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FUNCTIONAL ANALYSIS OF THE MEMBRANE BOUND *O*-ACYLTRANSFERASE HOMOLOGS FROM ARACHIDONIC ACID-PRODUCING FUNGUS, *MORTIERELLA ALPINA*

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A filamentous fungus, *Mortierella alpina* produces a large quantity of polyunsaturated fatty acids, such as arachidnic acid(C(20:4,n-6)).

The fatty acid desaturases and the elongases involved in the biosynthesis pathway of the arachidnic acid in *M. alpina* utilize different acyl carriers as the substrates, phospholipids or acyl-CoAs. Acyltransferase can be involved in the transfer of acyl groups between phospholipids and acyl-CoAs yet to be cloned. To clone the acyltransferase genes, we searched membrane bound *O*-acyltransferase (MBOAT) homologs from the *M. alpina* genome database. Two MBOAT homologs, *MaLPLAT5* and *MaLPLAT6*, were found and were cloned from *M. alpina*.

MaLPLAT5 and *MaLPLAT6* were overexpressed in the arachidonic acid- producing yeast strains which were transformed with the delta-12 desaturase gene, the delta-6 desaturase gene, the *GLELO* elongase gene and the delta -5 desaturase gene from *M. alpina*. The ratio of the arachidnic acid to total fatty acid were incresed in both of the *MaLPLAT5* and the *MaLPLAT6* overexpressed yeast strains.

RNA interference of the *MaLPLAT6* gene in *M. alpina* was carried out. The *MaLPLAT6* gene silenced strain accumulated dihomo-γ-linolenic acid (DGLA, C(20:3,n-6)). The enzyme encoded by the *MaLPLAT6* gene appears to be involved in the biosynthesis from DGLA to arachidnic acid in *M. alpina*.

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