Julius Brennecke
Senior Group Leader, Institute of Molecular Biotechnology (IMBA), Austria

piRNA-guided transcriptional repression

Nuclear Argonaute proteins induce transcriptional silencing of gene loci whose transcripts are complementary to the Argonaute-bound small guide RNAs. The molecular mechanisms underlying this process, from small RNA–target interaction to the formation of local heterochromatin, are incompletely understood. The piRNA pathway in Drosophila, a gonad-specific small RNA silencing system that represses transposable elements, is a powerful study system for investigating the molecular processes that contribute to co-transcriptional silencing. I will present our recent findings based on genetics and biochemistry that shed light on how the piRNA system is linked to the cellular heterochromatin machinery specifically at piRNA target loci.

CV:

PROFESSIONAL CAREER

2014 - present	Institute of Molecular Biotechnology (IMBA), Vienna Austria, Senior group leader
2009 - 2013	Institute of Molecular Biotechnology (IMBA), Vienna Austria, Independent junior group leader
2006 - 2008	Cold Spring Harbor Laboratories (CSHL), NY, USA, Postdoctoral fellow; Laboratory of Prof. Gregory Hannon
2005 - 2006	European Molecular Biology Laboratory (EMBL), Germany; Postdoctoral fellow; Laboratory of Dr. Stephen Cohen

EDUCATION

2004	PhD 07/2004 (summa cum laude); EMBL Heidelberg/Ruprecht-Karls University Heidelberg; Germany
2001 - 2004	PhD thesis; supervision: Dr. Stephen M. Cohen (EMBL Heidelberg)
2000 - 2001	Continuation of Diploma Thesis Project with Dr. Dirk Bohmann (University of Rochester, NY, USA)
2000	Diploma 03/27/2001 Molecular Biology, Cell Biology, Botany (Ruprecht-Karls University Heidelberg, Germany)
2000	Diploma Thesis; supervision: Dr. Dirk Bohmann (EMBL Heidelberg)
1995 - 2000	Studies in Biology; Ruprecht-Karls University Heidelberg, Germany

Petr Svoboda
Professor, Institute of Molecular Genetics of the Czech Academy of Sciences, Czech

Evolution of mammalian small RNA pathways– mice vs. golden hamsters

Three small RNA pathways exists in mammals: miRNA, RNAi, and piRNA pathways. All three of exhibit peculiar adaptations in mammalian oocytes. miRNAs are important gene regulators in most mammalian cells, except of mammalian oocytes. The loss of miRNA significance in oocytes comes from dilution of maternal miRNAs during oocyte growth, which creates unfavourable miRNA:mRNA stoichiometry. RNAi pathway, sequence-specific mRNA degradation induced by long double-stranded RNA, is largely inactive in mammalian cells, except of mouse oocytes. Evolution of highly active and essential RNAi in mouse oocytes was supported by long terminal repeats, which significantly contributed to adaptation of the molecular machinery as well as evolution of lncRNAs serving as substrates for biogenesis of small RNAs. Finally, the piRNA pathway, a major pathway suppressing retrotransposons in the germline, is not important for mouse oocytes, where the piRNA pathway exhibits adaptations specific for the mouse lineage. In contrast, the piRNA pathway of the golden hamster more closely resembles that of other mammals and its knock-out in oocytes is essential for normal development. Taken together, mammalian oocytes exhibit several unique features/adaptations of small RNA pathways, which reveal important aspects of their molecular mechanisms and strong adaptive nature of RNAi and piRNA pathways, which enables confronting emerging genomic threats and acquiring new critical roles in the germline.

CV:
- his lab studies RNA biology during mammalian oocyte-to-zygote transition, with a particular focus on small RNAs and maternal mRNA degradation.

1997 - MSc. in developmental biology at the Charles University Prague
1998-2002 - Ph.D. at University of Pennsylvania, lab of Richard Schultz, in
1999 - started to work on RNAi in mammals and studied mammalian small RNAs since.
2003-2006 - postdoc with Witek Filipowicz at the Friedrich Miescher Institute in Basel, mainly worked on mammalian microRNAs
2007-now - groupleader at the Institute of Molecule Genetics of the Czech Academy of Sciences.
2012 - senior groupleader
2013 - assoc. prof. in cell and developmental biology at the Charles Uni.
2017 - full prof. in cell and developmental biology at the Charles Uni.
2018 - elected EMBO member

Mikiko C. Siomi
Professor, Graduate School of Science, University of Tokyo, Japan

piRNA biogenesis and its regulation in *Drosophila*

Drosophila ovarian somatic cells (OSCs) express piRNAs that transcriptionally repress transposons. However, upon depletion of the tumor suppressor, *lethal(3)malignant brain tumor* [*l(3)mbt*], piRNAs that act in post-transcriptional silencing aberrantly accumulate in these cells because of the ectopic expression of germ-specific piRNA factors, such as Vasa and Aubergine. ChIP-seq for L(3)mbt in OSCs showed that L(3)mbt represses germ-specific piRNA factors both directly (through promoter-binding) and indirectly. Both modes of action were, however, mostly independent of known cofactors such as Lint-1. We then analyzed L(3)mbt interactors in OSCs and identified a novel L(3)mbt cofactor candidate, termed Lint-O. Our recent study supported the idea that L(3)mbt orchestrates transcriptional piRNA biogenesis gene regulation in concert with Lint-O in a manner that is mostly independent of known L(3)mbt cofactors.

CV:
Academic degree
1984 Graduated from Gifu University, Gifu, Japan
1988 Received Master degree from Kyoto University, Kyoto, Japan
1994 Received a PhD degree from Kyoto University, Kyoto, Japan
2003 Received a PhD degree from University of Tokushima, Tokushima, Japan

Research experience
1994 Post-doctoral fellow at the HHMI, University of Pennsylvania School of Medicine (Dr. Dreyfuss Laboratory), USA
1999 Assistant Professor at IGR, University of Tokushima, Japan
2002 Associate Professor at IGR, University of Tokushima, Japan
2008 Associate Professor at Keio University School of Medicine, Japan
2012 Professor at Graduate School of Science, The University of Tokyo, Japan
2018 EMBO Associate Member