

# COLLEGE OF MICRONESIA-FSM YAP CAMPUS AGRICULTURAL EXPERIMENT STATION

## NONI AND CARDIOVASCULAR DISEASES - PART 3

### Role of Plant Sterols

Hypercholesterolemia is a condition characterized by very high levels of cholesterol in the blood (see page 2). People with high blood cholesterol levels are typically advised by health professionals to consume a diet high in fiber and low in saturated fat and cholesterol. When medically safe, exercise is often encouraged as an adjunct to weight reduction and for its other cardiovascular benefits. Although these measures can reduce blood cholesterol, sometimes they do not go far enough. Other interventions may be needed, including cholesterol-lowering medicines. Adding daily natural plant sterols to a diet low in saturated fat and cholesterol is a natural option for maintaining car-

diovascular health. Plant sterols are emerging as one of the best all natural ways to combat high cholesterol.

Plant sterols are a class of phytochemical compounds found in the cells and membranes of plants. These plant lipid-like compounds are present at low levels in grains, fruits and vegetables. Although many types of plant sterols discovered so far, three of them are the most abundant: beta-sitosterol, campesterol and stigmasterol.

Studies show that these plant sterols compete with cholesterol, decreasing its absorption. Unfortunately, it is very difficult to obtain enough of the plant sterols regularly from the diet to effectively lower cholesterol. Scores of studies involving thousands

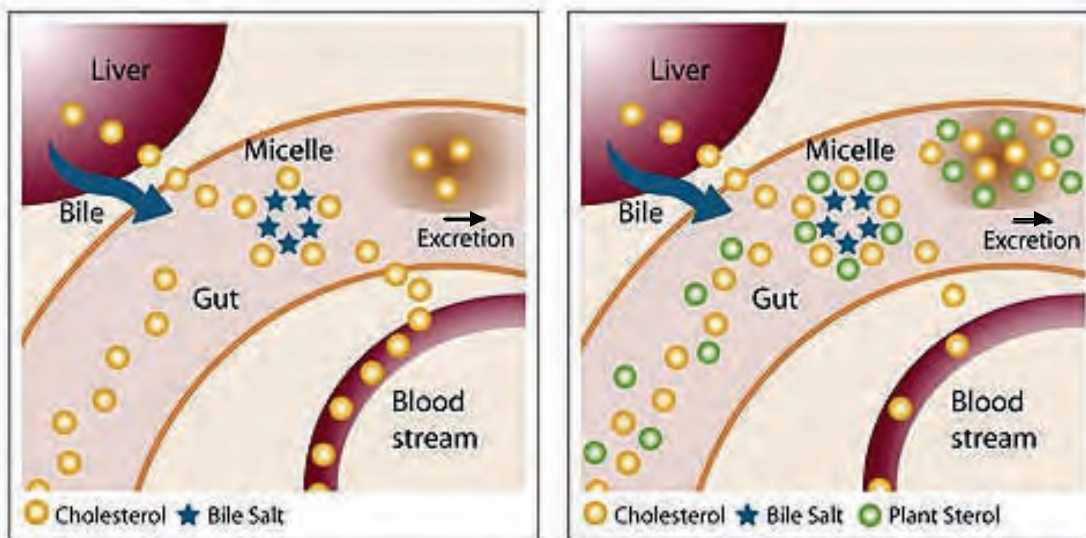
of people show that adding a plant sterol supplement with meals, safely and effectively helps lower total cholesterol. It also rapidly lowers very dangerous unstable LDL-cholesterol, often within just 2 to 4 weeks.

### Cholesterol Lowering Mechanism

The intestine absorbs cholesterol from dietary and biliary (liver) sources. Plant sterols act by reducing the absorption of dietary and biliary cholesterol from the gastrointestinal tract. When food is consumed, the fats from the meal are collected into small balls called micelles. During digestion, cholesterol from both sources competes with plant sterols for incorporation into the mixed micelles formed in the gut. Cholesterol predominates because of its higher concentration and is absorbed into the lining of the gut from the micelles. Any cholesterol that cannot be incorporated into the micelles is not absorbed and passes out of the gut.

When appreciable amounts of plant sterols are consumed, they compete with cholesterol and displace it from the micelles. As a result less cholesterol is absorbed and more is excreted through the bowel (Figure 1). The fall in cholesterol absorption is between 25 and 50 percent. The liver responds to the decreased supply of cholesterol from the gut by increasing uptake of cholesterol from the bloodstream and increasing cholesterol synthesis. The overall result is a fall in serum total and LDL-cholesterol but no change in triglycerides or HDL-cholesterol.

Figure 1: Human Cholesterol Digestion



### Digestion without Plant Sterols

The liver produces cholesterol which is transported, through bile, into the duct. Here it is added to the cholesterol ingested from the diet before crossing the gut wall to enter the bloodstream where it can lead to the formation of fatty plaques in the arteries.

### Digestion with Plant Sterols

By promoting the removal of cholesterol from the body, plant sterols decrease the amount of cholesterol absorbed from the gut into the bloodstream. In conjunction with a healthy diet, this helps to lower the levels of total and LDL ("bad") cholesterol.

Photo Courtesy: Wolfgang Albiez, Cognis GmbH, Germany

## Human Cholesterol Levels

Since the type and amount of cholesterol



300 mg/dL



**High risk  
Standard  
cholesterol  
treatment**

240 mg/dL



**Borderline  
Lifestyle and dietary  
measures  
Regular check up  
required**

200 mg/dL



**Safe  
cholesterol  
level**

160 mg/dL

in the body can have important health effects on the cardiovascular system, it

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Plant sterols do not get absorbed into the bloodstream. About 3-5 percent of ingested plant sterols are absorbed from the gastrointestinal tract. The remaining 95-97 percent of plant sterols passes through the gut and is excreted. Campesterol is slightly better absorbed than beta-sitosterol, the predominant plant sterol. Absorbed plant sterols do not accumulate in the body - they are rapidly excreted through the bile.

### Other Health Benefits

Regular intake of plant sterols has shown to be beneficial to patients with autoimmune diseases. Plant sterols have been proven to reduce inflammation and suppress over-reactive immune systems in rheumatoid arthritis patients. Moreover, concentrated extracts of plant sterols have been used in Benign Prostate Hypertrophy (BPH) patients to enlarge the prostate allowing increased urinary flow rate and decreased pain and burning. In addition, plant sterols are known to have strong immune enhancing properties. Evidence exists to suggest that they activate pancreatic beta cells for improved insulin production and thereby helps diabetic patients. Plant sterols are also known to improve levels of C- reactive protein, an inflammatory factor in the blood that increases the risk of stroke and heart attack.

For the millions of people all over the world looking to lead a healthy lifestyle, plant sterols offer a natural, safe and effective way to reduce cholesterol levels. Use heart-healthy supplements like noni since it contains the three most important plant sterols. Noni is also rich in vitamins, minerals and amino acids required to keep your heart healthy.

**Disclaimer:** The information provided in this information sheet is meant for educational purpose only. For any medical conditions, always consult a qualified medical practitioner.

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is a good idea to understand how it affects your health and how to manage your blood cholesterol levels. Such understanding helps you take better care of your heart and live a healthier life, reducing your personal risk for heart attack and stroke in the process.

Normal cholesterol levels usually fall into one of the three categories: desirable, borderline high risk, and high risk. A desirable safe cholesterol level is when the total blood ratio is less than 200 mg/dL. Borderline high risk falls between 200-239 mg/dL, and high risk equals 240 mg/dL and over. If the total blood ratio is less than 200mg/dL, the heart attack risk is typically low considering the individual does not exhibit any other common risk factors. Even individuals with a low risk factor are still advised to maintain a healthy diet low in saturated

fats and get enough physical activity on a daily basis. The risk of high cholesterol increases with age. Physicians suggest getting levels checked at least every three years or more often if you are a man over 45 or a woman over 55. People with levels from 200 to 239 mg/dL are considered borderline high risk. These people should be re-checked every one to two years if the levels are in the borderline range, if the HDL is less than 40mg/dL, and if there are no other risk factors present for heart disease. High risk category individuals need drug treatment. Physician can help decide which type of drug is best for an individual. However, any drug treatment need to be complemented with lifestyle changes. This will help the dose of medicine as low as possible, and lower the risk in other ways as well.

## Food Fortification

*The importance of fruits and vegetables to a healthy diet is well known, but studies have shown that very few people eat the amount of fruits and vegetables recommended for a healthy diet or have the opportunity for a nutrient balanced diet. Fortified foods or dietary supplements can be helpful in those situations for nutrients required for general well being.*

*Food fortification is the addition of one or more essential nutrients to food, whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency with one or more nutrients in the population or specific population groups.*

*Food fortification has become conventional in a number of markets around the world. The ingredients being added to enhance the nutritional value of food and beverage products are numerous. Omega-3 PUFAs (polyunsaturated fatty acids), probiotics and prebiotics, Vitamin A, Soy protein, iron, Creatine supplements to name just a few examples. One plant extract that is being given a lot more attention lately and has been shown to have a significant impact on human health are plant sterols because of its role in cholesterol reduction.*

*Noni fruit juice, fruit powder and leaf tea contains all the three important plant sterols namely beta-sitosterol, campesterol and stigmasterol. It also contains more than 200 nutraceuticals useful for various physiological functions in the human body. Noni is equally good for children and adults of all age groups. Why spend a fortune on vitamins and mineral supplements when you can get everything you need in noni. Use noni regularly and keep your body healthy.*

**Noni is a  
New Age  
Fruit**

**- Noni Guru**

