



NATURAL MEDICINE JOURNAL
RESEARCH GUIDE

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EVALUATING THE RESEARCH
AND CLINICAL APPLICATIONS OF
**PANAX
NOTOGINSENG
EXTRACT**

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Introduction

Panax ginseng, often referred to as the “King of ginsengs,” is considered to be the most important medicinal herb by Asian cultures, and according to archeological evidence has been used therapeutically for more than 60,000 years.¹ Panax notoginseng, a species within the genus of Panax ginseng, has been widely studied for its cardiovascular and metabolic effects. In 1963 Panax notoginseng was officially added to the Chinese Pharmacopoeia.

In Traditional Chinese Medicine, Panax notoginseng extract influences the heart, liver, and pericardium channels to nourish the blood, benefit Qi, and activate blood circulation throughout the body.² According to the *Compendium of Materia Medica*, because Panax notoginseng belongs to the blood phase of the Yangming and Jueyin meridians “it can treat all diseases of the blood.”³

Several factors make Panax notoginseng an important medicinal extract in clinical practice including its saponin profile, multiple mechanisms of action, and robust research data.

Unique attributes of Panax notoginseng

Panax notoginseng extract contains a variety of important nutrients including amino acids, β -sitosterol, fatty acids, polysaccharides, and saponins, with the various saponins playing a key role in the extract’s multiple biological activities.⁴ The notoginseng that contains the highest saponin content is grown in a narrow region of the Yunnan province in China. Because of the plant’s sensitivity to sunlight, there is strict soil rotation, growing, and cultivation requirements to ensure the optimal nutrient content of the notoginseng. The notoginseng plantations in this region are also organic and ISO-certified.



Panax notoginseng plant

Ginseng Plus® Panax NotoGinseng Extract is a patented form of notoginseng derived from the raw extract roots cultivated in the Yunnan region standardized to contain not less than 75% total ginsenosides including the following saponins:

- Notoginsenoside R1
- Ginsenoside Rg1
- Ginsenoside Re
- Ginsenoside Rb1
- Ginsenoside Rd

While some of these ginsenosides are found in other ginseng extracts, notoginsenoside R1 is unique to Panax notoginseng and accounts for many of the positive cardiovascular and metabolic effects.⁵

Only Ginseng Plus® Panax NotoGinseng Extract has Generally Recognized as Safe (GRAS) status in the United States due to its unique manufacturing process and total saponins profile. This extract is featured in the American Botanical Council’s HerbMedPro database which makes specific scientific and research information available to healthcare professionals.

Clinical applications

Based on the scientific research, today’s cardiovascular and metabolic clinical applications of Panax notoginseng include:

- Blood pressure management
- Blood sugar control
- Cardiovascular disease prevention and treatment
- Cholesterol control

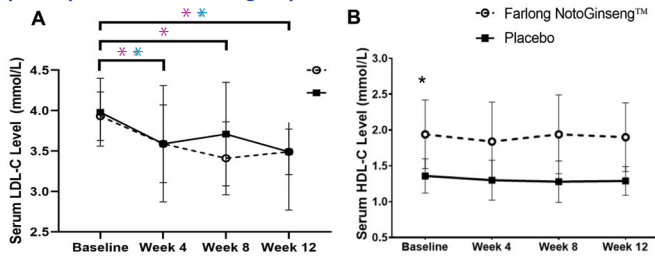
Research highlights for these conditions are featured in the next section of this guide.

Panax notoginseng extract accomplishes its many clinical benefits via multiple mechanisms of action including:⁶⁻⁸

- Antioxidant
- Anti-inflammatory
- Calcium homeostasis
- Decreased lipid peroxidation
- Mitochondrial function enhancement
- Vasodilatory effects
- Adaptogenic anti-stress

Following is a closer look at how this extract can positively influence heart health.

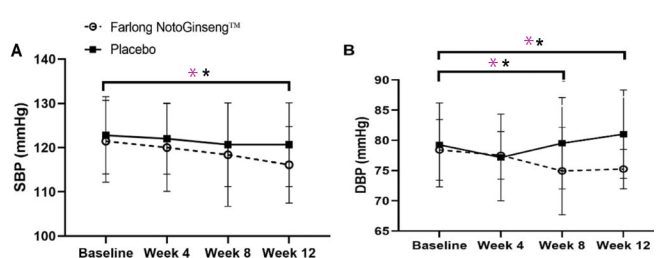
Figure 1. (A) Serum LDL-C levels for participants from the subgroup of baseline LDL >3.5 mmol/L. (B). Serum HDL-C levels for participants from the subgroup of baseline LDL >3.5 mmol



Note. Within-Group Difference ($p < 0.05$) = * - FNG, * - Placebo; Between Group Difference ($p < 0.05$) = *

Source: Evans M, Lewis ED, Crowley DC, Zeng A, Struve J, Guthrie N. Exploring the concept of proof of efficacy vs. probable harm in the absence of an intervention: a randomized, placebo-controlled, triple blind study in a pre-disease population. American Heart Association's Scientific Sessions. 2021, Nov 8.

Figure 2. (A) Systolic blood pressure (SBP) and (B) diastolic blood pressure (DBP) for participants from the subgroup of baseline LDL >3.5 mmol/L



Note. Within-Group Difference ($p < 0.05$) = * - FNG, * - Placebo; Between Group Difference ($p < 0.05$) = *

Cardiovascular research highlights

According to a 2017 review, specific to coronary artery disease, *Panax notoginseng* saponins have been shown in the scientific literature to have the following main functions:⁹

- Anti-apoptosis
- Anti-atherosclerosis
- Anti-inflammation
- Pro-angiogenesis
- Protection against myocardial ischemia
- Regulation of coagulation system
- Regulation of lipid metabolism

In that same review, the researchers concluded that *Panax notoginseng* “offers a new opportunity for the prevention and treatment of CAD (coronary artery disease).” They also report that several studies show that *Panax notoginseng* can reduce the frequency and duration of angina attacks, improve ECG results, and normalize lipid levels.

A 2020 randomized, placebo-controlled, triple-blind study used the Farlong Ginseng Plus® *Panax NotoGinseng* Extract to evaluate cholesterol and blood pressure



Panax notoginseng root

control in 95 healthy individuals.¹⁰ Here are the results of that study (see figure 1 and figure 2 on this page):

- There was a significant decrease in serum LDL cholesterol and an increase in serum HDL cholesterol in the Ginseng Plus® *Panax NotoGinseng* Extract group compared to placebo.
- There were decreases in both systolic and diastolic blood pressures in the Ginseng Plus® *Panax NotoGinseng* Extract group compared to placebo.
- The placebo group had increases in systolic and diastolic blood pressure and a decrease in serum HDL cholesterol.

When compared to cholesterol-lowering medications, *Panax notoginseng* can lower total cholesterol, LDL cholesterol, and triglycerides without causing the commonly seen side effects of pharmaceuticals such as gastrointestinal disturbances and liver damage.¹¹

A small study involving 30 patients with high blood pressure demonstrated that *Panax notoginseng* improved myocardial function by enhancing calcium pump activity, inhibiting calcium overload, and lightening left ventricular muscle mass.¹²

A 2018 meta-analysis and systematic review showed that *Panax notoginseng* reduced the frequency and duration of angina symptoms, and dosage requirements for nitroglycerin while optimizing lipid levels and ECG performance in patients with unstable angina pectoris.¹³ This is consistent with the findings of a 2013 systematic review that evaluated 17 randomized clinical trials and found that *Panax notoginseng* relieved angina pectoris related symptoms.¹⁴

A 2013 clinical trial involving 600 patients with coronary artery disease showed that the patients who took the *Panax notoginseng* had reduced the risk of heart attack and cardiac death.¹⁵

Ginseng Plus® Panax NotoGinseng Extract (Notoginseng Total Saponins ≥75%, HPLC)

Common Name

Notoginseng/Sanqi/Tienchi/Tianqi Extract, Panax Notoginseng Saponins, PNS

Description

Total saponins extracted from Panax Notoginseng root.

Characters

White to light yellow amorphous powder; bitter and slightly sweet.

Solubility

Soluble in methanol, ethanol and water. Insoluble in acetone, ether and benzene.

Identification

The retention time of main peaks of test solution shall be consistent with reference solution's.

Test Item	Specification	Method
Assay		
Notoginsenoside R1 (C47H80O18)	≥8.0%	(HPLC, ChP 2015 Volume I)
Ginsenoside Rg1 (C42H72O14)	≥29.0%	(HPLC, ChP 2015 Volume I)
Ginsenoside Re (C48H82O18)	≥3%	(HPLC, ChP 2015 Volume I)
Ginsenoside Rb1 (C54H92O23)	≥30.0%	(HPLC, ChP 2015 Volume I)
Ginsenoside Rd (C48H82O19)	≥5.0%	(HPLC, ChP 2015 Volume I)
Total	≥75%	

Test

Loss on drying	≤5.0%	(ChP 2015, sec. 0831)
Residue on Ignition	≤0.5%	(ChP 2015, sec. 0841)

Microbial Limits

Total aerobic bacteria count	≤1000cfu/g	(ChP 2015, sec. 1107)
Total Number of Molds and Yeast	≤100cfu/g	(ChP 2015, sec. 1107)
Escherichia Coli	Negative/1g	(ChP 2015, sec. 1106)
Salmonella	Negative/10g	(ChP 2015, sec. 1106)

Heavy Metals Limits

Lead	≤5mg/kg	(ChP 2015, sec. 2321)
Cadmium	≤0.3mg/kg	(ChP 2015, sec. 2321)
Arsenic	≤2mg/kg	(ChP 2015, sec. 2321)
Mercury	≤0.2mg/kg	(ChP 2015, sec. 2321)

Pesticide Residues Limits

BHC	≤0.01 mg/kg	(ChP 2015, sec. 2341)
DDT	≤0.01 mg/kg	(ChP 2015, sec. 2341)
PCNB	Negative	(ChP 2015, sec. 2341)

Metabolic research highlights

According to the American Heart Association, diabetes and heart failure are linked and their treatment should be too. Patients with type 2 diabetes, for example, are 2 to 4 times more likely to develop heart disease, and conversely, a patient with heart disease is at a much higher risk of developing type 2 diabetes.¹⁶ Therapeutic interventions that may aid in the prevention and treatment of both conditions are ideal. Panax notoginseng, which has significant clinical relevance for not only heart disease but also diabetes, presents an excellent option.

In 2010 and 2014 *in vivo* research demonstrated that Panax notoginseng has anti-hyperglycemic and anti-obesity activities with both papers attributing this effect to the Rb1 saponin.^{17,18}

A 2014 double-blind, placebo crossover study showed that Rb1 lowered glucose and insulin levels in male gym-nasts.¹⁹ According to a 2019 review, Rb1 has significant anti-diabetic effects via multiple pathways including the regulation of glycolipid metabolism and improving insulin and leptin sensitivities.²⁰

In vivo research also indicates that notoginsenoside R1 can help protect against key diabetic complications including cardiomyopathy, erectile dysfunction, kidney disease, and retinopathy.²¹⁻²⁴

Beyond cardiology

With the various mechanisms underlying Panax notoginseng's therapeutic effects, it's not surprising that preliminary research has also identified other key areas for possible clinical application beyond cardiology including:

- Anti-aging²⁵
- Antidepressant and anxiolytic²⁶
- Antiviral²⁷
- Autoimmunity²⁸
- Cancer^{29,30}
- Energy, endurance, and stamina³¹
- Nervous system disorders such as Alzheimer's, Parkinson's, and stroke³²

More human clinical trials are needed in these areas to confirm efficacy.

Choosing a Panax notoginseng product

As with most medicinal herbs, in the case of Panax notoginseng, maintaining high-quality standards from seed to supplement equals enhanced efficacy and improved

clinical outcomes. Obtaining detailed manufacturing certifications, third-party verifications, and other pertinent information is critical when choosing a high-quality Panax notoginseng extract. It's also helpful to use the brand that was featured in some of the significant research.

Ginseng Plus® Panax NotoGinseng Extract is manufactured by Farlong Pharmaceutical which uses plants from the high-elevation Yunnan region in China grown under shade cloth-controlled conditions. The plants are grown, cultivated, and manufactured following pharmaceutical GAP, cGMP, and US FDA standards.

The harvested roots are washed using both pressure and ultrasound technology to ensure the removal of all unwanted residues and non-plant material. Each crop undergoes frequent inspection and testing to ensure every batch meets the standardized total saponin content of $\geq 75\%$ as indicated by high-performance liquid chromatography (HPLC). Approximately 95% of the world's supply of notoginseng is provided by Farlong Pharmaceutical. For detailed specifications about Ginseng Plus® Panax NotoGinseng Extract from Farlong Pharmaceutical, see the sidebar on page 4.

Practical clinical information

The typical dosage of Panax notoginseng is 200 mg per day. Patients who may benefit from taking a Panax notoginseng extract in the form of a dietary supplement include those with:

- Blood sugar control issues or prediabetes
- High blood pressure
- High cholesterol
- A family history of heart disease, stroke, or diabetes
- Fatigue or lack of stamina

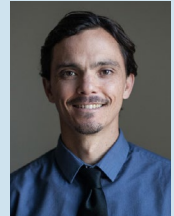
Regarding safety, Panax notoginseng is considered safe, which is why Ginseng Plus® Panax NotoGinseng Extract was awarded GRAS status. According to a 2017 overview, Panax notoginseng demonstrated few adverse events in the evaluated clinical studies and the adverse reactions reported were mild.³³ In addition, the studies evaluated in that paper showed no abnormalities in kidney or liver function.

The available scientific literature confirms that Panax notoginseng extract is safe and an effective complementary intervention for a broad range of cardiovascular and metabolic applications. Research into the use of

Panax notoginseng in cardiovascular and metabolic health is strong and growing, while further investigation and expansion of its use in a broad array of additional therapeutic categories are expected. The ideal clinical tool is one whose effects are wide-ranging and capable of addressing multiple underlying mechanisms of disease, and whose “side effects” are positive rather than negative. Panax notoginseng appears to fit this description perfectly.

About the Authors

Daniel Chong, ND, is a licensed naturopathic physician who has been practicing in Portland, OR, since 2000, where he originally earned his naturopathic degree from National University of Natural Medicine. Dr. Chong's focus is on risk assessment, prevention, and drug-free treatment strategies for cardiovascular disease and diabetes. In addition to his degree in naturopathic medicine, Dr. Chong has completed certificate training in cardiometabolic medicine at The Academy of Anti-Aging Medicine, a BaleDoneen Method Preceptorship, and served for 4 years as a clinical consultant for Boston Heart Diagnostics. He currently maintains a telehealth-based practice. You can learn more about him at cardiowellnessconsults.com.



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Editor's Note

This Research Guide was made available thanks to a grant from Farlong Pharmaceutical. Farlong is a science-based and vertically integrated functional ingredient provider who has more than 23 years of experience focused on discovering, developing, and providing safe, effective, and unique medicinal herbs, plant extracts, and formulas. For more information, visit Farlong.com.

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