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Cellular symbiosis and metabolic evolution

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The theory of symbiogenesis, proposed by Boris Kozo-Polyansky Mikhaylovich (1890-1957) and deployed in all its explanatory power by Lynn Margulis (1938-2011), allows the study of the emergence of new structures, metabolisms and behaviours from the association of different species. Actually there is an ancient connection between endosymbiosis and metabolic evolution in eukaryotes since associations with prokaryotic microorganisms have been present and recurrent throughout their evolutionary history. One of the best studied cases are the metabolic symbiogenesis between insects and bacteria, which have occurred independently many times during the last 300 million years, producing numerous mergers of the branches of the tree of life. A conspicuous outcome of symbiogenesis is that all eukaryotes are really metabolic mosaics.