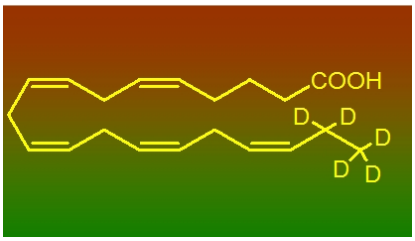
Lipid of the Month: March 2010

Deuterium-labeled eicosapentaenoic acid



5(*Z*),8(*Z*),11(*Z*),14(*Z*),17(*Z*)-Eicosapentaenoic acid is a member of the ω3 family of polyunsaturated fatty acids. Its structure was unequivocally established in the mid-1950s by chemical degradation experiments (1,2). Eicosapentaenoic acid is present *e.g.* in various marine organisms and is biosynthesized from linoleic acid mainly by the sequence linoleic (18:2ω6) → linolenic (18:3ω3) → stearidonic (18:4ω3) → ω3-arachidonic (20:4ω3) → eicosapentaenoic acid (20:5ω3).

Interest in eicosapentaenoic acid and docosahexaenoic acid, two major ω3 fatty acids in marine fish, partly stems from the pioneering work of Dyerberg and Bang, who proposed a link between the low prevalence of cardiovascular disease in native Inuits in Greenland to their dietary intake of fish rich in ω3 fatty acids (3). Underlying mechanisms probably include changes in the oxylipin metabolome such as reduced formation of arachidonic acid-derived cyclooxygenase products and a shift in the prostacyclin-thromboxane balance (4).
More recent work by Serhan *et al.* has demonstrated that specific oxygenation products of eicosapentaenoic and docosahexaenoic acids, called resolvins and protectins, are important for the termination of inflammatory processes and the initiation of the resolution phase following inflammation (5).
By and large, the emerging picture is that ω3 fatty acids such as eicosapentaenoic and docosahexaenoic acids are antiinflammatory whereas ω6 fatty acids such as linoleic and arachidonic acids are proinflammatory.

[19,19,20,20,20-$^{2}H_5$]Eicosapentaenoic acid (D-9603) supplied by Lipidox is prepared by total synthesis; please see the Documentation pages for criteria of identity and purity. Also available are [17,17,18,18,18-$^{2}H_5$]linolenic acid (D-1853) and [7,8,10,11,13,14-$^{2}H_6$]hexadecatrienoic acid (D-1606).

1. Klenk, E. (1954) Naturwissenschaften 41, 68.

2. Whitcutt, J.M. and Sutton, D.A. (1956) Biochem. J. 63, 469-475.
3. Bang, H.O. *et al.* (1971), Lancet 1 (7710), 1143-1146.
4. Dyerberg, J. *et al.* (1978) Lancet 2 (8081), 117-119.
5. Ariel, A. and Serhan, C.N. (2007) Trends Immun. 28, 176-183.