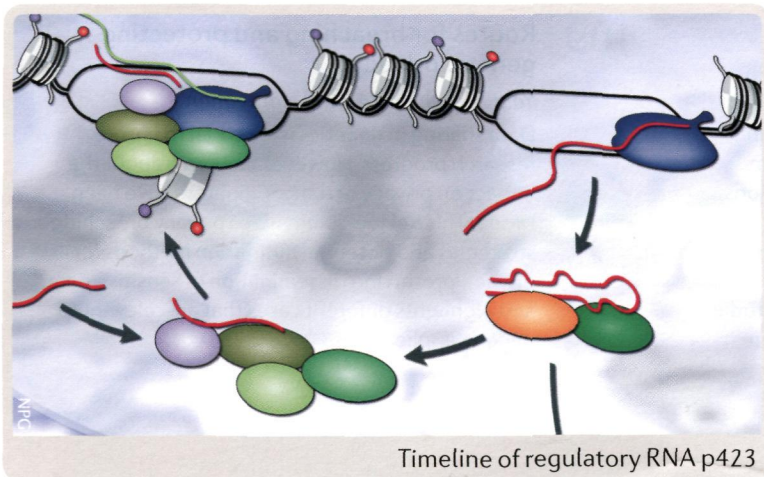
PERSPECTIVES

TIMELINE

423 The rise of regulatory RNA

Kevin V. Morris and John S. Mattick

Discoveries over the past decade portend a paradigm shift in molecular biology; evidence suggests that RNA is not only functional as a messenger between DNA and protein but also involved in the regulation of genome organization and gene expression. This Timeline article surveys the emergence of the previously unsuspected world of regulatory RNA from a historical perspective.



Research Highlight on a tRNA processing defect that causes a brain disorder p361

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