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REVIEWS

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GENETICS

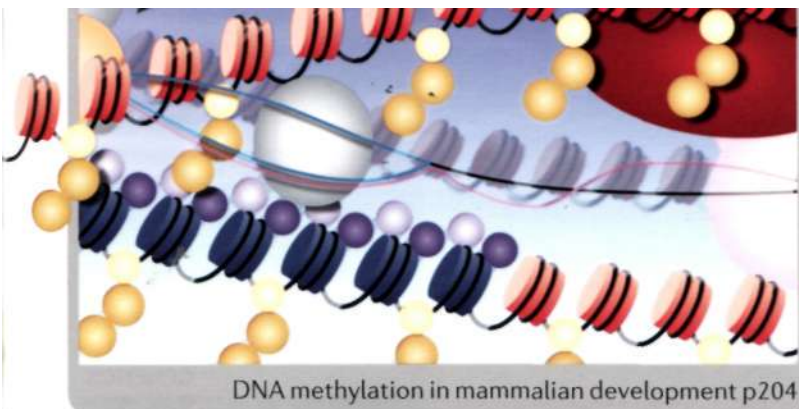


BACTERIAL CHROMOSOMES

Dynamic interplay between structure, replication and segregation

Sequence assembly methods

The needs and challenges of different applications



DNA methylation in mammalian development p204

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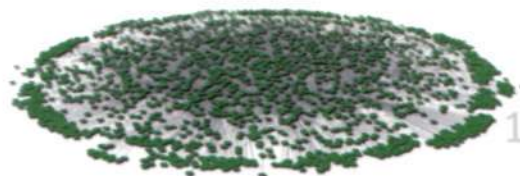
March 2013

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REVIEWS

- 157** **Sequence assembly demystified**
Niranjan Nagarajan and Mihai Pop
 As the use of next-generation sequencing has proliferated, so has the range of sequencing applications and software tools that are available for assembling sequences. To help readers to make informed choices about assembly techniques, this Review discusses the available options and practical trade-offs.
- 168** **Genotype to phenotype: lessons from model organisms for human genetics**
Ben Lehner
 A key challenge in genetics is predicting variation in phenotypic traits from the genome sequences of individuals. Work in model organisms indicates that a combination of genetic information and *in vivo* measurements of biological states will be essential for useful phenotypic predictions, including in humans.
- 179** **Q_{ST} - F_{ST} comparisons: evolutionary and ecological insights from genomic heterogeneity**
Tuomas Leinonen, R. J. Scott McCairns, Robert B. O'Hara and Juha Merilä
 Comparisons of quantitative trait (Q_{ST}) and neutral molecular marker (F_{ST}) divergence allow genetic drift and natural selection to be distinguished between as causes of population differentiation. Q_{ST} - F_{ST} comparisons are being increasingly used to tackle a range of evolutionary and ecological questions.

- 191** **Organization and segregation of bacterial chromosomes**
Xindan Wang, Paula Montero Llopis and David Z. Rudner
 Bacterial chromosomes were originally thought to be unstructured and largely unconstrained, but recent advances have supplemented historical research to reveal a highly structured and dynamic chromosome organization. This Review discusses our latest understanding of bacterial chromosome organization, including how the simultaneous nature of DNA replication and chromosome segregation in bacteria necessitates intricate interplay between these processes.
- 204** **DNA methylation: roles in mammalian development**
Zachary D. Smith and Alexander Meissner
 Advances in epigenomic and genetic studies have shown that DNA methylation undergoes local and global changes during mammalian development. This Review discusses the dynamics of this important epigenetic modification across various developmental stages.



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 Michaela Müller-McNicoll and Karla M. Neugebauer

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R. Craig MacLean, Clara Torres-Barceló and Richard Moxon

In this Opinion article, the authors discuss models that could explain the evolution of stress-induced mutagenesis in bacteria. They include a new model that argues that genetic drift could have a role in the evolution of low-fidelity DNA polymerases.

VIEWPOINT

228 Transgenerational epigenetic inheritance: how important is it?

Ueli Grossniklaus, Bill Kelly, Anne C. Ferguson-Smith, Marcus Pembrey and Susan Lindquist

How much transgenerational epigenetic inheritance takes place, and what impact does this have on organisms? We asked five leading researchers — working on key model organisms and on human disease — for their views.



235 The telomere syndromes (Corrigendum)

Mary Armanios and Elizabeth H. Blackburn



BACTERIAL CHROMOSOMES
Chromosomes involve heteromultimerization, regulation and segregation. Sequence assembly methods: the merit, and challenges of different applications.

► COVER: 'In the loop' by Patrick Morgan, inspired by the Review on p191.



A chromosomal basis for sociability p152

R. Libbrecht and X. Munn

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