



PERFORMANCE ENHANCERS FACTS AND BOTTOM LINE

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SYNEPHRINE







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PERFORMANCE ENHANCERS—DON'T SWALLOW THE HYPE!

This is the second edition of a dietary supplement booklet that has been produced by the Canadian Forces (CF) Health Services Group in an effort to provide CF personnel with a **balanced perspective on what dietary supplements may have to offer in terms of performance enhancement and health benefits.**

AN INDUSTRY OF ITS OWN

The dietary supplement industry is a multi-billion dollar per year business with new products appearing on the market every day. This type of growth makes it impossible for government regulators to closely monitor every product that ends up on the shelf. While some companies take great care in the production of their supplement products, others may have much lower standards. To make matters worse, the Internet makes it easy for Canadians to purchase these products internationally. Dietary supplements are commonly used by many CF personnel. These products may promise benefits such as muscle gain, weight loss, increased endurance, increased muscle power, reduced fatigue, improved appearance, accelerated workout recovery and even slowed aging. All of these results are highly desirable, especially for military personnel who are expected to be in a constant state of operational readiness.

THE TRUTH IS...

Unfortunately, there are few rave reviews or testimonials for getting healthy and fit through consistent physical training, good nutrition, proper rest and addiction-free living. The benefits of this approach to health cannot be obtained from a bottle, yet millions of Canadians embrace the hype and use dietary supplements on a daily basis. Research shows there is surprisingly little or no evidence that the vast majority of these products actually work. But despite the lack of scientific evidence, every year many CF personnel continue to waste their hard-earned dollars on products that do little to nothing to improve their health or physical performance, ignoring the fact that some of these products could potentially be harmful to them.





Millions of Canadians embrace the hype and use dietary supplements on a daily basis.

WHAT YOU SEE AND WHAT YOU GET

Canadians cannot be sure of what they are actually buying in this vast array of performance-enhancing products. In fact, dietary supplements remain largely unregulated, particularly outside Canada. What you see is not always what you get when purchasing these dietary supplements; you can't be entirely sure what many of these products *actually* contain. Some companies maintain high quality standards while others are less professional, so you really don't know what you are putting into your body. Recent studies show some of these products do not always contain the ingredients listed on their content label, and often contain other ingredients that are not listed on the label. Some products have even been found to contain lead, anabolic steroids, animal feces and other potentially harmful contaminants.

The bottom line is that you really can't be sure what your dietary supplement contains.

“NATURAL” AND/OR “SAFE”?

Many people are under the mistaken impression that because their dietary supplement is marketed as “natural,” it must also be safe. In fact, some dietary supplements contain substances that can have a pharmacological effect on their own or in combination with other products. This is even true



of something as “natural” as grapefruit, which slows down the body’s ability to metabolize medications like Lipitor (a cholesterol-lowering medication), which can in turn lead to serious medical problems. Dietary supplements can also interact with each other, with prescription medications and even with individual medical conditions. An example of this would be St. John’s Wort, a popular dietary supplement that can speed up the breakdown of many drugs, including birth control pills. The potential result of using this natural product could be an unplanned pregnancy! In the case of Vitamin K, it can interfere with the functioning of blood thinners and increase the risk of blood clots. The potential for undesirable reactions increases when you combine the use of multiple products—dietary supplements, medications, nicotine, caffeine and alcohol can all interact negatively.

It is important to realize that you are unique and could experience unique (and unexpected) reactions to anything you put into your body. Bottom line: despite being labelled as “natural,” dietary supplements can, and often do cause undesirable side effects. If you are on medications or have a medical condition, you should always consult with a health care professional before using dietary supplements. It’s your body and you need to be careful what you put into it.

It’s your body and you need to be careful what you put into it.

***Disclaimer:** The Strengthening the Forces team does not endorse the use of dietary supplements, but recognizes that many CF personnel look to these products for health and performance benefits. The information presented in this booklet is based on a review of recent scientific literature; it shows that the vast majority of dietary supplements are ineffective. The few products that have been shown to work either don’t work for everyone, don’t work for all physical activities, or can interact with certain medications and cause potentially serious side effects! The safest way to enjoy good health and physical fitness is to consistently train smart and eat smart. Exercise is medicine!*

BRANCHED CHAIN AMINO ACIDS

WHAT ARE THEY?

Leucine, isoleucine and valine are essential amino acids (building blocks of protein) that have similar chemical structures, notably a “branched chain” architecture. “Essential” means that the body cannot make these amino acids and so they must come from a dietary source.

Branched Chain Amino Acids (BCAAs) are broken down primarily in muscle tissue, whereas other amino acids are broken down in the liver. Most high-quality proteins (i.e., from meat, poultry, fish, eggs or dairy products) are 25% BCAA, and so your body’s needs can be met by eating a healthy diet.

MARKETING CLAIMS

Increase muscle tissue and reduce protein breakdown after a workout.

PROVEN EFFECTIVENESS

Consuming BCAAs before or after resistance training may increase protein synthesis and gains in lean body tissue. This effect is seen primarily in untrained individuals. BCAAs appear to be used as an energy source during endurance events, presumably after glycogen stores are depleted. Overall, BCAAs do not perform as claimed.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

BCAAs are generally considered safe.

COMMENTS

More research is needed on these products. To date, most studies have been completed on small groups and done for short periods of time.

Individuals who train regularly should not expect to see a benefit.



BOTTOM LINE

Research to date shows the benefits of using BCAAs are seen primarily in untrained individuals who are starting out a new strength/resistance training program. Individuals who train regularly should not expect to see a benefit. It is currently unclear whether BCAAs are beneficial for endurance events. If you are a well-trained person, don't waste your money on these products.

CAFFEINE

Caffeine is the most widely used drug in the world.



WHAT IS IT?

Caffeine is the most widely used drug in the world. It is a naturally occurring stimulant found in the leaves, nuts and seeds of more than 60 plants.

It is found in many products such as coffee, tea, cola, chocolate, guarana, yerba mate, energy drinks, energy shots and medications.

MARKETING CLAIMS

Increases mental alertness; elevates metabolic rate; reduces appetite; improves endurance performance; and reduces the feeling of fatigue.

PROVEN EFFECTIVENESS

Caffeine can enhance performance during endurance activities lasting longer than one hour, provided it is taken in the correct amount. Consuming excessive amounts of caffeine will not improve your performance and could cause a number of side effects such as dehydration and electrolyte imbalance, which will actually decrease your performance. People who consume caffeine regularly appear to experience fewer performance-enhancing benefits from caffeine. Benefits are seen with caffeine intake of 100–200 mg or 1–3 mg/kg body weight. Higher doses do not appear to produce further benefits. Caffeine

is often used in weight-loss products and combined with other drugs like aspirin and ephedrine to improve their effectiveness. There is little evidence that caffeine is an effective weight loss aid.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Too much caffeine can cause anxiety, jitters, sleep difficulties (if taken within eight hours of bedtime), reduced concentration, diarrhea, irritability, increased blood pressure, dehydration, calcium loss and irregular/rapid heart beats.

Frequent use of caffeine can lead to tolerance and, when use is abruptly stopped, negative withdrawal effects.

Health Canada recommends a daily intake of less than 400 mg for healthy adults (approximately 3–4 cups of coffee). Regular intake above 500 mg a day (4–7 cups of coffee) represents a significant health risk and is not recommended.

When rapid hydration is important, people should drink non-caffeinated fluids.

COMMENTS

Caffeine should be taken 30–90 minutes before workouts that will last one hour or longer, to spare carbohydrate use during exercise and

thereby improve endurance and exercise capacity. Caffeine peaks within 1–1.5 hours after ingestion and the peak can be maintained for 3–4 hours.

BOTTOM LINE

Caffeine is an effective performance enhancer provided it is taken in the correct amount and for the right activities (endurance activities lasting longer than one hour).



CREATINE

WHAT IS IT?

Creatine is a fuel for your muscles that your body makes from amino acids. It is also available through your diet from meat and fish. Creatine is stored in muscle, where it plays a role in energy production that can power muscle contractions for repetitive activities lasting less than 30 seconds. The amount that can be stored in the muscles varies from person to person; once your muscle stores are full, you can't increase these stores no matter how much creatine you eat.

MARKETING CLAIMS

Improves performance for repetitive high-intensity and short-duration (<30 seconds) activities such as squats, pull-ups, bench presses and sprints; increases how long you can perform at maximum intensity for short durations; increases muscle cell volume; and enlarges muscle fibres.

PROVEN EFFECTIVENESS

Research indicates creatine is an effective performance enhancer for repetitive, high-intensity, short-duration exercise. Gains in muscle mass are the result of being able

to train harder. When used for an extended period, it may promote significantly greater improvements in strength, fat-free mass and high-intensity exercise performance. There is little evidence that creatine will improve endurance or aerobic performance. For activities such as long-distance running, creatine may actually decrease performance as it can cause water retention, which results in weight gain.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

The scientific evidence suggests creatine is generally safe to use for healthy individuals. Common side effects include water retention, stomach and/or muscle cramps, nausea, diarrhea, headaches and muscle tightness.

COMMENTS

30% of the people who take creatine do not respond to it—meaning that taking creatine won't increase their muscle creatine stores or have any benefits. Caffeine may decrease creatine's performance-enhancing benefits.

Taking creatine with 75–100 g of carbohydrates will enhance its absorption and storage. People often mistake the rapid early weight gain that occurs with creatine to be muscle gain. Wrong! It's actually due to



For activities such as long-distance running, creatine may actually decrease performance as it can cause water retention, which results in weight gain.

the extra water your body stores with the creatine itself. This water is rapidly lost when you stop taking creatine.

Creatine is also available through your diet from meat and fish.

BOTTOM LINE

Creatine is safe and effective for people wanting to improve performance during repeated bouts of high-intensity exercise, and this ability to train harder may increase muscle mass. Creatine may be especially helpful for people with low muscle creatine stores. For those with naturally high creatine stores, it will be a waste of money.



ENERGY DRINKS

WHAT ARE THEY?

Energy drinks are soft drink-like beverages that usually contain high levels of sugar, caffeine and a combination of other ingredients such as taurine (an amino acid, one of the building blocks of protein), glucuronolactone (a carbohydrate) and B vitamins.

MARKETING CLAIMS

Boost energy; enhance performance; and improve alertness and concentration.

PROVEN EFFECTIVENESS

There is no compelling scientific evidence that the use of energy drinks improves performance. Some studies indicate their use may in fact decrease performance. No studies have compared the effectiveness of these products with using caffeine alone.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Energy drinks contain a number of ingredients whose safety has not been established. Many energy drinks contain herbs that can interact with medications and other supplements.

Side effects related to energy drinks include nervousness,

headache, insomnia, nausea, vomiting, dehydration and irregular heartbeat. Life-threatening conditions such as seizures, stroke and cardiac arrest have also been reported. In some cases, consumption of energy drinks has even led to death.

Energy drinks should be consumed in moderation. They should not be taken on an empty stomach or used as a meal replacement. You should limit the amount you drink to 500 ml (2 cups) per day.

Energy drinks should not be used to hydrate the body before, during and/or after exercise, and should not be confused with sports drinks such as Gatorade or Powerade. Sports drinks provide the right amount of carbohydrates to fuel working muscles and help replenish electrolytes. They have been extensively studied and shown to be safe and effective. Energy drinks, on the other hand, do not contain electrolytes and can worsen dehydration due to their high caffeine and sugar content.

Mixing energy drinks and alcohol can be dangerous. The stimulating effect of energy drinks may mask the drowsiness associated with alcohol intake, and this may increase the potential for overconsumption of alcohol and all the problems this can lead to.

COMMENTS

Energy shots are basically concentrated forms of energy drinks. They contain the same ingredients found in energy drinks but in a smaller amount of liquid. They have the same effects and health risks as energy drinks.

Energy drinks contain a number of ingredients whose safety has not been established.



BOTTOM LINE

Energy drinks should not be used during exercise. There is minimal scientific evidence to support any beneficial effects they might have on performance, and there are important concerns regarding their safety.



GLUCOSAMINE

Glucosamine can improve the joint function of some people with osteoarthritis.



WHAT IS IT?

Glucosamine is a building block that is **needed for the production of healthy joint cartilage**. It is often prescribed for people suffering from osteoarthritis. Glucosamine is often combined with other joint health products such as chondroitin, shark cartilage and Methylsulfonylmethane (MSM).

MARKETING CLAIMS

Decreases joint pain caused by excessive wear and tear; increases joint mobility; decreases joint swelling; thickens joint cartilage; and improves a person's overall ability to function.

PROVEN EFFECTIVENESS

Glucosamine and chondroitin have been reported to slow cartilage degeneration and reduce the degree of joint pain in active individuals, which may help to postpone and/or prevent joint problems. Glucosamine can improve the joint function of some people with osteoarthritis. However, some people "respond" to the use of glucosamine and others, for unknown reasons, do not.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Side effects of glucosamine include stomach upset, heartburn, diarrhea, increased gas and elevated blood glucose levels.

Glucosamine is made from the shells of crustaceans so it could possibly cause a reaction in people with shellfish allergies.

COMMENTS

If you have joint pain or suffer from osteoarthritis, you need to take 500 mg of glucosamine at 3 times a day for 3 months before you can determine whether it is working to reduce your symptoms. If you notice no difference, then you are likely a non-responder and should stop taking it.

BOTTOM LINE

For some people, glucosamine may be an effective product. If you are in a heavy training program, work in a job that is physically demanding or have a family history of osteoarthritis, using glucosamine may help you prevent or reduce future problems.

GLUTAMINE

WHAT IS IT?

Glutamine is the most abundant amino acid found in the body. It is a non-essential amino acid, which means it can be made by the body and is naturally found in many protein-rich foods such as meat, chicken, fish, milk products 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.

MARKETING CLAIMS

Increases cell volume and stimulates protein and glycogen production; prevents the breakdown of muscle after exercise and thereby helps with muscle gain, while reducing the incidence of injury; and enhances the functioning of the immune system and helps prevent overtraining syndrome.

PROVEN EFFECTIVENESS

There is no compelling scientific evidence that glutamine helps build muscle mass or improves exercise or muscular performance in healthy adults. Glutamine may help improve immune function after strenuous exercise.

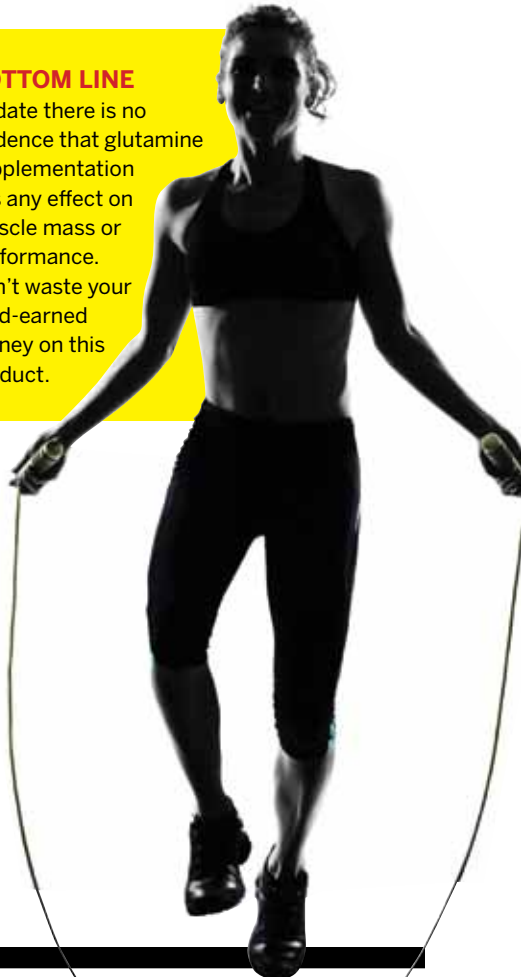
SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

No studies have looked at the effects of long-term glutamine use.

BOTTOM LINE

To date there is no evidence that glutamine supplementation has any effect on muscle mass or performance. Don't waste your hard-earned money on this product.

Don't waste your hard-earned money on this product.



MULTI-VITAMINS/ MINERALS

WHAT ARE THEY?

Multi-vitamins/minerals are essential nutrients needed for good health and **are the dietary supplement most frequently consumed by military personnel**. They are marketed under the assumption that most people are too busy to eat a proper diet, and that the more you exercise the more vitamins/minerals your body will need.

MARKETING CLAIMS

Increase energy; prevent diseases; cure illnesses; improve the

complexion; prevent hair loss; boost the immune system; and improve eyesight.

PROVEN EFFECTIVENESS

If you are eating a nutritious, well-balanced diet, taking a multi-vitamin/mineral supplement has little to offer you in terms of improved health or enhanced performance. Research has demonstrated that specific vitamins may offer some health benefit and that physical performance can be affected even when vitamin/mineral deficiency is marginal. Taking some of these supplements in large amounts can



They are marketed under the assumption that most people are too busy to eat a proper diet.

lead to their buildup in the body, and this can cause some potentially serious health problems. The motto “If a little is good, then more must be better” does not apply to taking vitamins and could be dangerous.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Multi-vitamins/minerals are generally safe to take in recommended doses. Excessive intake of individual vitamins and minerals can be toxic or interfere with the metabolism of other nutrients or medications.

COMMENTS

The people who may benefit from taking multi-vitamins/minerals are those who: diet severely; have medical problems that affect their ability to absorb important nutrients; are strict vegans (eat no foods from animal sources); have food allergies; spend time in areas where it is hard to find nutritious foods, such as travellers; or live on a diet consisting largely of junk food.



BOTTOM LINE

Taking multi-vitamins/minerals may be effective for some people but will never replace the benefits of healthy eating, and will not provide your body with everything it needs for good health and improved physical performance. If you take the time to train well, be sure to make the time to eat well.



NITRIC OXIDE

WHAT IS IT?

Nitric oxide is a gas that is produced when an enzyme converts the amino acid L-arginine into nitric oxide or from the breakdown of the body's nitrite stores.

Nitric oxide exists in the body for several seconds only, and in that brief period of time it sends signals to many different tissues.

MARKETING CLAIMS

Increases muscle growth; improves strength; increases endurance; stimulates fat loss; permits faster workout recovery; reduces the risk of cardiovascular disease; lowers blood pressure; reduces platelet aggregation; and allows you to look “pumped” for longer after a workout.

PROVEN EFFECTIVENESS

There is no compelling scientific evidence that nitric oxide products help build muscle mass or improve exercise or muscular performance in healthy adults. However, there is evidence that eating nitrite-rich foods such as leafy green vegetables and beetroot may be performance-enhancing. This has only been shown for non-elite performers doing high-intensity exercise lasting under 30 minutes.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Most nitric oxide products contain L-arginine or L-citrulline. Taken in large quantities, both of these substances can cause diarrhea, weakness and nausea.

COMMENTS

Nitric oxide has been shown to increase blood flow to tissues, improve muscle contraction and enhance the functioning of mitochondria (the cell's power plants). Most nitric oxide products promise the above benefits because they contain either L-arginine or L-citrulline and claim to be nitric oxide boosters. Since L-arginine and L-citrulline are used by the body to

Eating nitrite-rich foods such as leafy green vegetables and beetroot may be performance-enhancing.



produce nitric oxide, the marketing theory is that if you provide the body with more of these substances, the body will produce more nitric oxide. However, numerous scientific studies have failed to show that this occurs.

BOTTOM LINE

While nitric oxide is a valuable ingredient in medications such as nitro-glycerine, there is no evidence that nitric oxide supplements are performance-enhancing. There may be some performance-enhancing benefits from consuming nitrite-rich foods or supplements.



OMEGA-3 FATTY ACIDS



Omega-3 fatty acids play a crucial role in brain function, as well as normal growth and development.

WHAT ARE THEY?

Omega-3 fatty acids are considered essential fatty acids, which means they are necessary for human health but the body can't make them. Omega-3 fatty acids have to be obtained from the diet and can be found in fatty fish (such as salmon, mackerel and sardines), seafood (such as algae and krill), some seeds (such as flax seeds), some nuts (such as walnuts) and omega-3 fortified foods (such as omega-3 eggs).

Omega-3 fatty acids play a crucial role in brain function, as well as normal growth and development. They may also reduce the risk of heart disease and improve mental health.

MARKETING CLAIMS

Increase fat breakdown and improve muscle synthesis; reduce exercise-induced muscle soreness/inflammation; reduce heart rate and improve oxygen delivery to the heart; reduce exercise-induced asthma; and improve mental focus and concentration.

PROVEN EFFECTIVENESS

Research in humans is inconclusive as to whether omega-3 fatty acid supplements are effective in reducing exercise-induced inflammation,

or whether they improve performance. However, these supplements may be beneficial for overall health, if you are not getting enough omega-3 fatty acids from your diet.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Omega-3 fatty acids are generally considered safe for healthy individuals. However, high doses of omega-3 fatty acids may decrease the ability of your immune system to destroy disease-causing agents (such as viruses or bacteria) and may prolong bleeding times.

COMMENTS

Canada's Food Guide recommends that you eat at least two servings of fish per week (preferably fatty fish such as salmon, mackerel and sardines) to get the health benefits of omega-3 fatty acids. One Food Guide serving of fish is equal to 75 grams (2 ½ ounces) or half a cup of cooked fish.

BOTTOM LINE

Omega-3 fatty acids have many proven health benefits but there is no conclusive evidence that they have any positive effects on athletic performance. Omega-3 fatty acid supplements may be beneficial if you are not getting enough omega-3 fatty acids from your diet.

PROHORMONES

WHAT ARE THEY?

Prohormones are substances that are made in the body and ultimately converted into hormones such as testosterone or estrogen. The body carefully regulates the production of these substances. **Prohormones can also be synthesized in a laboratory and sold as dietary supplements.**

The most commonly marketed prohormones are precursors to testosterone, which include androstenedione (also referred to as “Andro”), androstenediol and dehydroepiandrosterone (DHEA). The theory behind using these products is that if you supply the body with more prohormones, the body will make more of the anabolic steroid testosterone.

MARKETING CLAIMS

Increase muscle tissue; improve strength; enhance personal energy; and reduce recovery time after workouts.

PROVEN EFFECTIVENESS

Studies have shown that no matter how much of these products you take, the body only converts a small amount of them into testosterone. Anabolic prohormones have not been shown to improve perfor-

mance. Research focused on older men shows these products may help increase their low testosterone levels but, once again, they do not provide any training benefit.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

The side effects of prohormones include reduced HDL cholesterol (the good cholesterol that helps to keep your blood vessels clean), increased estrogen levels, male breast development (gynecomastia), aggressive behaviour, enlarged prostate gland and masculinisation of females (often permanent).

Anabolic prohormones have not been shown to improve performance.



BOTTOM LINE

Prohormones do not increase the body's production of testosterone to the point where there is a performance-enhancing benefit. These products also can produce side effects that can have a serious negative impact on your health.

PROTEIN POWDERS

WHAT ARE THEY?

Protein powders remain one of the most popular performance enhancers on the market. They contain amino acids, which are the building blocks of all the proteins we use in our bodies.

MARKETING CLAIMS

Build muscle; increase strength; and improve stamina.

PROVEN EFFECTIVENESS

Proteins are an essential part of our diet and failing to eat enough of them will result in muscle loss, reduced performance and delayed recovery. Your body can only use a limited amount of protein per day, and eating more than this will not accelerate muscle growth.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Eating large amounts of protein can cause an upset stomach and diarrhea. Excess protein intake will be stored as fat. Many of these products contain ingredients that are not listed on their label.

COMMENTS

There are four important things to know about proteins:

1 Research shows that being active increases the amount of protein you need to build and repair your body tissues. Active people need 1.2–1.7 g of protein per kg body weight per day, and so a 90 kg person needs to consume about 110–155 g of protein per day. Failing to do this can result in muscle breakdown and delayed workout recovery.

2 The body has a limited ability to build muscle mass, and eating more protein will not stimulate the body to build more muscle. Excess protein intake will be stored as fat.

3 Eat high-quality proteins such as lean meat, skinless chicken, fish, eggs, legumes (soy, dried beans, peas and lentils) and low-fat milk products and alternatives such as yogurt and cheese. If you cannot eat sufficient quantities of these real foods through your diet, then you may need to use a protein supplement.

4 The body can load up a little bit more protein in the first two hours after a vigorous workout, so include a protein-rich food in your recovery snack.



Your body can only use a limited amount of protein per day, and eating more than this will not accelerate muscle growth.

The following table shows how an 80 kg person who does heavy physical training can meet/exceed his/her protein needs (136 g/day*) through a balanced diet**:

FOOD GROUPS	# SERVINGS	PROTEIN (g) ESTIMATE
Vegetables and Fruit	12	12
Grain Products	14	28
Milk and Alternatives	4	40
Meat and Alternatives	4	84
Total		164

* Based on 1.7 g protein/kg body weight/day, the greatest amount of protein the body can use per day for growth and repair.
 ** Calculations are based on a 3500 Kcal diet.



DID YOU KNOW?

Casein and whey are the two major proteins found in milk.

BOTTOM LINE

Protein is an important nutrient and the vast majority of Canadians get more than their daily requirement from their diet. If you are extremely active, eat a restrictive diet or are in a location where it is hard to get quality protein-rich foods, then using a protein supplement may be helpful.

RASPBERRY KETONES

WHAT ARE THEY?

Raspberry ketones are the substances that give red raspberries their distinctive smell. They have a history of use as flavor enhancers in food and as fragrances in cosmetic products. As raspberry ketones occur naturally in very small amounts, the raspberry ketone products on the market are produced synthetically in labs.

MARKETING CLAIMS

Induce weight loss by increasing the metabolic rate and accelerating fat loss.

PROVEN EFFECTIVENESS

There is insufficient scientific evidence to determine if raspberry ketones actually help to promote weight loss. Only a few studies have been conducted so far in test tubes, mice and rats; no studies have been done on humans to date.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Unknown due to insufficient research. The safety of raspberry ketones cannot be inferred from their long-term use as flavouring agents, as the dosages of raspberry

ketones that are used in supplements far exceed those that are used for flavouring foods.

COMMENTS

Many raspberry ketone weight-loss supplements contain raspberry ketones in combination with other weight-loss ingredients, including stimulants such as ephedrine and caffeine. This combination makes it very difficult to attribute any observed benefits or side effects to any one particular ingredient.

Only a few studies have been conducted so far in test tubes, mice and rats; no studies have been done on humans to date.



BOTTOM LINE

There is insufficient research on the safety and effectiveness of raspberry ketones for weight loss among humans. One thing we do know is that the safest and most proven way to achieve weight loss and overall health and well-being is through a healthy diet and regular physical activity.

SYNEPHRINE

The research to date has shown that synephrine has little or no effect on weight loss.

WHAT IS IT?

Synephrine is a “chemical cousin” to ephedrine/ephedra and so it is structurally similar to amphetamines. Several years ago, Canada and the United States banned the use of ephedrine in dietary supplements because of concerns for potentially serious side effects. This left the producers of “fat burning” or “thermogenic” supplements scrambling to find a “legal” alternative and many began producing synephrine.

Synephrine is also known as bitter orange, sour orange, Zhi Shi, Citrus aurantium, Shangzhou Zhiqiao, Fructus aurantii and Advantra Z.

MARKETING CLAIMS

Increases metabolic rate; promotes fat loss; and reduces appetite. The supplement industry is promoting synephrine as a substance that offers all of the fat-burning benefits of ephedrine without the side effects.

PROVEN EFFECTIVENESS

The research to date has shown that synephrine has little or no effect on weight loss. Most of the studies were done for very short periods, and so we really do not know if there is any long-term benefit of using this

product and what its potential long-term side effects are.

SAFETY, ADVERSE REACTIONS AND CONTRAINDICATIONS

Some studies have shown that synephrine causes increased heart rate and blood pressure, anxiety and heart arrhythmias. Case studies have implicated synephrine in patients that have experienced strokes and heart attacks.

COMMENTS

More well-done and long-term scientific research is needed for this product.

BOTTOM LINE

Research to date shows that the potential fat-burning effects of synephrine have been largely exaggerated. Unfortunately, there do not appear to be any shortcuts to losing weight and being healthy. Daily exercise, portion control and eating a healthy diet remain the safest and most effective healthy lifestyle choices.



TRAIN SMART

In your efforts to be healthy and physically fit, **one of the most important strategies that you can use is to *train smart* every day.** Training smart will allow you to get the most benefit from your workouts and will reduce your risk of becoming injured.

Research shows that over 50% of CF injuries occur during sports and physical activity. Research also shows that 80–95% of all injuries are preventable. These preventable injuries have a huge negative impact of the operational readiness of the CF.

The following are some evidence-based strategies that you can use every day to ensure you and your unit are training smart:

1 Make the time to do daily fitness training.

This will reduce your risk of injury. It will also reduce your risk of developing diseases such as diabetes, high blood pressure, obesity, heart disease, depression and cancer.

2 Always do an active warm-up.

Your warm-up should be specific to the activity or sport you are about to do. This means it should involve doing similar movements at a slower pace and gradually increasing the intensity. Static stretching does not prevent injuries.

3 Progress your training slowly.

How hard, how often and how long you train will greatly influence your risk of injury. As a general rule you should not increase your workload more than 5–10% per week.

4 Alternate high- and low-impact days.

Activities such as running, jumping and drills subject your muscles and joints to considerable impact. The body needs at least 48 hours to recover from this stress and so we recommend the next day's workout be a no or low impact activity such as swimming, cycling or weightlifting.



5 Cross-train regularly.

Doing a wide variety of fitness activities will help keep you fit, keep your program interesting, reduce your risk of injury and help you develop a wide range of physical skills.

6 Do regular core strengthening exercises.

Core strength is easily lost and is very important for ensuring the health of your lower back.



For more injury reduction strategies, contact your local health promotion staff for a copy of Strengthening the Forces' "Injury Reduction Strategies for Sports and Physical Activity" booklet.

EAT SMART

Proper nutrition is fundamental to your health and performance during training, whether in Canada or 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. **Healthy eating packs a powerful punch, providing your body with all the nutrients and energy it needs to deliver maximum performance.** Eating smart provides that winning edge!

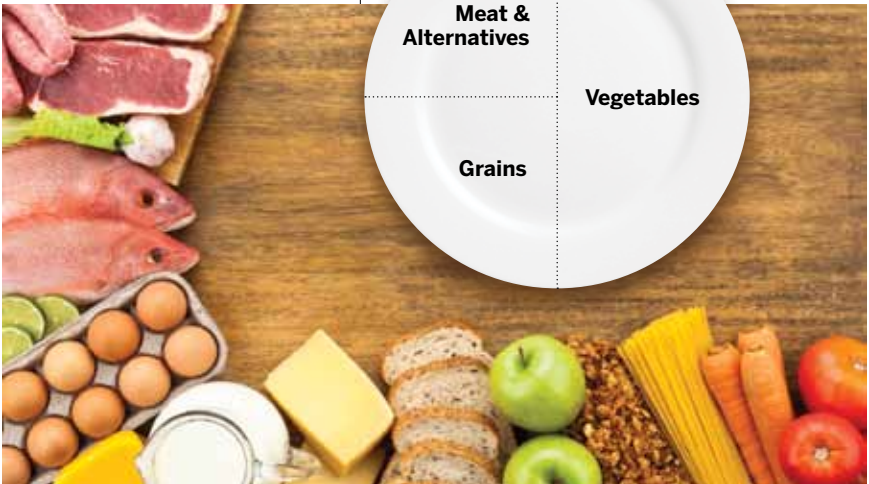
Here are some tips on how to **eat smart** every day:

1 Break your overnight fast with quality foods at breakfast. Start your day fuelled up and good to go!

2 Eat smaller meals every four to six hours to stay energized throughout the day.

3 Include foods from at least three food groups at breakfast and all four food groups for your lunch and dinner. The four food groups are: vegetables and fruits, grain products, milk and alternatives, and meat and alternatives.

4 Aim for the right balance: about $\frac{1}{2}$ your plate should be covered with vegetables, $\frac{1}{4}$ with grains (carbohydrate) and $\frac{1}{4}$ with meat and alternatives (protein). Add milk products and fruit to complete a balanced meal.



5 Limit your intake of high-fat, high-salt and sugary foods.

6 Remember to hydrate regularly. With the exception of alcohol and highly caffeinated and sugary drinks, all fluids you consume promote hydration. Consume at least 2 litres (8 cups) of fluid each day. In hot weather, or when you are very active, choose drinks that replace electrolytes such as commercial or homemade sports drinks.

7 Be certain to eat and drink adequate amounts of foods and fluids before, during and after vigorous exercise. Please refer to the table on the next page for specific food and fluid recommendations.

For more information

on how you can optimize your health and physical performance through nutrition, contact your local health promotion staff.

HOMEMADE SPORT DRINK RECIPES

Makes: 1 L (4 c)

Sport Drink A
500 mL (2 c) fruit juice
500 mL (2 c) water
1.5 mL (¼ t) salt

Nutrition Information
Per 250 mL (1 cup):
58 calories,
13 g carbohydrate (5.4%),
150 mg sodium
Food Guide Servings:
1 Vegetable and Fruit serving

Sport Drink B
(with less fructose)
60 mL (¼ c) fruit juice
925 mL (3¾ c) water
60 mL (4 Tbsp) sugar
1.5 mL (¼ t) salt

Nutrition Information
Per 250 mL (1 cup):
56 calories,
14 g carbohydrate (5.7%),
150 mg sodium
Food Guide Servings:
No significant amount per serving



FUEL FOR TRAINING AND RECOVERY

		DURING EXERCISE			AFTER EXERCISE
WHEN	BEFORE EXERCISE	lasting < 1 hr	lasting > 1 hr	lasting > 3hrs	0-2 hrs after exercise lasting > 1 hr or more
GOAL	Provide energy and prevent dehydration and hunger during exercise	Stay hydrated	Stay hydrated and provide energy	Stay hydrated, provide energy and replace sodium	Replace fluids and rebuild carbohydrate stores and repair muscles
FLUIDS	<p>Drink about 300–600 mL (1–2½ cup)</p> <p>Drink about 150–350 mL (½–1½ cup)</p> <p>Tip: Urine amount and colour is a good indication of hydration status. Aim for pale yellow!</p>	Drink water to thirst	Drink about 150 to 350 mL (½–1½ cup) every 15 or 20 minutes (0.5–1.5 L per hour of exercise)	Drink fluid as soon as possible	Drink fluid as soon as possible
FOOD	<p>Eat a balanced meal rich in carbohydrate with some protein and low in fat</p> <p>Eat a snack high in carbohydrate or a liquid meal</p>	Not needed	<p>Add a source of carbohydrate and minerals</p> <p>If needed, easily digested foods high in carbohydrates</p>	<p>Add a source of carbohydrate and sodium</p> <p>Include sodium in food or fluid</p>	<p>• Eat a snack as soon as possible</p> <p>• Eat a meal containing carbohydrate and protein</p>
SUGGESTIONS	<p>Meal Suggestions</p> <ul style="list-style-type: none"> • Rice, vegetables, lean meat and milk • Pasta, tomato/lean meat sauce, apple sauce, milk • Lean meat sandwich and juice • Pancakes with fruit, yogurt and nuts <p>Snack Suggestions</p> <ul style="list-style-type: none"> • Smoothie using fruit, milk, soy milk or yogurt • Chocolate milk • Pita with hummus and vegetable juice • A slice of bread with peanut butter and milk • Low-fat muffin and fruit yogurt 		<p>Sport drink (commercial or homemade)</p> <ul style="list-style-type: none"> • Carb concentration of 4–8% (40–80 g carb per litre of fluid) • Sodium intake of 0.5–0.7 g (¼ t salt) sodium per litre fluid <p>Water with carbohydrate foods</p> <ul style="list-style-type: none"> • Fruit (e.g. bananas, oranges, dates) • Granola bars, cookies, candies, bagels • Special sport gels, bars or candies 	<p>Snack Suggestions</p> <ul style="list-style-type: none"> • Bagel and chocolate milk or yogurt • Sandwich and juice • Granola bar and juice or yogurt drink <p>Meal Suggestions</p> <ul style="list-style-type: none"> • Pasta with tomato sauce, cheese and a salad • Chicken and vegetable rice, fruit salad and milk • Tuna sandwich, raw veggies and a glass of milk • Chili, bread and milk 	
<p>Tip: The tolerance is individual and depends on the type/intensity of exercise (marching vs. running). Avoid trying new foods or drinks before or during competition or rucksack march.</p>					





Health Promotion in the Canadian Forces
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THE FORCES**
Promotion de la santé dans les Forces canadiennes

