A Mucor Rouxii Mutant with High Accumulation of an Unusual Trans-Linoleic Acid (9c,12t-C18:2)

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Genetic and biochemical approaches reveal the existence of a $\gamma$-linolenic acid biosynthetic pathway in Mucor rouxii. By treatment with ultraviolet light, combined with low temperature cultivation and filtration enrichment, a mutant defective in polyunsaturated fatty acid synthesis was isolated. Genetic analysis and fatty acid supplementation indicate that the defect occurred in the $\Delta^{12}$-desaturation resulting in the absence of cis-linoleic acid and $\gamma$-linolenic acid and in the accumulation of monounsaturated fatty acids. In addition, an unusual fatty acid, trans-linoleic acid (9c,12t-C18:2), which has not been reported previously in this fungus, was found to increase in the mutant. The information gained from the mutant was used to develop the hypothetical pathway of fatty acid desaturation in M. rouxii.