

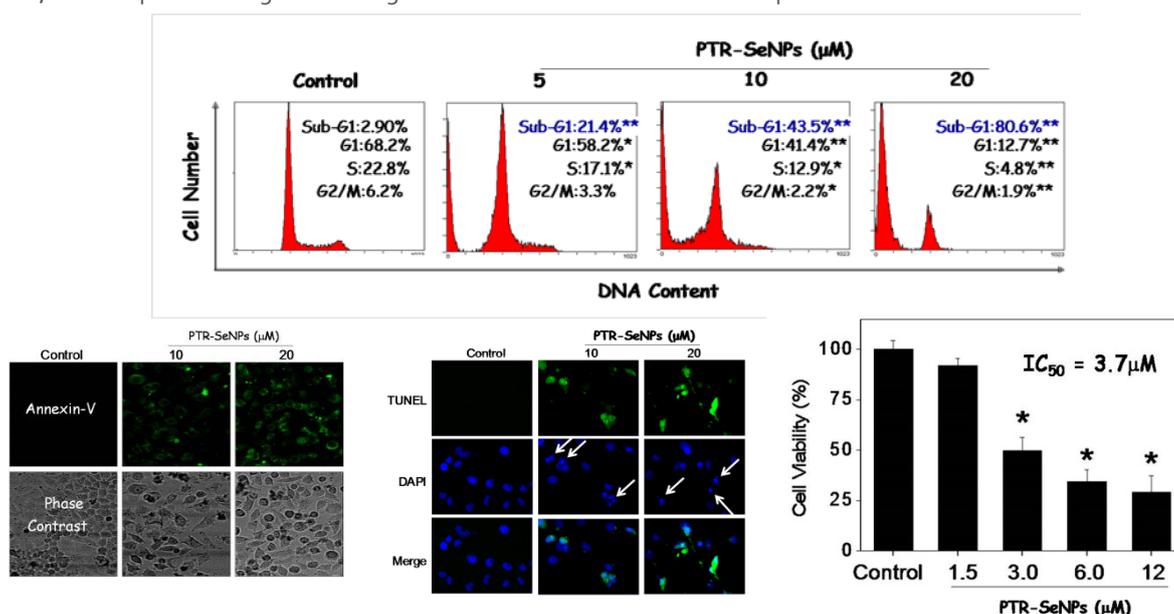
## Preparation of Highly Stable Selenium Nanoparticles with Strong Anti-tumor Activity Using Tiger Milk Mushroom

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Drug  
Discovery /  
Nutraceutical

- Selenium Nanoparticles [SeNPs] as Novel Cancer Chemopreventive Agents / Health Food Products .
- Brand New Functional Food Ingredients for Stabilizing SeNPs .

Selenium nanoparticles (SeNPs) have recently become a new research target since they were found to possess excellent bioavailability, low toxicity and remarkable anti-cancer activity. Nevertheless, SeNPs aggregate easily and their anti-cancer activity will be significantly reduced, once their nano-size could not be maintained. By using the mushroom polysaccharide-protein complexes (PSPs) isolated from sclerotia of *Pleurotus tuber-regium*, highly stable SeNPs (PTR-SeNPs) were successfully prepared under a simple food-grade redox system [Chinese patent: 201110208539.2; US patent : 13/557,864]. Besides, these novel SeNPs were found to remarkably inhibit the growth of human breast carcinoma MCF-7 cells by apoptosis induction in a dose-dependent manner, but were non-cytotoxic toward the normal cells suggesting that its cytotoxicity was cancer-specific. Further investigation on its cancer cells inhibition mechanism demonstrated that PTR-SeNPs also markedly induced apoptosis in the MCF-7 cells as evidenced by a significant increase in sub-G1 cell population, DNA fragmentation, chromatin condensation, phosphatidylserine translocation and cleavage of PARP. Finding of this study would not only facilitate the development of mushroom PSPs into new functional food ingredients to stabilize SeNPs, but also provide insights on using these novel SeNPs in cancer chemoprevention.



### Representative Publications

1. Surface decoration of selenium nanoparticles by mushroom polysaccharide-protein complexes to achieve enhanced cellular uptake and anti-proliferative activity. *J Mater Chem* (2012) 22, 9602-9610.
2. Purification of selenium-containing allophycocyanin from selenium-enriched *Spirulina platensis* and its hepatoprotective effect against t-BOOH-induced apoptosis. *Food Chem* (2012) 134, 253-261.
3. Immunomodulatory activities of mushroom sclerotial polysaccharides. *Food Hydrocolloid* (2011) 25, 150-158.
4. Antiproliferative effects of sclerotial polysaccharides from *Polyporus rhinoceros* Cooke (Aphylllo-phoromycetidae) on different kinds of leukemic cells. *Int J Med Mushrooms* (2008) 10, 255-264.
5. Sclerotium of culinary-medicinal King Tuber Oyster mushroom *Pleurotus tuberregium* (Fr.) Singer (Agaricomycetidae): its cultivation, biochemical composition and biopharmacological effects (review). *Int J Med Mushrooms* (2008) 10, 303-313.



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