

Effects of Ginsenosides, Active Ingredients of *Panax Ginseng*, on Development, Growth, and Life Span of *C. elegans*

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The backbone structure of ginsenosides, active ingredients of *Panax ginseng*, is similar with that of sterol, especially cholesterol. *Caenorhabditis elegans* (*C. elegans*) is one of free living nematodes and is well-established animal model for biochemical and genetic studies. *C. elegans* cannot synthesize *de novo* cholesterol, although cholesterol is essential requirement for its growth and development. In the present study, we investigated the effects of ginseng total saponins (GTS) on the average brood size, growth, development, worm size, and life span of *C. elegans* in cholesterol-deprived and -fed medium. Cholesterol deprivation caused damages on normal growth, reproduction, and life span of worms throughout F1 to F3 generations. GTS supplement to cholesterol-deprived medium restored the growth, reproduction, and life span of worms as much as cholesterol alone-fed medium. GTS co-supplement to cholesterol-fed medium not only promoted worm reproduction but also induced bigger worms and faster growth than cholesterol-fed medium. In study to identify which ginsenosides are responsible for life span restoring effects of GTS, we found that ginsenoside Rc supplement not only restored life span of worms grown in cholesterol-deprived medium but also prolonged life span of worms grown in cholesterol-fed medium. Worms grown in medium supplemented with ginsenoside Rb1 or Rc to cholesterol-deprived medium exhibited strong filipin staining, in which filipin forms tight and specific complexes with 3 β -hydroxy sterols. These results show a possibility that ginsenosides could be utilized by *C. elegans* as a sterol substitute and further indicate that ginsenoside Rc is the component of *Panax ginseng* that prolongs the life span of *C. elegans*.

Key words: *Panax ginseng*, sterol, *C. elegans*, reproduction, life span, ginsenoside Rc