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TRZY DOMENY CZY DWIE? SPOJRZENIE NA EWOLUCJĘ *PROKARYOTA* I POCHODZENIE *EUKARYOTA*

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Three domains or two? Outlook upon evolution of *Prokaryota* and the origin of *Eukaryota*

Abstract: Evolutionary relationships among prokaryotes and the origin of eukaryotes are discussed in this review. Molecular data of rRNA sequences derived from different organisms led Woese and collaborators to propose the three-domain universal tree of all living organisms consisting of archaebacteria *(Archaea),* eubacteria *(Bacteria)* and eukaryotes *(Eukarya).* Since its introduction to the science, the proposal has been widely accepted among biologists as an evolutionary paradigm. However, this proposal, based primarily on genes involved in the information transfer processes, is inconsistent with the ultrastructural characteristics of prokaryotes, the phylogenies of many genes and highly conserved proteins, and it pro ides no explanation as to the differences seen between different groups of organisms. A second alternate proposal for the evolution of major groups of prokaryotes and the origin of eukaryotes has emerged from extensive analyses of numerous con-served indels found in various proteins. This proposal discerns only two domains, *Procaryotae* and *Eucaryotae.* Among the former group, two subdomains, *Monodermata* and *Didermata,* are distinguished. In view of the two-domain concept, all eukaryotic cells are descendants of the ancestral chimera that arose by a unique fusion event between an archaebacterium and a Gram-negative eubacterium. The new proposal calls into question the validity of the three domain model and the assignment of domain status to *Archaea,* as well as the idea of eukaryotes having been directly descended from the archaebacterial ancestor.

l. Introduction. 2. Principles of current evolutionary paradigm. 3. Incongruities within the evolutionary paradigm. 4. Critique of validity of the three domain proposal. 5. An alternate proposal for evolution of *Prokaryota.* 6. Position of archaeabacteria in a new evolutionary model. 7. The origin and phylogenetic relationships among diderm bacteria. 8. Evolutionary relationship between *Eukaryota* and proteobacteria, 9. Synthesis of the new proposal for evolution of *Prokaryota* and the origin *of Eukaryota*

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