

## DETOXIFICATION OF THE METABOLIC TOXIN PROPIONATE-3-NITRONATE BY FUNGAL NITRONATE MONOOXYGENASE

Kevin Francis<sup>‡</sup>, Shirley Nishino<sup>#</sup>, Crystal Smitherman<sup>‡</sup>, Jim Spain<sup>#</sup> and Giovanni Gadda<sup>‡§</sup>

Departments of <sup>‡</sup>Chemistry and <sup>§</sup>Biology, and <sup>-</sup>The Center for Biotechnology and Drug Design, Georgia State University, Atlanta, GA 30302-4098; <sup>#</sup>Department of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA 30302

Nitronate monooxygenase (NMO; E.C. 1.13.12.16) is an FMN-dependent enzyme that oxidizes alkyl nitronates to their corresponding carbonyl compounds and nitrite. While the kinetic and mechanistic properties of NMO from *Neurospora crassa* and *Williopsis saturnus* have been characterized, the physiological role of the enzyme has been elusive for decades. The current study demonstrates that the purified enzyme effectively oxidizes propionate-3-nitronate (P3N), the highly toxic conjugate base form of the plant metabolite 3-nitropropionate (3NPA). P3N was toxic to *E. coli* cells lacking NMO, but the toxicity was overcome through either expression of the recombinant gene or addition of exogenous enzyme to the cultures. Both *W. saturnus* and *N. crassa* were able to grow in the presence of P3N/3NPA. In contrast, a knockout mutant of *N. crassa* lacking the gene encoding for NMO could not grow. The results indicate that NMO functions to protect the fungi against the toxicity of 3NPA and P3N.

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