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Autotrophic CO₂ fixation pathways in changing environments

Prof. Ivan Berg
University of Münster

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Abstract

Autotrophy, the ability to produce biomass exclusively from inorganic carbon, probably evolved together with life, being the basis for past and today's carbon cycling. To date, seven different pathways responsible for autotrophic CO₂ fixation are known, while more pathways are still awaiting discovery. Their distribution reflects both the diversity of life and the diversity of the ecological niches existing in nature. The study of autotrophy sheds new light on the evolution and functioning of the biosphere and the origin of life. Here, I will discuss how the environmental conditions shape autotrophic CO₂ fixation in two thermophiles, in sulfur reducing *Desulfurella acetivorans* and in nitrate reducer *Ammonifex degensii*, determining the choice of the pathway and the efficiency of growth. We hypothesize that these types of metabolic adjustments may be widespread in microbial world.

