

# Contents

Vol. 208 No. 1 January 2018



An artist representation of gene multifunctionality — from molecules to cell systems — drawn from the Aztec plumed serpent. A genetic screen in yeast shows that enzyme-loss phenotypes and their genetic interactions are many times not driven by the loss of their annotated catalytic function, suggesting additional “moonlighting” functions of these proteins. See Espinosa-Cantú *et al.* pp. 419–431. Image courtesy of Erika Cruz-Bonilla.

## FLYBOOK

- 1–18** **Advances in Engineering the Fly Genome with the CRISPR-Cas System**  
Bier, Ethan, Melissa M. Harrison, Kate M. O’Connor-Giles, and Jill Wildonger  
**OPEN ACCESS**

- 19–51** **Subcellular Specialization and Organelle Behavior in Germ Cells**  
Yamashita, Yukiko M.

## WORMBOOK

- 53–78** **Invading, Leading and Navigating Cells in *Caenorhabditis elegans*: Insights into Cell Movement *in Vivo***  
Sherwood, David R. and Julie Plastino

## PRIMER

- 79–88** **New Role for an Old Protein: An Educational Primer for Use with “The Identification of a Novel Mutant Allele of *topoisomerase II* in *Caenorhabditis elegans* Reveals a Unique Role in Chromosome Segregation During Spermatogenesis”**  
Boateng, Ruby and Anna K. Allen

## INVESTIGATIONS

### STATISTICAL GENETICS AND GENOMICS

- 89–95** **Estimating Realized Heritability in Panmictic Populations**  
Lstibůrek, Milan, Václav Bittner, Gary R. Hodge, Jan Pícek, and Trudy F. C. Mackay

### GENOME INTEGRITY AND TRANSMISSION

- 97–110** **Using Separation-of-Function Mutagenesis To Define the Full Spectrum of Activities Performed by the Est1 Telomerase Subunit *in Vivo***  
Lubin, Johnathan W., Timothy M. Tucey, and Victoria Lundblad  
**HIGHLIGHTED ARTICLE**

- 111–124** **Cohesin Function in Cohesion, Condensation, and DNA Repair Is Regulated by Wpl1p via a Common Mechanism in *Saccharomyces cerevisiae***  
Bloom, Michelle S., Douglas Koshland, and Vincent Guacci  
**OPEN ACCESS**

- 125–138** **Sgs1 Binding to Rad51 Stimulates Homology-Directed DNA Repair in *Saccharomyces cerevisiae***  
Campos-Doerfler, Lillian, Salahuddin Syed, and Kristina H. Schmidt  
**OPEN ACCESS**

CELLULAR GENETICS

- 139–151 **Delayed Encounter of Parental Genomes Can Lead to Aneuploidy in *Saccharomyces cerevisiae***  
Tartakoff, Alan Michael, David Dulce, and Elizabeth Landis
- 153–171 **Elucidation of the Two H3K36me3 Histone Methyltransferases Set2 and Ash1 in *Fusarium fujikuroi* Unravels Their Different Chromosomal Targets and a Major Impact of Ash1 on Genome Stability**  
Janevska, Slavica, Leonie Baumann, Christian M. K. Sieber, Martin Münsterkötter, Jonas Ulrich, Jörg Kämper, Ulrich Güldener, and Bettina Tudzynski

GENE EXPRESSION

- 173–189 **The Evolution of Gene-Specific Transcriptional Noise Is Driven by Selection at the Pathway Level**  
Barroso, Gustavo Valadares, Natasa Puzovic, and Julien Y. Dutheil  
**HIGHLIGHTED ARTICLE**
- 191–205 **Two Distinct Regulatory Mechanisms of Transcriptional Initiation in Response to Nutrient Signaling**  
Ferdoush, Jannatul, Rwik Sen, Amala Kaja, Priyanka Barman, and Suresh R. Bhaumik
- 207–227 **More than One Way in: Three Gln3 Sequences Required To Relieve Negative Ure2 Regulation and Support Nuclear Gln3 Import in *Saccharomyces cerevisiae***  
Tate, Jennifer J., Rajendra Rai, and Terrance G. Cooper
- 229–244 **Functional Redundancy of Variant and Canonical Histone H3 Lysine 9 Modification in *Drosophila***  
Penke, Taylor J. R., Daniel J. McKay, Brian D. Strahl, A. Gregory Matera, and Robert J. Duronio

DEVELOPMENTAL AND BEHAVIORAL GENETICS

- 245–272 **A Statistically-Oriented Asymmetric Localization (SOAL) Model for Neuronal Outgrowth Patterning by *Caenorhabditis elegans* UNC-5 (UNC5) and UNC-40 (DCC) Netrin Receptors**  
Limerick, Gerard, Xia Tang, Won Suk Lee, Ahmed Mohamed, Aseel Al-Aamiri, and William G. Wadsworth
- 273–282 **Isolation of Aggressive Behavior Mutants in *Drosophila* Using a Screen for Wing Damage**  
Davis, Shaun M., Amanda L. Thomas, Lingzhi Liu, Ian M. Campbell, and Herman A. Dierick  
**HIGHLIGHTED ARTICLE OPEN ACCESS**
- 283–296 **Identification of *Isthmin 1* as a Novel Clefting and Craniofacial Patterning Gene in Humans**  
Lansdon, Lisa A., Benjamin W. Darbro, Aline L. Petrin, Alissa M. Hulstrand, Jennifer M. Standley, Rachel B. Brouillette, Abby Long, M. Adela Mansilla, Robert A. Cornell, Jeffrey C. Murray, Douglas W. Houston, and J. Robert Manak

## POPULATION AND EVOLUTIONARY GENETICS

- 297–305** **Fitness Costs and Variation in Transmission Distortion Associated with the Abnormal Chromosome 10 Meiotic Drive System in Maize**  
Higgins, David M., Elizabeth G. Lowry, Lisa B. Kanizay, Philip W. Becraft, David W. Hall, and R. Kelly Dawe  
**HIGHLIGHTED ARTICLE**
- 307–322** **Local Fitness Landscapes Predict Yeast Evolutionary Dynamics in Directionally Changing Environments**  
Gorter, Florian A., Mark G. M. Aarts, Bas J. Zwaan, and J. Arjan G. M. de Visser
- 323–338** **Coalescent Processes with Skewed Offspring Distributions and Nonequilibrium Demography**  
Matuszewski, Sebastian, Marcel E. Hildebrandt, Guillaume Achaz, and Jeffrey D. Jensen
- 339–348** **Additive Phenotypes Underlie Epistasis of Fitness Effects**  
Sackman, Andrew M. and Darin R. Rokytka
- 349–364** **Evidence for Selection-by-Environment but Not Genotype-by-Environment Interactions for Fitness-Related Traits in a Wild Mammal Population**  
Hayward, Adam D., Josephine M. Pemberton, Camillo Berenos, Alastair J. Wilson, Jill G. Pilkington, and Loeske E. B. Kruuk  
**HIGHLIGHTED ARTICLE**
- 365–375** **Complex History and Differentiation Patterns of the t-Haplotype, a Mouse Meiotic Driver**  
Kelemen, Reka K. and Beatriz Vicoso  
**OPEN ACCESS**
- 377–382** **The Spread of an Inversion with Migration and Selection**  
Charlesworth, Brian and Nicholas H. Barton

- 383–398** **Assessing the Relationship of Ancient and Modern Populations**  
Schraiber, Joshua G.  
**HIGHLIGHTED ARTICLE OPEN ACCESS**

## GENETICS OF COMPLEX TRAITS

- 399–417** **Improving Metabolic Health Through Precision Dietetics in Mice**  
Barrington, William T., Phillip Wulfridge, Ann E. Wells, Carolina Mantilla Rojas, Selene Y. F. Howe, Amie Perry, Kunjie Hua, Michael A. Pellizzon, Kasper D. Hansen, Brynn H. Voy, Brian J. Bennett, Daniel Pomp, Andrew P. Feinberg, and David W. Threadgill  
**HIGHLIGHTED ARTICLE OPEN ACCESS**

## GENOME AND SYSTEMS BIOLOGY

- 419–431** **Protein Moonlighting Revealed by Noncatalytic Phenotypes of Yeast Enzymes**  
Espinosa-Cantú, Adriana, Diana Ascencio, Selene Herrera-Basurto, Jiewei Xu, Assen Roguev, Nevan J. Krogan, and Alexander DeLuna  
**HIGHLIGHTED ARTICLE**

## CORRIGENDUM

- 433** **Chromosome Inversions, Local Adaptation and Speciation**  
Kirkpatrick, Mark and Nicholas H. Barton