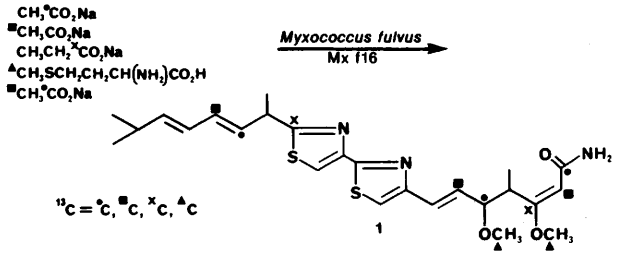
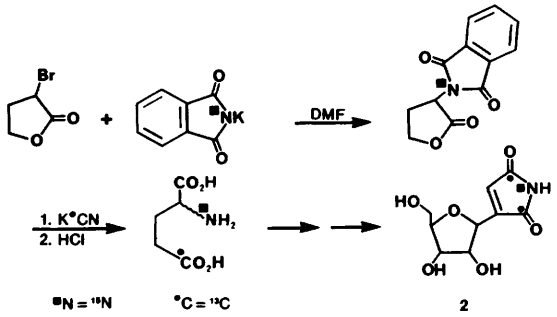
Stable Isotopes

Organics containing stable isotopes have had a long history at Aldrich starting with deuterated solvents over a decade ago. More recently, carbon-13-enriched compounds have been offered in expanding diversity, followed by carbon-13-depleted products and nitrogen-15-labeled organic and inorganic compounds. Below are the results of some recent studies employing isotopes to solve interesting biosynthetic, structural and mechanistic problems.

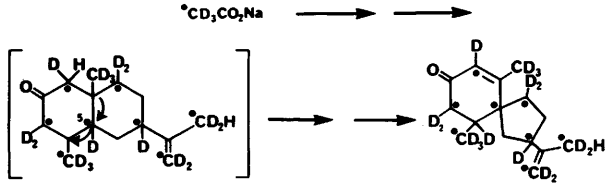
Studies on the biosynthesis of the nonaromatic moiety of Myxothiazol (**1**) in *Myxococcus fulvus* Mx f16 using labeled sodium carboxylates and methionine indicated that the precursors were incorporated into the backbone of the molecule.[1]



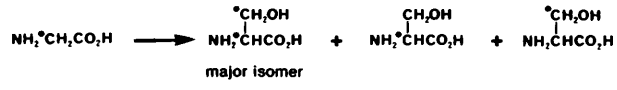
Studies with labeled L-glutamic acid have shown that it is a direct biosynthetic precursor of showdomycin (**2**).[2]



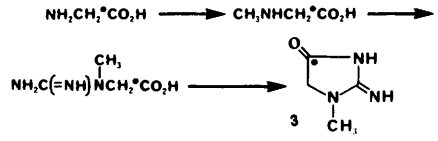
Sodium acetate-2-^{13}C-2-d_3 has been used to study the proposed migration of hydrogen from C-5 to C-4 in the biosynthesis of potato phytoalexin shown below.[3]



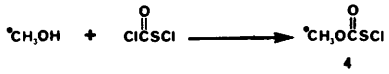
The metabolism of **glycine-2-^{13}C** to labeled serine by a suspension of cultured tobacco cells has been followed *in vivo* using ^{13}C-NMR.[4] The kinetics of the intragastric utilization of **D-glucose-1-^{13}C** in mice have also been followed *in vivo* by NMR.[5]



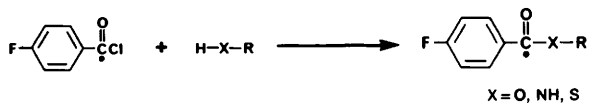
Glycine-1-^{13}C has been used as a precursor in the synthesis of creatinine (**3**), an important end-product of nitrogen metabolism in vertebrates.[6]



Methyl-^{13}C alcohol was used to synthesize ^{13}C-labeled methoxycarbonylsulfenyl chloride (**4**), which was subsequently used to test for the presence of a disulfide linkage in digestion fragments of reduced hen egg-white lysozyme.[7]



4-Fluorobenzoyl-*carbonyl*-^{13}C chloride is a versatile tagging reagent which gives rise to distinctive ^{19}F- and ^{13}C-NMR signals that can be correlated to specific functional groups.[8]



The mechanism of the elimination reactions of $Os(CO)_4R_2$ has been studied using stable isotopes.[9]

References:
(1) Trowitzch-Kienast, W. *et al. Justus Liebigs Ann. Chem.* **1986**, 93. (2) Buchanan, J.G. *et al. Chem. Commun.* **1984**, 1515. (3) Stoessel, A.; Stothers, J.B. *Can. J. Chem.* **1983**, *61*, 1766. (4) Ashworth, D.J.; Mettler, I.J. *Biochemistry* **1984**, *23*, 2252. (5) Field, J. *et al. Biochem. Biophys. Res. Commun.* **1984**, *123*, 862. (6) Rowley, G.L.; Kenyon, G.L. *J. Heterocycl. Chem.* **1972**, *9*, 203. (7) Galphin, I.J.; Hoyland, D.A. *Tetrahedron* **1985**, *41*, 901. (8) Spratt, M.P. *et al. Anal. Chem.* **1985**, *57*, 359. (9) Carter, W.J.; Okrasinki, S.J.; Norton, R.J. *Organometallics* **1985**, *4*, 1376.

28,201-4	**Acetic-$^{13}C_2$ acid, sodium salt**	**250mg $79.00; 1g $220.00**
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27,931-5	**Acetic-2-^{13}C acid, sodium salt**	**250mg $37.50; 1g $104.50**
29,908-1	**Acetic-2-^{13}C-2-d_3 acid, sodium salt**	**250mg $126.00; 1g $350.00**
29,193-5	**4-Fluorobenzoyl-*carbonyl*-^{13}C chloride**	**250mg $115.00; 1g $400.00**
29,704-6	**D-Glucose-1-^{13}C**	**50mg $51.00; 250mg $170.00**
27,942-0	**Glycine-1-^{13}C**	**250mg $50.00; 1g $139.50**
27,943-9	**Glycine-2-^{13}C**	**250mg $125.00; 1g $429.50**
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29,703-8	**Potassium cyanide-^{13}C**	**250mg $40.00; 1g $134.50**
29,924-3	**Phthalimide-^{15}N, potassium derivative**	**250mg $16.00; 1g $44.50**
27,945-5	**Propionic-1-^{13}C acid, sodium salt**	**250mg $43.00; 1g $119.50**
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