

Stearic Acid & Nutritional Supplements

Stearic acid, a saturated fat (18:0), has been reported to suppress the action of T-cells. An *in vitro* (Latin; in glass) study conducted by Tebbey and Buttke demonstrated that T cells lack the enzyme stearoyl-CoA desaturase which precludes them from desaturating 18:0 (stearic acid). Feeding T-cells large amounts of 18:0 may lead to impaired membrane integrity. Such a large feeding of 18:0 to T-cells leads to a loss of membrane potential and loss of cell function and viability.

This study (Immunology, 1990, 70, 379-384 authors Tebbey and Buttke) has been used by various marketers of dietary supplements to make the claim that stearic acid is toxic and supplements that contain stearic acid are also toxic. Marketers of dietary supplements know that most persons are not trained in toxicology. Toxicology is a field of science that explores the relationship of effects caused by various doses of ingredients to cell and organ function. The *in vitro* method of testing allows the incorporation of very large doses of substances that may not represent the *in vivo* (Latin; in live) condition. For example every dietary mineral can be shown to be toxic by *in vitro* analysis. A scientist can increase potassium to 1000 times its normal amount in cell function by *in vitro* testing and report the toxic effects of potassium.

A marketer that elected to use such an *in vitro* potassium report could claim that “this dietary supplement contains potassium which has been shown to be toxic”. The general observer knows that too much of a mineral will normally cause an imbalance in any living system and that observer is generally not influenced by such a marketer.

In vitro studies have shown that stearic acid can activate neutrophil function (Eur J Clin Invest. 2002 Apr ; 32 (4) :285-9 author Wanten). Because neutrophils circulate in the blood and very quickly migrate into tissues in response to a local invasion by microorganism, does this mean the addition of stearic acid to a dietary supplement will increase immune function? Nutritionists may explore the relationship between dietary intake of stearic and immune function to determine if such an effect is observable.

One such study would examine the population of persons that are more resistant to infection and their dietary fat intakes. This is an epidemiological study that looks for a possible finding from early *in vitro* studies. Should a finding be found to exist the next possible study would be to give individuals or animals measured amounts of stearic acid and measure *in vivo* immune function markers. Such a study was done by Galdiero (Life Sci 1994 ; 55 (7) : 499-509 “ Beneficial effects of myristic, stearic or oleic acid as part of liposomes on experimental infection and antitumor effect in a murine model”. Galdeiro was able to demonstrate protection animals given liposomes containing stearic acid if the animals were given stearic acid three days before experimentally induced infection.

Cardiovascular studies have shown that (1) stearic acid improves thrombogenic and atherogenic risk factors in healthy males [Eur J Clin Nutr 2001 Feb; 55 (2) :88-96 , (2) dietary increases of stearic acid does not alter plasma lipids, platelet aggregation or platelet activation status [Eur J Clin Nutr 2002 Jun; 56 (6) : 490-9] and that (3) dietary stearic acid dose not affect in vivo thrombozane A2 or prostacyclin biosynthesis [Am J Clin Nutr 1994 (suppl) 1054S-8S).

The amount of stearic acid or magnesium stearate in a tablet is generally no more than 0.5%. This means that a single 1000 mg tablet would supply 5 mg of stearic acid. In comparison one soft gel of flax seed oil supplies 14 mg of stearic acid. Stearic acid occurs naturally in many plant oils. Most manufactures select a vegetable source grade, generally palm oil, of stearic acid.

Finally, a study showing stearic Acid and saturated fats have the ability to help disrupt the signaling process that potential germs use to form biofilms. This is contrary to the claims made by some clinicians. The title of the Study is: Identification of ground beef-derived fatty acid inhibitors of autoinducer-2-based cell signaling. The study abstract is as follows: Autoinducer-2 (AI-2) molecules are used by several microorganisms to modulate various processes, including bioluminescence, biofilm formation, and virulence expression. Certain food matrices, including ground beef extracts, possess compounds capable of inhibiting AI-2 activity. In the present study, we identified and characterized these AI-2 inhibitors from ground beef extract using hexane solvent extraction and gas chromatography. *Gas chromatographic analysis revealed the presence of several fatty acids such as palmitic acid (C16:0), stearic acid (C18:0), oleic acid (C18:omega9), and linoleic acid (C18:omega6) that were capable of inhibiting AI-2 activity.* These fatty acids were tested (using *Vibrio harveyi* BB170 and MM32 reporter strains) at different concentrations (1, 5, and 10 mM) to identify differences in the level of AI-2 activity inhibition. AI-2 inhibition ranged from 25 to 90%. A mixture of these fatty acids (prepared at concentrations equivalent to those present in the ground beef extract) produced 52 to 65% inhibition of AI-2 activity. *The fatty acid mixture also negatively influenced Escherichia coli K-12 biofilm formation.* These results demonstrate that both medium- and long-chain fatty acids in ground beef have the ability to interfere with AI-2-based cell signaling. Source: Soni KA, Jesudhasan P, Cepeda M, Widmer K, Jayaprakasha GK, Patil BS, Hume ME, Pillai SD. •Identification of ground beef-derived fatty acid inhibitors of autoinducer-2-based cell signaling. •J Food Prot. •2008 January •71(1):134-8. Food Safety & Environmental Microbiology Program, Department of Poultry Science, Texas A&M University, College Station, Texas 77843, USA.

Again, if a marketer uses in vitro science to influence your understanding of what products are beneficial or potential toxic to your patients then you should understand that the marketer does not have a good understanding of nutritional sciences. There is a vast wealth of in vivo studies in the fields of nutrition, toxicology and medicine to draw from for a marketer is present information to you.