

# Kathryn Lucido, Biochemistry

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## Spinach, a cyclops, and the search for a cure for prostate cancer

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Other than skin cancer, prostate cancer is the most prevalent form of cancer in men. The likelihood of developing prostate cancer increases with age; so that nearly every male will die with some form of prostate cancer though most likely not from the cancer itself. Prostate cancer is regulated by endocrine and dietary factors, as well as genetic predisposition. In the male reproductive tract, Sonic Hedgehog (Shh) signaling is necessary for the development of the prostate. It has also been found to be extremely important in the growth of a number of tumor types including prostate cancer, basal cell carcinoma (skin cancer), medulloblastoma, glioma, sarcoma, tumors of the digestive tract, small cell lung cancer and pancreatic carcinoma. The Lubahn lab has been studying the roles of Estrogen Receptors and estrogenic compounds on prostate cancer, and has recently used a series of phytoestrogens, natural estrogens found in plants, to inhibit the hedgehog-signaling pathway. One natural product, cyclopamine, is able to inhibit the pathway and has been shown to inhibit prostate cancer cell growth both in vitro and in vivo xenograft models. Additionally, some flavanoid compounds in spinach have been found to have a similar chemical structure to several other phytoestrogens that have been shown to have preventative effects on prostate cancer. A competitive binding assay was performed using various doses of cyclopamine and an unpurified spinach extract to determine K<sub>d</sub> for both compounds to ER alpha and ER beta. The compounds were also tested in the NIH-3T3 Shh Light II cells, which have a stably transfected Gli-Luciferase reporter, to see if they downregulated the hedgehog signaling pathway.