

Structure and the Metabolism of polyunsaturated fatty acids-PUFAs

Polyunsaturated Fatty Acids (PUFAs) consist of carbon, hydrogen atoms and oxygen atoms and are categorized as n-3 and n-6 fatty acids. PUFAs are classified based on the location of the first double carbon double bond to from the methyl (ω) end of the molecule. PUUFAs are n-3 fatty acids if the first double carbon double bond is between the third and fourth carbons from the ω carbon end, and PUFAs are n-6 fatty acids if the first double carbon bond is between the sixth and seventh carbons.

Essential fatty acids of LA and ALA are the parents of long-chain PUFAs polyunsaturated fatty acids. In the human body, LA and ALA can synthesize n-6 fatty acids, such as including gamma-linolenic acid (GLA), dihomo-gamma-linolenic acid (DGLA), and arachidonic acid (AA), and n-3 fatty acids, including such as eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) can be generated from LA and ALA in the body. Therefore, For this important purpose it is important to activate, desaturations enzymes, including such as delta-6-desaturase (D6D) and delta-5-desaturase (D5D), enzymes and elongations, such as Elongation 5 are needed to be activated. Desaturations enzymes, which increase the number of double bonds, are found in the entire of human body; however, the highest concentration of these enzymes have been found in the liver. The desaturations enzymes remove two hydrogen atoms from the fatty acids thereby creating and leads to a carbon-carbon double bond into the fatty acid chain, still. The elongation enzymes increase the number of carbon atoms need to be increased, elongation enzymes are responsible for this package (Figure 1). In the first step, the D6D enzyme converts LA (C18:2n-6) to GLA (C18:3n-6) in the n-6 pathway and converts ALA (C18:3n-3) to stearidonic acid (C18:4n-3) in the n-3 pathway. GLA

Commented [JKP1]: Title case is to be used for headers at levels 1 and 2.

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Commented [JKP2]: Please check this insertion for technical accuracy. The common terminology is "carbon-carbon double bond." Check whether you can use this term throughout the thesis.

Commented [JKP3]: If omega is inserted as a symbol after "methyl," then it means ω stands for CH_3 . Is this correct? If not, it would be better to write "the methyl (or the ω carbon) end."

Commented [JKP4]: Please ensure that the expanded forms of these two abbreviations have been given earlier in the chapter.

Commented [JKP5]: The expanded form of an abbreviation is given only the first time it is used in a chapter. Subsequently, the abbreviation is to be used.

Commented [JKP6]: This sentence has been given a different start to avoid capitalizing "n-6."

and stearidonic acid are converted to DGLA (C20:3n-6) and eicosatetraenoic acid (C20:4n-3) by ~~the elongations~~ enzymes. In the next step, ~~the~~ D5D enzyme converts DGLA and eicosatetraenoic acid into AA (C20:4n-6) and EPA (C20:5n-3), ~~respectively~~ (Figure 1). ~~and~~ This process ~~can~~ be ended ~~up~~ by producing longer-chain PUFAs, ~~such as~~ including docosahexaenoic acid (C22:6n-3) and docosapentaenoic acid (C22:5n-6). ~~H~~ However, it seems some fatty acids, such as docosahexaenoic acid, cannot be produced in ~~a~~ high amounts ~~because~~ AA and EPA are necessary for the formation of eicosanoids and other productions. Therefore, ~~the~~ dietary intake of DHA ~~has~~ been advised because of ~~the~~ low ~~conversion~~ of ALA to DHA. In addition, AA and DHA ~~can~~ ~~are~~ be considered ~~as~~ essential fatty acids ~~for~~ during infant~~sey~~ ~~because~~ ~~as~~ the body of babies may not produce sufficient amounts of desaturations enzymes. D6D and ~~D6D~~ are ~~the~~ rate-limiting ~~of~~ for the ~~conversion~~ of LA and ALA into longer-chain PUFAs; however, it is believed ~~that~~ D6D is ~~the~~ rate-limiting ~~of~~ for the whole PUFA pathway. The conversion of ALA to long-chain fatty acids may be more efficient in women ~~as~~ compared to men; ~~perhaps~~ ~~because~~ ~~as~~ a result of ~~the~~ presence of high ~~estrogen~~ levels ~~estrogen~~ in women [178].

AA and EPA are the main substrates for ~~the~~ synthesis of eicosanoids, such as prostaglandins (PGs), leukotrienes (LTs), and thromboxanes [180], by the actions of lipoxygenase (LOX) and cyclooxygenase (COX) [129] (Figures 1 and 2). ~~e~~ Eicosanoids have been shown to be involved in the regulation of ~~inflammation~~ ~~the~~ levels of ~~inflammation~~.

Commented [JKP7]: In academic writing, we avoid using "as" to mean "because."

Commented [JKP8]: Word Choice:
"Conversation" refers to the activity of talking to someone.
"Conversion" refers to a change, as in units of currency or a compound from one form to another.

Commented [JKP9]: Do you mean D5D here? Please check.