Implememtation of arachidonic acid biosynthesis in higher plants

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A constant supply of very long-chain polyunsaturated fatty acids (PUFAs) such as arachidonic (ARA), eicosapentaenoic (EPA), and docosahexaenoic acid (DHA) as part of the human diet is considered beneficial. These omega-6- and omega-3-fatty acids are not present in reserve triacylglycerols of angiosperm plants and, therefore, enter the human diet mainly in the form of marine and freshwater fish. In view of the increasing world population and the problem of overfishing marine resources, transgenic oilseeds might constitute a sustainable source of PUFAs. To establish PUFA biosynthesis by genetic engineering of annual oilseed crops additional fatty acyl desaturases and elongases are required that have regiospecificities not present in agronomically important plants. The corresponding genes have already been identified in lower plants, yeasts, fungi, and animals. For the expression of multiple genes in transgenic oilseeds, the respective genes under control of seed-specific promotors have to be transformed into plants. The results of this strategy will be discussed, and it will be interesting to see how close we have reached our goal by the actual time of the meeting in Copenhagen.