

Amy C. Rosenzweig

Biological Methane Oxidation

Methane gas is underutilized as a feedstock for production of liquid fuels due to low conversion efficiencies and high capital costs. Increasing natural gas reserves combined with an ongoing price spread between natural gas and gasoline have led to renewed interest in bioconversion of methane. In nature, methanotrophic bacteria activate methane with high selectivity under mild conditions using methane monooxygenases (MMOs). However, the use of MMOs in bioconversion processes is hindered by low efficiency, low carbon yields, and suboptimal kinetics. Improving these properties requires detailed understanding of the MMO enzyme systems, which has not been achieved for the primary MMO in nature, particulate MMO (pMMO). This talk will address the state of knowledge regarding the active site and chemical mechanism of this complex integral membrane enzyme.

Amy Rosenzweig is the Weinberg Family Distinguished Professor of Life Sciences in the Departments of Molecular Biosciences and of Chemistry at Northwestern University. Her laboratory uses biochemical, biophysical, X-ray crystallographic, spectroscopic, and omic approaches to attack problems at the forefront of bioinorganic chemistry. Areas of interest include biological methane oxidation, metal uptake and transport, and oxygen activation by metalloenzymes. She received a B. A. in chemistry from Amherst College, a Ph. D. in inorganic chemistry from Massachusetts Institute of Technology, and a postdoctoral fellow at Harvard Medical School. Rosenzweig is a fellow of the American Academy of Arts and Sciences (2014) and a member of the National Academy of Sciences (2017). Her awards include the Royal Society of Chemistry Joseph Chatt Award (2014), the American Chemical Society Nobel Laureate Signature Award for Graduate Education (2006), an Honorary Doctor of Science Degree from Amherst College (2005), and a MacArthur Fellowship (2003).

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