A Whole Health Guide to Prostate Health

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Empowerment & Knowledge

What You Need to Know About the Prostate Gland

Understanding the prostate

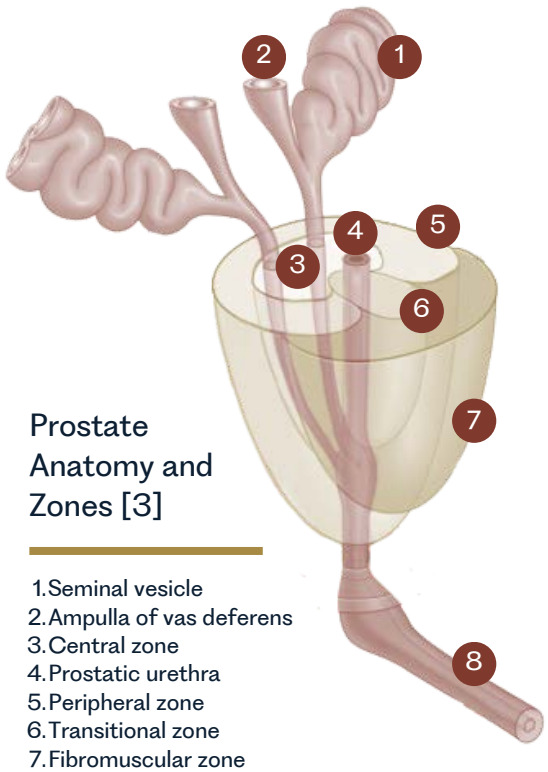
The prostate gland is part of the male reproductive system that sits below the bladder but in front of the rectum [1]. This walnut-sized gland is responsible for the production of a fluid that, together with sperm, makes up semen.

The prostate gland has smooth muscle cells that help forcefully expel its fluid through the urethra during ejaculation [1]. At this time, the prostate's fluid, which contains prostate-specific antigen (PSA), combines with sperm cells and fluids from other glands to form semen [2].

Anatomy of the prostate

The prostate gland can be divided into three zones [1, 3]:

1. The innermost zone that encases the upper third of the urethra is called the transition zone and is most likely to be involved in prostate growth.
2. The central zone surrounds the transition zone, making up 25% of the prostate's mass.
3. The outermost zone (and the largest of the three) of the prostate is called the peripheral zone, and it makes up 70% of the prostate's total mass.



Prostate Anatomy and Zones [3]

1. Seminal vesicle
2. Ampulla of vas deferens
3. Central zone
4. Prostatic urethra
5. Peripheral zone
6. Transitional zone
7. Fibromuscular zone
8. Penile urethra

Common Prostate Conditions

Benign Prostatic Hyperplasia (BPH)

As men age, the transition zone can undergo non-cancerous or benign growth, which can press against the bladder, causing uncomfortable symptoms. This condition is called benign prostatic hyperplasia (BPH), and its prevalence has increased by 70.5%, reaching 94 million cases in 2019, up from 51 million cases in 2000 [1, 4]. The prevalence of BPH increases as men age, being present in >90% of men by age 85.

Common symptoms of an enlarged prostate include [4]:

- Impaired kidney function [5]
- Leaking urine after using the bathroom
- Recurrent urinary tract infections (UTIs) [6]
- Sexual dysfunction [7]
- Takes longer to start urinating
- Urge to urinate more frequently
- Weak stream of urine

What are the contributing factors for BPH?

Although the direct cause of BPH is not well understood, there are a variety of risk factors, some within a man's control and others outside of his control [8]. Risk factors that one has some control over include diet [9], metabolic factors, such as diagnosis of metabolic syndrome [10], diabetes [11], insulin resistance [12] or obesity [13], hormone levels, and physical activity level [14]. Age [13], genetics [15], and race [16] are unmodifiable risk factors, meaning you do not have control over them.

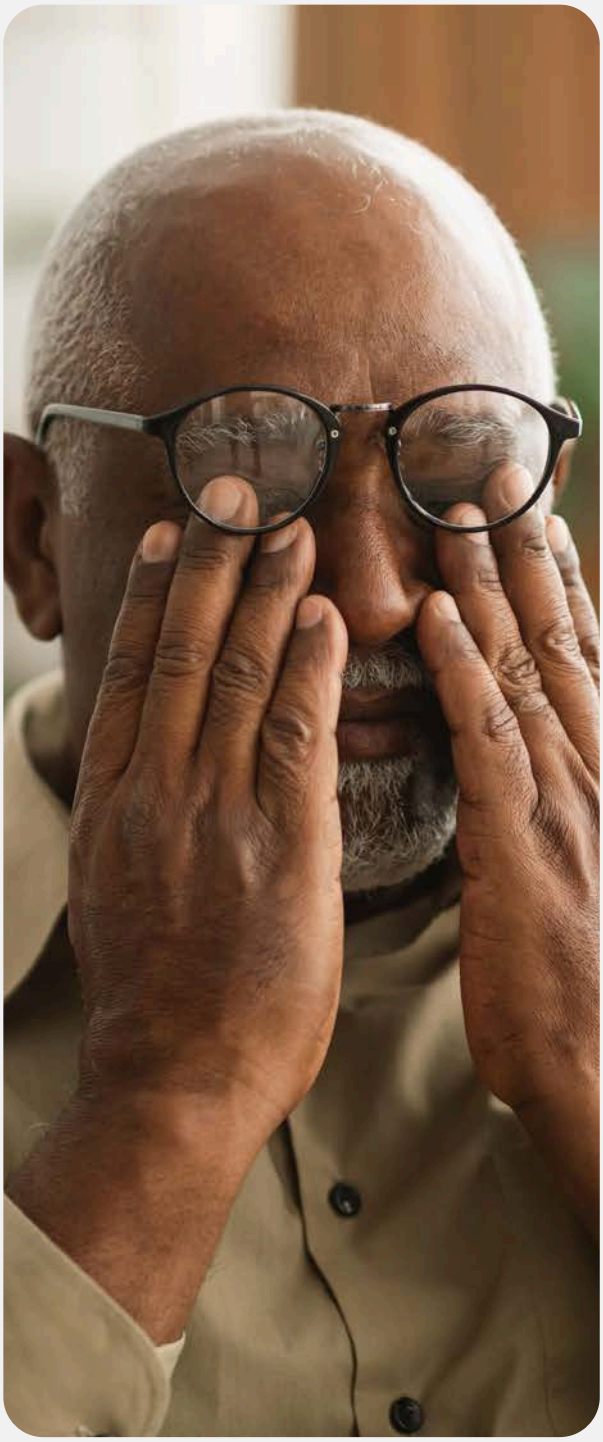
The conversion of testosterone to dihydrotestosterone (DHT), a potent androgen, is also an important factor in prostate growth [8]. Androgens have also been shown to inhibit cells from being destroyed [17], a key feature of cells undergoing rapid growth, such as seen in cancer. Other factors associated with BPH include localized and systemic inflammation [18].

Prostatitis

Prostatitis is inflammation of the prostate that may cause urinary symptoms, such as those mentioned below, pelvic pain, and fever. The prevalence of prostatitis is around 8% [19]. The prostate has a natural defense against infection, including regular clearing of the urethra during urination or ejaculation and the presence of antimicrobial agents in seminal fluid. However, it's possible that bacteria, such as *Escherichia coli, Staphylococcus aureus,* and *Chlamydia trachomatis,* can cause chronic prostatitis [20].

Common symptoms of prostatitis include [21]:

- Body aches
- Burning feeling or pain during urination
- Chills
- Dribbling or hesitancy to urinate
- Fever
- Increased urinary frequency
- Inflamed prostate
- Nausea and vomiting



Prostate cancer

Compared to the non-cancerous growth in the transition zone resulting in BPH, cancerous or malignant growth is primarily associated with the largest prostate zone – the peripheral zone. Prostate cancer is the second most common cancer in men worldwide, second only to lung cancer [22]. The incidence of prostate cancer was recently investigated, and from 1990 to 2019, the global incidence of prostate cancer increased by 116% [23]. Although incidence rates have been shown to increase in the past three decades, it should be noted that the lifetime risk of developing prostate cancer is approximately 13% [24]. When caught early and with effective treatment interventions, deaths are exceedingly low, with a 5-year survival rate of >97% [24].

What are the contributing factors to prostate cancer?

Similarly to other cancers, risk factors for prostate cancer may include age, family history, and genetics [25]. Additionally, lifestyle behaviors and exposures such as smoking, dietary choices, physical activity, endocrine disruptors, and certain occupations, such as those in the agricultural or petroleum industries, may contribute to the risk of prostate cancer [25].

Research that investigates the relationship between hormones, such as testosterone and DHT, and the risk of developing prostate cancer is scarce. However, some data report a significant correlation between both low serum testosterone levels and high prostate tissue testosterone levels with an increasing Gleason score [26]. These findings have been corroborated in later findings [27]. The Gleason score is an assessment tool used to grade prostatic cancer [28]. Higher Gleason scores correlate with more aggressive cancer, whereas lower scores indicate that the cancer will grow more slowly.

While hormone levels have had a limited focus in prostate cancer research, emerging evidence suggests that exposure to endocrine disruptors may influence prostate cancer risk. Phthalates are a group of chemicals that are used in manufacturing to make plastic more flexible and durable [29]. A meta-analysis investigated the relationship between urinary phthalates and their metabolites and cancer risk. It was reported that in patients with prostate cancer, levels of urinary MECPP (a phthalate metabolite) were significantly increased [30].

Andropause and prostate health: What's the connection?

Declining androgens in aging men have been referred to as "male menopause" or andropause [31]. Symptoms reflect low testosterone levels and can include depression, concentration issues, sleep issues, lethargy, and decreased libido. Testosterone replacement therapy may be used to address symptoms of andropause [32]. However, testosterone replacement therapy is not without its risks, and its long-term effect on prostate cancer risk is not fully understood [32]. For men with prostate cancer, there is a lack of evidence on the safety of testosterone replacement therapy [33].

Testosterone levels can be affected by factors like obesity and stress, which may reduce the activity of the hypothalamic-pituitary-testicular (HPT) axis [34]. By nourishing the HPT axis, Revolution MacaFlow® can support the body's own testosterone production instead of adding exogenous testosterone.

Prostate-specific antigen (PSA) testing

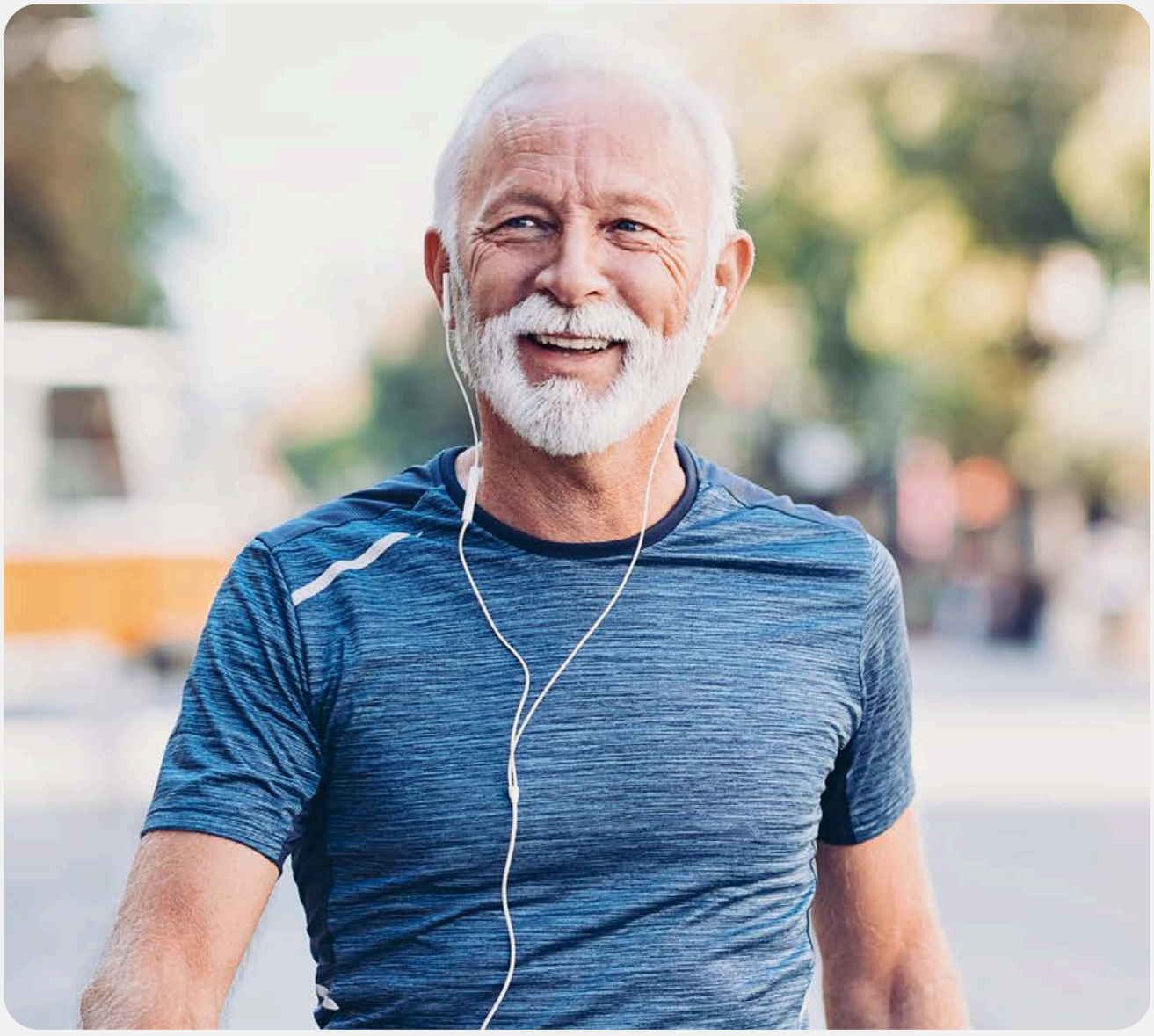
Prostate-specific antigen (PSA) is produced and excreted from the prostate gland. Therefore, measuring PSA levels may help diagnose prostate cancer. However, the clinical use of PSA testing remains controversial, and in 2012, the United States Preventive Services Task Force (USPSTF) recommended against PSA screening in routine primary care [35]. Nonetheless, PSA is the most common test healthcare providers use for early detection of prostate cancer [36].

There are several concerns with PSA testing. First, there can be significant variability in PSA levels across individuals and ethnicities [37]. Second, there are currently no standardized guidelines for effectively defining an abnormal PSA value for the diagnosis of prostate cancer [36]. However, it is generally recognized that a PSA value of 4 ng/mL represents the normal upper limit [38], and values above this (and appropriately adjusted for age-related increases [39]) should coincide with additional cancer screening. Third, to complicate matters further, a PSA result outside of normal ranges does not automatically secure a prostate cancer diagnosis [40]. Increased PSA levels have been implicated in numerous non-cancerous conditions, such as BPH [41], prostatitis [42], and perineal trauma [43].

What can you do?

This guide discusses practical strategies to support prostate health through diet, exercise, and lifestyle. However, if you have any of the above-mentioned health concerns, you should visit your healthcare provider for an evaluation. They can assess the severity of your symptoms and discuss the wide array of options you have. Every person has beliefs about life, health, and medicine, so finding a practitioner aligned with those values is imperative.

It's important to note that some health conditions can mimic symptoms of prostate problems. For example, urinary tract infections can create symptoms similar to an enlarged prostate [44]. With this in mind, speaking to your healthcare provider would help you understand your unique situation.



Hormones

Key Communicators In The Body

How does the body communicate within?

All information in the body is received through two types of messengers: neurotransmitters and hormones. Neurotransmitters help cells communicate through the nervous system, but hormones help communicate cell-to-cell or from one cell through the bloodstream to another cell. The hormones testosterone, estrogen, and cortisol influence the prostate.

How do hormones align with prostate health?

Hormones like testosterone and estrogen are most often associated with male and female physiology, respectively. These hormones fluctuate throughout the day, following a circadian rhythmicity between the morning and evening hours [45].

Testosterone

Testosterone is the most well-known androgen hormone associated with normal male development. Testosterone is used by the male body to support the development of male characteristics, such as facial hair and a deeper voice [46]. It is also used to support proper sperm production and maintain muscle mass and bone density.

In the prostate, the 5α-reductase enzyme converts testosterone into dihydrotestosterone (DHT), the most active and potent androgen [47]. DHT is an enigma: though it is beneficial for sexual development in men from the prenatal period through puberty, it can contribute to harmful growth in the adult prostate [48]. For example, increased activity of DHT is exhibited in prostate cancer; however, some reports suggest a positive correlation between DHT levels and a lower risk of death from prostate cancer [48, 49]. In contrast, testosterone and DHT levels were not reported to be positively associated with BPH [50]. There also appears to be an association between increased DHT levels and male pattern hair loss [48].

Estrogen

In comparison, estrogen is considered a female-dominant hormone, although estrogen appears to be important for both sexes. In males, estrogen helps to develop the male reproductive system and supports sperm maturation [51, 52].

Estrogen and estrogen receptors may play a role in prostate cancer, although the relationship is unclear [53, 54]. Though absolute serum estrogen levels are not considered a risk factor for prostate cancer, an increased estrogen/testosterone ratio is associated with prostate cancer initiation and progression [53]. It has also been shown that in the prenatal period, the developing prostate is particularly sensitive to estrogens and endocrine-disrupting compounds, and this may influence the development of prostate cancer during adulthood [53, 55].

Although the relationship between estrogen and prostate cancer remains unclear, there is accumulating data that support a relationship between estrogen metabolites and prostate cancer. When the body breaks estrogen down to be excreted safely from the body, it goes through several phases of transformation [56]. The first phase transforms estrone (E1) and estradiol (E2) into 2-hydroxy-E1/E2 and 16-hydroxy-E1/E2. Pooled data from over 1,000 cohort participants suggest an 82% greater odds of developing prostate cancer when higher levels of urinary 16-hydroxy-E1 metabolites are present [57]. On the other hand, a higher 2-hydroxy-E1 to 16-hydroxy-E1 ratio was associated with a protective effect [57].

These findings highlight the complexity of estrogen's role in prostate cancer, particularly through the action of its metabolites. This growing body of evidence underscores the importance of further research to clarify these mechanisms and their implications for prevention and treatment strategies.

Cortisol

Cortisol is best known for its involvement in the body's stress response system. However, cortisol affects nearly every organ and tissue in the body - from the cardiovascular system to the reproductive system [58]. To understand if cortisol is related to the likelihood of having prostate cancer, 141 men (71 with prostate cancer and 70 considered low-risk) were recruited to complete an evaluation [59]. The researchers reported that, compared to the men in the low-risk group, increases in cortisol levels were associated with an 11% increase in the odds of being in the prostate cancer group [59].

Insulin and insulin-like growth factor-1

Insulin-like growth factor (IGF) appears to play a significant role in prostate cancer onset and progression [60]. Earlier data from over 3,500 patients with confirmed prostate cancer showed a 38% increased risk for prostate cancer in those individuals with the highest amounts of IGF-1 compared to those whose IGF-1 levels fell in the lowest quintile [54]. Similarly, higher insulin levels are positively associated with prostate cancer risk [61].

While these findings suggest a potential link between altered insulin metabolism, such as in individuals with type II diabetes, and an increased likelihood of developing prostate cancer, current evidence does not support this association. Surprisingly, the opposite has been found. Results from a meta-analysis of 45 studies involving more than 130,000 individuals found a 14% reduced risk between type II diabetes and prostate cancer [62, 63].

Sex hormone-binding globulin

Sex hormone-binding globulin (SHBG) binds to androgens and controls their availability [64]. Higher SHBG levels may reduce free testosterone and DHT availability to binding sites found on the prostate, potentially lowering the risk of prostate cancer [64-66].

It's important to note sex differences between SHBG levels across the adult lifespan for men and women. In women, SHBG levels follow a U-shaped pattern, declining from a woman's 20s through her 60s and increasing after the 6th decade [67]. Among men, SHBG levels show a steady increase with age [68].

Considering the risk for prostate-related health concerns rises with each decade of life, understanding common age-associated patterns in SHBG in men can be a useful tool in the assessment, treatment, and management of these conditions [64].

In this guide, we will help you understand how diet and lifestyle strategies may help you support prostate health.

The Way to Feel “At Home” in Your Body: Four Steps to a Healthy Prostate

To get your body’s communication on track and have seamless signals and ready responses from the endocrine system and beyond, we need to look at four different processes, which are all happening simultaneously in your body. When these four aspects are taken care of, you can support prostate health and feel more “at home” in your body.

If you can remember the H.O.M.E. acronym,
you’ll easily recall how to promote prostate health.

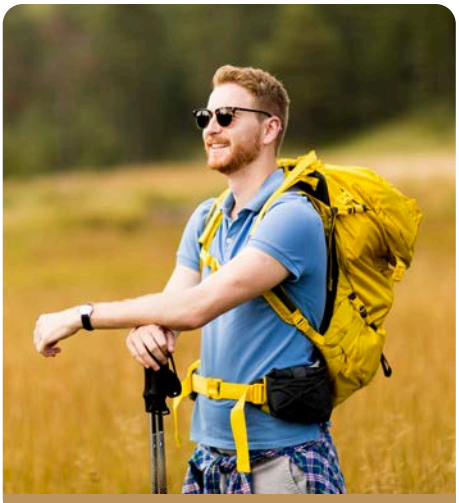
Harmonization

The whole body seeks harmony, with its organ systems working in concert like a well-orchestrated symphony. Countless processes operate within constant checks and balances, ensuring stability and seamless communication – a foundation for prostate health. Harmonization for prostate health may be supported in several ways. To the best of our ability, we need to eat an anti-inflammatory diet, move our bodies in enjoyable and sustainable ways, attain a good night’s rest, and practice stress management techniques to help support prostate health for the long-term.

In this guide, we will help you get ideas to make this shift. Sometimes you may need to work with a healthcare professional to guide you in making these changes "stick." It takes time, attention, and focus to adjust your overall health. However, it's well worth it, because if you don't address the overall health of the prostate regularly, the symphony inside will be a cacophony of noise.

Optimization

Optimization for prostate health means harmonizing your diet and lifestyle to support your prostate and set the stage for balanced hormones. An all-or-nothing approach is usually not beneficial when it comes to making changes for your health, which certainly applies to prostate health. Though you don't have control over genetic changes that may innately influence hormone metabolism, you can do your best within your circumstances. You do have a locus of control around several factors, including your diet, sleep schedule, and other lifestyle factors, like scheduled exercise. Optimizing your lifestyle to support your prostate sets the stage for balanced hormones, which promotes healthy reproductive function, improved energy levels, and metabolic health.



In this guide, we provide you with tips to optimize your food intake, exercise, and lifestyle factors to best support prostate health.

Metabolism

When you you start your journey toward improved prostate health, it may support optimized metabolic health through hormones like insulin. To best support metabolism, try to eat balanced meals rich in dietary fibers, phytonutrients, and plenty of protein. Working with a healthcare provider is advised to help you discover a personalized diet tailored to your unique biology, physiology, and health needs.

In this guide, we provide you with strategies to optimize your diet and nutrition for prostate health.

Elimination

The body primarily eliminates testosterone and its metabolites through urine, although a small percentage is eliminated in the feces [69, 70]. Ideally, the body makes hormones, uses them, and then efficiently eliminates them so they do not build up. Testosterone, estrogen, and dihydrotestosterone are examples of some of the hormones that will be excreted during elimination [69]. Ensuring adequate liquid intake to promote proper elimination may help support a healthy prostate. Additionally, prioritizing foods, such as fiber, promotes the healthy elimination of hormones via the stool.

Individuals experiencing an enlarged prostate may have challenges during elimination. As discussed, an enlarged prostate may impede the natural flow of urine, causing a stop-and-go stream or weak stream [44]. Working with a trusted healthcare practitioner will be essential to receive proper care and support if symptoms are present.

In this guide, we provide you with strategies to support prostate health that promotes proper digestion and elimination.

Dietary Supplements for Prostate Health

Maintaining prostate health involves multiple factors, including hormone balance and a healthy inflammatory response. Certain botanicals and nutrients may offer supportive benefits when included as part of a proactive wellness routine.

Revolution MacaFlow®

Maca (*Lepidium peruvianum*) and saw palmetto (*Serenoa repens*)

Emerging preclinical research has explored the potential of specific types of *Lepidium peruvianum* (maca) and *Serenoa repens* (saw palmetto) to support antioxidant activity and pathways involved in maintaining a balanced inflammatory response [71]. In a preclinical study using human prostate cell lines, a combination of red and black maca with saw palmetto was shown to modulate cellular markers involved in inflammatory signaling pathways [71]. These findings are preliminary and do not reflect effects in the human body.

MacaFlow® combines a targeted formulation of maca phenotypes with a proprietary saw palmetto extract, chosen for its traditional use and emerging research in men's health. Together, these botanicals may help support a balanced inflammatory response and healthy hormone metabolism, foundational aspects of prostate wellness.*

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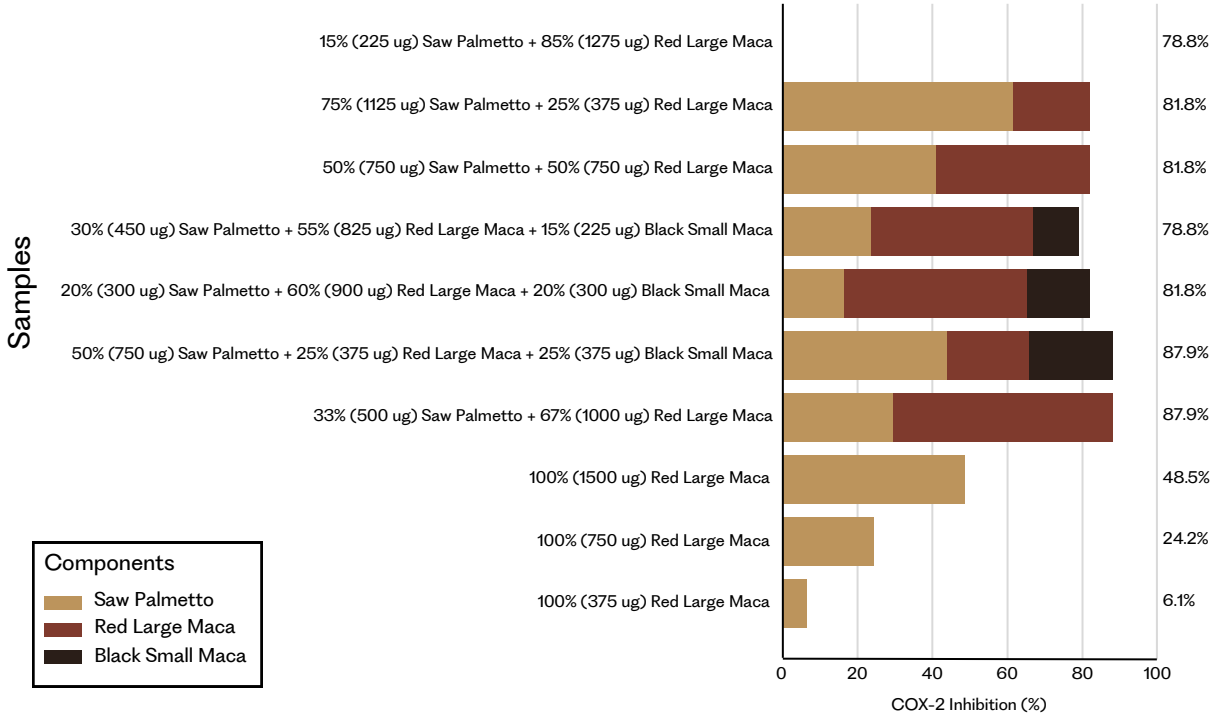
COX-2 Inhibition by Combined Maca and Saw Palmetto Samples



*These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent any disease.

With this in mind, it is important to note that not all maca is created equal. The origin, color, and processing methods can significantly influence its bioactive profile. In fact, a published review describes up to 17 maca phenotypes, each with unique characteristics that may influence their nutritional profile [72]. Similarly, the fatty acid and phytosterol content of saw palmetto can vary based on how it is grown and processed [73]. The specific combination of maca phenotypes with saw palmetto found in MacaFlow® was selected based on preclinical evidence of synergistic activity [71]. These botanicals may offer support for cellular health and inflammatory balance when used as part of a comprehensive approach to maintaining prostate health.*

Zinc

Zinc is a nutrient the body needs in small amounts. It is involved in many chemical reactions affecting immune function, neurotransmission, reproduction, and normal growth and development [74, 75]. The use of zinc for prostate health, specifically for prostate cancer, has long been debated.

Results from a 2024 systematic review report zinc may play a dual role in prostate cancer [76]. First, zinc has been shown to have protective properties on the prostate. For example, it helps old or damaged cells self-destruct and manages inflammation, which may inhibit cancer cells from proliferating. Some findings that suggest supplementing zinc between 1-24 mg/day was associated with a lower risk of diagnosed prostate cancer cases turning lethal [77]. In comparison, zinc has also been shown to have harmful effects on the prostate [76]. Taken for longer than 15 years and at a dose of greater than 75 mg per day may disrupt normal cell functioning, possibly leading to cellular toxicity and promoting cancer cell growth [78].

Taken together, more research is needed to clearly understand zinc's role in conditions affecting the prostate. The optimal dosage and duration of zinc supplementation for prostate health remain unclear and most likely vary substantially among individuals. It is best to consult with a healthcare practitioner to find out what is required.

> While dietary supplements can support a comprehensive treatment plan, it's important to discuss them with your healthcare provider first to ensure they are personalized to your needs.

Diet & Nutrition

Though there is no single recommended diet for prostate health, evidence points to the benefits of managing blood sugar, reducing inflammation, and consuming a phytonutrient-rich diet. Additionally, some foods are natural inhibitors of 5-alpha reductase, which may help decrease the conversion of testosterone to DHT.

Even though one's diet needs to be personalized, here are some general nutrition guidelines that can benefit prostate health, regardless of the food plan you may follow.

Best Practices for Diet & Nutrition

Drink water

Proper hydration aids in delivering nutrients, regulates body temperature, improves mood and concentration, increases and maintains energy, lubricates joints, and supports healthy detoxification. It is also critical to support regular bowel movements, urination, and sweating — our three routes of eliminating waste from our bodies. Water intake may need to be adjusted based on physical activity, sauna use, and time of day — to name a few.

Do you find water boring? If so, add fruits like oranges, lemons, limes, and grapefruit, herbs like mint, cilantro, and rosemary, or vegetables like cucumbers. Get creative and combine some of these fruits, herbs, and vegetables, such as cucumber and mint or grapefruit and rosemary. Making ice cubes from the above-mentioned options can be a fun way to drink more water, too!

Additionally, if you drink water but still don't feel hydrated, you may consider mineralizing your water using Sole (pronounced sol-'ay), a super-saturated Original Himalayan Crystal Salt® solution. One study demonstrated that mineralized water increased hydration indicators by 10% and effectively stabilized pH [79].

Protein

Protein is essential for hormone production, healing and repair, and increasing satiety or feelings of fullness. Daily protein requirements vary depending on age and activity. It is recommended that you work with your healthcare provider to determine your optimal intake.

Ideal protein intakes remain a topic of ongoing research, though the optimal amount appears to be more than the RDA, which is 0.8 g/kg/day [80]. For example, the International Society of Sports Nutrition (ISSN) recommends that athletes and exercising individuals consume 1.4–2.0 g/kg/day, whereas the PROT-AGE Study Group recommends at least 1.0–1.2 g/kg/day for older individuals (>65 years) [80, 81]. As a practical guideline, targeting 1.2—1.6 g/kg/day offers a balanced middle ground that likely meets the needs of most men.

Include proteins, such as:

- Animal-based options, such as:
  - Grass-fed meat (beef, bison, buffalo, lamb)
  - Pasture-raised eggs
  - Pasture-raised poultry (chicken, turkey)
  - Wild-caught fish (sardines, salmon, tuna)
- Plant-based options, such as:
  - Beans and legumes
  - Nuts and seeds
  - Tofu and tempeh
  - Whole grains

Despite the importance of protein in the diet, increased total meat and processed meat intake may be associated with an increased risk of prostate cancer [82]. Processed meats include products such as deli meats, bacon, sausage, and hot dogs. However, this association may be due to the high-heat cooking methods, such as frying, grilling, and barbequing, commonly used to cook meat [83]. Such cooking methods create compounds called advanced-glycation end products (AGEs), which increase inflammation and may promote cancer development [84].

Fruits and vegetables

A plant-rich diet with adequate fruits and vegetables may support prostate health and prevent prostate cancer [85, 86]. Phytochemicals are bioactive plant compounds found in fruits, vegetables, and other plant products, including tea, whole grains, and legumes. A diet rich in phytochemicals may help reduce the risk of developing BPH and prevent prostate cancer [87]. Aiming to “eat the rainbow” is a fun way to include more anti-inflammatory and phytonutrient-rich plants in your diet. Eat one serving of each color of the rainbow daily.

White button mushrooms

Cancer alters normal immune responses and leads to immune-suppressive activity, allowing cancer to grow freely. In a paper published in 2024, researchers explored whether white button mushroom (WBM) extracts could inhibit the spread of prostate cancer by modulating immune cells that promote tumor progression during the cancer process [88]. In a small clinical trial, eight patients with prostate cancer were given 14 g of WBM tablets each day for three months. Compared to baseline blood samples, blood taken after the WBM intervention was reported to show a decrease in the pro-tumor immune cells and an increase in a type of immune cell called a T-cell, which plays a role in favorable immune outcomes. The researchers hypothesized that the compound that may support these findings is WBM's β-glucan content, and further research to differentiate it from other β-glucan types may help promote cancer research [88].

Beyond the specific immune-modulating effects of WBM extracts, research has also examined the relationship between whole mushroom consumption and prostate cancer risk, offering additional insights into the potential benefits of dietary mushrooms in supporting cancer. The results from a large cohort study (a study where a population is followed over several years), researchers investigated the relationship between whole mushroom consumption and the number of new prostate cancer cases [89]. Over 36,000 Japanese men were followed for 13 years, and it was reported that consuming mushrooms regularly was associated with a lower rate of developing prostate cancer, especially in older men. Specifically, eating mushrooms 1-2 times per week was associated with an 8% lower risk of prostate cancer, and eating mushrooms 3-4 times per week was associated with a 17% lower risk [89].

Fats and oils

Fats are essential for helping the body absorb the fat-soluble vitamins A, D, E, and K, and they are also incorporated into cell membranes for structure and function [90]. Some dietary fats, especially those from plants, have anti-inflammatory properties [91].

Include healthy fats, such as:

- Avocado
- Nuts: Almonds, walnuts
- Oils: Extra virgin olive oil, flaxseed, pumpkin seed, avocado, and sesame
  - For cooking: Avocado oil, butter, coconut oil, extra-virgin olive oil, ghee (clarified butter), sesame oil
  - Not for cooking, but for salad dressings and other non-heat preparations: Flaxseed oil, pumpkin seed oil

    To maintain the highest quality oil, always store oil in dark bottles away from heat sources

- Olives
- Seeds: Flaxseeds, chia seeds, sesame seeds, hemp seeds, and pumpkin seeds

Historically, evidence on the benefits of fish consumption and omega-3 fatty acids for prostate health is conflicting [92]. However, recent research finds no association between lean fish consumption and prostate cancer risk, potential protection against prostate cancer by omega-3 fatty acids, and no effect of omega-3 fatty acid supplements on cell proliferation in patients with prostate cancer [93, 94].

Though fats are an essential part of a healthy diet, high-fat diets rich in saturated and trans fats may promote prostate cancer by disrupting hormonal regulation, inducing oxidative stress and inflammation, changing the expression of growth factors, and altering lipid metabolism [83, 95, 96]. As such, a high-fat diet is considered a risk factor for prostate cancer [97]. To reduce your intake of saturated fats, limit consumption of high-fat animal products, including meats and full-fat dairy products. To reduce your intake of trans fats, limit consumption of foods such as commercial baked goods, pizza, microwave popcorn, and fried foods.

On the other hand, low-fat diets may decrease testicular testosterone production, and it's recommended that dietary fat intake not fall below 25% of daily energy intake [104].

Working with your healthcare provider to determine your optimal fat intake is recommended.

Whole grains

Whole grains provide fiber, which can support healthy blood sugar balance and lower the risk of insulin resistance. Lowering insulin resistance may support prostate health and prevent prostate cancer [61]. Whole grains also contain phytochemicals to support prostate health [99].

Unless otherwise indicated, include whole grains, such as:

- Brown rice
- Buckwheat
- Millet
- Oats
- Quinoa

Note: Choose gluten-free options as needed or as directed by your healthcare provider.

A note about glycemic impact

Foods with a high glycemic index are known to rapidly increase blood sugar. Including protein, fiber, or fat with meals containing carbohydrates can help reduce the meal's glycemic impact.

Reduce or avoid

- Suspected or known food sensitivities, intolerances, and allergies, such as:
  - Caffeine
  - Corn
  - Dairy products (cheese, milk, yogurt)
  - Gluten (e.g., barley, rye, spelt, wheat)
  - Peanuts
  - Shellfish

Note: Work with your healthcare provider to determine whether you have any food sensitivities, intolerances, or allergies through laboratory testing or elimination from the diet.

- Processed/refined carbohydrates, which may cause blood sugar dysregulation and contribute to inflammation.
  - Breads, especially white bread
  - Chips
  - Crackers
  - Fruit juice
  - Pancakes and waffles
  - Pastas
  - Ready-to-eat cereal
  - Soft drinks
  - White flour
  - White sugar and other refined sweeteners
- Grilled foods [83]

Alcohol

Whether or not alcohol consumption is associated with prostate cancer is debated; however, it appears that high alcohol consumption, and binge drinking in particular, is associated with an increased risk of prostate cancer and an increased incidence of fatal prostate cancer [100, 101]. Given the many negative health consequences of alcohol consumption, it is best to reduce it [102].

Best Practices for Diet & Nutrition

Phytochemicals with Anti-Prostate Cancer Effects

Epigallocatechin-gallate (EGCG)** [103]

- Green tea

Glucoraphanin and Sulforaphane*** [114, 105]

- Broccoli, cabbage, cauliflower, kale

Lycopene* [106, 107]

- Apricots, carrots, papaya, pink grapefruit, pumpkin, rosehip, tomatoes, tomato paste, tomato sauce, watermelon

Natural Inhibitors of 5-alpha-reductase

Astaxanthin */** [108, 109]

- Algae, Arctic charr, Coho salmon, crab, crayfish, krill, rainbow trout, Sockeye salmon

Isoflavones*/** [110, 111]

- Soy products (e.g., soybeans, tofu, and tempeh)

Phytosterols (Beta-sitosterol) */** [110, 112, 113, 114]:

- Avocado oil, legumes, nuts, olive oil, seeds, soybeans, stinging nettle tea

Zinc** [115, 116]

- Cheese, oats, oysters, pumpkin seeds, shrimp, lentils, yogurt

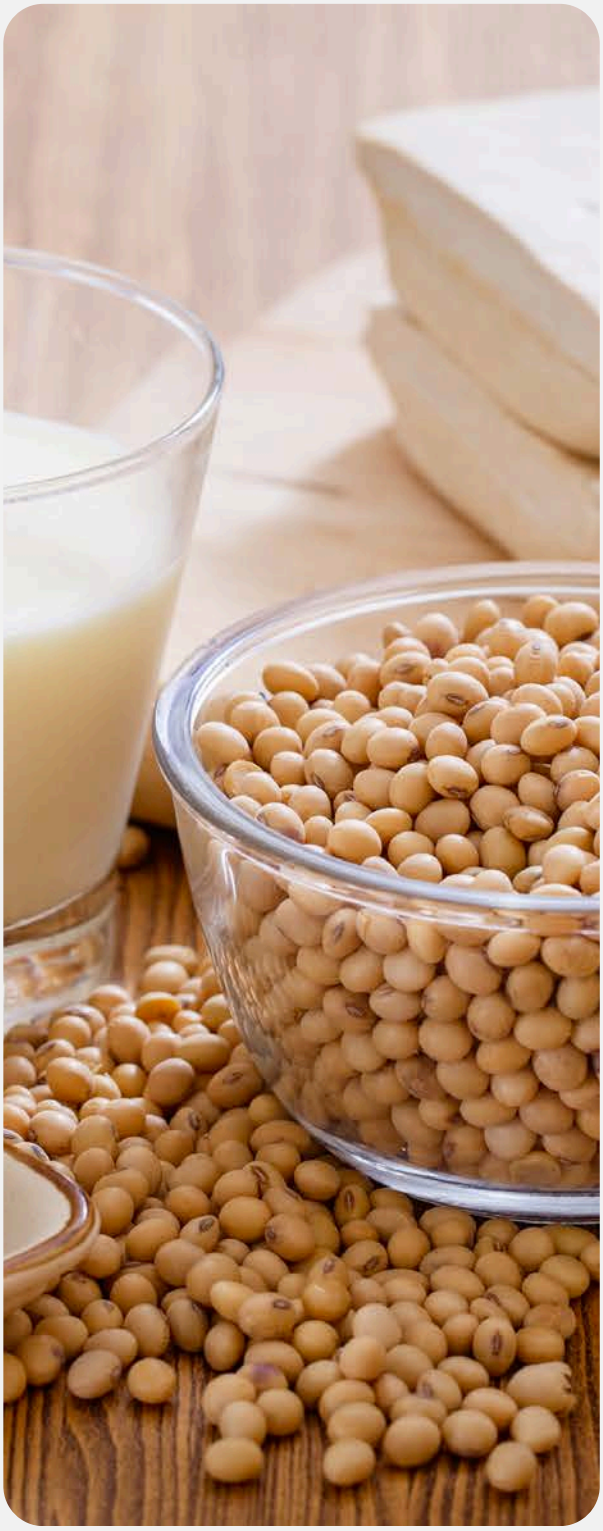
A 2025 study using 2008-2018 NHANES data from nearly 15,000 males identified an association between reduced risk of prostate cancer and supplemental intake of vitamin B1 (thiamin) and vitamin B2 (riboflavin) after adjusting for factors such as age, BMI, alcohol intake, and hypertension [117]. These findings are observational and do not establish cause and effect; further research is needed to understand the potential role of these nutrients in prostate health.

Is soy safe for men to eat?

It is a common belief that men should not eat soy due to its phytoestrogen content. Phytoestrogens, including isoflavones, are plant compounds with a similar structure to estradiol [118, 119]. They can exert a weak or even anti-estrogen effect on estradiol receptors (ERs), including ER-alpha and ER-beta. Isoflavones, which are found in soybeans and legumes, have a stronger affinity for ER-beta compared to ER-alpha [120]. Coincidentally, prostate cells have a higher expression of ER-beta, which may be the mechanism by which isoflavones protect against prostate cancer [120, 121]. Isoflavones also have antioxidant properties, which may further influence their effect on prostate cancer [120].

Most recently, a 2024 meta-analysis concluded that soy consumption lowers the risk of prostate cancer, particularly when it is low-grade or localized prostate cancer [122]. The study also found that race may impact the effectiveness of soy against prostate cancer, with African Americans and Latinos benefitting the most.

Unless an individual has an allergy or sensitivity to soy, incorporating soy foods, such as edamame, tofu, or tempeh, into the diet may offer notable health benefits for prostate health.



The Gut-Prostate Axis

Emerging research suggests that the gut microbiome may be involved in prostate cancer, possibly by influencing the immune system, metabolism, and inflammation [123, 124]. It is also suggested that benign prostatic hyperplasia could induce changes in the gut microbiome by decreasing the abundance of *Lactobacillus* [125, 126]. Additionally, *Escherichia shigella* appears to increase the risk of benign prostatic hyperplasia, though more research is needed [124]. In animal models, astaxanthin, mentioned above, is shown to improve prostate inflammation by increasing Akkermansia muciniphila in the gut microbiome [126]. Given the diverse effects of the gut microbiome on the prostate and beyond, supporting its health is a good idea.

What to eat to support the gut microbiome:

- Fermented dairy products, such as yogurt and kefir [127]
- Fermented plants, such as kimchi, sauerkraut, miso, and natto (fermented soybean) [127].
- Polyphenols from colorful fruits and vegetables [128]
- Prebiotics from plants, such as onions, whole grains, beans, and legumes [128]

Fermented foods can be consumed daily, and products like kimchi and sauerkraut can contribute to your daily vegetable intake [129]. For those unaccustomed to eating fermented foods, it may be best to start with small servings and gradually increase your intake to reduce unwanted digestive symptoms, such as bloating and gas.

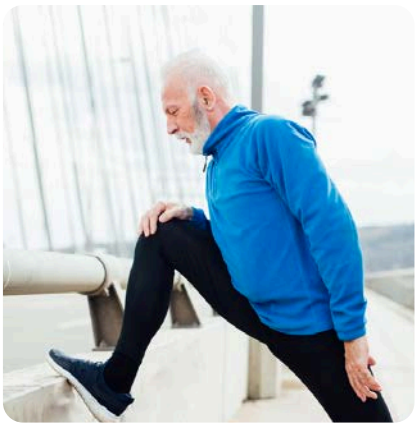
If you suspect issues with your gut microbiome, such as infection, it is best to work with your healthcare provider to receive proper testing and treatment.

Exercise & Movement

Exercise is an important part of prostate health as it can support blood sugar balance, reduce inflammation, and help you maintain a healthy weight [130].

Walking for healthy blood sugar balance

Physical activity can increase insulin sensitivity, an important factor in hormone and prostate health [136]. Even the simple act of going for a walk after eating can reduce blood sugar (glucose) levels and the glycemic response to meals [131]. One study found that after consuming approximately 70-80 grams of carbohydrates at breakfast (considered high carbohydrate in this study), those who walked at a moderately intense pace (defined as 120 steps per minute or 3.56 miles per hour) for 15 minutes had an approximately 20% lower blood glucose peak compared to those who remained seated after eating breakfast [131].



To do so, it's recommended to walk or do other light-to-moderate intensity exercises for 15-30 minutes after eating [132]. For best results, it's best to time exercise with the post-meal glucose peak. Healthy individuals can begin to exercise 15 minutes after eating as blood glucose peaks 30 to 60 minutes after eating. However, those with type II diabetes often experience glucose peaks 1 to 2 hours after eating and may benefit from waiting 30 minutes after meals to begin exercise.

DHT, exercise, and muscle

Given the role of androgens in muscle growth and function, one may be concerned with the impacts of exercise on DHT and vice versa [133]. DHT's involvement in exercise performance and muscle is not well understood, but it is worth noting that DHT is mostly found in tissues such as the prostate, hair follicles, liver, and skin rather than muscle [98]. Nevertheless, we discuss some common concerns in this section.

First, there may be concern over exercise-induced increases in DHT levels. In a study on healthy males, DHT increases immediately after exercise; however, it returns to baseline after 60 minutes [134]. This is an important distinction for those who want to lower DHT levels while also taking advantage of the many health benefits of exercise.

Second, there may be concern over DHT and exercise adaptations. Indeed, it is possible that exercise-induced increases in DHT levels could be involved in muscle protein synthesis [135]. However, one study reports that reducing DHT levels via 5-alpha reductase does not negatively affect muscle, particularly in those with adequate testosterone levels [136]. However, this topic is not well understood and needs more research.

Lastly, there may be concern over the performance effect of DHT inhibition. Though limited, evidence from animal research suggests that DHT impacts exercise metabolism, and inhibiting DHT production during endurance exercise may shift substrate or fuel use from fat to carbohydrates [137].

For active individuals concerned with the interplay between DHT and exercise, especially for those taking steps to control DHT levels for prostate health, it may be best to focus on the well-known and effective strategies for improving exercise performance and muscle growth. These include, but are not limited to, consuming an adequate diet, having an effective training regimen for your goals, incorporating evidence-based ergogenic aids, and prioritizing restful sleep.

Maintaining healthy testosterone levels is another critical factor for exercise performance and muscle growth. Testosterone levels may be negatively affected by low-calorie diets, low fat intake, deficiencies in vitamin D and zinc, and chronic inflammation, to name a few [98].

Some tips to help you move more

Do what you enjoy! For some, this may mean going to the gym and hitting the elliptical and weights. For others, it can be the pool, and still others, the dance floor. Find a combination of activities that you enjoy!

Add some resistance activities. Consider squats, lunges, push-ups, using resistance bands, weights, and/or bodyweight exercises to give your large muscle groups some additional attention. Moderate to high-intensity resistance exercise stimulates testosterone production, especially when multi-joint movements (e.g., squats), short rest periods, and higher volumes (i.e., more repetitions and sets) are used [138]. If it is safe for you to do so, it may be best to use free weights rather than machines, as this recruits more muscle mass to maintain balance [139, 140].

The pool is a great place to combine aerobics with the natural resistance the water provides. It is ideal for older people and some disabled people.

Find a buddy or group to work out with or to participate in classes or activities. Consider joining a hiking group, dance class, yoga, Pilates class, soccer team, golf, tennis, or others.

Consider when you feel best exercising and schedule a time with yourself for exercise. Hire a personal trainer to keep you accountable. Is there a gym on the way to/from work to make it easier to stick with?

Remember to support your exercise with proper nutrition. This combination will give you the energy you need to perform, recover, and feel great while moving.

Seek assistance from a trained professional to create the ideal exercise routine. With their support, you can ensure exercise meets your experience level, preferences, schedule, and addresses any health or joint concerns (e.g., back or knee problems).

Lifestyle & Environment

Having a healthy lifestyle plays a vital role in prostate health, even among men who have a high genetic risk of prostate cancer [141]. This is encouraging news, given that prostate cancer is highly heritable. Some evidence suggests a healthy lifestyle is most beneficial for those with the highest genetic risk for prostate cancer [141]. Such lifestyle components include maintaining a healthy weight, exercising, and not smoking [142].

Sleep

Sleep disorders may be considered a risk factor for prostate cancer [143]. When sleep is insufficient or disrupted, there is increased inflammation, dysregulated melatonin production, and immune system suppression [144]. Research findings on sleep and prostate cancer risk are mixed as some studies found prostate cancer risk increased with short-duration sleep, whereas others did not [144].

One recent study found that men with evening chronotypes (i.e., they go to sleep later in the evening) who experience more than one hour of sleep deprivation doubled their risk of prostate cancer [144]. Sleep deprivation was defined as the difference between sleep duration during weekdays vs. weekends and was averaged across the lifetime. Another study found that men who woke up for more than 60 minutes after going to sleep had an increased risk of prostate cancer [145].

Considering the importance of sleep for overall health and its potential connection to prostate cancer, incorporating healthy sleep habits into your routine may have far-reaching health impacts.

The following tips can help you get quality sleep:

- Adhere to a sleep routine to the best of your ability by having a regular sleep-wake schedule.
- Dim lights two hours before bed.
- Sleep in a dark room or use an eye mask.
- Use the plant melatonin supplement, Herbatonin®, when appropriate.
- When waking at night to use the restroom, avoid turning on lights unless it is unsafe.

Additionally, managing your stress levels and finding healthy outlets for stress is supportive of sleep.

Community

Some evidence shows that single men and widowers have an increased risk of prostate cancer [146]. In widowers, the cancer was characterized by tumors that had already spread beyond the prostate by the time of diagnosis. It's possible that social support, such as that found in marriages, promotes a healthy lifestyle and more proactive medical care. In men with prostate cancer, better overall survival is seen in married men compared to widowed or unmarried men [147]. In this study, widowed or unmarried men were more likely to live alone. Together, this research implies that surrounding yourself with those you care about may benefit your health.

Environmental contaminants and prostate health

The prostate can be negatively affected by environmental contaminants, especially for those exposed during critical windows of development, such as during pregnancy and in newborns [148]. Exposure to chemicals like bisphenol A (BPA) from fetal life through adulthood can disrupt hormones and contribute to benign hyperplasia and prostate cancer in adult and elderly men [148]. Though the use of prostate-specific antigen (PSA) to identify prostate cancer is debated, one recent study found that urinary BPA was positively correlated with PSA in older males [149].

Sources of BPA include [150]:

- Canned foods
- Plastic food containers
- Plastic glasses, bowls, cups, and utensils
- Plastic water bottles
- Polluted drinking water
- Seafood and freshwater fish from polluted waters
- Thermal paper (e.g., receipts)

When food products with BPA packaging can't be avoided, it is best to minimize heating and storing high-fat foods in the packaging as this can increase migration of BPA into food [157].

It's also possible that toxin exposure causes epigenetic changes across generations, which means that steps taken to reduce toxin exposure today may reduce the risk of prostate disease for one's children and grandchildren [150].

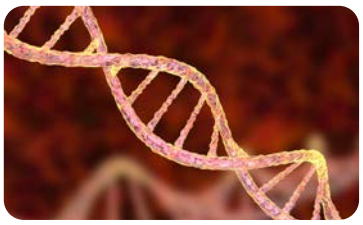
Genetics

As mentioned, prostate cancer is considered highly heritable, which means there is a strong genetic component to its development [141]. Prostate cancer heritability can be attributed to common single nucleotide polymorphisms (SNPs) and rare but significant genetic variants, such as BRCA2 mutations, which predispose individuals to aggressive prostate cancer [152, 153]. Mutations in ATM and NBN genes are also associated with aggressive prostate cancer [154]. ATM and NBN genes help maintain DNA integrity and repair double-strand breaks, respectively [155, 156].

Whereas a mutation is a change in DNA base pairs, a SNP is a change in a single nucleotide [157, 158]. More than 100 SNPs are associated with prostate cancer, and their effects appear to accumulate when in combination compared to individual SNPs [158]. For example, a SNP in the CYP19A1 gene, which encodes the aromatase enzyme and drives the conversion of estrogens to androgens, is associated with prostate cancer progression [158, 159]. When combined with SNPs in the genes HSD3B1 and HSD17B4, there appears to be a cumulative effect on prostate cancer progression [158]. The HSD3B1 gene encodes an enzyme that synthesizes non-testicular testosterone and DHT, and changes in it can result in high androgen synthesis [160]. The mechanism by which HSD17B4 influences prostate cancer is not fully understood, but its overexpression is shown to increase prostate cancer cell proliferation and may be due to changes in cell metabolism [161].

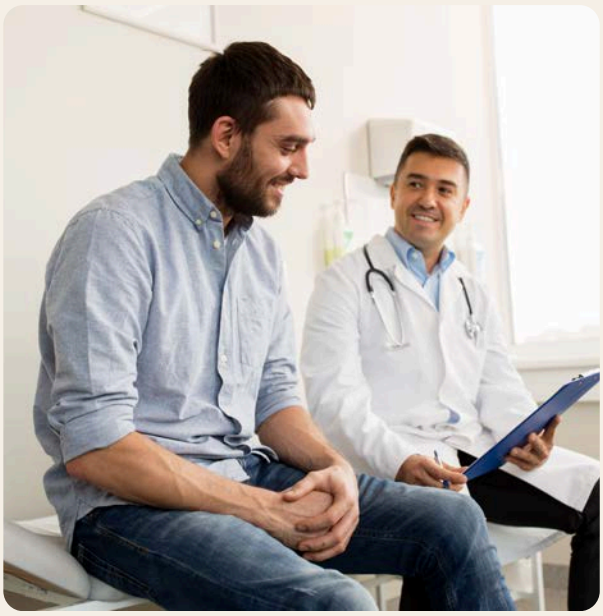
Other genes with SNPs associated with prostate cancer include [159]:

- COMT
- ESR1
- UGT1



Though genetic mutations underlie many diseases and cancers, it's worth mentioning that not all SNPs are harmful, and some may be protective against prostate cancer [157, 159].

Because prostate cancer research is ongoing, gene panels for assessing prostate cancer risk and disease aggressiveness are likely incomplete. However, those with a family history of prostate cancer may wish to speak to their healthcare provider about genetic testing to understand their individual risk better.

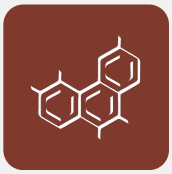


Many factors affect prostate health. Our goal is to help you improve prostate health with a "Whole Health" approach. This approach allows you to make changes in many areas of your life, from diet to exercise and more. If you are uncertain about certain areas of your health, working with a health professional who can customize a plan to meet your individual needs is best.

Summary

Empowerment & Knowledge

- The prostate gland produces a fluid that, together with sperm, makes up semen.
- Common prostate conditions include benign prostatic hyperplasia, prostatitis, and prostate cancer.
- Some health conditions can mimic symptoms of prostate problems, and it is important to speak with your healthcare provider if you suspect an issue.
- Declining androgens in aging men have been referred to as “male menopause” or andropause and are associated with low testosterone levels.



Hormones

- Testosterone is the most well-known androgen hormone associated with normal male development.
- Dihydrotestosterone (DHT), the most active and potent androgen, may be involved in prostate cancer and male pattern baldness.
- An increased estrogen/testosterone ratio is associated with prostate cancer initiation and progression.
- Revolution MacaFlow® may support overall prostate health by supporting cellular health and a healthy inflammatory response.

Diet & Nutrition

- Choose a dietary pattern that fits your food preferences, lifestyle, and beliefs.
- “Eat the rainbow” with foods from every color daily as they provide phytonutrients for prostate health.
- Reduce or eliminate food triggers.
- Focus on key nutrients for prostate health, such as lycopene, glucosinolates, and zinc.
- Incorporate fermented foods into your diet and consume a fiber-rich diet to support the gut microbiome.

Exercise & Movement

- Exercise can reduce insulin resistance, lower inflammation, and help you maintain a healthy weight.
- Walking after meals is one way to lower blood sugar levels and promote prostate health.
- Select activities you enjoy doing.
- Work with a personal trainer to develop a workout program that fits your needs and preferences.

Lifestyle & Environment

- A healthy lifestyle, including exercising, maintaining a healthy weight, and not smoking, plays an important part in prostate health.
- Sleep disorders may be a risk factor for prostate cancer.
- Having a sense of community may be important for promoting healthcare-seeking behavior and living a healthier lifestyle.
- BPA is a toxin that may be implicated in prostate conditions.
- Reducing BPA exposure may be especially important during critical periods of development, such as during pregnancy and in newborns.
- Genetic mutations and SNPs influence prostate cancer risk, and those with a family history of prostate cancer may wish to speak to their healthcare provider about genetic testing.

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