



Preparation of Propolis Nanofood and Application to Human Cancer

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Propolis has well-known antimicrobial activity as well as antioxidant, antitumoral, anti-inflammatory, and regenerative properties, but its effects on the immune response are not well understood. Furthermore, clinical application of this relatively efficacious agent in cancer and other diseases has been limited due to poor aqueous solubility and, consequently, minimal systemic bioavailability.

Nanoparticle-based delivery approaches have the potential to render hydrophobic agents like propolis dispersible in aqueous media, thus circumventing the pitfalls of poor solubility. We have synthesized a polymeric nanoparticle-encapsulated formulation of propolis (propolis nanofood) utilizing micellar aggregates of cross-linked and random copolymers of N-isopropylacrylamide (NIPAAm) with N-vinyl-2-pyrrolidone (VP) and poly(ethyleneglycol) monoacrylate (PEG-A)...

Propolis nanofood, unlike free propolis, is readily dispersed in aqueous media.

Propolis nanofood demonstrates comparable in vitro therapeutic efficacy to free propolis against a panel of human pancreatic cancer cell lines, as assessed by cell viability and clonogenicity assays in soft agar.

Future studies utilizing propolis nanofood are warranted in pre-clinical in vivo models of cancer and other diseases that might benefit from the effects of propolis...

Propolis nanofood opens up avenues for systemic therapy of human cancers wherein the beneficial effects of propolis have been propounded. Future studies using relevant experimental models will enable us to address these scenarios in an in vivo setting.

Propolis nanofood inhibits pancreatic cell growth in murine xenograft models;

these effects are accompanied by a potent anti-angiogenic response and should facilitate the eventual clinical translation of this well-known but under-utilized therapeutic agent. No overt host toxicity is noted when maximal volumes are administered to mice. Taken together with the dismal outlook for patients with human pancreatic carcinoma, our observations suggest that propolis nanofood should be investigated in the clinical setting...