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6th International Symposium on CD1 and NKT Cells

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Article

Evidence that mutation is universally biased towards AT in bacteria.

8

Hershberg R, Petrov DA
PLoS Genet. 2010; 6(9)

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This noteworthy paper and another by Hildebrand et al. {1} reveal that point mutation is AT-biased, shown in four distinct bacterial lineages in this work. This implies that the fixation of AT to GC mutations is favoured over GC to AT ones in bacterial populations, as would be expected if G and C were generally beneficial compared to A and T in bacterial genomes.

From the analysis of within-species nucleotide variations in clonal pathogenic bacteria (which are said to essentially escape selection), the authors identify a strong majority of GC to AT mutations in the five studied groups. Transitions from G to A and from C to T amount up to 75% of total synonymous mutations in these clonal lineages. Given that some of these genomes are GC-rich, some evolutionary force must be at work that favours the fixation of G and C over A and T alleles in bacterial populations. The two candidates are natural selection and GC-biased gene conversion -- or any molecular drive affecting the transmission of genetic material irrespective of cellular fitness.

This is a remarkable result which challenges classical views about base composition evolution in prokaryotes and again highlights the importance of within-species data in comparative genomics.

References:

{1} Hildebrand et al. PLoS Genet 2010, 6:e1001107 [PMID:20838593].

Competing interests: None declared

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 19 Oct 2010

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