

Abstract: Methanotrophic bacteria were once considered obligate for the aerobic metabolism of single carbon substrates. That view has been challenged with extensive genome sequencing and physiological study of methanotrophic isolates from diverse ecosystems. We have now extended the metabolic versatility of gammaproteobacterial methanotrophs (Type I) to denitrification and thiosulfate oxidation, both of which occur under hypoxic conditions. The finding of abundant Type I methanotrophs in many anoxic ecosystems is now supported by their metabolic versatility while simultaneously providing new linkages between methanotrophy and the nitrogen and sulfur cycles.