Study of degree of conservation in regulatory sequences of human intronic and intergenic miRNA genes in comparison to 16 vertebrate species.

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Names of genome assemblies of 17 vertebrates

1. oryCun1-- Rabbit
2. danRer3-- Zebra fish
3. tetNig1-- Tetra Odon
4. monDom4-- Opossum
5. fr1-- Fugu
6. galGal2-- Chicken
7. rn4-- Rat
8. Mm8-- Mouse
9. echTel1-- Tenrec
10. loxAfr1-- Elephant
11. bosTau2-- Cow
12. canFam2-- Dog
13. panTro1-- Chimpanzee
14. dasNov1-- Armadillo
15. xenTro1-- Frog
16. rheMac2-- Macaque
17. Hg18-- Humans
miRNAs or microRNAs

- Single stranded RNA molecules.
- Encoded by genes transcribed from DNA but not translated into protein (non-coding RNA).
- Partially complementary to mRNA molecules (coding RNA).
- Prevent protein translation through a mechanism similar to RNAi.
miRNA action

- The miRNA sequence combines with proteins to form a complex called RISC [RNA-Induced Silencing Complex].
- The RISC then captures a native mRNA molecule that complements the short miRNA sequence.
- If the pairing is essentially perfect, the native mRNA is cut into useless RNA fragments that aren't translated.
- If however, the pairing is less than perfect then the RISC complex binds to the mRNA and blocks ribosome movement along the native mRNA also halting translation.
- Net effect **NO PROTEIN IS MADE.**

http://fig.cox.miami.edu/~cmallery/150/gene/how_siRNA_works.htm
Orientation of miRNA genes on the genome

The diagram depicts orientation of intronic miRNA genes only.
A few notes

- Based on work done in Regulatory conservation of protein coding and miRNA genes in vertebrates: lessons from the opossum genome by Benos et al.

- Covers the analysis for only the intergenic genes. I replicated that work and did similar analysis for intronic same strand genes and intronic opposite strand genes.
References

- For the dataset containing all the discovered and classified human miRNAs: http://www.diana.pcbi.upenn.edu/cgi-bin/miRGen/v3/Genomics.cgi
- UCSC genome browser for a listing of all the discovered human genes.
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