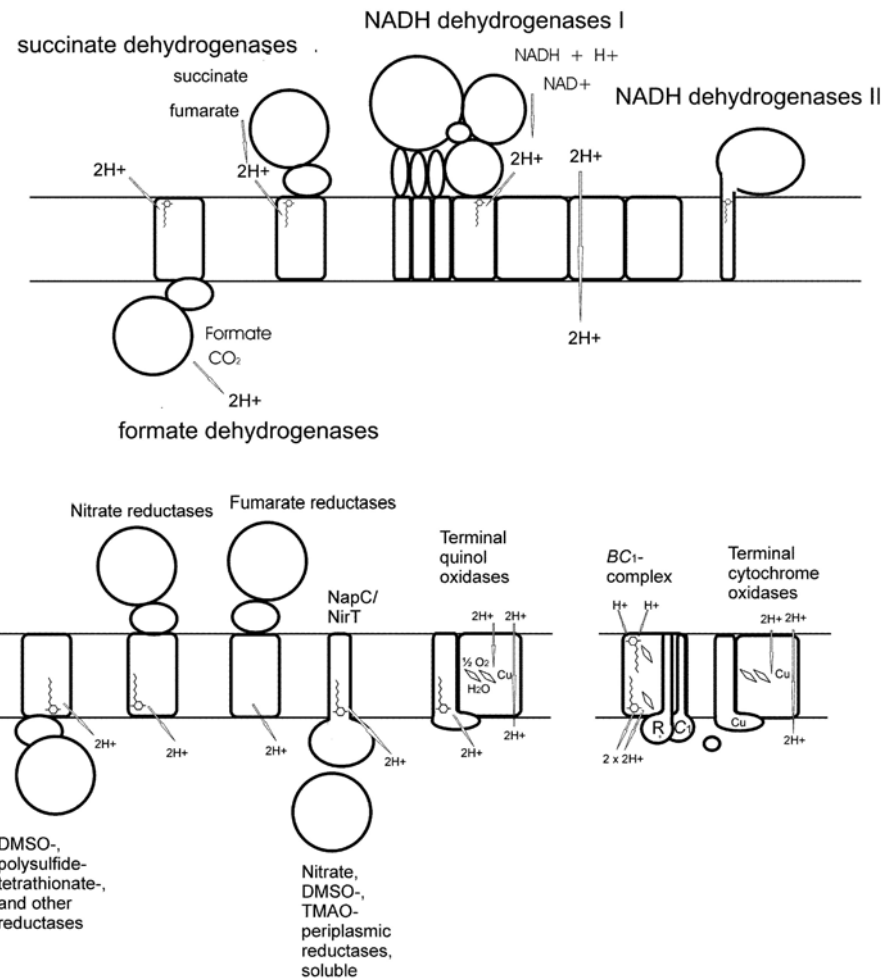


М.Ф. Яньюшин

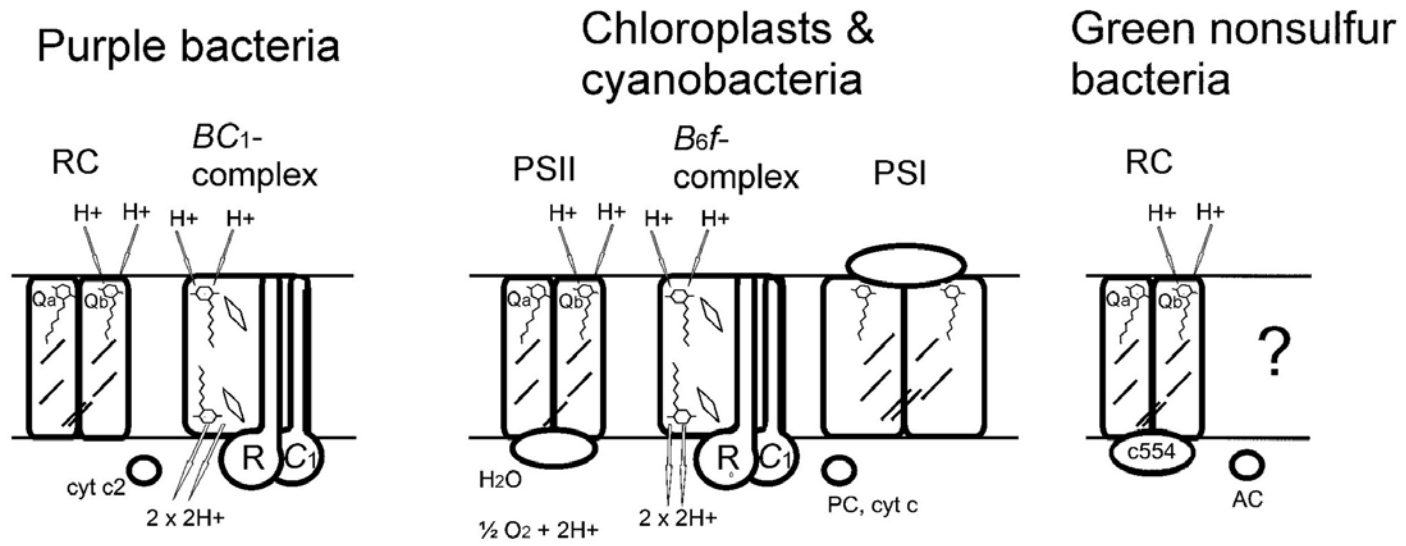
Институт фундаментальных проблем биологии РАН, Пущино

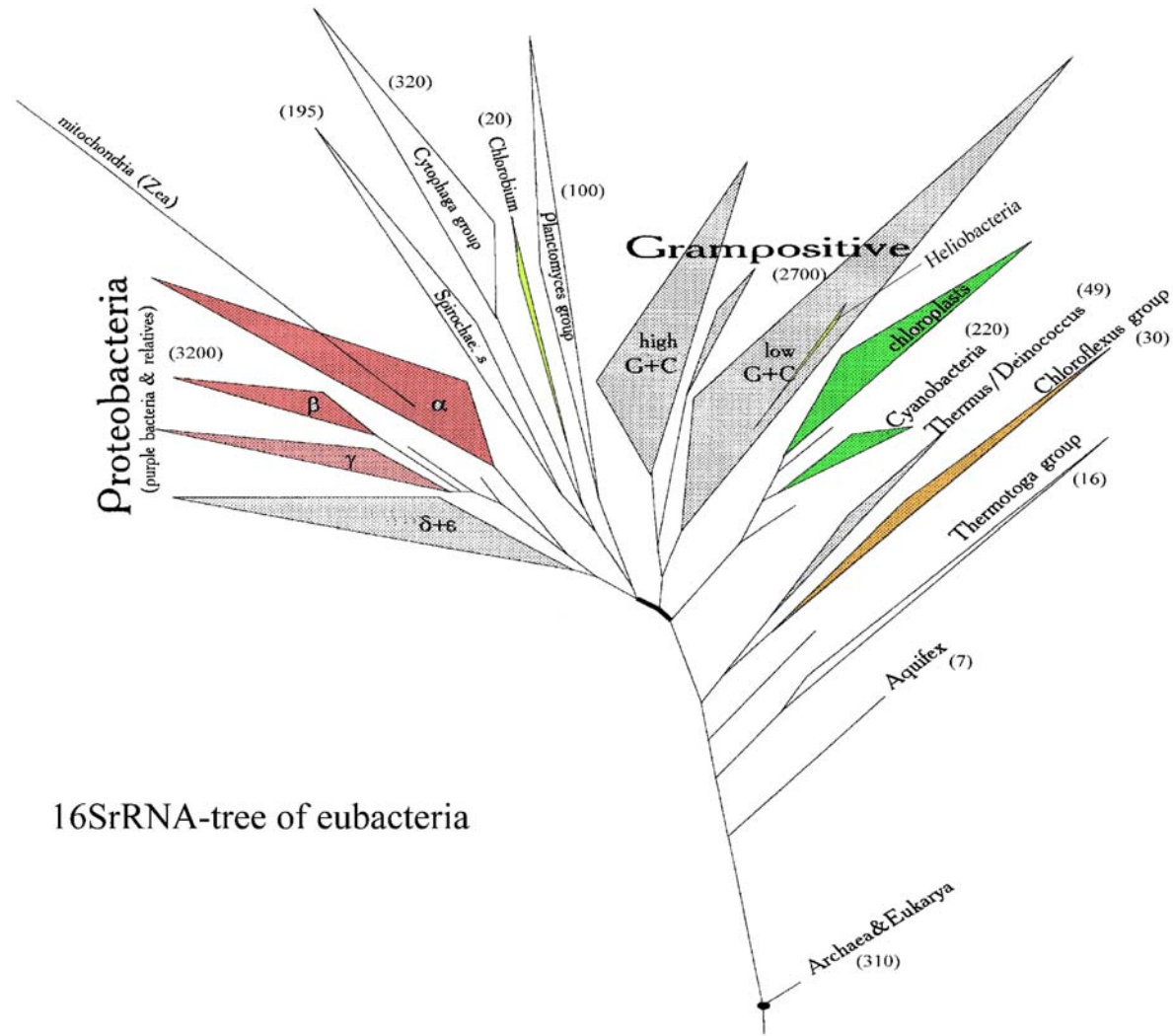
Опероны бактериальных мембранных оксидоредуктаз:  
Структурное разнообразие, распределение по геномам, филогения.

# Компоненты дыхательных цепей



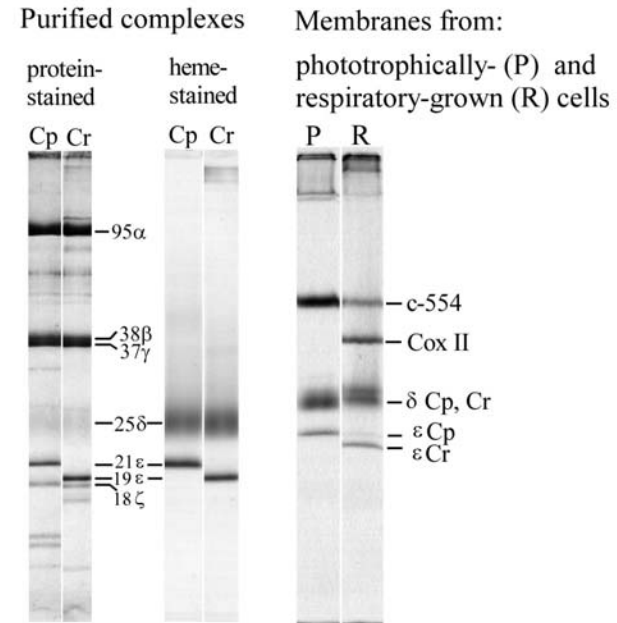
## Компоненты фотосинтетических цепей



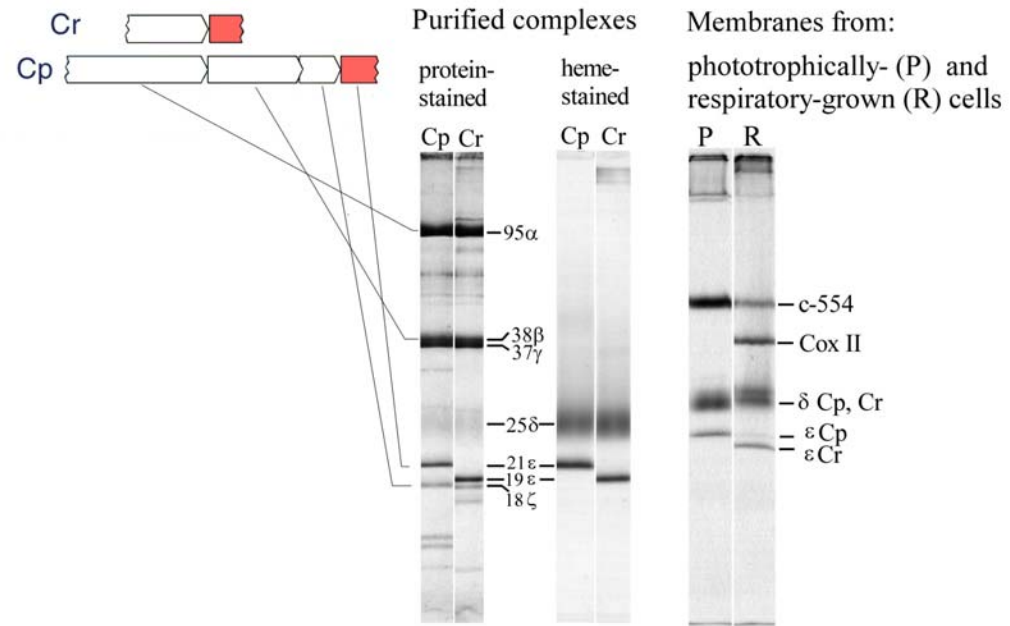


16SrRNA-tree of eubacteria

One of the complexes is expressed in phototrophic culture and the other in respiratory one

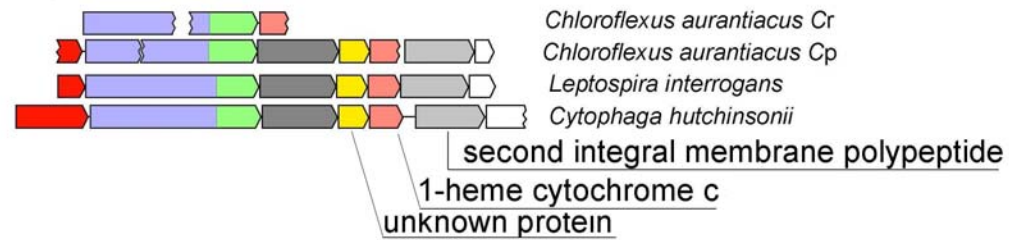


# Search for genes encoding the complexes in *C. aurantiacus* genome



# First search for homologies in genomic databases

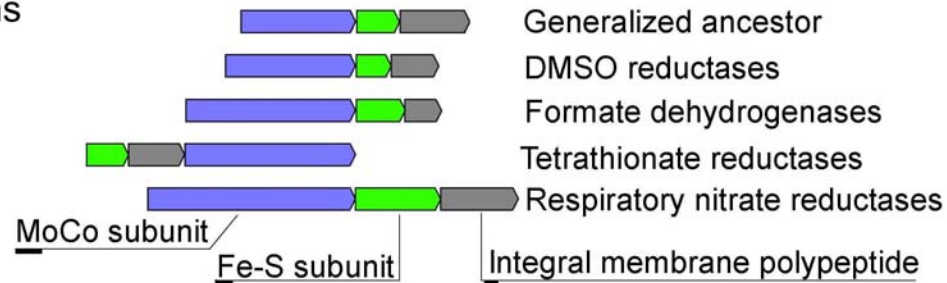
## MFIcc operons



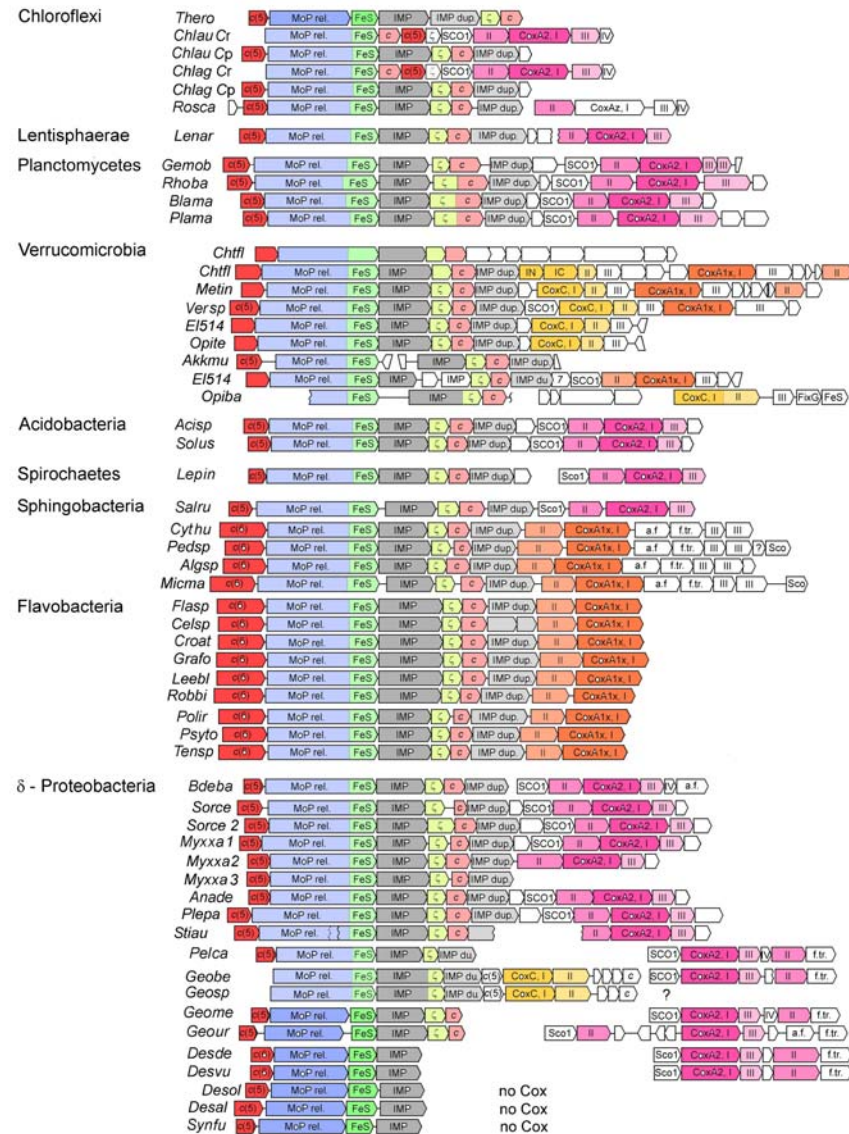
## intermediate (MFIc)



## MFI operons

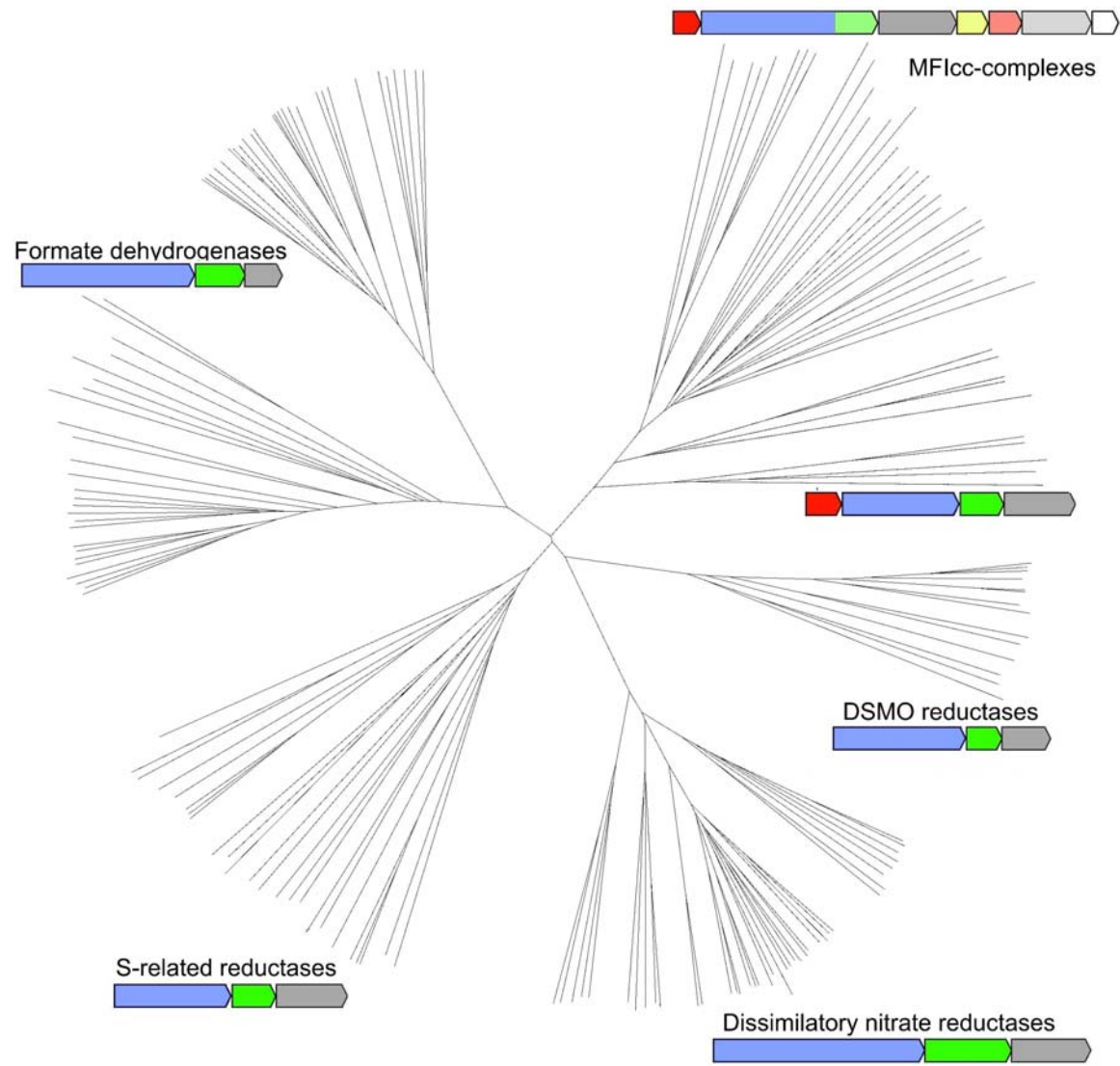


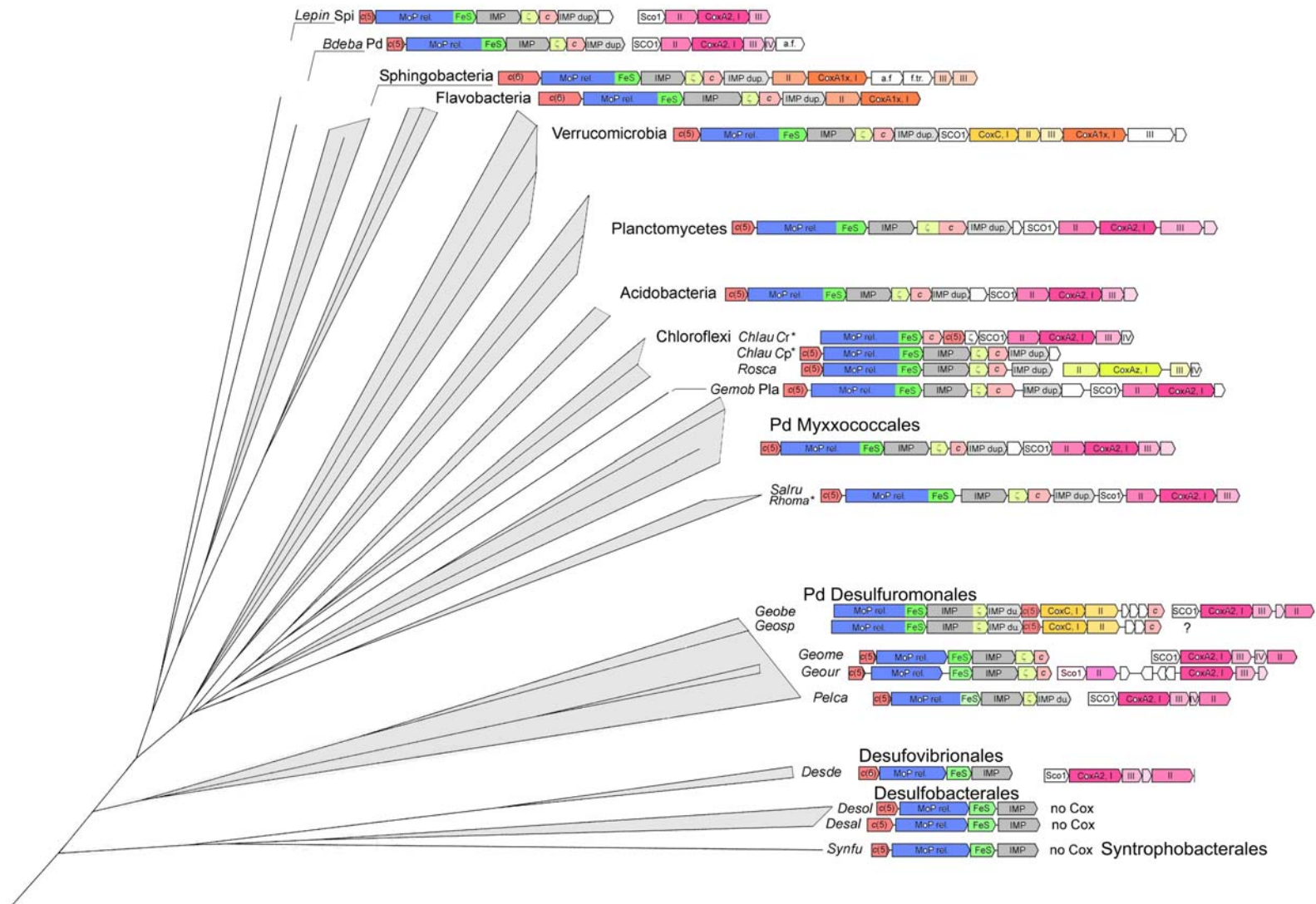
# MFIsс-опероны, которые можно найти в опубликованных геномах



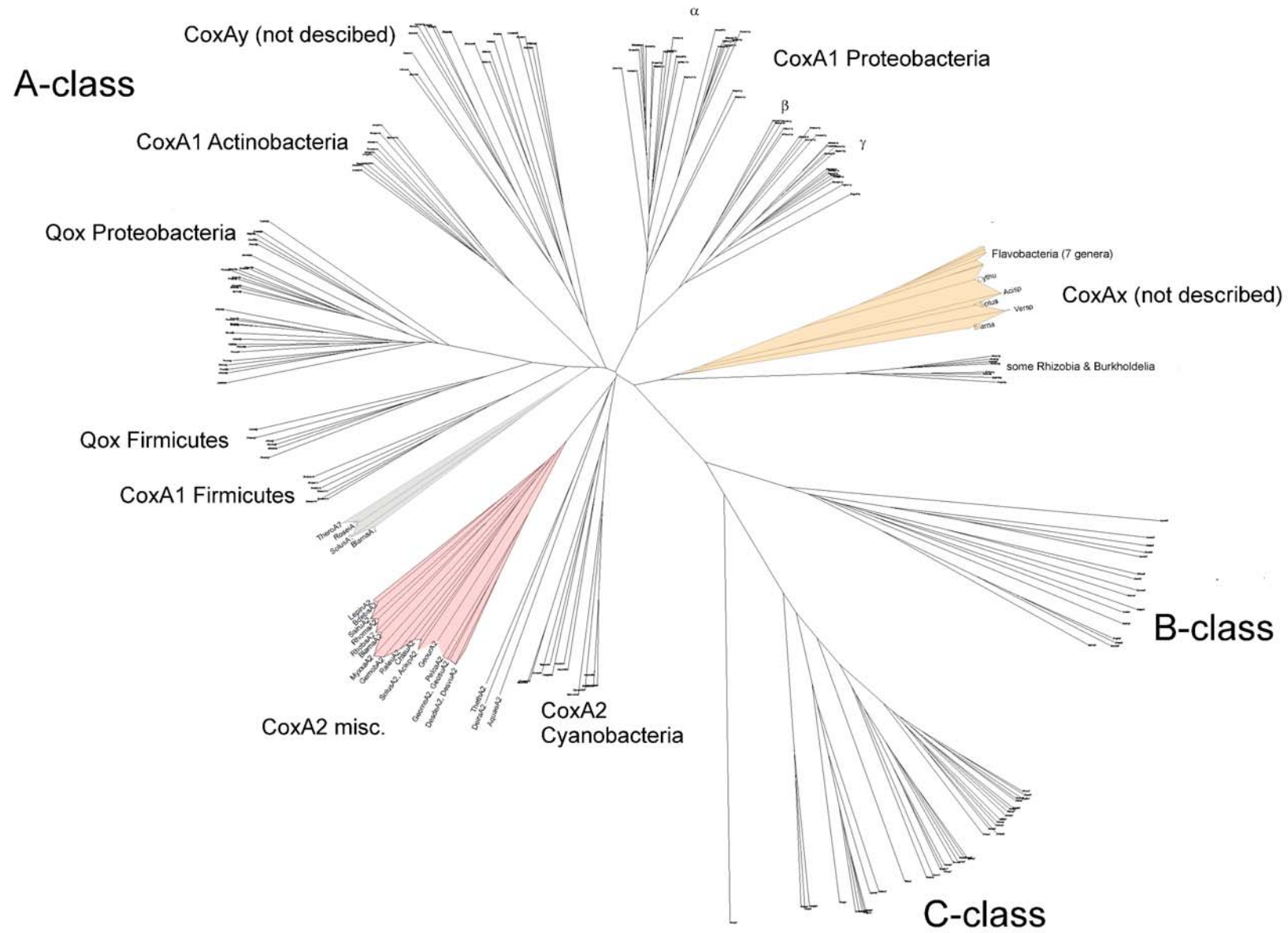


# Дендрограмма MFI и MFicc-оперонов

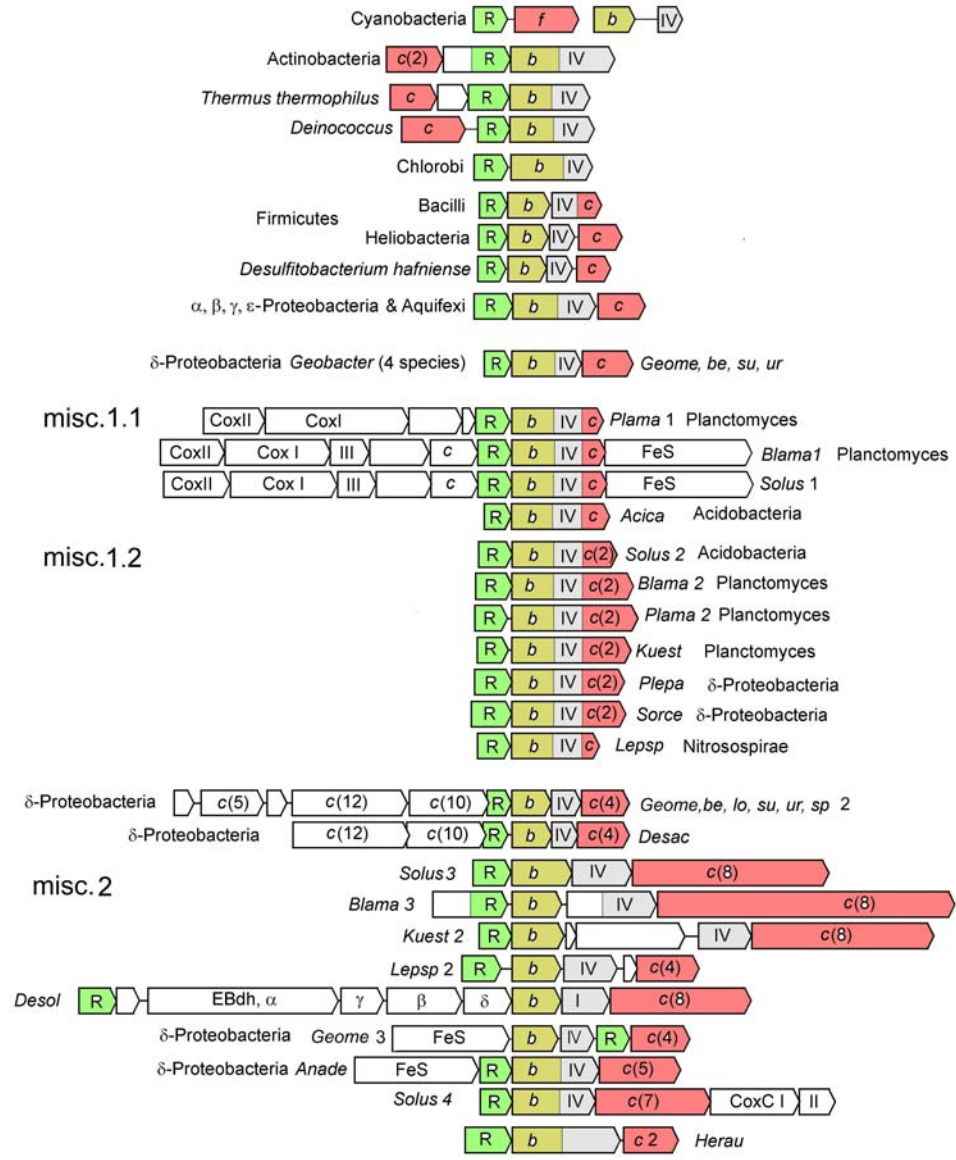




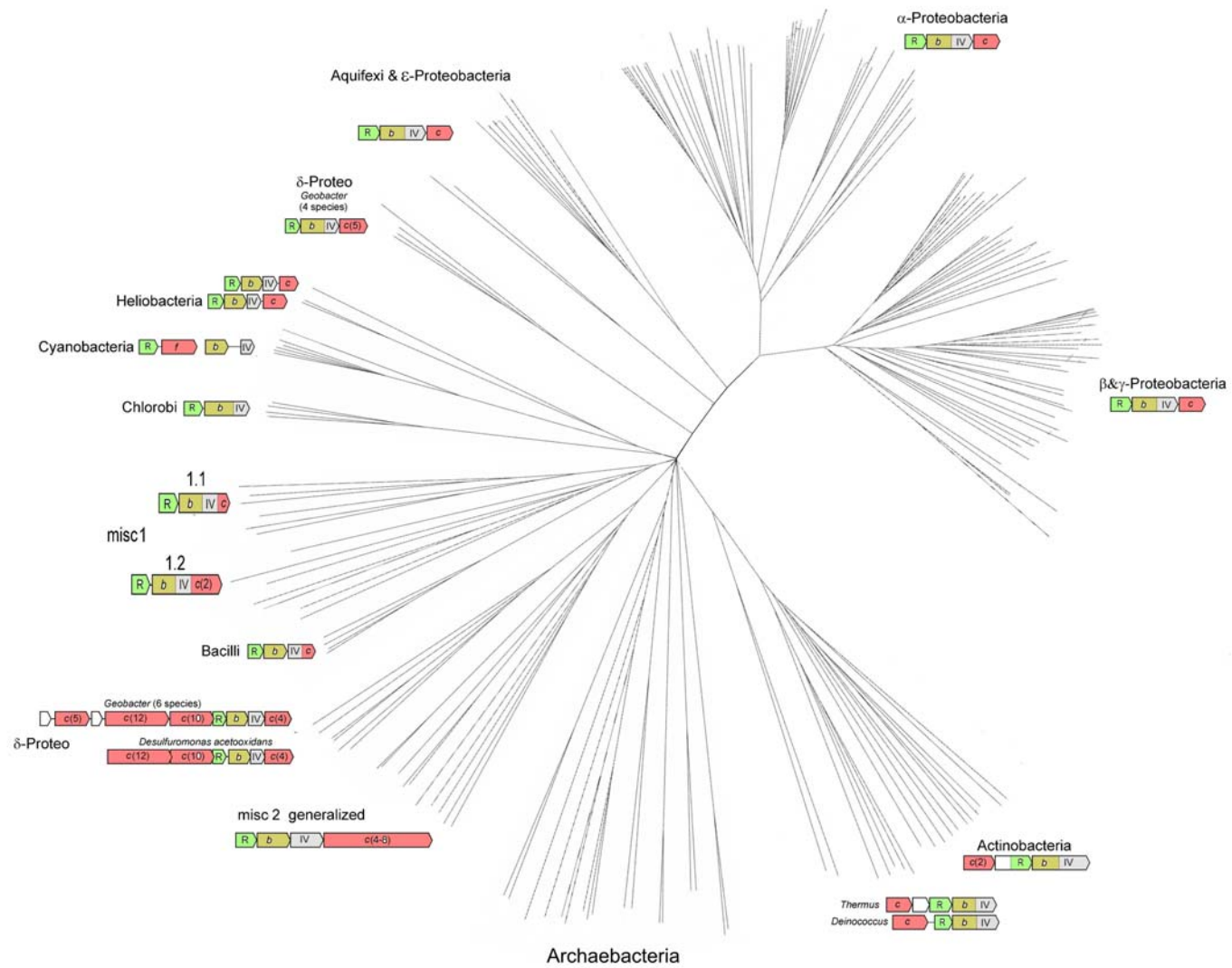
# Dendrogram for subunit I of Cu-heme cytochrome(quinol) oxidases



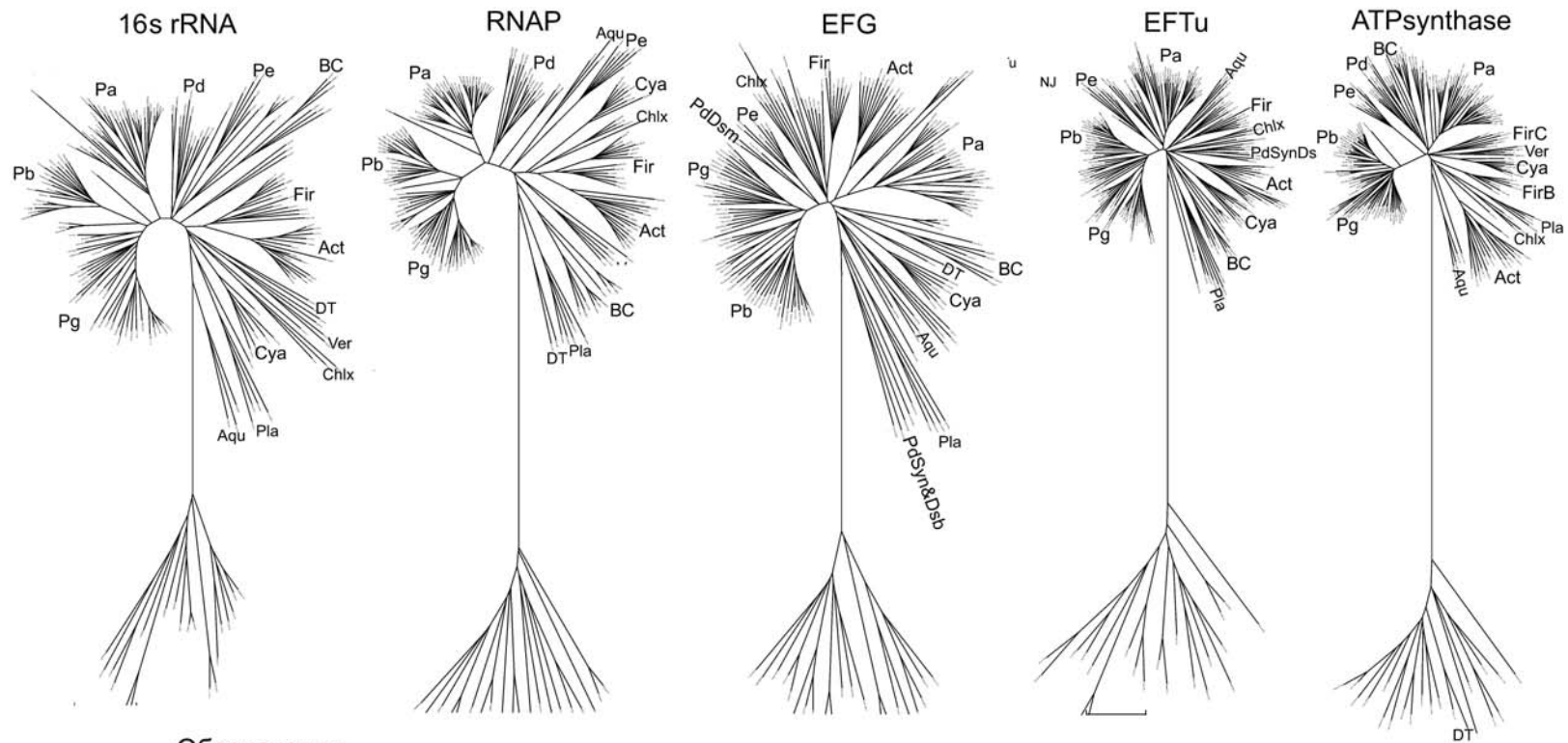
# bc1- и bc1-подобные опероны



# Дендрограмма bc1-оперонов



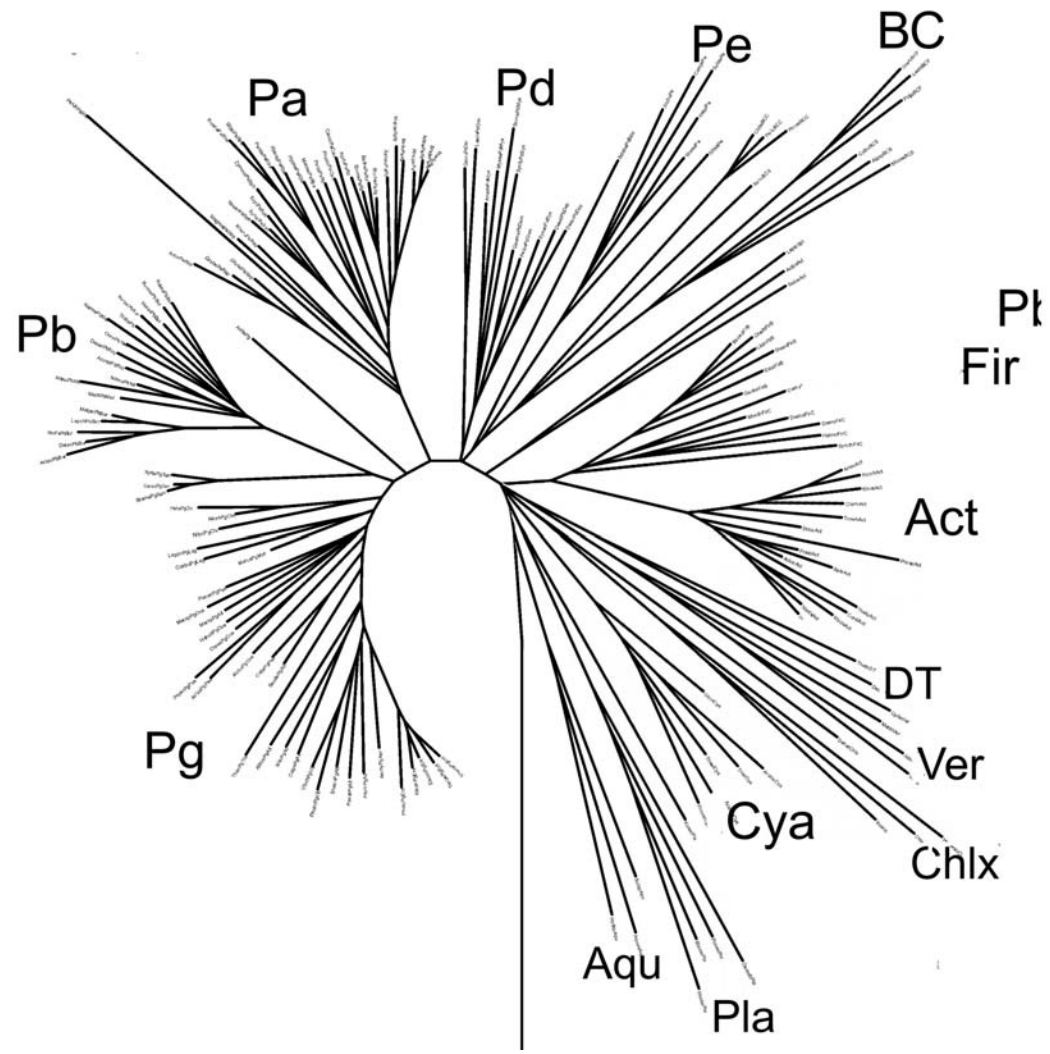
## Насколько похожи дендрограммы надежных молекулярных часов

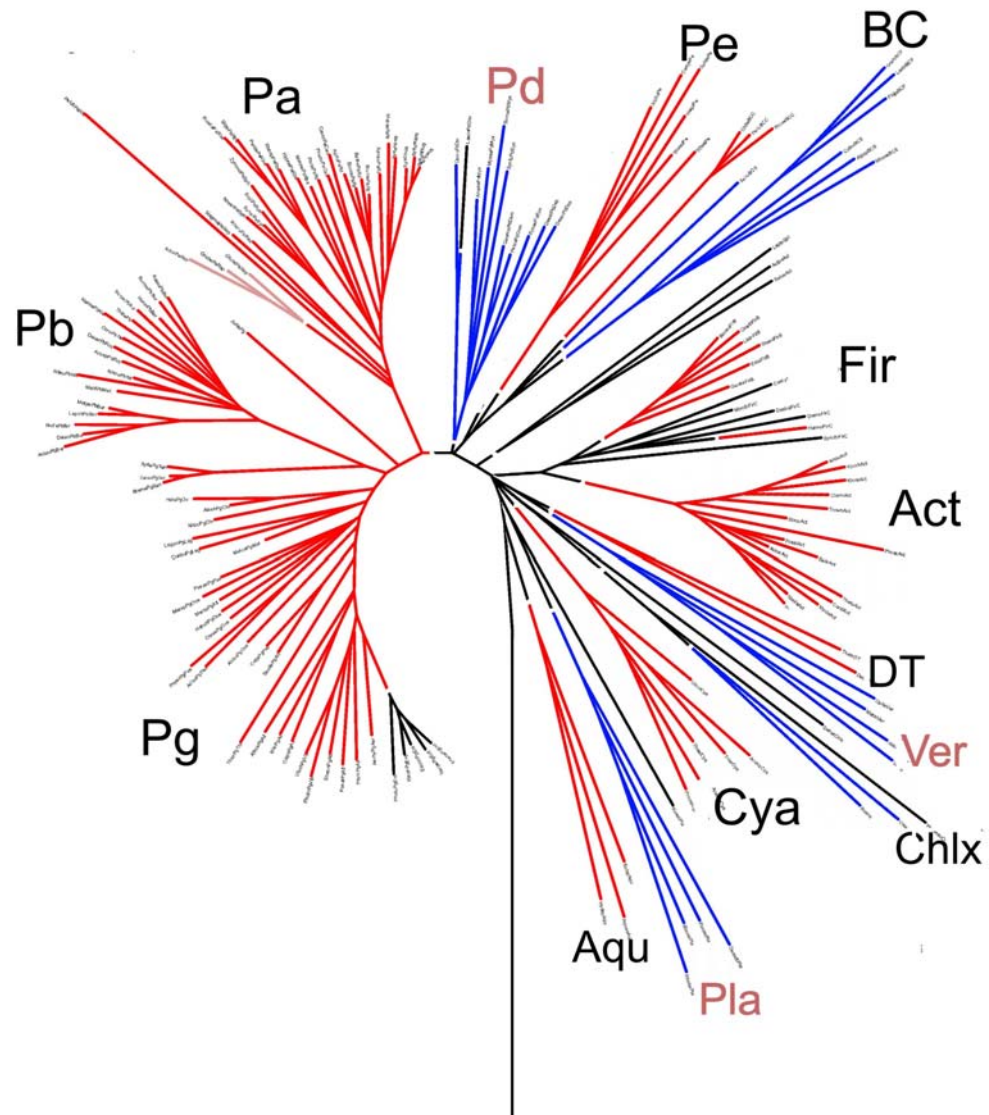


### Обозначения

Pabgde Proteobacteria, Fir Firmicutes, Act Actinobacteria, Cya Cyanobacteria, BC Bacteroidetes & Chlorobii

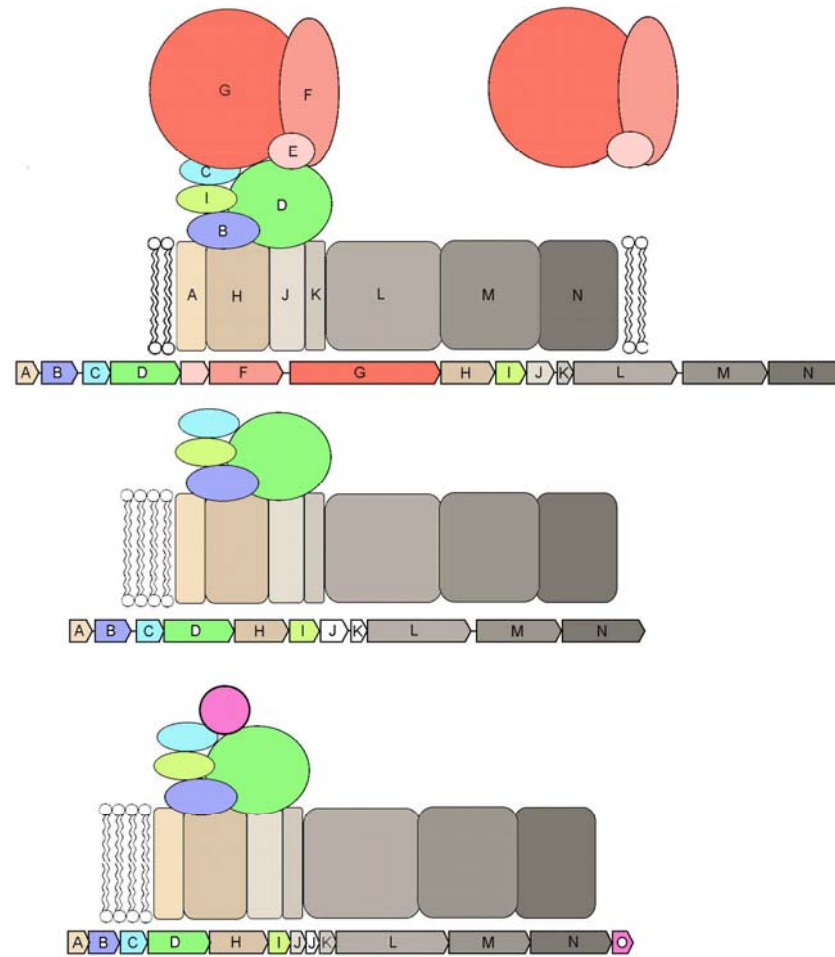
Aqu Aquifexi, Chlx Chloroflexi, Pla Planctomycetes, Ver Verrucomicrobia, DT Deinococcus-Thermus







# NADH-дегидрогеназа I



# Dendrogram for large subunits of H<sub>2</sub>ases and NuoD

