Press report
November 2015

Virginie Orgogozo

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Drosophila evolution

Yassin, A., & David, J. R. (2015). Within-species reproductive costs affect the asymmetry of satyrization in Drosophila. *Journal of evolutionary biology*.

Machado, H. E., Bergland, A. O., O'Brien, K. R., Behrman, E. L., Schmidt, P. S., & Petrov, D. A. (2015). Comparative population genomics of latitudinal variation in D. simulans and D. melanogaster. *Molecular ecology*.

Miyagi, R., Akiyama, N., Osada, N., & Takahashi, A. (2015). Complex patterns of cis-regulatory polymorphisms in ebony underlie standing pigmentation variation in Drosophila melanogaster. *Molecular ecology*, *24*(23), 5829-5841.

Genitalia evolution

BENNIK, R. M., BUCKLEY, T. R., HOARE, R. J., & HOLWELL, G. I. (2015). Molecular phylogeny reveals the repeated evolution of complex male genital traits in the New Zealand moth genus Izatha (Lepidoptera: Xyloryctidae). *Systematic Entomology*.

Drosophila behavior

Qin, S., Yin, H., Yang, C., Dou, Y., Liu, Z., Zhang, P., ... & Xie, C. (2015). A magnetic protein biocompass. *Nature materials*.
A protein complex offers explanation for how animals may sense Earth's magnetic pull.

Picao-Osorio, J., Johnston, J., Landgraf, M., Berni, J., & Alonso, C. R. (2015). MicroRNA-encoded behavior in Drosophila. *Science*, *350*(6262), 815-820.
In *Drosophila* larvae, mutation of microRNA *miR-iab4/iab8* affects the animal's ability to correct its orientation if turned upside down.

Chen, C., Buhl, E., Xu, M., Croset, V., Rees, J. S., Lilley, K. S., ... & Stanewsky, R. (2015). Drosophila Ionotropic Receptor 25a mediates circadian clock resetting by temperature. *Nature*, *527*(7579), 516-520.
A *Drosophila* chemosensory receptor, expressed in leg sensory neurons, is necessary for behavioural and molecular synchronization of the fly's circadian clock to low-amplitude temperature cycles; this temperature-sensing pathway functions independently from the known temperature sensors of the fly's antennae.

Development and evolution

Rast-Somssich, M. I., Broholm, S., Jenkins, H., Canales, C., Vlad, D., Kwantes, M., ... & Tsiantis, M. (2015). Alternate wiring of a KNOXI genetic network underlies differences in leaf development of A. thaliana and C. hirsuta. *Genes & development*, *29*(22), 2391-2404.

Payne, J. L., & Wagner, A. (2015). Mechanisms of mutational robustness in transcriptional regulation. *Frontiers in genetics*, *6*.

Epigenetics

Siklenka, K., Erkek, S., Godmann, M., Lambrot, R., McGraw, S., Lafleur, C., ... & Kimmins, S. (2015). Disruption of histone methylation in developing sperm impairs offspring health transgenerationally. *Science*, *350*(6261), aab2006.

Overexpression of a histone demethylase in the mouse germ line reveals a mode of transgenerational epigenetic inheritance through males. These aberrant histone modifications probably occur in the rare (~1 to 3% in the mouse) regions of the sperm genome that remain complexed with nucleosomes rather than becoming condensed by protamines, which displace most of the histones in sperm nuclei.

Review

Blount, Z. D. History's Windings in a Flask: Microbial Experiments into Evolutionary Contingency. Book « Chance and Evolution », University of Chicago. In press.

Oakley, T., & Speiser, D. I. (2015). How Complexity Originates: The Evolution of Animal Eyes. *Annual Review of Ecology, Evolution, and Systematics*, *46*(1).

Reinhardt, K., Dobler, R., & Abbott, J. (2015). An Ecology of Sperm: Sperm Diversification by Natural Selection. *Annual Review of Ecology, Evolution, and Systematics*, *46*(1).

Technology and society

Gantz, V. M., Jasinskiene, N., Tatarenkova, O., Fazekas, A., Macias, V. M., Bier, E., & James, A. A. (2015). Highly efficient Cas9-mediated gene drive for population modification of the malaria vector mosquito Anopheles stephensi. *Proceedings of the National Academy of Sciences*, 201521077.
This system copies an ∼17-kb construct from its site of insertion to its homologous chromosome in a faithful, site-specific manner. Dual anti-*Plasmodium falciparum* effector genes, a marker gene, and the autonomous gene-drive components are introgressed into ∼99.5% of the progeny following outcrosses of transgenic lines to wild-type mosquitoes. The effector genes remain transcriptionally inducible upon blood feeding.
Strains based on this technology could sustain control and elimination as part of the malaria eradication agenda.

Pennisi, E. (2015). Gene drive turns mosquitoes into malaria fighters. *Science*, *350*(6264), 1014-1014.

Sociology of science

Wellenreuther, M., & Otto, S. (2015). Women in evolution–Highlighting the changing face of evolutionary biology. *Evolutionary Applications*.

Diogo, R. (2015). Where is the evo in Evo-Devo (evolutionary developmental biology)?. *Journal of Experimental Zoology Part B: Molecular and Developmental Evolution*.
At the recent meeting of the Pan-American Society for Evo-Devo, terms associated with development at the more molecular/genetic level were vastly overrepresented compared to terms related to evolution or to development at the whole organism level.

A magnetic protein biocompass

Siying Qin[1†], Hang Yin[1†], Celi Yang[1], Yunfeng Dou[1], Zhongmin Liu[2], Peng Zhang[3], He Yu[4], Yulong Huang[5], Jing Feng[3], Junfeng Hao[6], Jia Hao[1], Lizong Deng[3], Xiyun Yan[3], Xiaoli Dong[5], Zhongxian Zhao[5], Taijiao Jiang[3], Hong-Wei Wang[2], Shu-Jin Luo[4] and Can Xie[1★]

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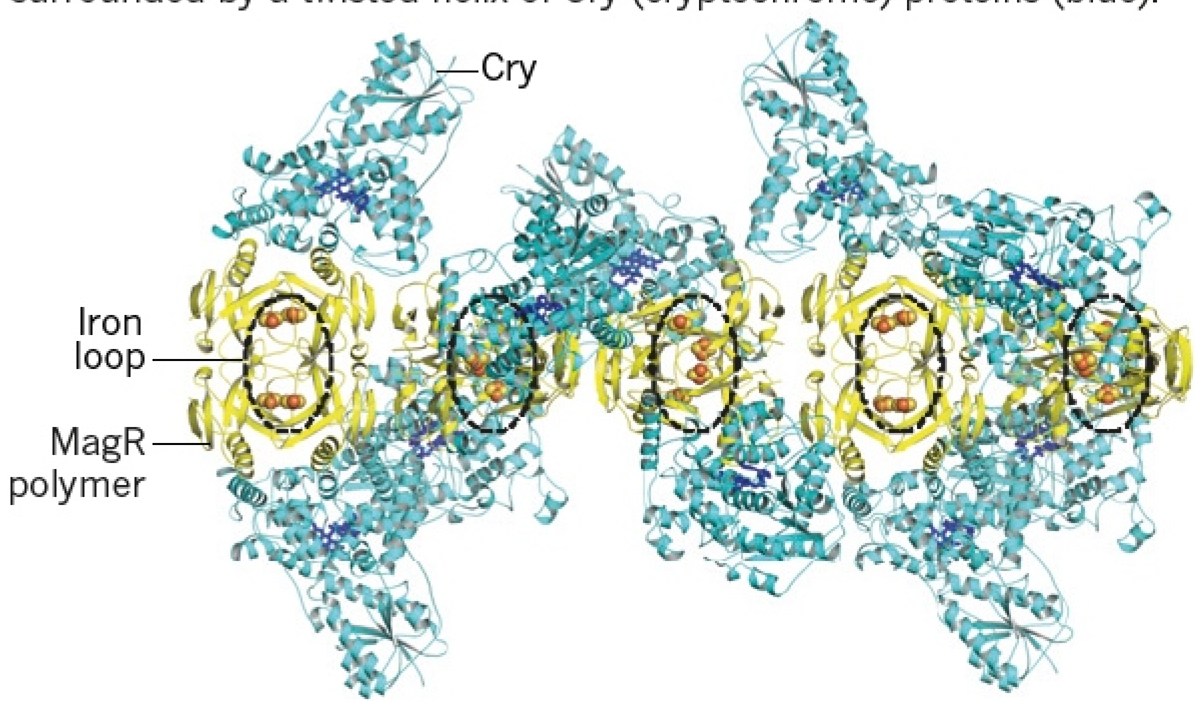
PROTEIN BIOCOMPASS

The structure of the proposed biological compass needle: a core of polymerized MagR proteins (yellow, with loops of iron atoms), surrounded by a twisted helix of Cry (cryptochrome) proteins (blue).



Highly efficient Cas9-mediated gene drive for population modification of the malaria vector mosquito *Anopheles stephensi*

Valentino M. Gantz[a,1], Nijole Jasinskiene[b,1], Olga Tatarenkova[b], Aniko Fazekas[b], Vanessa M. Macias[b], Ethan Bier[a,2], and Anthony A. James[b,c,2]

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