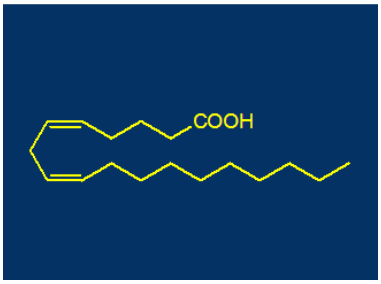
Lipid of the Month: October 2008

Sebaleic acid



The positional isomers of linoleic acid (9(*Z*),12(*Z*)-octadecadienoic acid) have been prepared by total synthesis (1). Of these, the 5,8- and 6,9-octadecadienoates are naturally occurring and consequently of biological interest. 5(*Z*),8(*Z*)-Octadecadienoic acid, or *sebaleic acid*, occurs only in one tissue, *i.e.* human skin, and is a component of sebum secreted by the sebaceous glands (2). Sebaleic acid is biosynthesized by chain elongation and desaturation of 6(*Z*)-hexadecenoic acid (sapienic acid), another unusual fatty acid produced by the sebaceous glands. The function of sebaleic and sapienic acids in human skin is unclear, although an antibacterial effect has been attributed to the latter fatty acid (3). The presence in sebaleic acid of a methylene group-interrupted (*Z*),(*Z*)-diene system makes it a potential substrate for lipoxygenases, and a recently published study has described formation of 5-hydroxy-6(*E*),8(*Z*)-octadecadienoic acid from sebaleic acid incubated with neutrophil 5-lipoxygenase (4). Interestingly, this 5-hydroxy metabolite underwent dehydrogenation into 5-oxo-6(*E*),8(*Z*)-octadecadienoic acid, which exerted a potent chemotactic effect on neutrophils (4).

Sebaleic acid (A-1858) is synthesized by Lipidox by coupling of acetylenic intermediates followed by semihydrogenation. Sapienic acid (A-1606), the biological precursor of sebaleic acid, is also available.

1. Christie, W.W. and Holman, R.T. (1967) Chem. Phys. Lipids 1, 407-423.
2. Nicolaides, N. and Ansari, M.N.A. (1969) Lipids 4, 79-81.
3. Wille, J.J. and Kydonieus, A. (2003) Skin Pharmacol. Appl. Skin Physiol. 16, 176-187.
4. Cossette, C. *et al.* (2008) J. Biol. Chem. 283, 11234-11243.