

Research

Nascent transcript analysis of glucocorticoid crosstalk with TNF defines primary and cooperative inflammatory repression 1753
 Sarah K. Sasse, Margaret Gruca, Mary A. Allen, Vineela Kadiyala, Tengyao Song, Fabienne Gally, Arnav Gupta, Miles A. Pufall, Robin D. Dowell, and Anthony N. Gerber

A-to-I RNA editing contributes to the persistence of predicted damaging mutations in populations 1766^{OA}
 Te-Lun Mai and Trees-Juen Chuang

Global analyses of the dynamics of mammalian microRNA metabolism 1777
 Elena R. Kingston and David P. Bartel

Cotargeting among microRNAs in the brain 1791
 Jennifer M. Cherone, Vjola Jorgji, and Christopher B. Burge

The subgenomes show asymmetric expression of alleles in hybrid lineages of *Megalobrama amblycephala* × *Culter alburnus* 1805^{OA}
 Li Ren, Wuhui Li, Qinbo Qin, He Dai, Fengming Han, Jun Xiao, Xin Gao, Jialin Cui, Chang Wu, Xiaojing Yan, Guoliang Wang, Guiming Liu, Jia Liu, Jiaming Li, Zhong Wan, Conghui Yang, Chun Zhang, Min Tao, Jing Wang, Kaikun Luo, Shi Wang, Fangzhou Hu, Rurong Zhao, Xuming Li, Min Liu, Hongkun Zheng, Rong Zhou, Yuqin Shu, Yude Wang, Qinfeng Liu, Chenchen Tang, Wei Duan, and Shaojun Liu

Methods

Gene expression profiling of single cells from archival tissue with laser-capture microdissection and Smart-3SEQ 1816^{OA}
 Joseph W. Foley, Chunfang Zhu, Philippe Jolivet, Shirley X. Zhu, Peipei Lu, Michael J. Meaney, and Robert B. West

FFPEcap-seq: a method for sequencing capped RNAs in formalin-fixed paraffin-embedded samples 1826^{OA}
 Jeffery M. Vahrenkamp, Kathryn Szczotka, Mark K. Dodson, Elke A. Jarboe, Andrew P. Soisson, and Jason Gertz

Identification and dynamic quantification of regulatory elements using total RNA 1836^{OA}
 Sascha H. Duttke, Max W. Chang, Sven Heinz, and Christopher Benner

SiCloneFit: Bayesian inference of population structure, genotype, and phylogeny of tumor clones from single-cell genome sequencing data 1847
 Hamim Zafar, Nicholas Navin, Ken Chen, and Luay Nakhleh

(continued)

PhISCS: a combinatorial approach for subperfect tumor phylogeny reconstruction via integrative use of single-cell and bulk sequencing data 1860^{OA}

Salem Malikic, Farid Rashidi Mehrabadi, Simone Ciccolella, Md. Khaledur Rahman, Camir Ricketts, Ehsan Haghshenas, Daniel Seidman, Faraz Hach, Iman Hajirasouliha, and S. Cenk Sahinalp

Quantitative mitochondrial DNA copy number determination using droplet digital PCR with single-cell resolution 1878^{OA}

Ryan O'Hara, Enzo Tedone, Andrew Ludlow, Ejun Huang, Beatrice Arosio, Daniela Mari, and Jerry W. Shay

Single-pollen-cell sequencing for gamete-based phased diploid genome assembly in plants 1889^{OA}

Dongqing Shi, Jun Wu, Haibao Tang, Hao Yin, Hongtao Wang, Ran Wang, Runze Wang, Ming Qian, Juyou Wu, Kaijie Qi, Zhihua Xie, Zhiwen Wang, Xiang Zhao, and Shaoling Zhang

Resources

Dynamics of microRNA expression during mouse prenatal development 1900^{OA}

Sorena Rahamanian, Rabi Murad, Alessandra Breschi, Weihua Zeng, Mark Mackiewicz, Brian Williams, Carrie A. Davis, Brian Roberts, Sarah Meadows, Dianna Moore, Diane Trout, Chris Zaleski, Alex Dobin, Lei-Hoon Sei, Jorg Drenkow, Alex Scavelli, Thomas R. Gingeras, Barbara J. Wold, Richard M. Myers, Roderic Guigó, and Ali Mortazavi

Genes essential for embryonic stem cells are associated with neurodevelopmental disorders 1910

Shahar Shohat and Sagiv Shifman

A chromosome-level assembly of the Atlantic herring genome—detection of a supergene and other signals of selection 1919^{OA}

Mats E. Pettersson, Christina M. Rochus, Fan Han, Junfeng Chen, Jason Hill, Ola Wallerman, Guangyi Fan, Xiaoning Hong, Qiwu Xu, He Zhang, Shanshan Liu, Xin Liu, Leanne Haggerty, Toby Hunt, Fergal J. Martin, Paul Flück, Ignas Bunikis, Arild Folkvord, and Leif Andersson

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Cover In reciprocal crosses, two kinds of fishes, *Megalobrama amblycephala* (herbivore) and *Culter alburnus* (carnivore) (left bottom corner), produce two kinds of hybrid lineages (middle), which are herbivorous and possess two subgenomes derived from their parents. The allelic recombinant events in the genomic DNA (middle) and reflected in mRNA levels are found between two subgenomes in the hybrids. In addition, expression divergence with additive and dominance effects and *cis*- and *trans*-regulation are observed in the hybrids. These changes represent alternative strategies for counteracting deleterious effects of the subgenomes and improving adaptability of novel hybrids, and provide insights into the evolution of vertebrate genomes immediately following hybridization. (Cover artwork by Chaosi Liu, jessieliu2019@yeah.net. [For details, see Ren et al., pp. 1805–1815.])