

Short Interfering RNA (That's "SIR" to you)

BMS 265
Todd Logan
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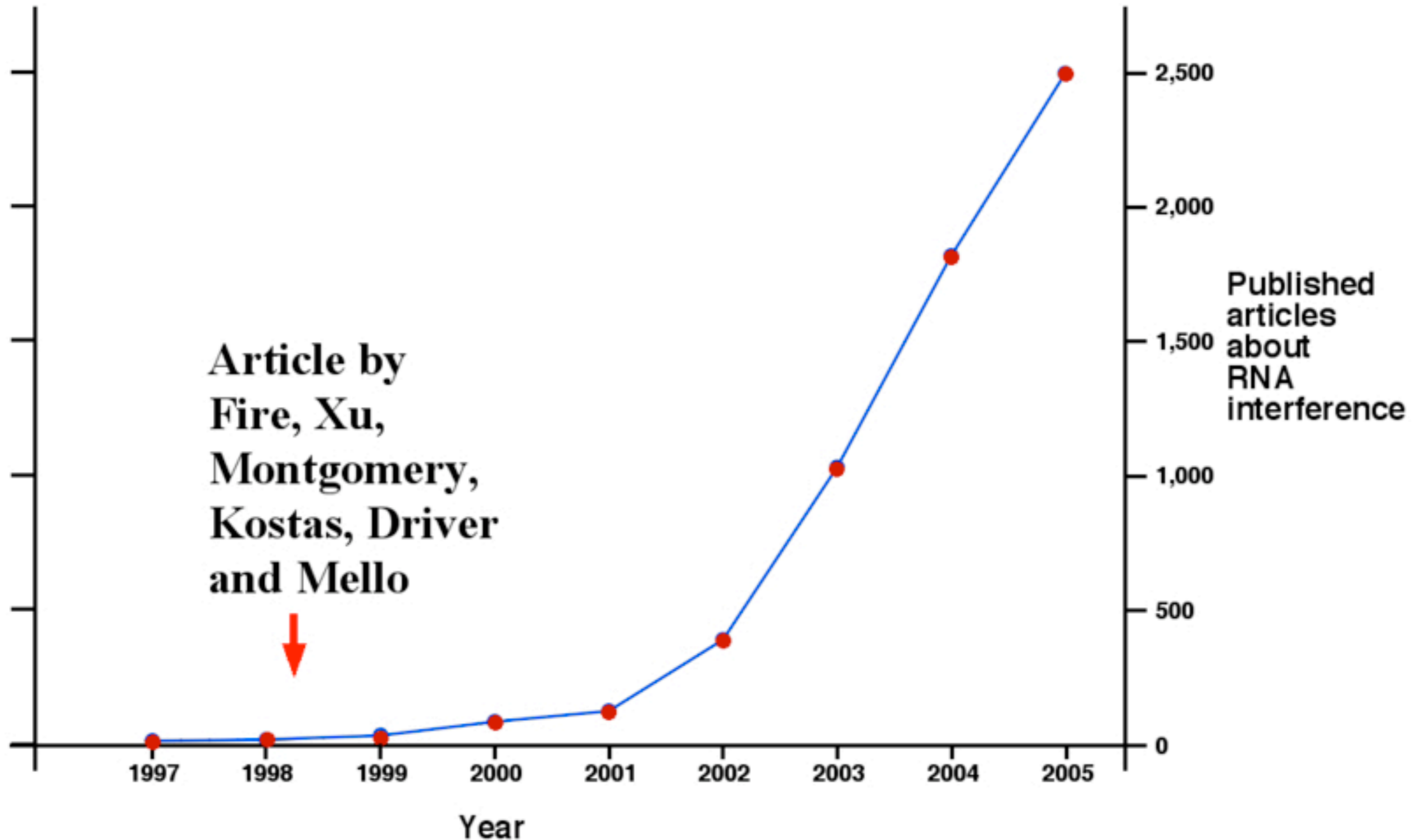
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- And then.....

siRNA's rise to fame



The Exemplary Members

- trans-acting small interfering RNAs (tasiRNAs)
- repeat-associated small interfering RNAs (rasiRNAs)
- scan RNAs (scnRNAs)
- long small interfering RNAs (lsiRNAs)

The Wannabes

- micro RNAs (miRNAs)
- piwi-interacting RNAs (piRNAs)
- 21U-RNAs

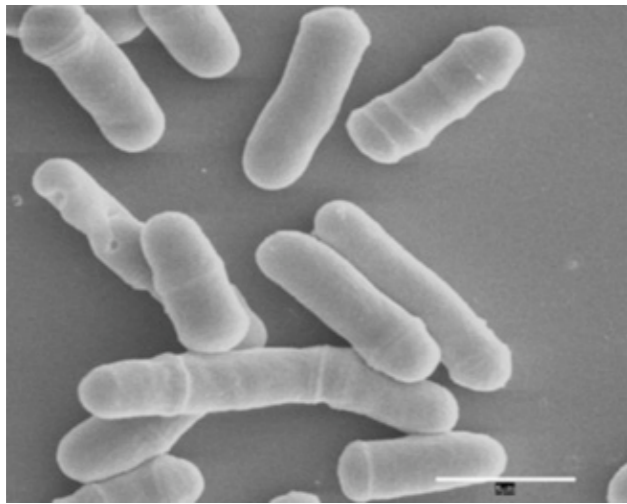
Evolution/Conservation

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S. pombe



A. thaliana



D. melanogaster



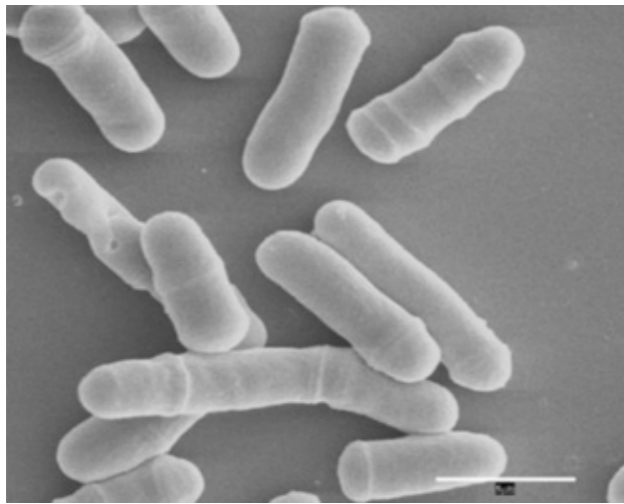
M. musculus



H. sapien

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siRNAs (or analogous small RNAs)
highly conserved

Biogenesis

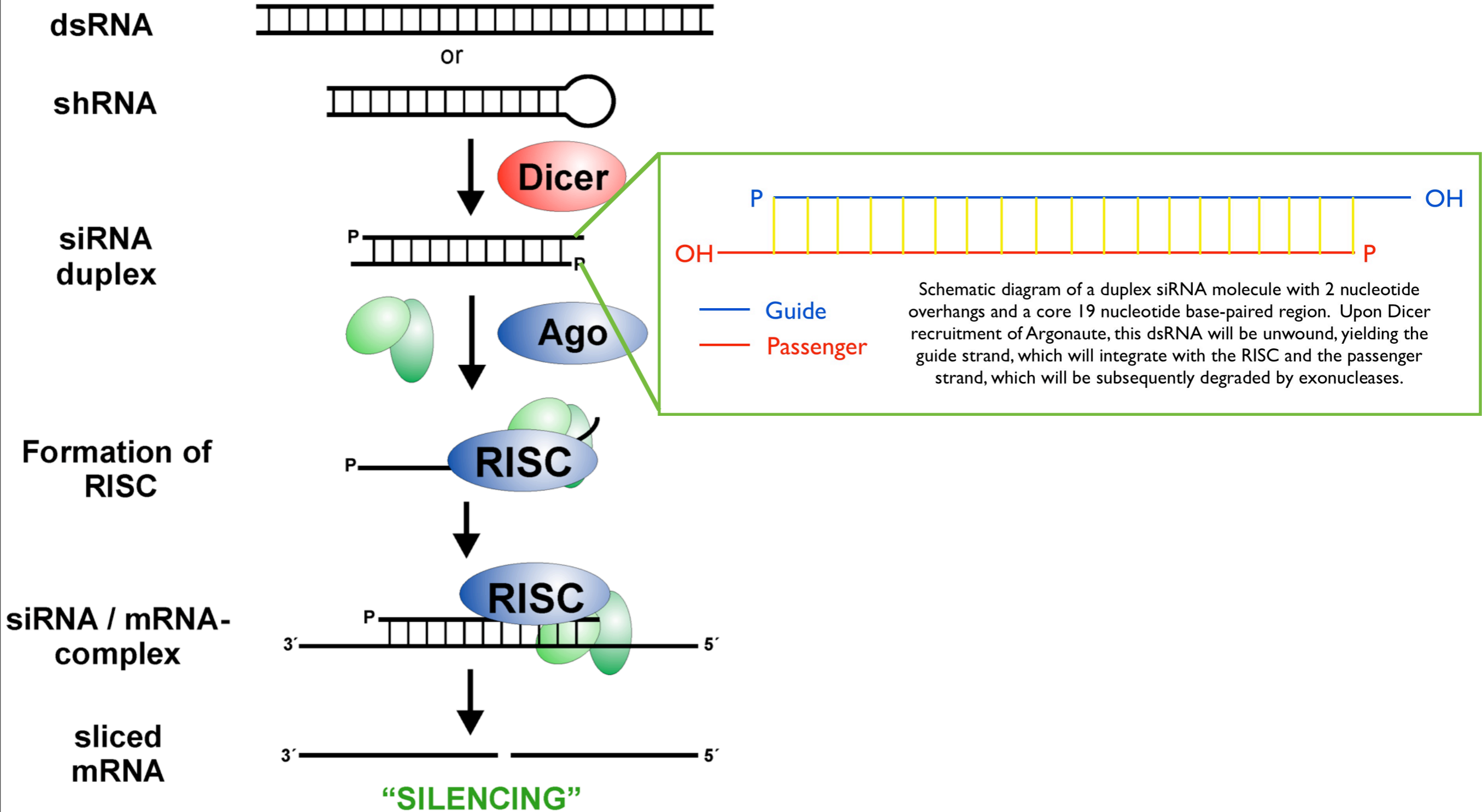


Diagram illustrating the major steps in siRNA biogenesis and subsequent siRNA-mediated gene silencing.

Cellular functions

- translational inhibition
- pathogen resistance
- chromatin remodeling
- genome stability
- DNA elimination

Partners in crime

- messenger RNA (mRNA)
- RNA dependent RNA polymerase (RdRP)
- Dicer
- Argonaute
- RNA-induced silencing complex (RISC)
- ADAR
- Armitage
- R2D2
- HEN1

Po'tential

- synthetic siRNAs, siRNA plasmids, siRNA viral vectors
- Transient or stable knockdown of target gene
- Exquisite specificity (disease relevant point mutations)
- Study of hypomorphic alleles
- Elucidation of roles of genes, causal pathways
- Genome-wide siRNA screens: novel gene discovery

Roles in disease

- Endogenous siRNAs in human disease?
- Induction of siRNA by *Pseudomonas syringae* in plants
- conserved role in immune response
- Synthetic siRNAs as novel therapeutics to treat asthma, diabetes, cancer and neurological disease
- siRNA therapy mediates improvement of ALS symptoms



The Revolution Starts Here

San Francisco, CA

Links

- <http://web.mit.edu/sirna/> - Database of tested siRNAs and shRNAs
- http://www.proteinlounge.com/sirna_database.asp - Comprehensive database of siRNA against all known mRNA sequences in a variety of organisms
- siRNA at Whitehead - A web-based siRNA Selection Program
- siSearch - a siRNA design tool using a number of popular design methods
- HuSiDa - Human siRNA Database