



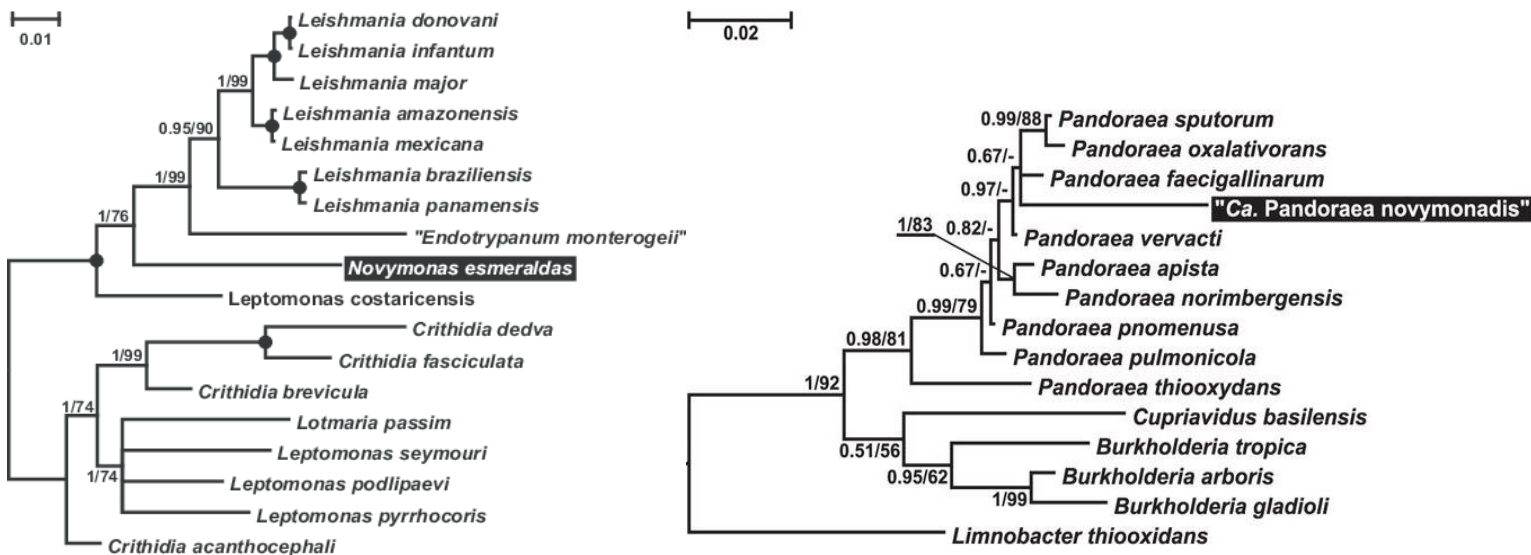
# Genomic analyses of *Novymonas esmeraldas* and *Ca. Pandoraea novymonadis*

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*Novymonas esmeraldas* is a new member of the family Trypanosomatidae (Esmeraldas Province, Ecuador, 2008). It was assigned to a new genus, which was identified as a member of the subfamily Leishmaniinae.

Further research documented the presence of bacterial endosymbionts inside *N. esmeraldas* cells. According to the phylogenetic analysis, endosymbiont is a member of the genus *Pandoraea* (*Candidatus Pandoraea novymonadis*). This is the first example of *Pandoraea* being the intracellular endosymbiont.

**Fig. 1.** Phylogenetic trees of trypanosomatids and bacterial endosymbionts.

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# GENOMIC AND PROTEOMIC ANALYSES

<i>N. esmeraldas</i>	<i>Ca. Pandoraea novymonadis</i>
Total length of genome is 32 Mb	Total length of genome is 1,16 Mb
3,901 peptides detected in protein fraction 41% coverage	719 peptides detected in protein fraction 74% coverage

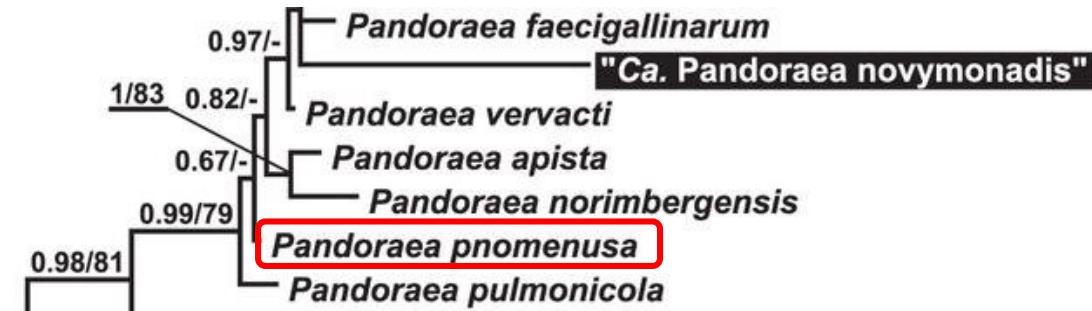
Among the host-encoded proteins found in the endosymbiont fraction were:

- Two transporters:
  1. The protein belonging to the ABC-multidrug resistance superfamily (NESM\_000062100.1)
  2. A transmembrane protein 18 (NESM\_000205400.1)
- Trifunctional enoyl-CoA-hydratase/enoyl-CoA-isomerase/3-hydroxyacyl-CoA-dehydrogenase (NESM\_000750700.1)
- Lipid metabolism enzymes

The presence of these host proteins in bacterial fraction indicates that *N. esmeraldas* complements the biosynthesis of fatty acids and  $\beta$ -oxidation in *Ca. Pandoraea novymonadis*.

The *Ca. P. novymonadis* genome was compared to that of its basal phylogenetic relative *Pandoraea pnomenusa* and found to be substantially (~80%) reduced.

*Ca. P. novymonadis* lacks some genes responsible for the synthesis of essential amino acids. These are present in the *N. esmeraldas* genome.



## Conclusion

The symbiotic relationship between *N. esmeraldas* and *Ca. Pandoraea novymonadis* can serve as a model for studying the development of endosymbiosis in parasitic protists and other eukaryotes.