

**Structure and Function of OxIT, the Oxalate Antiporter  
of *Oxalobacter formigenes***

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The Gram-negative anaerobe, *Oxalobacter formigenes*, and its most abundant membrane protein, OxIT, are worthy of study for several reasons. On the one hand, at the level of whole body physiology, *O. formigenes* provides a significant pathway for elimination of dietary oxalate from the human gut. Second, at the level of cell biology, the manner in which *O. formigenes* utilizes oxalate reflects an unusual mode of energy coupling, one that exploits the presence of a cytosolic oxalate decarboxylation system and a membrane antiporter, OxIT, which allows entry of oxalate in exchange with formate, the product of oxalate decarboxylation. Because the exchange of oxalate with formate brings a negative charge into the cell, and because oxalate decarboxylation is accompanied by consumption of a single proton, the phenomenological coupling between transport and metabolism results in generation of a proton-motive force, driving ATP synthesis and other membrane localized activities. At a still deeper level, that of biochemistry and biophysics, the elements involved in processing oxalate continue to be of interest. In particular, and as emphasized in this presentation, the antiporter, OxIT, serves as a useful model for study of the molecular basis of solute transport by members of the Major Facilitator Superfamily (MFS), a large collection of evolutionarily related transporters, having representatives in both eukaryotes and prokaryotes. The work discussed today will address the ways in which continued study of OxIT contributes to understanding of biochemical mechanisms underlying solute transport by the MFS.

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