



# The Canadian Forces Health Services Group



# The Dietary Supplement Dilemma: Helpful *or* Harmful?

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The dietary and sports supplements industry in Canada has quickly grown into a staggeringly lucrative \$17 billion/year business. While manufacturers spend millions of dollars in multi-media advertising and marketing campaigns promising the “latest breakthrough” or “miracle cure,” it can be confusing for consumers to know the facts and potential dangers of performance enhancing products. Canadian Forces (CF) members, with a desire to meet their requirement to remain fit, healthy, and strong, are naturally curious about the

possible advantages of such substances. Whether you hear about sports supplements from your team mates in the locker room or the sales clerk at your local health food store, chances are that you are not getting the whole story about how supplements work and the risks you take by using them. The Canadian Forces Health Services Group wants you to have balanced information, from a military sports medicine perspective, about twelve performance enhancers that are commonly used by CF personnel.

## Know the **Facts** and **Bottom Line** about 12 performance enhancers commonly used by CF Members

### **What are dietary or performance enhancing supplements?**

Dietary supplements are products containing nutrients or other food components that you eat or drink in an effort to gain something that may be lacking in your diet or to gain an “edge” or “advantage” on the competition. They include such things as vitamins, minerals, herbs, amino acids, enzymes, metabolites, organ tissues, glandulars, or other plant products.

### **Dietary supplements come in many forms:**

- Tablets
- Capsules
- Soft Gels
- Gel Caps
- Liquids
- Powders
- Bars
- Gum
- Injectables

### **What attracts us to use dietary supplements?**

CF members are motivated to use such products for a variety of compelling reasons: personal fitness, appearance, competitiveness, high operational (physical) demands, fighting the effects of aging, and peer influence.

Marketing promises can be misleading:

- “Lose 30 lbs in one week without dieting or exercise!”
- Words like “*natural*” or “*drug free*” imply that they are harmless or safe.
- You will lose weight;
- Look better & sleep better;
- Build muscle mass;
- Enjoy an improved sex life; or
- Prevent and treat illnesses.

However, the industry has done little research to support the vigorous claims they make. In addition, there has not been adequate research on important issues such as risks, benefits,

adverse reactions (in the heat, cold or at elevation), the effects on judgement and reaction times, as well as the consequences of long-term use and drug interactions.

These products may be contaminated or spiked and some may be harmful especially when used excessively or in combination with other products.

The dietary supplement industry remains a largely **un-regulated industry** in the USA and an **under-regulated industry** in Canada.

### **Bottom Line:**

Do not depend on dietary supplements to make you successful. No supplement can take the place of:

- Hard training;
- Skills practice;
- Good nutrition;
- Appropriate rest; and
- Good genetics.

## Remember: *Exercise is Medicine!*

**M**ore information on the topic of dietary supplements, nutrition, and performance enhancers can be found at the following websites:

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

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

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

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

[www.asda.org.au/athletes/fact.htm](http://www.asda.org.au/athletes/fact.htm)

[www.ais.org.au/nutrition/supp.htm](http://www.ais.org.au/nutrition/supp.htm)

[www.cces.ca](http://www.cces.ca)

[www.wada-ama.org](http://www.wada-ama.org)

[www.cfsan.fda.gov/~dms/supplmnt.html](http://www.cfsan.fda.gov/~dms/supplmnt.html)

<http://vm.cfsan.fda.gov/~dms/ds-ill.html>

[www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food\\_guide\\_rainbow\\_e.html](http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_rainbow_e.html)

[www.army.mil](http://www.army.mil) (public affairs, icon of soldier, Hot Topics, Dietary supplements)

## Creatine

**What is it?** Creatine is made in your body. It is also found in raw meat and fish. Creatine is stored in muscles where it plays a major role in the immediate production of energy that can power muscle contractions for activities lasting 10 seconds or less. The amount that can be stored in muscles varies greatly from one person to the next. Once your muscle stores are full, you cannot store any more creatine no matter how much of it you eat. Creatine supplements are produced by many companies that are not under any regulatory control, and its quality can vary widely.

**Marketing claims:** *“Creatine increases muscle growth; enhances high intensity performance; and, it increases the length of time you can perform at maximum intensity for repeated efforts such as squats, sprints and bench presses.”*

**Facts:** Research shows that creatine can improve some peoples’ ability to perform repetitive high intensity exercise for very brief periods: 10 seconds or less. This means that during your bench-pressing routine, it might help you to do 1-3 more repetitions/set during maximum efforts. It is the ability to do this little bit of extra training that stimulates your muscles to grow, not the creatine itself. Coffee, tea and cola drinkers need to know that caffeine will prevent creatine from having any performance enhancing benefit. People who have naturally high creatine stores will find that taking creatine supplements is a waste of their hard earned money.

**Side Effects:** Creatine can cause certain side effects: water retention (approximately 2 kg), stomach cramping, nausea, diarrhea, sleep problems, muscle tightness, muscle cramps and compartment syndrome. These side effects can make it very difficult for some individuals to exercise. People often mistake the rapid early weight gain that occurs with creatine to be due to muscle gain. Wrong! It is actually due to the extra water that your body stores when you use this product. This water is rapidly lost when you stop taking creatine. Since the kidneys clear creatine from the body, people with kidney problems should be assessed by their physician before taking this product.



Photo credit: MCpl Frank Hudec,  
CF Combat Camera

### Bottom Line:

Creatine may help some people with low muscle creatine stores, who participate in repetitive high intensity activities that last 10 seconds or less. For endurance activities such as long distance running, creatine may actually decrease performance because of the weight gain that occurs due to body water retention.

*“I gained size and weight quickly when I started using creatine. I found that my strength and size gains were impressive after two months of hard work. The only problem was the amount of money I was spending, but I was determined to continue making gains. The only side effects I ever felt were occasional stomach cramps and having to urinate almost constantly. When the budget ran out and I was no longer on creatine, I quickly realized how much of my size was water and I shrunk quickly.”*

— Anonymous Testimonial by CF Member

## Ephedrine/Ephedra

**What is it?** Ephedrine is a drug that is similar to amphetamines. It can be artificially produced in a laboratory or extracted from the herb, Ephedra. Ephedrine is a common ingredient found in certain medications, weight loss products (“Fat Burners”) and performance enhancers (“Kickers”). It may be listed in products under more than forty different names including: Yellow Horse, Ma Huang, Desert Herb, Sea Grape, Joint Fir and Yellow Astringent.

**Marketing claims:** *“Ephedrine increases the body’s metabolic rate and reduces your appetite – both of these are helpful if you are trying to lose some unwanted pounds. It is a stimulant or “Kicker” that improves your athletic performance.”*

**Facts:** Short-term research has shown that ephedrine may promote a weight loss of 1 kilogram per month. Unfortunately, no long-term research has been published on this product. If you read the fine print, all these products say that to work best they should be used in combination with diet and exercise. Dieting and exercise alone can easily produce the weight loss results that are attributed to these products. As a stimulant, ephedrine can give you a psychological and physical boost large enough to improve your athletic performance – this is one of the reasons it is considered a banned substance by the World Anti-Doping Agency.

**Side Effects:** Ephedrine can cause many serious side effects: increased blood pressure, heart failure, seizures, heart rhythm problems, psychosis, heart attacks and strokes. Ephedrine is especially dangerous when taken with caffeine, particularly if you are exercising intensely in hot weather. In recent years, a number of elite athletes have died this way. As a result of these problems, ephedrine has been banned as a dietary supplement in both Canada and the United States. If you have been prescribed a medication that contains ephedrine, be certain to use these products as directed by your physician.



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### Bottom Line:

Ephedrine is a potentially dangerous product, especially when used in combination with caffeine. The risks associated with its use are far greater than the small short-term weight loss or energy boost that it has been shown to produce.

**“I took Ephedrine, a weight loss/ripping supplement. The bottle cost \$75 and I think a bottle should last a person 3 weeks. You are supposed to take 4 pills a day, but I only took one a day for 3 days and stopped. I was sweating like crazy and felt very restless with an accelerated heart rate. I just couldn’t relax!”**

— Anonymous Testimonial by CF Member

## Protein Powders

**What is it?** Protein powders are one of the most popular dietary supplements on the market. Proteins are the building blocks for many body tissues such as muscles, tendons, hormones, etc. Structurally, all proteins are made up of amino acids. Protein powders contain amino acids from many different sources including whey, soy, whole egg, cow's milk, egg white, fish, beef, chicken, casein, beans and peanuts.

**Marketing claims:** *“Protein powders will help you to build larger muscles and provide you with greater exercise stamina.”*

**Facts:** Only resistance training activities will stimulate muscle growth. Since the body recycles most of the protein you break down during exercise, you only need to eat a small amount of protein to meet your body's need to build and repair. The average Canadian Forces member's diet contains more than enough protein to meet the needs of the hardest working athletes in the world. For example, a 90 kg service member who is preparing for the Nijmegen march will have his/her daily protein needs met by eating two chicken breasts. Eating more protein than your body needs will not promote extra muscle growth. Any extra protein will be converted into either glucose or stored as fat.

**Side Effects:** Eating large amounts of protein can give you an upset stomach and diarrhea. Unfortunately, all the protein you eat, in excess of your body's needs, will be stored as fat rather than muscle.



### Bottom Line:

If you are eating a properly balanced diet as outlined in *Canada's Food Guide to Healthy Eating*, using protein powders is a waste of your hard earned money and will only contribute to the building of your fat stores and not your muscle mass.

*“When I was a young pup around 1998, I was using excess amounts of protein supplements. The results were good, but when I did my medical, they found that my cholesterol was elevated. For the first time in my life, my cholesterol was out of whack! When I stopped all the supplements, it went back to normal.”*

— Anonymous Testimonial by CF Member

## Multi-vitamins, Minerals and Herbal Preparations

**What are they?** These products contain a wide variety of substances such as vitamins, herbs, amino acids, fatty acids, minerals, trace elements and anti-oxidants. Their ingredient lists typically include vitamins A, B, C, D, E, beta-carotene, zinc, copper, selenium, calcium, niacin, conjugated linoleic acid, riboflavin, thiamin, fish oil, garlic, iron, folic acid, magnesium, manganese, echinacea, chromium, co-enzyme Q10, iodine, potassium, and just about anything else you could imagine. Many of these ingredients are found in the foods that you eat as part of a nutritious well balanced diet. Multi-vitamins/minerals and herbal preparations are marketed under the assumption that most people are too busy to eat a proper diet and the more you exercise the more vitamins your body will need.

of people who might benefit from using these products includes those who are dieting severely, strict vegans (eat no food that comes from animal sources), people with certain medical problems, travelers who spend a long time in areas where it is hard to get good nutrition and those who live on a diet consisting primarily of junk food. Taking vitamins/minerals and herbal preparations instead of eating well *will not* provide your body with everything it needs for good health and performance.

**Side Effects:** These products are generally safe to take unless you are allergic to one or more of the ingredients. As noted, excessive intake of fat-soluble vitamins can cause serious medical problems.

### Bottom Line:

Few people need to take multi-vitamins/minerals or herbal preparations to meet their nutritional needs. Exceeding these nutritional needs will not improve your health or your performance, but it will reduce the amount of money you have to spend on other things such as a trip to the Caribbean. If you take the time to train well, be sure to take the time to eat well.



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**Marketing claims:** *“These products can do an amazing number of things: give you more energy, prevent diseases, cure illnesses, improve your complexion, increase your memory, enhance your sex life, increase your confidence, prevent hair loss, promote weight loss, boost your immune system, improve your eye sight, alter your mood, and even reduce the effects of aging.”*

**Facts:** If you are eating a nutritious, well balanced diet, taking many multi-vitamins/minerals or herbal preparations has little to offer you in terms of improved health or enhanced performance. Taking these products in large amounts can lead to their build up in the body and this can cause some serious health problems – this is especially true for the fat-soluble vitamins (A, D, E and K). The small number



## Anabolic Prohormones

**What are they?** Anabolic prohormones are substances that are manufactured in the body and are structurally similar to anabolic steroids. They can also be synthesized in a laboratory. In the human body, prohormones are part of a complex pathway that ultimately leads to the production of several hormones including testosterone and estrogen. The most commonly sold prohormones are: androstenedione (also referred to as “andro”), androstenediol, and dehydroepiandrosterone (DHEA).

**Marketing claims:** *“Anabolic prohormone supplements will be converted into testosterone in the body. This boost to testosterone is the equivalent of taking an anabolic steroid and so will: decrease recovery time after workouts, improve personal energy, build muscle, and improve strength.”*

**Facts:** Only very small amounts of these substances are converted into testosterone in the body and not in amounts that have been shown to improve performance. The research shows that taking anabolic prohormones does not produce any extra muscle or strength gains, even in people who are pumping massive amounts of steel on a regular basis. In fact, most of these substances are converted into other hormones such as estrogen and these substances can cause some serious side effects.

**Side Effects:** Significant side effects include: male breast development (gynecomastia), male pattern baldness, aggressive behaviour, masculinization of females and significant decreases in your blood’s high-density lipoprotein (HDL) levels. HDL is the “Good” cholesterol that helps keep your blood vessels from becoming clogged with fat deposits. By lowering your HDL value, anabolic prohormones will put you at greater risk of having a heart attack. You also need to realize that these products often contain substances that are not listed on the label and these “hidden extras” can also cause some serious side effects.

### Bottom Line:

Prohormones do not increase the production of testosterone to a level sufficient to enhance physical performance and can produce side effects that could seriously endanger your health.



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## Caffeine

**What is it?** Caffeine is the most widely used drug on earth. It is a central nervous system stimulant like amphetamines. Caffeine is found in many products: some medications, coffee, tea, espresso, cappuccino, chocolate, guarana and cola drinks such as Red Bull, Coca Cola, Pepsi and Jolt Cola. Some of these drinks are quite potent. For example, a 2-ounce cup of espresso contains 3 times the caffeine of a regular can of Coke. Caffeine is very common ingredient in weight loss products where it is often combined with other drugs such as ephedrine and aspirin. Athletes have been using caffeine to enhance performance for decades, and many students have relied on caffeine to keep them awake while they cram for their final exams. The Canadian Forces is studying the use of products such as caffeine gum to help soldiers remain more vigilant during long and demanding operational taskings.

**Marketing claims:** *“Caffeine increases mental alertness (keeps you awake), elevates metabolic rate (weight loss), reduces appetite (weight loss), improves endurance performance (work longer / harder) and reduces the feeling of being tired when you are working intensely (work longer / harder).”*

**Facts:** Caffeine can produce all of the above performance enhancing benefits provided it is taken in the correct amounts. It works better for some people than it does for others. The ideal dose is approximately 2 cups of regular coffee for a 70 kg person. Consuming more than this will *not* improve your performance and could cause a number of side effects that actually hurt your physical and mental performance. If you are planning to use caffeine before an athletic competition, try it before some practices to know how it will affect you. On its own, caffeine has not been shown to promote weight loss.

**Side Effects:** Excessive caffeine intake can cause the following: anxiety, jitters, sleep difficulties, reduced concentration, diarrhea, irritability, increased blood pressure, calcium loss and irregular heart beats. These side effects could really cause problems for people who perform tasks that require high concentration and steady hands such as pilots, surgeons and snipers.



### Bottom Line:

Caffeine is a very effective performance enhancer provided it is taken in the correct amounts and for the right activities.





## Echinacea

**What is it?** Echinacea is an herb from the daisy family, and it also known as the purple coneflower herb. Aboriginal people in North America have used Echinacea for centuries, and it is currently one of the most popular dietary supplements with CF members. There are nine species of Echinacea, but the roots and leaves of Echinacea purpura, Echinacea pallida and Echinacea angustifolia are the most commonly used for the production of supplements. Echinacea is available as a liquid, capsule, tablet, powder, lozenge, tea or as an injection.

**Marketing claims:** *“Echinacea boosts the function of the immune system, and it is effective against two of the most frequently seen illnesses: the common cold and the flu. It is also claimed that Echinacea can reduce the immunosuppressive effects of intense physical exercise.”*

**Facts:** Studies have shown that Echinacea does help the immune system deal with the common cold/flu. It is most effective when taken at the first signs of a cold/flu and it should be discontinued once your cold/flu symptoms have gone. Exactly how it works is uncertain, but it may improve the function of some immune cells; increase the production of certain cells; and, it may reduce the immunosuppressive effect of certain hormones produced in the body. There is some evidence that Echinacea may reduce the incidence of the common cold in athletes who are training intensely.

**Side Effects:** Very few side effects have been reported from using Echinacea. Since Echinacea stimulates the immune system, it should not be used by people with autoimmune diseases or systemic illnesses such as systemic lupus erythematosus (SLE), scleroderma, HIV/AIDS, tuberculosis and multiple sclerosis. People who are allergic to plants in the daisy family should not use Echinacea. Echinacea can also cause allergic reactions in people with asthma or allergies to grass pollens. Echinacea may decrease the effectiveness of immune-suppressing drugs such as corticosteroids (Cortisone and Prednisone) and could increase the risk of liver damage when taken with drugs such as anabolic steroids, Amiodarone, Methotrexate and Ketoconazole.



### Bottom Line:

Echinacea does appear to help shorten the length and intensity of the common cold/flu especially if it is taken at the very beginning of your symptoms. It is uncertain if taking Echinacea on a daily basis is effective in reducing the chances of catching a cold/flu. While Echinacea is generally very safe, there are certain people who should not use this product.



## Glucosamine

**What is it?** Glucosamine is a building block that is needed for the production of healthy joint cartilage. It is a dietary supplement that is prescribed by many health care professionals for patients who have osteoarthritis. It is found in many of the over-the-counter products that are sold in pharmacies and health food stores. Glucosamine is often combined with other joint health products such as chondroitin sulfate and MSN. It is relatively inexpensive and at the proper dose of 1500 milligrams/day can cost as little as \$5/month. It is available through prescription at all Canadian Forces pharmacies.

**Marketing claims:** *“People who suffer from excessive wear and tear in their joints should use glucosamine because it will decrease joint pain; increase joint mobility; decrease joint swelling; and, as a result of these changes, will improve the individual’s overall ability to function.”*

**Facts:** The research shows that glucosamine can substantially improve the function of some people with osteoarthritis. In some studies, it has also been shown to help re-build damaged joint cartilage – nothing else we know of does this. There are people who “respond” to the use of this supplement and there are others who, for unknown reasons, do not. You should take glucosamine on a daily basis for 3 months before you decide if it is working to reduce your symptoms of arthritis.

**Side Effects:** Very few side effects have been reported with glucosamine use: stomach upset, and increased intestinal gas. People with sulfa allergies should avoid glucosamine as these products have sulfate molecules. Glucosamine is made from the shells of crustaceans and so should also be avoided by people with shellfish allergies.



### Bottom Line:

For some people with excessive joint wear and tear, glucosamine offers a very safe way to reduce the symptoms they are experiencing and perhaps may even help to rebuild some of their damaged joint cartilage. If you are doing a heavy training program, work in a job that is physically very demanding or have a family history of arthritis, using glucosamine may also help you prevent or reduce future problems.

*“In the 80’s, I took supplements by the bottles: amino acids, ornithine, arginine, desiccated liver, brewers yeast, anabolic vitamin megapack, etc. I also took glutamine, which gave me a good pump (vascular pressure increase), but no strength benefits or size increases. Immediately after stopping the glutamine, the effect was gone. It seems to work only while taking it. After taking all these things, I am hoping my health will not be affected long term.”*

– Anonymous Testimonial by CF Member

## Glutamine

**What is it?** Glutamine is the most abundant amino acid found in muscle tissue and plasma. Glutamine is made by the body, and it is also found in many protein rich foods such as meat, chicken, fish, milk products, cheese and legumes. Glutamine is used as a fuel source by a wide variety of body cells, including some of the cells in your immune system that work very hard to keep you from getting sick. Stresses such as intense exercise, infection, trauma or surgery all reduce the body stores of glutamine. Glutamine is one of the most popular anti-catabolic supplements on the market and is available in capsules, pills, powders and sport beverages.

**Marketing claims:** *“Glutamine prevents the breakdown of muscle after exercise and, therefore, helps with muscle gains while reducing the incidence of injury; it enhances the functioning of the immune system so that athletes who are training intensely will get sick less often; and it helps prevent overtraining syndrome.”*

**Facts:** There is no evidence that glutamine helps build muscle mass or improves exercise performance in weight training athletes. Studies to determine if glutamine supplements can improve immune function and reduce the incidence of illness in individuals who are training intensely are mixed – with some showing some benefit and others showing none. Greater research is needed in this area.

**Side Effects:** To date, no side effects have been reported with glutamine use. It should be noted that no studies have looked at the effects of its long-term use.



### Bottom Line:

Using glutamine to help build muscle is a waste of your money. Whether glutamine can be used to reduce the incidence of illness during intensive training periods remains to be determined through further research.

*“Two years ago, I decided to invest more money and got myself a personal trainer who does my work out programs and plans my diet. At this point, I started noticing good differences. I do continue to take the protein supplements, and I have found they work. The way I see things now is: Supplements work (protein anyway) if used in conjunction with a lifestyle change - general healthy living - people shouldn't expect them to work if they just believe what the commercials for the supplements say. I also use glutamine. I feel that it reduces my recuperation time between workouts. I'm not sure it is a placebo effect or not.”*

– Anonymous Testimonial by CF Member



## Anabolic Steroids

**What are they?** Anabolic steroids are synthetic substances that are structurally very similar to the male sex hormone, testosterone. They include such drugs as Anador, Stanozolol, Androlin, Nandrolone, Dianabol, Nandrol, Danazol, THG, Fortabol, Androl and Deca-Durabolin. Some anabolic steroids are made in legitimate laboratories, and they are used in the treatment of specific medical problems. Unfortunately, most of the anabolic steroids being sold on the street are produced on the black market where there is no quality control. Chemical analysis of some of these products has shown some containing nothing more than car polish colored with urine. It is estimated that more than 1 million North Americans are currently using anabolic steroids.

**Marketing claims:** *“Anabolic steroids build muscle, reduce the recovery time needed after exercise, increase energy, enhance aggressiveness, as well as increase calcium levels in bone and elevate hemoglobin levels.”*

**Facts:** There is a large volume of scientific research that shows that anabolic steroids do work. In combination with a well balanced diet and an intense resistance training program, they can help body builders and power athletes gain lean muscle mass. Endurance athletes use them to help them recover and repair tissues faster between workouts so that they can train harder, longer and more often.

**Side Effects:** Anabolic steroids have the potential to cause some very serious side effects. The dangers were discovered from studying people taking relatively low doses of anabolic steroids. We know very little about what will happen to those people who admit they are taking extraordinarily large amounts of these substances. We also know very little about the long-term consequences of anabolic steroid use, but many East German athletes are currently suffering greatly as a result of their steroid use in the 1970's and 80's. Females taking anabolic steroids experience masculinization: increased body hair, reduced breast size, deeper voice, clitoral enlargement, male pattern baldness and menstrual irregularities. Unfortunately, most of these changes are permanent. Strangely enough, for males the side effects are feminizing: decreased testicle size, reduced sperm count, impotence, enlarged prostate, and breast development. There are also a set of side



effects that are common to both sexes: increased blood fats, acne, elevated blood pressure, decreased immune function, infectious diseases, aggressiveness, sleep problems, paranoia, joint pains, tendon ruptures, hallucinations, cancer, hepatitis and liver tumors.

### Bottom Line:

While anabolic steroids work to build muscle and increase endurance, these dangerous substances should be avoided because of their long list of potentially serious side effects. In addition, there is no way of knowing what black market products actually contain. Many of them have contaminants that could be very harmful to you or your friends.

## HMB

**What is it?** HMB is also known as beta-hydroxy-beta-methylbutyrate and is produced when leucine (an amino acid) is broken down in the liver and muscle tissues. Good food sources of HMB include catfish, squash, avocado, cauliflower, asparagus, cheese and grapefruit. HMB was first used on farms where studies showed it increased the lean muscle mass and enhanced the functioning of the immune system of farm animals. Based on these results, researchers began using HMB on humans hoping it would produce the same effects. HMB is sold as tablets, capsules and in combination with many other supplements.

**Marketing claims:** *“HMB can reduce the breakdown of muscle after exercise, improve strength, increase lean muscle mass, reduce body fat, decrease cholesterol levels and reduce blood pressure.”*

**Facts:** To date, the research on HMB is inconclusive with some studies showing it works and other studies showing it does not. In the studies involving unfit subjects, HMB appeared to be of some benefit. On the other hand, in the studies involving fit subjects, HMB was not found to be helpful.

**Side Effects:** No side effects have been reported from the use of HMB.

### Bottom Line:

The jury is still out on HMB. At the moment, the best that can be said is that HMB may be useful when training people who are unfit. HMB has not been proven to be helpful for fit people.

## Ginseng

**What is it?** Ginseng is an extremely popular supplement that has been used for centuries. It is sold as a single product, and it is also found as an ingredient in many other dietary supplements. Ginseng is extracted from the root of the Ginseng plant and comes in four basic types: Chinese/Korean, American, Siberian and Japanese.

**Marketing claims:** *“Ginseng decreases muscle breakdown after exercise; increases aerobic capacity; increases the time it takes to become exhausted while performing intense exercise; improves memory; increases alertness; and, enhances the ability to think.”*

**Facts:** Ginseng has been extensively studied and there is no scientific evidence that it can provide any of the above benefits.

**Side Effects:** Ginseng has been reported to cause various side effects: diarrhea, skin rashes, euphoria, nervousness, irritability, increased blood pressure, swelling and difficulty sleeping.

### Bottom Line:

While people have used ginseng for centuries to treat a wide variety of problems, there is no scientific evidence that it provides any health or performance enhancing benefit. Save your money and buy yourself a new pair of running/walking shoes.



## **Top Fuel For Top Performance: Nutrition For Action**

Proper nutrition is fundamental to your performance during training at home and while deployed. If you are serious about getting the most out of your training, it is vital that you regularly supply your body with nutritious food to deliver maximum performance.

### **Top Fuel Tips**

1. Fuel up with quality foods at breakfast, as it is the most important meal of the day.
2. Eat every 3 to 4 hours to stay energized throughout the day.
3. Include foods from all 4 food groups in your meals:
  - Grain products
  - Vegetables and fruits
  - Milk products
  - Meat and alternatives
4. Balance is the key. About 2/3 of your plate should be covered with grain products, vegetables and fruit and 1/3 covered with protein foods. For example 8 crackers, an apple and a slice of cheese.
5. Carbohydrates are found in breads, cereals, grains, beans, peas, lentils, vegetables, fruit, milk and yogurt.
6. Protein-rich foods include meat and alternatives, milk product, nuts, seeds, tofu, and eggs.
7. Remember hydration – fluid intake is very important. In hot environments choose drinks that replace electrolytes. Dehydration forces the heart to work harder and can make it difficult to perform normally easy tasks.
8. **Before physical activity** – for best performance, consume foods rich in carbohydrate 1-2 hour before training. This allows time for blood sugars to stabilize and your stomach to empty. Some people add a little protein or fat to keep the stomach satisfied for longer.
9. **During physical activity** – for physical activity lasting greater than 1 hr, fuel early and often with 30-60 g/hr of easily digested carbohydrates.
10. **After physical activity** – because muscle is primed to absorb glucose faster immediately after you exercise, it is important to refuel 15-30 minutes after your workout with foods rich in carbohydrate and a little protein.

### **Fluid Needs**

Hydration is critical for optimal performance and recovery. Drink early and drink often – preventing dehydration is much easier than treating heat related illnesses.

- Exercise dulls thirst. By the time you feel thirsty, you are already dehydrated.
- Weight loss of 2% of your body weight is a sign of dehydration and can ↓ performance by 15-20%. For an 80 kg person, that is a loss of 1.6 kg or 1.6 liters of fluid. This does not take long on a hot day.
- Dehydration causes fatigue, cramps, ↑ body temperature, ↑ heart rate, ↓ muscle coordination and ↓ performance. Severe dehydration can lead to heat exhaustion, heat stroke and death.

- The best way to prevent dehydration is to plan your fluid intake. Consume at least 2 liters (8 cups) of fluid each day to replace losses through sweating, breathing, etc. This is important even on cold days but it is especially important in hot humid weather. Throughout the day drink water, milk, juice, and eat water-rich foods such as vegetables, fruit and broth soups. Carry a water bottle so you can drink anytime.



### **Monitoring your fluid status:**

Urine volume and color are simple indicators of your hydration status.

- If you have large quantities of light yellow urine – you are well hydrated.
- If you have small amounts of dark colored urine – you are dehydrated and need to drink more fluids!
- If your urine is colourless and you gain weight during physical activity, you may be drinking too much plain water. Try adding a pinch of salt to your water or use a sports drink. Low blood sodium can cause muscle cramps, nausea and potentially serious medical problems.

### **Fuelling up before physical activity**

Be certain to eat and drink adequate amounts of fluids and carbohydrates prior to exercising.

- Drink 500ml of fluids 30min – 2 hrs before activity. Diluted fruit juice or a sports drink may help you retain fluid better and top up your electrolytes and blood sugars.
- If you exercise early in the morning, try having a light snack such as a granola bar and a glass of diluted fruit juice before your workout.
- If you have 2 to 4 hours before you exercise, try eating a small carbohydrate-rich meal with plenty of fluids.
- If you are going to be active all day long, snack frequently on high carbohydrate foods and keep up with your fluid losses.

### **Refuelling during physical activity**

While you are exercising, focus on fluid replacement.

- Start drinking fluids before you are thirsty. Try drinking as much as you can tolerate every 10-15 minutes. The more fluid in your stomach, the more quickly it will be absorbed.
- For exercise sessions less than one hour, drinking plain water should meet all your needs.
- When exercising longer than one hour, add electrolytes and carbohydrates to help ↑ absorption and maintain blood sugar and electrolyte levels. Avoid highly sweetened drinks like juice or full strength sports drinks as they can cause stomach cramping. Try adding together:
  - 500 ml (2 cups) fruit juice
  - 500 ml (2 cups) water
  - 1.5 ml (1/4 teaspoon) table salt
- When exercising for long periods in hot and humid conditions, drink adequate volumes of fluids and add some extra salt to your diet:
  - Put some extra salt on your meals
  - Eat salty foods like pretzels, pickles, crackers and soup
  - Drink tomato juice, or
  - Use a sports drink

### **Refuelling after physical activity**

Be sure to drink enough fluid to replace your losses and refuel with carbohydrates and protein.

**Fluid is your first concern.** Consume at least 1.5 liters of fluid for every kilogram of body weight you lose while exercising. Drink water, fruits juices, vegetable juices, milk or sports drinks. Beer and other drinks that contain alcohol are not recommended because they promote dehydration.

**If you need to exercise again today but do not have time for a meal** – try snacking on low fat, carbohydrate-rich foods as soon as possible after exercising – ideally within the first 15 minutes. Here are some great snack suggestions:

- Orange juice, fig bars and yogurt
- A bagel and a glass of chocolate milk
- Lower fat cereal bar, apple juice and yogurt
- Fruit, a lower fat muffin and milk, or
- Bread, tomato juice and a boiled egg

**If you need to exercise again today and have a 2-4 hour break** – try eating carbohydrate-rich foods such as pasta, rice, potatoes, sweet potatoes and vegetables. Add some low fat protein to your meal with things such as low fat milk or yogurt, lean meat, fish or beans.

**If you have finished physical activity for the day and have all night to digest your food** – focus on eating a well balanced diet to replace your fluid losses, restore your carbohydrate stores and provide the protein you need to build and repair damaged tissues.

### **Here are some lunch and dinner suggestions:**

Chili  
Bread with a little soft margarine or butter  
Salad, milk and fruit

Grilled hamburger with mustard and relish  
Lettuce, tomato, peppers and pickles  
Blender shake with fruit

Pasta with tomato and meat sauce  
Raw vegetables  
Yogurt and fruit



**Remember:**  
*“You are what you eat!”*

**For more information on nutrition:**  
[www.dietitians.ca](http://www.dietitians.ca)

**For more resources on sport nutrition:**  
[www.coach.ca/e/nutrition/resources.htm](http://www.coach.ca/e/nutrition/resources.htm)

# TRAIN Smart!



Every workout you do is like taking a step. You can take a step *down* if you over train and injure yourself. You can step *forward* if you are maintaining your fitness. Or, you can take a step *up*, if you succeed in increasing the amount of work you can safely handle in your workouts. If you are putting a lot of time and effort into training, why not make sure you do it right? Here are 10 tips to help you train smarter:

## # 1 Start back slowly

If you resume exercising after being inactive for a while, your body needs time for your muscles, joints, ligaments and tendons to adapt. Just because you could do it before does *not* mean that your body is ready to do it right now. It is important to realize that muscles adapt faster than tendons because of their larger blood supply. This leaves tendons vulnerable to injury if training is increased too quickly. A short period of muscle soreness will always occur when you return to being active. This is best handled by exercising at a lighter intensity until the soreness resolves. Do not stop being active.

## # 2 Build a solid fitness base

It is important to begin any period of training by focusing on the basics: flexibility, muscular strength, aerobic fitness and eliminating any muscle imbalances (strength or flexibility). As your fitness in these areas improves, you can gradually increase the intensity of your workouts. If you decide to increase your intensity significantly, be sure to reduce your overall volume to avoid overtraining and injury.

## # 3 Progressive Training

Gradually increase the physical demands you make on your body so you improve at a rate that is realistic for you. Genetic limits, the stresses of life, nutrition, and injuries all affect your rate of improvement. How quickly you adapt to the demands of training is highly individual, so it is unrealistic to expect to improve at the same rate as your training partner.



Photo credit: MCpl Frank Hudec, CF Combat Camera

For these reasons, there is no best workout regime that works for everyone. By slowly increasing the load (weight or intensity) and duration (reps or time) of your training, your body is given time to adapt while minimizing your risk of injury. The payback for training progressively, and not overdoing it, will be less fatigue/illness and fewer injuries.

## # 4 Do not ignore old injuries

Let your injuries heal before progressing in your training. Injuries often reoccur because of a neglected fitness component or a weaker body part. For example, you may have a muscular imbalance that has developed because of years of training improperly. When injuries do occur, find alternate activities that allow you to continue to exercise painlessly. For example, if your knee hurts running, you may be able to swim or bicycle without pain. These alternate activities allow you to maintain your fitness while your injury heals.

## # 5 Work on your weaknesses

Typically, we tend to focus on our strengths because we do well at them. Failing to work on your weaknesses not only hurts your performance, but you often end up overloading the weaker area and developing an injury. Aim to correct all your weaknesses at the beginning of your training program before focusing on specific goals.



## #6 Train specifically

The body adapts to how it is challenged. For example, you will not become a better sprinter if you only go for long, slow runs. The closer your training resembles the conditions you will encounter, the better prepared you will be to achieve your goals. This includes simulating the temperatures, time of day and the terrain with which you will be challenged. Add specificity to your training after you have developed a solid fitness base as recommended in tip #2.

## #7 Warm-up slowly and inclusively

Regardless of the activity or how mentally tough you are, you will perform better if you make the time for a slow progressive warm-up. Aerobic activities increase blood flow and this permits the delivery of oxygen and nutrients to the working muscles. A neuromuscular warm-up involves practicing the movements and skills that are important to your sport or activity. Rushing your warm-up could leave you poorly prepared for your workout and increase your risk of injury.

## #8 Always cool down

Intense training should always be followed by a cool down that includes some aerobic activity to ensure that the by products of fatigue are pumped out of your muscles. Stretching also helps to relax tired muscles and can reduce the amount of stiffness you experience after exercising. Going for an easy swim or a bike ride after a hard workout is a great way to achieve both of these needs. During intensive training periods, a massage can also minimize recovery time and increase your capacity to train at a higher level sooner.

## #9 Listen to your body!

If you are in pain, slow down or lower your intensity. If the pain does not go away with less intensity, stop the activity and use the RICE principle (Rest, Immobilize, Cold compress and Elevate). If you are

still in pain several days after your training session, you should be medically assessed. Allowing the time for injuries to heal in the early stages is a smart move that can prevent little problems from becoming big problems that prevent you from training properly. When your body is trying to talk to you, hopefully you will listen so it does not have to scream.

## #10 Rest and recovery are essential parts of the recipe for great training

If you are training hard, one way to reduce the chances of over-training is to regularly schedule recovery days. These are days when you significantly reduce the intensity of your workouts, cross train or completely rest. For example, a tired marathoner might go for an easy 70-minute bike ride to give his/her legs a rest from the pounding of running. Recovery days are as important as your hard workouts because they are needed for your body to have the chance to adapt and repair. As you age, your need for recovery days will increase. Most 40 year-olds will need two or more recovery days between intense workouts.



Photo credit: Cpl James Nightingale, CF Image Technician

Hopefully, the above guidelines help you to train consistently, reduce your risk of injury

and allow you to get the most out of your workouts. If you have any specific needs or questions related to your fitness program, please seek the advice of one of the fitness professionals at any of our CF fitness facilities.



## Consumer Tips:

- # 1. Research before buying. Obtain information from reliable sources, such as health care professionals.
- # 2. Seek information other than what is provided in health food stores or by manufacturers: both are driven by profit motives.
- # 3. Be aware that articles in fitness, health and nutrition magazines may be paid advertisements.
- # 4. Beware of phrases like “miracle cure” and “latest breakthrough.” If these claims were true, they would be announced in the news media and be widely used by health care professionals.
- # 5. Avoid supplements during pregnancy or if breast feeding, since some nutritional supplements can be transferred through breast milk.
- # 6. If you are on medications, check with your health care provider before taking a supplement, since some products negatively interact with medications.
- # 7. Choose supplements that are manufactured by large or well-known companies that traditionally have strict quality control.
- # 8. Remember that there are no current regulations that govern the serving size or amount of ingredients in a supplement.
- # 9. Keep in mind that reporting side effects is voluntary, and the absence of information does not mean that a particular product or ingredient has not been associated with problems.
- # 10. If you are a competitive athlete who could be subjected to drug testing, there is no way to be certain that your dietary supplement does not contain a banned substance.

## CF Health Promotion Local Contacts

<b>Bagotville</b> 418-677-4000 ext. 8102 418-677-8017 (fax)	<b>London</b> 519-660-5275 ext. 5007 519-660-5342 (fax)
<b>Borden</b> 705-424-1200 ext. 7084 705-423-7245 (fax)	<b>Montreal</b> 514-252-2777 ext. 2631 514-252-2018 (fax)
<b>Cold Lake</b> 780-840-8000 ext. 8966 780-840-7323 (fax)	<b>Moose Jaw</b> 306-694-2222 ext. 5519 306-694-2832 (fax)
<b>Comox</b> 250-339-8211 ext. 8328 250-339-8203 (fax)	<b>North Bay</b> 705-494-2011 ext. 2350 705-494-2177 (fax)
<b>Edmonton</b> 780-973-4011 ext. 6147 780-973-4162 (fax)	<b>Ottawa</b> 613-992-4044 613-992-4361 (fax)
<b>Esquimalt</b> 250-363-5680 250-363-4315 (fax)	<b>Petawawa</b> 613-687-5511 ext. 4665 613-588-7500 (fax)
<b>Gagetown</b> 506-422-2000 ext. 4172 506-422-1219 (fax)	<b>St-Jean</b> 450-358-7099 ext. 7207 450-358-7367 (fax)
<b>Gander</b> 709-256-1703 ext. 469 709-256-1730 (fax)	<b>Shilo</b> 204-765-3000 ext. 3867 204-765-3890 (fax)
<b>Geilenkirchen</b> (49) 2451-717139 (49) 2451-717403 (fax)	<b>St. John's</b> 709-570-4750 709-570-4987 (fax)
<b>Goose Bay</b> 709-896-6900 ext. 7214 709-896-6961 (fax)	<b>Toronto</b> 416-633-6200 ext. 3730 416-635-2747 (fax)
<b>Greenwood</b> 902-765-1494 ext. 5389 902-765-1745 (fax)	<b>Trenton</b> 613-392-2811 ext. 3767 613-965-2196 (fax)
<b>Halifax</b> 902-427-0550 ext. 7802 902-427-1283 (fax)	<b>Valcartier</b> 418-844-5000 ext. 4679 418-844-6020 (fax)
<b>Kingston</b> 613-541-5010 ext. 8748 613-540-8730 (fax)	<b>Winnipeg</b> 204-833-2500 ext. 4160 204-833-2664 (fax)

## Local Website Addresses:

- Borden:** [http://borden.mil.ca/hpu/index\\_e.asp](http://borden.mil.ca/hpu/index_e.asp)
- Ottawa:** [http://cfsuo.mil.ca/csss/psp/health/intro\\_e.asp](http://cfsuo.mil.ca/csss/psp/health/intro_e.asp)  
or <http://www.cfsuo.forces.gc.ca/hp/>
- Esquimalt:** <http://www.pspesquimalt.ca/strengthen/index.shtml>
- Petawawa:** [http://www.army.dnd.ca/cfb\\_petawawa/newspsp/health.asp](http://www.army.dnd.ca/cfb_petawawa/newspsp/health.asp)
- Trenton:** <http://www.healthpromotion.cfbtrenton.com/>