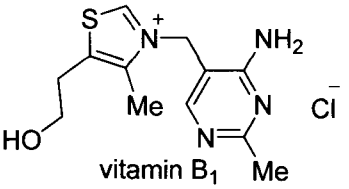
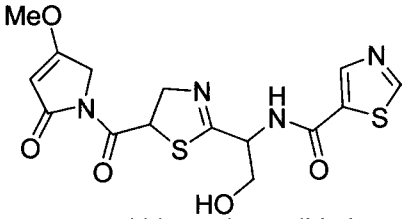
The physical and spectral properties of 1,3-thiazole are similar to those of pyridine in some ways. The electronegative *N*-atom at the 3-position makes C(2) partially electropositive and consequently susceptible to nucleophilic attack.

Thiazole is known to occur naturally in various forms. The most widely recognized thiazole lies in the essential vitamin B_1 or thiamin in the form of its thiazolium salt. It is a water-soluble vitamin of the B complex. Thiamin pyrophosphate is the essential coenzyme in the enzymatic decarboxylation of pyruvate to aldehyde.

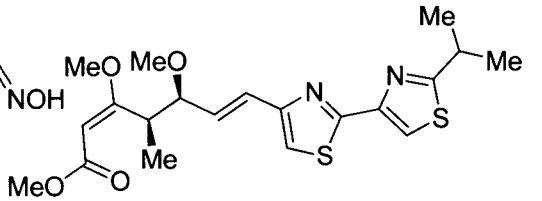


vitamin B_1

Several natural products including penicillins are thiazolidine derivatives. Other natural antibiotics such as althiomycine[2,3] and thiazole antibiotics like micrococcin[4a] include the thiazole heterocycle and they are shown on the next page.[5] Cystothiazole A in particular is a bithiazole metabolite isolated from the myxobacterium *Cystobacter fuscus* and shows activity against a broad range of fungi as well as *in vitro* cytotoxicity toward human colon carcinoma HCT-116 and leukemia K562 cells.[4b] Metabolic products of living organisms such as aeruginoic acid isolated from *Pseudomonas aeruginosa* contains a 1,3-thiazole ring.[6] Firefly luciferin is an interesting light-emitting natural product found in firefly. This compound is actually responsible for bioluminescence and chemiluminescence. It possesses a structure comprising both a benzothiazole and a Δ^2-thiazoline ring.[7]



althiomycin: antibiotic



cystothiazole A: antibiotic