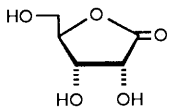
# D-Ribonolactone
## Chiral Cornerstone



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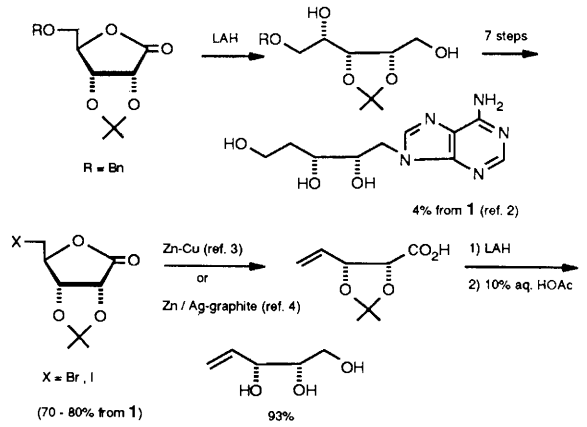
D-(+)-Ribonic γ-lactone (**1**, D-ribonolactone), a chiral cornerstone of many asymmetric synthetic strategies, is again available from Aldrich. A thorough review of its chemistry and role in organic synthesis, especially in the construction of important natural products such as (-)-ranunculin, (-)-neplanomycin A and lasalocid A, was published a few years ago.[1] Examination of the more recent literature reveals its continuing pivotal role in the preparation of chiral acyclics, chiral cyclopentenones and oxabicyclic systems, key intermediates of biologically important molecules. The following paragraphs highlight some recent synthetic applications germane to these areas.

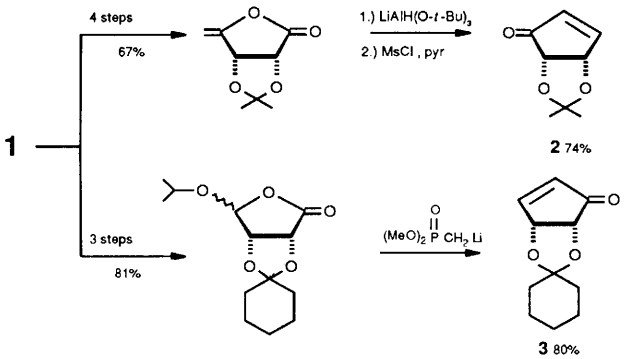
### Chiral Acyclics:

Reductive cleavage of the lactone ring system is a useful strategy for chirality transfer of the ring vicinal diol moiety to an acyclic system.




### Chiral Cyclopentenones:

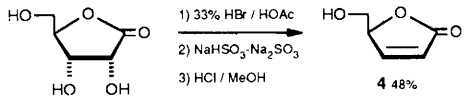
D-Ribonolactone is a convenient source of chiral cyclopentenones **2**[5] and **3**[6,7] which are useful intermediates for the synthesis of prostanoids and carbocyclic nucleosides.



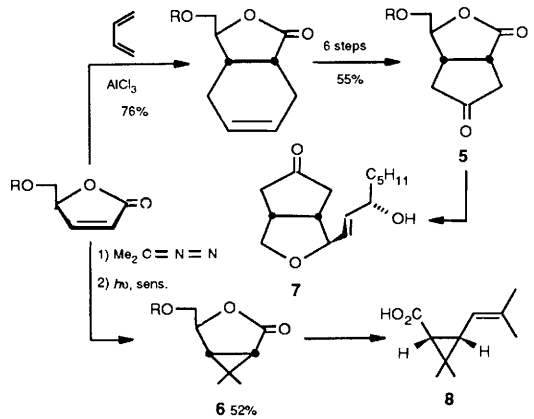

Johnson and Penning[8] have used **2** in a remarkably efficient synthesis of (-)-$PGE_2$ methyl ester. Borchardt[9] and coworkers employed **3** in a recent synthesis of (-)-aristeromycin, a carbocyclic nucleoside analog with antiviral and cytotoxic activity.

### Chiral Oxabicyclic Systems:

D-Ribonolactone (**1**) is also a convenient source of 2(5*H*)-furanone **4**[10-13] as most recently demonstrated by Godefroi and co-workers.[10] Less recent syntheses of **4** from **1** were developed by Font[11] and Ireland.[12] This furanone is also a recent addition to our listings.




Mann and co-workers[14] have demonstrated that chiral oxabicyclic systems **5** and **6** are readily obtainable from **4** and show great potential as synthons for prostacyclin analogs (*e.g.*, **7**) and *cis*-chrysanthemic acid[15] derivatives (*e.g.*, **8**).




### References and Notes:


(1) Joullie, M.M. *et al. Heterocycles* **1985,** *23,* 691. (2) Wang, C.-L.J. *et al. Tetrahedron Lett.* **1988,** *29,* 1107. (3) Jager, V.; Hafele, B. *Synthesis* **1987,** 801. (4) Furstner, A.; Weidmann, H. *J. Org. Chem.* **1989,** *54,* 2307. (5) Belanger, P.; Prasit, P. *Tetrahedron Lett.* **1988,** *29,* 5521. (6) Borchardt, R.T. *et al. J. Org. Chem.* **1987,** *52,* 5457. (7) Enantiomeric **3** is available from D-mannose in 44% yield; see ref. 6. (8) Johnson, C.R.; Penning, T.D. *J. Am. Chem. Soc.* **1986,** *108,* 5656. (9) Borchardt, R.T. *et al. Tetrahedron Lett.* **1989,** *30,* 1453. (10) Godefroi, E.F. *et al. J. Org. Chem.* **1988,** *53,* 627 and ref. 20 cited therein. (11) Font, J. *et al. Tetrahedron* **1982,** *38,* 2395 and ref. 2 cited therein. (12) Ireland, R.E. *et al. J. Am. Chem. Soc.* **1983,** *105,* 1988. (13) Furanone **4** is also available from D-mannitol; for leading references see Mann, J. *et al. J. Chem. Res. (S)* **1987,** 369 and Danilova, G.A. *et al. Tetrahedron Lett.* **1986,** *27,* 2489. (14) Mann, J. *et al. J. Chem. Soc., Perkin Trans. 1* **1986,** 2279. See also Mann, J.; Thomas, A. *Chem. Commun.* **1985,** 737. (15) Mann, J.; Thomas, A. *Tetrahedron Lett.* **1986,** *27,* 3533.


**85,729-7** **D-(+)-Ribonic γ-lactone,** 98% **(1)** **1g $12.00**
**5g $45.00**

**11,742-0** **D-(+)-Ribonic γ-lactone,** crystalline, 90%
**5g $20.00**

**34,686-1** **(*S*)-(-)-5-(Hydroxymethyl)-2(5*H*)-furanone,** 98% **(4)**
**250mg $15.00; 1g $42.00**