

Special Report

\$10.00

**The effect**

**Boron**

**has on**

**Prostate Cancer**

*Helping People Improve  
Their Health Naturally  
Since 1998*

By Keith D. Bishop, Clinical Nutritionist, B.Sc. Pharmacy, Health Coach©

Natural Cancer Reports

9612 N. May Avenue, Oklahoma City, OK 73120

phone 405.936.3333 fax 866-594-1901

[keith@healthnutrx.com](mailto:keith@healthnutrx.com) [www.HealthNutRx.com](http://www.HealthNutRx.com)

## Prostate Cancer - Boron

*Natural Cancer Reports provides research based, referenced, time saving, economical, information on integrating lifestyle, diet, and dietary supplements in to cancer programs.*

*My busy schedule, writing and loyal clientele allows me to accept a limited number of new clients. If you have a serious need for more information and assistance, I'm available for personalized, evaluations, recommendations and natural care consultations for many health issues including cancer. You may call my office at 405-936-3333 to schedule your appointment.*

*This report contains information about only one dietary supplement that has an impact on cancer. There are many dietary supplement, lifestyle, environment, diet and medical treatment influences on cancer. This report does not cover the effects of dietary supplements, lifestyle, environment, and diet on prescription medications, chemotherapy and radiation treatments. You should consult your health care practitioner before making changes in your health program.*

I have written a summary, based on research, of the positive and negative information for this dietary supplement. I've placed references at the bottom of each column so that you can easily find them. You have paid me for unbiased information.

I apologize for some of the difficult to understand medical terms and acronyms that are commonly used in research. I intentionally left some of them in this report so that doctors and oncologists will understand and appreciate the research on this natural approach to health. You do not need to know all of these terms to fully

appreciate the value of the following information.

---

---

### Boron

Boric acid is the naturally occurring form of boron circulating in the human body. Raisins, prunes, and nuts are generally excellent sources of boron. Fruit (other than citrus), vegetables, and legumes also typically contain significant amounts of boron.<sup>1</sup> Additional information, potential side effects, toxicities and interactions are available at [www.supplementinfo.org](http://www.supplementinfo.org) and [www.drugs.com](http://www.drugs.com). People who eat adequate amounts of produce, nuts, and legumes may consume 2 to 6 mg of boron per day.<sup>2</sup>

Research shows boron increases estradiol and testosterone levels.<sup>3 4</sup> Knowing this, I've always been cautious with boron in clients that have a personal or family history of prostate cancer or breast cancer. At the time I published this special report, August 2008, there are no medical studies showing concerns about boron increasing the risk of prostate cancer or breast cancer.

NAD (Nicotinamide adenine dinucleotide) is essential for energy production in all cells in the body.<sup>5</sup> NADP (Nicotinamide adenine dinucleotide

- 1 [www.supplementinfo.org](http://www.supplementinfo.org) accessed August 08, 2008.
- 2 Kelly GS. Boron: a review of its nutritional interactions and therapeutic uses. *Altern Med Rev* 1997;2:48-56 [review].
- 3 Naghii MR., The significance of dietary boron, with particular reference to athletes. *Nutr Health*. 1999;13(1):31-7. Review.
- 4 Benderdour M, Bui-Van T, Dicko A, Belleville F., In vivo and in vitro effects of boron and boronated compounds. *J Trace Elem Med Biol*. 1998 Mar;12(1):2-7. Review
- 5 Wikipedia contributors. Nicotinamide adenine dinucleotide. Wikipedia, The Free Encyclopedia. June 29, 2008, 19:08 UTC. Available at: [http://en.wikipedia.org/w/index.php?title=Nicotinamide\\_adenine\\_dinucleotide&oldid=222512865](http://en.wikipedia.org/w/index.php?title=Nicotinamide_adenine_dinucleotide&oldid=222512865). Accessed July 15, 2008.

## Prostate Cancer - Boron

phosphate ) required for to protect cells from oxidative damage, and assists in the production of fats and cholesterol for cells.<sup>6</sup> Movement of the calcium ion (Ca<sup>++</sup>) into and out of the cell functions as a signal for many cell processes.<sup>7</sup> Cells will die if NAD and NADP production is interrupted or stopped. Boric acid was found to inhibit the production of NAD and NADP and inhibited the release of stored calcium ion (Ca<sup>++</sup>) in growing DU-145 prostate cancer cells. Cell proliferation was inhibited by 30%, 60%, and 97% with increasing concentrations of boric acid.<sup>8</sup>

A population study found that increased groundwater boron concentrations, across the state of Texas, correlate with a reduced risk of prostate cancer incidence and death. Researchers then discovered that boric acid was found to improve the anti-proliferative effectiveness of non-prescription chemo-preventative agents, selenomethionine (selenium) and genistein (soy), while enhancing radiation treatment cell kill rate.<sup>9</sup>

A laboratory study found that prolonged exposure to high doses of boric acid causes prostate cancer cells DU-145 to flatten out, lose cell volume and to lose rapid cell growth capabilities. Boric acid also caused dose-dependent reduction in cellular

chemicals, cyclins A-E and MAPK proteins that contribute to rapid cell growth. Prostate cancer cells displayed reduced metastatic potential via reduced adhesion, migration, invasion potential and F-actin changes.<sup>10</sup>

Boric acid inhibited the proliferation of prostate cancer cell lines, DU-145 and LNCaP, in a dose-dependent manner. Higher doses of boron did a better job of inhibiting prostate cancer cell growth. The cancer cell line PC-3 was inhibited, but required concentrations of boric acid higher than observed in humans. Some prostate cancers may not be affected by boron. Studies using DU-145 cells showed that boric acid induced a cell death-independent proliferative inhibition, with little effect on cell cycle stage distribution and mitochondrial function.<sup>11</sup>

Not all boron studies show positive results. 35,244 men participated in the VITAL supplement and food frequency questionnaire in 2000-2002. A total of 832 men developed prostate cancer in the following 2 to 4 years. Dietary boron intake from diet plus multivitamins were not associated with prostate cancer risk. Furthermore, none of the foods high in boron content was associated with a decreased risk of prostate cancer.<sup>12</sup> *Boron was not associated with an increased risk of prostate cancer.*

### The third National Health and Nutrition Examination Survey (NHANES

- 6 Wikipedia contributors. Nicotinamide adenine dinucleotide phosphate. Wikipedia, The Free Encyclopedia. May 4, 2008, 05:21 UTC. Available at: [http://en.wikipedia.org/w/index.php?title=Nicotinamide\\_adenine\\_dinucleotide\\_phosphate&oldid=210047909](http://en.wikipedia.org/w/index.php?title=Nicotinamide_adenine_dinucleotide_phosphate&oldid=210047909). Accessed July 15, 2008.
- 7 Wikipedia contributors. Calcium. Wikipedia, The Free Encyclopedia. July 1, 2008, 13:26 UTC. Available at: <http://en.wikipedia.org/w/index.php?title=Calcium&oldid=222857834>. Accessed July 15, 2008.
- 8 Barranco WT, Kim DH, Stella Jr SL, Eckhert CD., Boric acid inhibits stored Ca(2+) release in DU-145 prostate cancer cells. *Cell Biol Toxicol.* 2008 May 31.
- 9 Barranco WT, Hudak PF, Eckhert CD. Evaluation of ecological and in vitro effects of boron on prostate cancer risk (United States). *Cancer Causes Control.* 2007 Feb;18(1):71-7.

- 10 Barranco WT, Eckhert CD. Cellular changes in boric acid-treated DU-145 prostate cancer cells. *British Journal of Cancer.* 2006 Mar 27;94(6):884-90.
- 11 Barranco WT, Eckhert CD. Boric acid inhibits human prostate cancer cell proliferation. *Cancer Letters.* 2004 Dec 8;216(1):21-9.
- 12 Gonzalez A, Peters U, Lampe JW, White E., Boron intake and prostate cancer risk. *Cancer Causes Control.* 2007 Dec;18(10):1131-40.

## Prostate Cancer - Boron

---

III), compared boron intake of 95 prostate cancer cases with that of 8,720 males with out prostate cancer. Dietary boron intake was associated with a decreased risk of prostate cancer. A higher dietary dose decreased the risk of prostate cancer.<sup>13</sup>

Mice were injected with LNCaP prostate cancer cells. Two groups of 10 animals were dosed with oral boric acid solutions. A control group received only water. Tumor sizes were measured weekly for 8 weeks. The size of tumors was decreased in mice exposed to the low and high dose of boric acid by 38% and 25% respectively. Serum PSA levels decreased by 88.6% and 86.4% respectively, as compared to the control group. The boron markedly reduced insulin Growth Factor-1 (IGF-1) inside the tumors.<sup>14</sup> IGF-1 increases the growth of prostate cancer.<sup>15 16</sup>

Adult Dosage: I typically recommend that my clients take 2-3 mg of Boron twice daily with food. Do not take boric acid powder. Additional information, potential side effects, toxicities and interactions are available at [www.supplementinfo.org](http://www.supplementinfo.org), [www.drugs.com](http://www.drugs.com) and many other Internet information sources.

- 
- 13 Cui Y, Winton MI, Zhang ZF, Rainey C, Marshall J, De Kernion JB, Eckhart CD., Dietary boron intake and prostate cancer risk. *Oncol Rep.* 2004 Apr;11(4):887-92.
  - 14 Gallardo-Williams MT, Chapin RE, King PE, Moser GJ, Goldworthy TL, Morrison JP, Maronpot RR., Boron supplementation inhibits the growth and local expression of IGF-1 in human prostate adenocarcinoma (LNCaP) tumors in nude mice. *Toxicol Pathol.* 2004 Jan-Feb;32(1):73-8.
  - 15 Saikali Z, Setya H, Singh G, Persad S., Role of IGF-1/IGF-1R in regulation of invasion in DU145 prostate cancer cells. *Cancer Cell Int.* 2008 Jul 3;8:10.
  - 16 Kawada M, Inoue H, Arakawa M, Ikeda D., Transforming growth factor-beta1 modulates tumor-stromal cell interactions of prostate cancer through insulin-like growth factor-I. *Anticancer Res.* 2008 Mar-Apr;28(2A):721-30.

## Prostate Cancer - Boron

The information presented in Natural Cancer Reports is for information and education purposes only. It is based on scientific studies (human, animal, or laboratories), clinical experience, or traditional usage as referenced in each article. The results reported may not necessarily occur in all individuals. Consult your doctor, health practitioner, and/or pharmacist for any health problem and before using any supplements or before making any changes in prescribed medications.

Natural Cancer Reports are not designed to provide medical advice or professional services and is intended for educational and reference use only. The information is not a substitute for professional care and should not be used for diagnosing or treating a health problem or a disease. If you have, or suspect you may have, a health problem you should consult your doctor.

Due to the life and death issues of cancer you should always consult with your doctor, health practitioner, and/or pharmacist before making changes in your health program.

---

---

### **FDA (Food and Drug Administration) statements on supplement labels.**

You will notice the following statements on dietary supplement labels:

*“This product is not intended to treat, diagnose, or cure any disease. These statements have not been evaluated by the FDA.”*

A free special report is available at  
[www.NaturalCancerReports.com](http://www.NaturalCancerReports.com)

---

### **Quality Dietary Supplements**

Quality may be an issue with some dietary supplement manufacturers. A free special report on the Quality of Dietary Supplements is available at  
[www.NaturalCancerReports.com](http://www.NaturalCancerReports.com)

---

*Additional Bishop Health Reports for cancer and other health issues are available at:*

[www.NaturalCancerReports.com](http://www.NaturalCancerReports.com)

*Helping people improve their health naturally since 1998.*

---