

# Emulsions vs. Liposomes

**"With all of the talk about nanotechnology and liposomes, what is a clinician to do?"**

The idea of new delivery systems for nutrients is exciting. We always want the fastest, most economical results for our patients. And one of the areas that are very intriguing to me is the field of liposomal nutrients. The claims are liposomal nutrients increase absorption as they get into the blood stream and ultimately into the cell easier and can therefore change physiology faster. Those are some amazing benefits but what are the potential risks?

Liposomes reduce oil to water soluble micelles by using a phospholipid blend of an oily compound and a synthetic detergent such as carboxymethylcellulose (CMC) or polysorbate 80, (referred to as tweens).

A liposomal delivery of oil such as fish oil or vitamin E delivers particles, sometimes referred to as nanoparticles that are much smaller than normal "natural" oil and water particles as found in foods. You're starting to see the



term nanoparticles in more foods and supplements.

Manufacturers usually avoid labeling the "active agent that is used in the liposome." Why? Because there are strong correlations with these compounds promoting leaky gut. For example, the article to the right shows the relationship of relatively low concentrations of two commonly used food emulsifiers, namely carboxymethylcellulose and polysorbate-80, and how they induced low-grade inflammation and obesity/metabolic syndrome in wild type mice and promoted robust colitis in mice pre-

disposed to this disorder. Authors suggest "the emulsifiers altered gut microbiota which set the stage for leaky gut and might be contributing to increased societal incidence of obesity/metabolic syndrome and other chronic inflammatory diseases."

Another article to the right discusses nanoparticles from titanium dioxide and their negative influence on pro-inflammatory signaling and reduced nutrient absorption by negatively affecting intestinal barrier function. Another issue that is not really talked about is "maybe some of these nutrients are not sup-

posed to get into the cell in the manner and concentration they do long term?"

Nanoparticles below 0.5 microns are so small they don't reflect light and are colorless. To give you some perspective, 0.5 microns which is also the same as 500 nanometers (nm) is one tenth the size of a red blood cell. The visible spectrum is from 400 to 700nm. This is significant because oil particles from 500 nm and above will reflect light. Particles below 400 nm will not reflect visible light. Visible light will pass through those solutions and they appear clear. And the sales pitch is "because they are so small they have the ability to enter cells faster and in a more concentrated way." Maybe they do, but maybe that's not so good.

Compare it to glucose, a known beneficial cellular fuel. An appropriate amount of glucose is essential for life. In the presence of too much glucose, insulin receptor sites are downregulated to slow glucose from entering the cell too rapidly. But what if glucose was made so small that it didn't need receptor sites and it could flood the cell. To quote an old corny margarine commercial, "It's not nice to fool Mother Nature."

In contrast, oils found in nature in seeds and nuts are found as micro-emulsion particles about 0.5 microns in diameter. This is similar to milk lipid droplets in mother's milk.

Years ago, Biotics Research decided to look for agents that will allow oils to be micro-emulsified in a way that does not cause membrane damage and decided to use food based plant gums as their emulsifying agents. Knowing many people have compromised liver function, from its inception Biotics Research has taken the extra step to micro emulsify oily nutrients such as vitamin A, E, D, K and CoQ 10 and also oils such as oregano. The size of Biotics' micro-emulsions is in the 0.5 microns range similar to how they are found in nature. The

result is documented lymphatic uptake of oily nutrients.

Over the years, many companies have attempted to make emulsions but particle sizes vary and separation occurs over time. Biotics is one of the few companies that has consistent particle sizes and will hold their micro-emulsion sizes in water for days. I have included a link that goes into more detail on emulsification and Biotics unique properties.

With all the talk about nanotechnology and liposomes, what is a clinician to do? For now, buyers beware! First of all there is no reason to use liposomes for smaller molecules like vitamin D, K, A, or for compounds that are well absorbed via the lymph system like CoQ. There may be a place for them with larger molecules like glutathione but ask for safety studies. Find out what detergents are used to make the liposome. If it's a toxic chemical, is it removed? Not all liposomes are the same. The reality is, "we don't know the long term benefit of liposomes but we do know the safety of emulsions." And emulsions are more cost effective; liposomes are at least 4 times more expensive.

Regular viewers know that we have been pounding on a plant based diet and whole foods for over 15 years. Based on the studies to the right, emulsifiers in foods definitely affect the microbiota and ultimately leaky gut and inflammation.

Let's have ongoing conversations with our patients about eating real food. Because it all comes back to a simple principle "eat foods that will rot or spoil but eat them before they do." The more food is processed, the more emulsifiers it contains.

Thanks for reading this week's Tuesday Minute. I look forward to being with you again next Tuesday.