Plant-based Compounds with Anti-Neoplastic Properties

BACKGROUND
Breast cancer is the second most common type of cancer, worldwide. The major problem of cancer treatments is that they are toxic and often not selective for tumor cells. Black cohosh, a North American perennial, has been used to treat a variety of disorders, including inflammatory conditions, diarrhea, rheumatism and female disorders. We have obtained in vitro and in vivo evidence that extracts and purified components from black cohosh may be able to prevent and treat breast and other cancers, as well as inflammatory disorders. The herbal ingredients have been shown to suppress tumor development in certain murine models of carcinogenesis, with no observed adverse effects.

INVENTION
This invention will develop an extract and a particular component from the herb black cohosh that demonstrates strong non-toxic, anti-cancer effects. When the isolated component, a triterpene glycoside, is combined with the known anti-cancer agent paclitaxel, a synergistic effect develops that inhibits the growth of breast cancer cells in vitro; this will reduce the dose of paclitaxel and overall toxic side effects of the treatment and delay the development of resistance.

APPLICATIONS
- The invention can prevent and treat breast cancer;
- The technology can be applied to a variety of cancers beyond breast cancer;
- The herbal extract/component may also be applied to:
  - inflammatory and HIV diseases;
  - lower lipids, and offer osteoprotective benefits.

ADVANTAGES
There is an enormous need for anticancer drug treatments that are selective for malignant vs. nonmalignant cells. Black cohosh components target the growth factors involved in cancer development. By combining our therapy with existing anti-cancer therapeutics, the dose of the known drugs is reduced, resulting in fewer side effects. These advancements make black cohosh a logical and promising candidate for further investigation.

MARKET
Market Opportunities - $50-100 Billion
- Breast Cancer: second most common type of cancer
  Rising Revenues
  Pharma companies in 2010 had US sales over $12.7 billion from breast cancer treatments. But patents for their leading drugs will expire soon
- Other Cancers/Other Diseases
  Add other cancers (prostate, colon, skin, and oral) and other diseases (HIV, lipid inflammatory disorders), the market potentially exceeds $50-100 billion, worldwide.

TEAM
Lehman College:
- Dr. Linda Einbond, genetic and dietary factors in human cancer causation/chemoprevention
- Professor Stephen Redenti, nanoparticles/stem cells

Columbia University Medical Center:
- Professor David Figurski, characterization of cancer genes
- Dr. Rong Cheng, statistics and bioinformatics
- Professor Nancy Reame, clinical trials

European Foundation for Oncology and Environmental Sciences “B. Ramazzini,” Bologna, Italy:
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