Extracellular Electron Uptake: Among Autotrophs and Mediated by Surfaces - DTU Orbit (02/11/2019)

Extracellular Electron Uptake: Among Autotrophs and Mediated by Surfaces

Autotrophic microbes can acquire electrons from solid donors such as steel, other microbial cells, or electrodes. Based on this feature, bioprocesses are being developed for the microbial electrosynthesis (MES) of useful products from the greenhouse gas CO₂. Extracellular electron-transfer mechanisms involved in the acquisition of electrons from metals by electrical microbially influenced corrosion (EMIC), from other living cells by interspecies electron transfer (IET), or from an electrode during MES rely on: (i) mediators such as H₂; (ii) physical contact through electron-transfer proteins; or (iii) mediator-generating enzymes detached from cells. This review explores the interactions of autotrophs with solid electron donors and their importance in nature and for biosustainable technologies.

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