

Abstract Submitted
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Evolution at the Nucleotide Level JOSE PARRA, BERNARD GERSTMAN, Department of Physics, Florida International University, 33199, THEORETICAL BIOPHYSICS TEAM — We carry out a quantitative analysis that supports the viewpoint that DNA mutations do not occur with equal probabilities. We find evidence that the identity of the neighboring nucleotide within a codon influences the probability of a point substitution and we use a mutation model to quantify the strength of these interactions. We find a set of neighbor dependent mutation parameter strengths that does the best job of explaining the current frequency spectrum of appearance of amino acids. We also show that this optimal solution does not fully explain the current frequency of appearance of amino acids, and therefore other effects, such as externally imposed survival advantage of amino acids sequences, must also play a role in the evolution of nucleotide sequences. We also explain how the relative importance for genetic evolution of internal nucleotide mutation versus external selection can be determined if the frequency spectrum of amino acids could be determined at various times in the past.

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