Metabolism and functional effects of plant-derived omega-3 fatty acids in humans


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Δ6-desaturase (Fads2)

H₂C \[\text{COOH}\]
\(\rightarrow\)
α-Linolenic acid (ALA; 18:3n-3)

Δ6-desaturase (Fads2)

H₂C \[\text{COOH}\]
\(\rightarrow\)
Stearidonic acid (SDA; 18:4n-3)

Elongase (Elov5)

Δ5-desaturase (Fads1)

H₂C \[\text{COOH}\]
\(\rightarrow\)
Linolenic acid

\(\rightarrow\)
Eicosatetraenoic acid (ETA; 20:4n-3)

Elongase (Elov5)

Δ5-desaturase (Fads1)

H₂C \[\text{COOH}\]
\(\rightarrow\)
Linolenic acid

\(\rightarrow\)
Eicosapentaenoic acid (EPA; 20:5n-3)

Elongase (Elov5 or 5)

H₂C \[\text{COOH}\]
\(\rightarrow\)
Docosapentaenoic acid (DPA; 22:5n-3)

Elongase (Elov5 or 5)

H₂C \[\text{COOH}\]
\(\rightarrow\)
Docosahexaenoic acid (DHA; 22:6n-3)

Figure 1
Figure 2

α-Linolenic acid

Cell membranes

β-Oxidation

Storage

Desaturation and elongation

Fatty acid synthesis

Saturated and monounsaturated fatty acids

EPA

DPA

DHA

Acetyl-CoA

Krebs cycle

CO₂
Figure 3

A) 

% of total fatty acids

Weeks

B) 

% of total fatty acids

Weeks
Figure 4

A) Change in EPA (%)

B) Change in DPA (%)

C) Change in DHA (%)

ALA intake (g/d)
Figure 5

A) ALA SD A EPA

B) Change in EPA (%)

AL A  SDA  EPA