

Protein Structure and genomic composition - (session: Structural Genomics)

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Composition is one of the component of the structural organization of the genomes. In particular, vertebrate genomes show compositionally homogeneous DNA segments known as isochores (Bernardi, 2000). The evidences that relate GC content of a gene with the encoded protein properties, in terms of amino acid content, imply that coding region compositions may also affect protein structure properties. The study of the relationships between coding regions compositional features and the structures of the encoded proteins, especially in the light of the typical compositional properties of secondary structures (Chiusano et al., 2000) evidenciate still unrevealed features. Fluctuations of the synonymous and non-synonymous substitution rates of mammalian genes were found to correlate with the secondary structure (alpha-helix, aperiodic, beta-strand) of the encoded proteins (Chiusano et al., 1999). Moreover, specific nucleotide composition were observed in the three codon positions corresponding to a given protein secondary structures, with strong implications on the origin of the genetic code organisation. Different data sets were taken in consideration so that to analyse the relationships between coding region compositions and the properties of the encoded proteins.

Bernardi G., (2000). The compositional evolution of vertebrate genomes. *Gene* 259: 31-43.

Chiusano M.L., D,Onofrio G., Alvarez-Valin F., Jabbari K., Colonna G., Bernardi G. (1999). Correlations of nucleotide substitution rates and base composition of mammalian coding sequences with protein structure. *Gene* 138: 23-31.

Chiusano M.L., Alvarez-Valin F., Di Giulio M., D,Onofrio G., Ammirato G., Colonna G. and Bernardi G. (2000). Second codon positions of genes and the secondary structures of proteins: implications for the origin of the genetic code. *Gene* 261: 63-69.