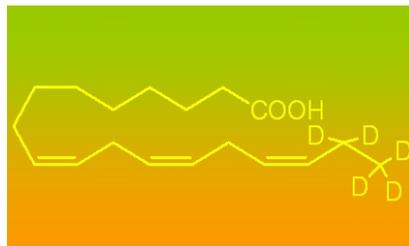


Deuterium-labeled linolenic acid



Linolenic acid, *i.e.* 9(*Z*),12(*Z*),15(*Z*)-octadecatrienoic acid, is a member of the ω 3 family of polyunsaturated fatty acids. Linolenic acid was recognized as a trienoic acid by the Austrian chemist Karl Hazura, who applying a method for permanganate hydroxylation of unsaturated fatty acids (1) isolated a hexahydroxystearate from hydroxylated linseed oil. The double bond positions were established by Erdmann and coworkers in 1909 on the basis of ozonolysis experiments (2).

In early work, isolation and purification of unsaturated fatty acids from vegetable oils were carried out by bromination and debromination procedures, and during such work there was evidence for the presence of a second linolenic acid isomer referred to as " β -linolenic acid". The existence of β -linolenic acid as a natural product was refuted in subsequent work, and it is now realized that this compound was formed as an artifact due to incomplete stereospecificity of the debromination reaction. Notably, since β -linolenic acid was a reality at the time (1919) when the ω 6 trienoic fatty acid 6,9,12-octadecatrienoic acid was isolated from evening primrose seeds (3), this acid had to be named using the third letter of the Greek alphabet and therefore called " γ -linolenic acid". For further discussion of α - and β -linoleic and linolenic acids, see the paper by Green and Hilditch (4).

Linolenic acid is a typical plant fatty acid and is further converted to the ω 3 fatty acids 5,8,11,14,17-eicosapentaenoic acid and 4,7,10,13,16,19-docosahexaenoic acid in *e.g.* fish and mammals. Linolenic acid is also the precursor of the phytohormone (+)-7-iso-jasmonoyl-(*S*)-isoleucine (5) and a host of other plant oxylipins (6). In many respects, linolenic acid in plants can be regarded as a functional equivalent of arachidonic acid in animals.

[17,17,18,18,18- $^2\text{H}_5$]Linolenic acid (D-1853) supplied by Lipidox is prepared by total synthesis. Other deuterated fatty acids available include [19,19,20,20,20- $^2\text{H}_5$]eicosa-

pentaenoic acid (D-9603) and [7,8,10,11,13,14-²H₆]hexadecatrienoic acid (D-1606).

1. Hazura, K. (1888) *Monatsh. Chem.* 9, 469-474.
2. Erdmann, E. *et al.* (1909) *Ber. Dtsch. Chem. Ges.* 42, 1334-1345.
3. Heiduschka, A. and Lüft, K. (1919) *Arch. Pharm.* 257, 33-69.
4. Green, T.G. and Hilditch, T.P. (1935) *Biochem. J.* 29, 1552-1563.
5. Fonseca, S. *et al.* (2009) *Nature Chem. Biol.* 5, 344-350.
6. Mosblech, A. *et al.* (2009) *Plant Physiol. Biochem.* 47, 511-517.