

# STRUCTURAL AND FUNCTIONAL DIVERSITY OF THE EUKARYOTIC GENOME

Brno, Czech Republic, October 14-16, 2010

## Further reading for "Metaptation: Metaphors for Genome Evolution," by David G. King

### Simple sequence repeats / indirect selection for "tuning knobs" (listed by date)

- King DG (1985) Metaptation: A descriptive category for evolutionarily versatile patterns of genetic and ontogenetic organization. *Evol Theory* 7: 222. (*Abstract only; introduces the word "metaptation."*)
- Trifonov EN (1989) The multiple codes of nucleotide sequences. *Bull Math Biol* 51: 417-432.
- Gerber H-P *et al.* (1994) Transcriptional activation modulated by homopolymeric glutamine and proline stretches. *Science* 263: 808-811.
- Rosenberg SM *et al.* (1994) Adaptive mutation by deletions in small mononucleotide repeats. *Science* 265: 405-407.
- Kashi Y, King DG, Soller M (1997) Simple sequence repeats as a source of quantitative genetic variation. *Trends in Genetics* 13: 74-78.
- King DG, Soller M, Kashi Y (1997) Evolutionary tuning knobs. *Endeavour* 21: 36-40. (*Introduces the "tuning knob" metaphor.*)
- King DG, Soller, M (1999) Variation and fidelity: The evolution of simple sequence repeats as functional elements in adjustable genes. In: S.P. Wasser, ed., *Evolutionary Theory and Processes: Modern Perspectives*, Kluwer Academic Publishers, Dordrecht, pp. 65-82. (*Includes an explanation of indirect selection.*)
- Fondon III JW, Garner, HR (2004) Molecular origins of rapid and continuous morphological evolution. *PNAS* 101(52): 18058-18063.
- Li Y-C *et al.* (2004) Microsatellites within genes: Structure, function, and evolution. *Mol Biol Evol* 21: 991-1007.
- Verstrepen KJ *et al.* (2005) Intragenic tandem repeats generate functional variability. *Nature Genet* 37: 986-990.
- Kashi Y, King DG (2006a) Simple sequence repeats as advantageous mutators in evolution. *Trends Genet* 22: 253-259.
- Kashi Y, King DG (2006b) Has simple sequence repeat mutability been selected to facilitate evolution? *Isr J Ecol Evol* 52: 331-342. (*Includes an explanation of indirect selection.*)
- King DG, Trifonov EN, Kashi Y (2006) Tuning knobs in the genome: Evolution of simple sequence repeats by indirect selection. In: LH Caporale, ed., *The Implicit Genome*, Oxford University Press, pp. 77-90.
- King DG, Kashi Y (2007a) Mutability and Evolvability: Indirect selection for mutability. *Heredity* 99: 123-124.
- King DG, Kashi Y (2007b) Mutation rate variation in eukaryotes: evolutionary implications of site-specific mechanisms. *Nature Rev Genet* 8 (doi:10.1038/nrg2158-c1).
- Vinces MD, Legendre M, Caldara M *et al.* (2009) Unstable tandem repeats in promoters confer transcriptional evolvability. *Science* 324: 1213-1216.

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### Evolutionary Protocols (other than "tuning knobs") (listed by first author)

- Arber W (2005) Gene products with evolutionary functions. *Proteomics* 5: 2280-2284.
- Barry JD (2006) Implicit information in eukaryotic pathogens as the basis of antigenic variation. In: Caporale LH, ed. *The Implicit Genome*. Oxford: Oxford University Press, pp. 91-106.
- Bayliss CD, Moxon ER (2006) Repeats and variation in pathogen selection. In: Caporale LH, ed., *The Implicit Genome*. Oxford: Oxford University Press, pp. 54-76.
- Caporale LH (1999) Chance favors the prepared genome. In: Caporale, L. H., ed. *Molecular Strategies in Biological Evolution, Ann. N. Y. Acad. Sci.* 870: 1-21.
- Caporale LH (2000) Mutation is modulated: Implications for Evolution. *Bioessays* 22: 388-395.
- Caporale LH (2003) Foresight in genome evolution. *Amer. Sci.* 91: 234-241.
- Caporale LH. (2003) Natural selection and the emergence of a mutation phenotype: An update of the evolutionary synthesis considering mechanisms that affect genomic variation. *Ann. Rev. Microbiol.* 57: 465-485.
- Caporale LH (2006) *The Implicit Genome*. Oxford: Oxford University Press, pp. 91-106.
- Csete M, Doyle J (2002) Reverse engineering of biological complexity. *Science* 295: 1664-1669.
- Doyle J, Csete M, Caporale LH (2006) An engineering perspective: The implicit protocols. In: Caporale LH, ed., *The Implicit Genome*. Oxford: Oxford University Press, pp. 294-298.
- Doyle J, Csete M (2007) Rules of engagement. *Nature* 446: 860.
- Kirschner M, Gerhart J (1998) Evolvability. *Proc. Natl. Acad. Sci. USA* 95: 8420-8427.
- Mihola O *et al.* (2009) A Mouse Speciation Gene Encodes a Meiotic Histone H3 Methyltransferase. *Science* 328:373-375. (*A speciation protocol?*)
- Oliver KR, Green WK (2009) Transposable elements: powerful facilitators of evolution. *BioEssays* 31: 703-714.
- Shapiro JA (1983) Variation as a genetic engineering process. Pp. 253-270, in D.S. Bendall, ed. *Evolution from Molecules to Men*, Cambridge University Press, Cambridge.
- Shapiro JA (1997) Genome organization, natural genetic engineering and adaptive mutation. *Trends Genet* 13:98-104.
- Thaler D (1994) The evolution of genetic intelligence. *Science* 264: 224-225.

### Contrary literature (listed by date)

- Bridges CB (1919) Specific modifiers of eosin eye color in *Drosophila melanogaster*. *J Exp Zool* 28(3): 37-384. (*Defines "mutation"; establishes the expectation that most mutations are deleterious.*)
- Sturtevant AH (1937) Essays on evolution. I. On the effects of selection on mutation rate. *Q Rev Biol* 12: 464-467. (*"Mutation are accidents."*)
- Williams GC (1966) *Adaptation and Natural Selection*. Princeton: Princeton University Press, 1966. (*A classic text; includes a strong argument that natural selection must always prefer minimal mutation rates.*)
- Sniegowski PD, Gerrish PJ, Johnson T *et al.* (2000) The evolution of mutation rates: separating causes from consequences. *Bioessays* 22: 1057-1066. (*Reiterates the old argument that natural selection favors minimal mutation rates.*)
- Sniegowski PD, Murphy HA (2006) Evolvability. *Current Biology* 16: R831-R834. (*Argues that evolvability is not an adaptation.*)