



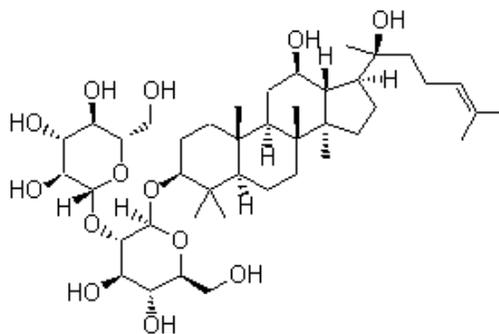
Integrative Health Resources

Rg3 (from *Panax ginseng*) **Snapshot Monograph**

Rg3 (from *Panax ginseng*, C.A.Meyer)

Most Frequent Reported Uses:

- Adaptogen (enhances mental and physical performance, improves learning ability, and decreases stress and fatigue)
- Neuroprotection; decrease microglial activation and excitotoxicity
- Immune enhancement; cancer therapy
- Blood sugar regulation
- General health and protection from diseases such as cancer, heart disease stroke and diabetes



Rg3 ginsenoside chemical structure

Supplement Name:

Rg3, isolated from (*Panax ginseng*, C.A. Meyer) root.

Chemical Name: B-D-Glucopyranoside, (3², 12²)- 12, 20- dihydroxydammar- 24-en-3-yl 2-O-2-D-glucopyranosyl

Physical and Chemical Properties: White powder with slightly bitter taste; Insoluble in water, and very slightly soluble in hydrous methanol and ethanol; Molecular formula: C₄₂H₇₂O₁₃; Molecular weight: 784.32.

Introduction:

Rg3, also written Rg(3), is in a class of triterpene saponins called ginsenosides, which are found in the plant genus *Panax* (including Asian or *Panax ginseng* and American ginseng or *Panax quinquefolius*). Rg3 is produced by steaming the ginseng root, then extracting and isolating the Rg3 constituent.

Ginseng root has been traditionally used in Chinese Medicine as a general health tonic. Today, *Panax ginseng* is used mainly for its adaptogenic properties. An “adaptogen,” is a substance that increases nonspecific resistance of the body to a wide range of chemical, physical, psychological and biological factors (stressors).

Ginsenosides are the major pharmacologically active components of ginseng, and appear to be responsible for most of the positive effects on the body, including vasorelaxation, antioxidation, anti-inflammation, hypoglycemic, antifatigue, neuroprotective, immune modulating and anti-cancer. Approximately 40 ginsenoside compounds have been identified. Saponin complexes found in ginseng root are often split into two groups: the Rb group (characterized by the protopanaxadiol presence, including Rb1, Rb2, Rh2, Rc and Rd) and the Rg group (propanaxatriol, including Rg1, Re, Rf, Rg2 and Rg3).

Purified individual ginsenoside are becoming popular in integrative medicine to treat various health conditions instead of using whole ginseng root extracts. Individual ginsenosides may have different effects in pharmacology and mechanisms due to their different chemical structures.

Functions:

Neuroprotection: Laboratory studies have found that the Rg3 extract from *Panax ginseng* supports healthy neurotransmitter function in the brain (Bao et al, 2005, Mannaa et al, 2006). The ginsenosides seem to decrease excitotoxic and oxidative stress-induced neuronal cell damage, leading to enhanced memory effects.

Rg3 has also been reported to decrease both microglial activated inflammation and neuronal cell apoptosis in neurodegenerative conditions, like Parkinson’s and Alzheimer’s diseases. Rg3 has been reported in laboratory studies to effectively decrease oxidative iNOS, increase macrophage scavenger receptor type A (MSRA), reduce inflammatory cytokine expression and significantly reduce the expression of TNF-alpha in activated microglia (Tian et al, 2009). Rg3 increased the survival rate of neurons exposed to TNF-alpha (Joo et al, 2008). Rg3 has also been reported to attenuate NMDA receptor-mediated currents and NMDA-induced neurotoxicity (Kim et al, 2004). Inhibition of L-type Ca(2+) channels by Rg3 may also be another mechanism of ginseng-mediated neuroprotection.

Laboratory studies also support the anxiolytic effects of Rg3 (Kim et al, 2009). The reported mechanism was related to the increase of the storage of hepatic glycogen, and

the decrease of the accumulation of metabolites including lactic acid and serum urea nitrogen.

Anti-cancer: Laboratory studies report that ginsenosides isolated from *Panax ginseng*, including Rg3, have anticancer activity. Rg3 has been reported to inhibit growth and metastasis several types of tumors, partly by inhibiting angiogenesis and by its antioxidant activity. Rg3 has also been reported to have potent inhibitory effects on the activation of activator protein-1 (AP-1), a transcription factor that is responsible for c-jun and c-fos oncogenic transactivation. This supports the anti-tumor promoting activity of Rg3 as mediated through down-regulation of NF-kappaB and AP-1 transcription factors. Interestingly, heat-processing of ginseng roots significantly increases the Rg3 content and the antiproliferative activity against various tumor cell lines.

Rg3 extracts have been reported to inhibit oxidative damage on healthy tissue caused by the chemotherapeutic drug cyclophosphamide, with the combination of low-dose chemotherapy and anti-angiogenic inhibitor Rg3 suppressing growth of experimental tumors more effectively than conventional therapy or Rg3 alone (Zhang et al, 2008; Liu et al, 2009). Human studies have found that Rg3 administered to cancer patients improved the quality of life and lifespan (Lu et al, 2008).

Ginsenosides are reported to decrease the P-glycoprotein mediated multi-drug resistance (MDR) problems seen with chemotherapy drugs on cancer cells. MDR in cancer cells can lead to chemotherapeutic failure. Rg3 has also been reported to regulate 5-HT(3A) receptor channel activity, opening up the possibility that Rg3 could be an antiemetic agent for use during chemotherapy and/or radiation (Lee et al, 2007).

Others: A laboratory study suggests that Rg3 improves insulin signaling and glucose uptake primarily by stimulating the expression of IRS-1 and GLUT4 (Kim et al, 2009). Some studies have reported that ginsenosides in general have anti-hyperglycemia and anti-obesity effects that involve the PPAR-mediated pathway (Ni et al, 2009).

Rg3 may exhibit hepatoprotective activity due to its antioxidant capacity. Rg3 has been found to inhibit lipopolysaccharide (LPS)-induced oxidative tissue injury in laboratory animals.

Dosage:

- The recommended dose of Rg3 is 5mg twice a day of a standardized extract. Take on an empty stomach if possible.

Standardization:

- Rg3 is standardized to contain 90% ginsenosides.
- Rg3 products should be taken for at least 4 weeks before beneficial effects can be expected.

Side Effects and Warnings:

- Rg3 has been reported to be safe in recommended doses.
- Ginsenosides have been reported to decrease platelet aggregation (Lee et al, 2009). It is recommended to use Rg3 extracts with caution in individuals with bleeding disorders.

**Rg3 Extract (from *Panax ginseng*)
Patient Snapshot****Uses:**

- Rg3 helps your body cope with cancer and cancer-related problems.
- Rg3 can support brain function and help protect sensitive brain cells from damage.
- Rg3 may also help improve the way your immune system responds to infection and disease.

Dosage:

- The recommended dosage of Rg3 is 5mg of a standardized extract, twice daily. Take on an empty stomach if possible.

Special Concerns:

- If you are taking prescription or non-prescription medications, have a pre-existing medical condition, or are pregnant and/or breastfeeding, talk with your healthcare provider before taking any dietary supplement.
- Do not take if there is an allergy to any component of this dietary supplement.
- Do not take Rg3 if you have a bleeding disorder without consulting a doctor.

DISCLAIMER: Statements made are for educational purposes and have not been evaluated by the US Food and Drug Administration. They are not intended to diagnose, treat, cure, or prevent any disease. If you have a medical condition or disease, please talk to your doctor prior to using the recommendations given.

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