Les conférences FR TransBioMed

Invitation : Zoran Ivanovic – Inserm U1035/EFS

Bill Martin

Institute of Molecular Evolution - Heinrich-Heine-Universitaet Duesseldorf – Germany

“*Anaerobisis and evolution: We should not forget our humble anaerobic beginnings*”

Lundi 10 décembre à 11h00

Amphithéâtre Broca Neurosciences
Site de Carreire zone sud, université de Bordeaux

Today the atmosphere has about 21% oxygen. Earth scientists now tell us, however, that the rise of oxygen was a very late event in evolution, something that occurred in the last 600 million or even the last 450 million years, since the origin of land plants. Life on land is dominated by eukaryotes, land plants and of course land animals. Before life on land, life was confined to aquatic environments. But eukaryotes have a fossil record that extends back more than 1.5 billion years. The majority of eukaryote evolution took place in anaerobic environments. Thus it is should not be surprising to see that the traces of our anaerobic past preserved in diverse eukaryotic lineages. Part of the talk will be devoted to looking at the remnants of our anaerobic past as preserved in modern metabolis, both in anaerobes and in aerobes. A puzzling aspect of oxygen in Earth history is this: Cyanobacteria started making molecular oxygen about 2.5 billion years ago, but why did it take so long for oxygen to accumulate in the atmosphere? There are a number of very complicated proposals in the literature. Perhaps the reason is very simple, though, and we will consider such a suggestion (nitrogenase inhibition). Perhaps the reason is simple enough that everyone (nonspecialists) can discuss it.

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Zimorski V, Mentel M, Tielens AGM, Martin WF: Energy metabolism in anaerobic eukaryotes and Earth's late oxygenation. *Free Radicals Biol Med. submitted*.

Martin WF, Bryant DA, Beatty JT: A physiological perspective on the origin and evolution of photosynthesis. *FEMS Microbiol. Rev*. 42:201–231 (2018).

Martin WF, Tielens AGM, Mentel M, Garg SG, Gould SB: The physiology of phagocytosis in the context of mitochondrial origin. *Microbiol Mol. Biol. Rev.* 81:e00008-17 (2017).