

## **Birth of the domains Bacteria, Archaea and Eucarya and of major taxa within them: a hypothesis.**

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A hypothesis to explain how the birth of the Bacteria, Archaea and Eucarya domains and of major taxa within them took place is presented. It is proposed that the birth of each domain was an independent event consisting in the genetic isolation of a particular cell from a very diverse pool of "primitive cells". Cells within this pool have a dynamic pattern of cell fusion followed by mostly illegitimate DNA recombination. It is postulated that genetic isolation was achieved: a) by evolution of the peptidoglycan layer in Bacteria, b) by evolution of a glycoproteic cell wall in Archaea, and c) by evolution of the nuclear membrane in Eucarya. It is also postulated that, within each domain, branching was a consequence of sporadic events of fusion between two cells of different phylogenetic lineages, followed by mostly illegitimate DNA recombination and cell wall regeneration. The two fusing cells may have belonged to the same domain, to different domains or even one may have belonged to one of the domains and the other to the pool of "primitive cells". In this last case, new complex phenotypes, previously absent from all the domains, were suddenly introduced in one of them (e.g.: photosynthesis in Bacteria, methanogenesis in Archaea). A corollary of this theory is that genes should have a phylogenetic tree with defined nodes while organisms are characterized by discontinuities instead of nodes.