

## Sterols and Stanols (Part 1)

I have wanted to write on this topic for several months, and I am very excited to finally do so. I will do this in two parts. My goal is to educate about these substances but also make people aware that in some situations sterols other than cholesterol can cause atherosclerosis. I know that most of the public has no idea about phytosterols but has seen the term on some brands of baby aspirin. I am also perplexed that the majority of physicians that I have encountered also do not know the difference between a sterol and a stanol.

I want to start with some definitions. Cholesterol is a sterol. A sterol is a steroid with an alcohol group attached to it. Stanols are saturated or reduced sterols that are similar to cholesterol but have a methyl or an ethyl group attached to it. This difference minimizes stanol absorption in the intestines. Cholestanol is a stanol. Cholesterol can be broken down by the liver into cholestanol and thus is a by-product of cholesterol metabolism. If sterols or stanols are esterified (combined with fatty acids), then they can be incorporated into margarine. We consume many sterols from plant sources (sitosterol, campesterol, and stigmasterol), shellfish (desmosterol and fucosterol) and animal sources (cholesterol). All of these sterols with the exception of cholesterol are collectively referred to as noncholesterol sterols. Collectively, these sterols can be called phytosterols. Sitosterol represents about 80% of all noncholesterol sterols in the diet and is the most well known noncholesterol sterol in the diet.

When fats (triglycerides) enter the intestine in our food, they are broken down into their basic building blocks. The main breakdown products are called fatty acids. These fatty acids and sterols from dietary sources are packaged into what is called a micelle. These micelles “ferry” these fatty acids and sterols to the intestinal lining (epithelium) and then they are absorbed by passive diffusion into the intestinal cells. Passive diffusion is a biological principle that substances flow through a semi-permeable from an area of higher concentration to an area of lesser concentration. There is no pump required to get them out of the intestine and ultimately into the bloodstream. Most humans absorb about 50% of sterols in the intestines but some people are what is termed “hyperabsorbers” (60-80%) and hypoabsorbers.