

# miRNA Research

Frequently cited miRNA-related articles from peer-reviewed journals and scientific texts

## *Getting Started*

*The following articles describe important insights into the history and uses of miRNA.*

**miRNA in review**—Many excellent reviews on miRNAs can be found in the literature. Here are a few of our favorites.

- Carrington, J. C. and V. Ambros. (2003) Role of microRNAs in plant and animal development. *Science*. 301:336-338.
- Bartel, D. (2004) MicroRNAs: genomics, biogenesis, mechanism, and function. *Cell*. 116:281-97.
- Dugas, D. and B. Bartel. (2004) MicroRNA regulation of gene expression in plants. *Current Opinion in Plant Biology*. 7:512-520.
- He, L. and G. Hannon. (2004) MicroRNAs: small RNAs with a big role in gene regulation. *Nature Review Genetics*. 5:522-31.
- Kim, V. N. (2005) MicroRNA Biogenesis: Coordinated Cropping and Dicing. *Molecular Cell Biology: Nature Reviews*. 6:376-385.
- Pasquinelli, A., S. Hunter and J. Bracht. (2005) MicroRNAs: a developing story. *Current Opinion Genetics and Development*. 15:200-205.
- Tang, G. (2005) siRNA and miRNA: an insight into RISCs. *Trends Biochem Sci*. 30:106-14.
- Lai, E. C., B. Tam and G. M. Rubin. (2005) Pervasive regulation of Drosophila Notch target genes by GY-box-, Brd-box-, and K-box-class microRNAs. *Genes & Dev*. 19:1067-1080.
- Du, T., and P. D. Zamore. (2005) microPrimer: the biogenesis and function of microRNA. *Development*. 132:4645-4652.

## *Milestones in miRNA Research*

- Lee, R., R. Feinbaum and V. Ambros. (1993) The *C. elegans* heterochronic gene *lin-4* encodes small RNAs with complementarity to *lin-14*. *Cell*. 75:843-54.
- Reinhart, B. J., F. J. Slack, M. Basson, A. E. Pasquinelli, J. C. Bettinger, A. E. Rougvie, H. R. Horvitz and G. Ruvkun. (2000) The 21-nucleotide *let-7* RNA regulates developmental timing in *Caenorhabditis elegans*. *Nature*. 403:901-906.
- Lau, N. C., L. P. Lim, E. G. Weinstein and D. P. Bartel. (2001) An Abundant Class of Tiny RNAs with Probable Regulatory Roles in *Caenorhabditis elegans*. *Science*. 294:858-862.
- Lee, R., R. Feinbaum and V. Ambros. (2004) A short history of short RNA. *Cell*. 116:S89-92.
- Ruvkun, G., B. Wightman and I. Ha. (2004) The 20 years it took to recognize the importance of tiny RNAs. *Cell*. 116:S93-96.

## *miRNA Biogenesis*

- Lee, Y., C. Ahn, J. Han, H. Choi, J. Kim, J. Yim, J. Lee, P. Provost, O. Radmark, S. Kim and V. Kim. (2003) The nuclear RNase III Droscha initiates microRNA processing. *Nature*. 425:415 - 419.
- Liu, J., M. A. Carmell, F. V. Rivas, C. G. Marsden, J. M. Thomson, J. J. Song, S. M. Hammond, L. Joshua-Tor and G. J. Hannon. (2004) Argonaute2 Is the Catalytic Engine of Mammalian RNAi. *Science*. 305:1437-1441.
- Murchison, E. and G. Hannon. (2004) miRNAs on the move: miRNA biogenesis and the RNAi machinery. *Curr Opin Cell Biol*. 16:223-9.

## *miRNA Prediction*

- Rhoades, M. W., B. J. Reinhart, L. P. Lim, C. B. Burge, B. Bartel and D. P. Bartel. (2002) Prediction of plant microRNA targets. *Cell*. 110:513-20.
- John, B., A. Enright, A. Aravin, T. Tuschl, C. Sander and D. Marks. (2004) Human MicroRNA Targets. *PLoS Biol*. 2:1862-1879.

- Krek, A., D. Grun, M. Poy, R. Wolf, L. Rosenberg, E. Epstein, P. MacMenamin, I. da Piedade, K. Gunsalus, M. Stoffel and N. Rajewsky. (2005) Combinatorial microRNA target predictions. *Nat Genet.* 37:495-500.
- Rajewsky, N. and N. Socci. (2004) Computational identification of microRNA targets. *Dev Biol.* 267:529-35.
- Kiriakidou, M., P. T. Nelson, A. Kouranov, P. Fitziev, C. Bouyioukos, Z. Mourelatos and A. Hatzigeorgiou. (2004) A combined computational-experimental approach predicts human microRNA targets. *Genes & Dev.* 18:1165-1178.
- Lewis, B., C. Burge and D. Bartel. (2005) Conserved seed pairing, often flanked by adenosines, indicates that thousands of human genes are microRNA targets. *Cell.* 120:15-20.

#### *Identifying mammalian miRNA*

- Wienholds, E., W. P. Kloosterman, E. Miska, E. Alvarez-Saavedra, E. Berezikov, E. de Bruijn, H. R. Horvitz, S. Kauppinen and R. H. A. Plasterk. (2005) MicroRNA Expression in Zebrafish Embryonic Development. *Science.* 309:310-311.
- Chen, P. Y., H. Manninga, K. Slanchev, M. Chien, J. J. Russo, J. Ju, R. Sheridan, B. John, D. S. Marks, D. Gaidatzis, C. Sander, M. Zavolan and T. Tuschl. (2005) The developmental miRNA profiles of zebrafish as determined by small RNA cloning. *Genes & Dev.* 19:1288-1293.

#### *Identifying plant miRNA*

- Jones-Rhoades, M. and D. Bartel. (2004) Computational identification of plant micro-RNAs and their targets, including a stress-induced miRNA. *Molecular Cell.* 14:787-799.
- Gustafson, A. M., E. Allen, S. Givan, D. Smith, J. C. Carrington and K. D. Kasschau. (2005) ASRP: the Arabidopsis Small RNA Project Database. *Nucleic Acids Res.* 33:D637-640.
- Allen, E., Z. Xie, A. Gustafson and J. Carrington. (2005) microRNA-directed phasing during trans-acting siRNA biogenesis in plants. *Cell.* 121:207-21.

#### *miRNA Functional Characterization*

- Wightman, B., I. Ha and G. Ruvkun. (1993) Posttranscriptional regulation of the heterochronic gene *lin-14* by *lin-4* mediates temporal pattern formation in *C. elegans*. *Cell.* 75:855-892.
- Yekta, S., I. H. Shih and D. P. Bartel. (2004) MicroRNA-directed cleavage of *HOXB8* mRNA. *Science.* 304:594-596.
- Poy, M., L. Eliasson, J. Krutzfeldt, S. Kuwajima, X. Ma, P. Macdonald, S. Pfeffer, T. Tuschl, N. Rajewsky, P. Rorsman and M. Stoffel. (2004) A pancreatic islet-specific microRNA regulates insulin secretion. *Nature.* 432:226-30.
- Chang, S., R. Johnston, C. Frokjaer-Jensen, S. Lockery and O. Hobert. (2004) MicroRNAs act sequentially and asymmetrically to control chemosensory laterality in the nematode. *Nature.* 430:785-789.
- Giraldez, A. J., R. M. Cinalli, M. E. Glasner, A. J. Enright, J. M. Thomson, S. Baskerville, S. M. Hammond, D. P. Bartel and A. F. Schier. (2005) MicroRNAs Regulate Brain Morphogenesis in Zebrafish. *Science.* 308:833-838.
- He, L., J. M. Thomson, M. T. Hemann, E. Hernando-Monge, D. Mu, S. Goodson, S. Powers, C. Cordon-Cardo, S. W. Lowe, G. J. Hannon and S. M. Hammond. (2005) A microRNA polycistron as a potential human oncogene. *Nature Letters.* 435:828-833.
- Lu, J., G. Getz, E. A. Miska, E. Alvarez-Saavedra, J. Lamb, D. Peck, A. Sweet-Cordero, B. Ebert, R. H. Mak, A. A. Ferrando, J. R. Downing, T. Jacks, R. Horvitz and T. R. Golub. (2005) MicroRNA expression profiles classify human cancers. *Nature.* 435:834-838.
- Zhao, Y., E. Samal and D. Srivastava. (2005) Serum response factor regulates a muscle-specific microRNA that targets *Hand2* during cardiogenesis. *Nature.* 436:214-220.
- Johnson, S., H. Grosshans, J. Shingara, M. Byrom, R. Jarvis, A. Cheng, E. Labourier, K. Reinert, D. Brown and F. Slack. (2005) RAS Is Regulated by the let-7 MicroRNA Family. *Cell.* 120:635-47.
- Krutzfeldt, J., N. Rajewsky, R. Braich, K. G. Rajeev, T. Tuschl, M. Manoharan, and M. Stoffel. (2005) Silencing of microRNAs in vivo with 'antagomirs'. *Nature.* Advance online publication; published online 30 October 2005.

*miRNAs in Stem Cells*

- Suh, M., Y Lee, J. Kim, S. Kim, S. Moon, J. Lee, K. Cha, H. Chung, H. Yoon, S. Moon and et al. (2004) Human embryonic stem cells express a unique set of microRNAs. **Developmental Biology**. 270:488-498.
- Houbaviy, H., M. Murray and P. Sharp. (2003) Embryonic stem cell-specific MicroRNAs. **Dev Cell**. 5:351-358.
- Chen, C., L. Li, H. Lodish and D. Bartel. (2004) MicroRNAs modulate hematopoietic lineage differentiation. **Science**. 303:83-86.

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Literature Code: #00177-08-B-01-U