Analogous enzymes inside the Tritryps genomes
Ana Carolina Ramos Guimarães¹, Wim Maurits Degrave¹, Antonio Basílio de Miranda¹
¹Laboratório de Genômica Funcional e Bioinformática, IOC/FIOCRUZ. Avenida Brasil, 4365 -
Manguinhos, Rio de Janeiro, Brasil.

Background
Enzymes are proteins capable of catalyzing chemical reactions. Analogous enzymes, or
alternative forms of a particular function, are the result of independent evolutionary events.
Although they are able to catalyze the same reactions, they present no detectable sequence
similarity at the primary level, and possibly different tertiary structures as well. These enzymes
are very attractive entities for the development of studies on the evolution of genes and
metabolic pathways.

Materials and methods
In this work, we implemented a tool (AnEnPi) that is able to clustering primary protein
sequences and visualizing the results; it also carries out similarity searches via BLAST and/or
HMMER and reconstructs metabolic maps. With this tool it was possible to analyze data about
the presence/absence of enzymatic functions in the genomes.

Results
Until now, some data has shown very interesting, including the discovery of analogous forms of
the same enzymatic activity in a single organism, called intragenomic analogy. These cases of
intragenomic analogy, or in other words, the situation where two (or more) proteins with no
similarity sequence is detectable between them, but sharing the same function and are present
in the same genome, were examined in greater detail in a group of organisms
(Trypanosomatidae).

Conclusion
The information that we currently observed cannot be conclusive, but leads us to believe that
could be related to gene regulation, differential expression in different forms of life, among
others. This information will become clearer with the incorporation of transcriptomic and
proteomic data and a wide literature search.

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