The Dangers of Protein Drink Supplements

A study of the risks associated with protein drinks including heavy metal contaminants, high protein diet effects, and the trends towards pro-hormones

Tag Words: Protein Drinks; Heavy Metal; Contaminants; effects; pro-hormones; protein; arsenic; lead; kidneys

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Summary (YC)

Commercial protein drinks are meant for boosting protein level in the body; however, undesired substances also enter the body through protein supplemental drinks and cause undesired effects. Heavy metal contaminant is one of the undesired substance, and can accumulate to a risky level with multiple servings of protein drinks per day. U.S. Pharmacopeia (USP) set the daily limit for heavy contaminants of arsenic - 15µg; lead - 10µg; cadmium - 5µg; mercury - 15µg. Arsenic, lead, and cadmium are all found to be close to the daily limit. Pro-hormones are also found, with or without being listed on the ingredient label. Pro-hormones are found to disturb natural hormonal balance in the body and may be harmful in growth or sex development in adolescents and children, and other undesired side effects on adults. Besides, high protein level is not necessarily beneficial to the body and causes an extra burden to kidneys. Most U.S. adult can obtain sufficient protein in their diet from natural sources.

Video Link

Dangers of Protein Drinks: http://www.youtube.com/watch?v=J8CQNrzpgf0

The Issue: Protein Drinks

Introduction and History (YC)

Commercial protein drinks are mean for boosting protein level in the body; however, undesired substances also enter the body through protein supplemental drinks and cause undesired effects. These supplements are usually used by athletes, baby boomers, pregnant women, and teenagers to boost protein level in the body for purposes such as muscle buildup and meal replacement. Consumer Report recently investigates the content protein supplement in several popular brands, both in powder and liquid forms. Heavy metal contaminants were found existing prevalently in these products. There are also indications that protein drinks contains pro-hormone, precursor of steroid hormone and is under regulation by law. With unregulated serving frequency, both pro-hormone and unsafe level of accumulation of heavy metals would cause harmful effects. The information about protein drinks investigation is available in the July 2010 article of Consumer Report.

(AS)

"For as long as scientists have known that muscle tissue is comprised mostly of proteins, men looking to gain weight and add strength have been using protein supplements. Initially these supplements were nothing more than selectively choosing foods that are naturally higher in protein, such as eggs, milk, and meat. However, as technology progressed and the ability to produce specifically engineered protein supplements was born, the race was on to find the most efficacious supplement. Over the years there has been much debate over which types of proteins are superior in their anabolic properties, as well as the best times use these supplements. Below is a small excerpt about the beginnings of our modern concept of protein supplementation."

"In the late 1930s a young pharmacist named Eugene Schiff developed a method of processing whey from milk for human consumption. He created Schiff Bio-Foods, a whey packaging company. This was a half century before whey concentrates would emerge as a popular supplement in the bodybuilding scene. For a short time he sold his packaged whey to local drug stores, then sold his own store to enter into the manufacturing and packaging of health foods. The demand during World War II for non-perishable foods allowed the food industry to expand and popularize the market for powdered or dehydrated foods and bodybuilders would eventually find their way into this market. Powdered milk and eggs, and later powdered soy protein, were promoted as an easy way to get additional protein into the diet. The first protein powders "tailored" specifically for athletes appeared around 1950. One of these was called 44, "The Supplemental Food Beverage," produced in California by a company called Kevo Products. The principle ingredient was dehydrated powdered whole soy beans, along with kelp, wheat germ, dextrose, and various dehydrated plants, herbs and flavorings. The supplement was sold at health food stores, body-building studios, and health institutes. Meal replacement products also appeared during the 1950s, with much hype. One product, called B-FIT, was recommended as a replacement for two or three regular meals per day. Advocates for new diet theories--food combining, alkaline-forming diets, even strict vegetarianism--promoted their ideas throughout the 1950s, but the big emphasis was on protein powders and supplements. For the 1954 world weightlifting championships, team coach Bob Hoffman hauled more than 100 pounds of his Hi Protein powder to Vienna, hailing it as the "secret weapon" for his athletes."

“The protein supplementation industry is a multi-million dollar business with people on both sides of the aisle in regards to it's validity. The RDA recommends that the average person, including weightlifters, consume approximately 0.8 - 1 gram/kg body weight per day of dietary protein. There are basically two major camps in the weightlifting arena. Some people argue that the reason they use protein supplements is that the RDA has underestimated the protein requirements for active individuals and that they are only making up the deficit. These individuals would concede that an abundance of protein probably does not increase muscle mass or strength, but that if they only ate what the RDA suggested they would actually be protein deficient.”
“A recent study, released by Consumer Reports, has revealed an alarming fact about the protein shakes, the second most important thing that fitness freaks swear by.”

“The study reveals that protein shakes can be a major cause for concern for all those who consume them regularly, as, it has been found recently, they contain substances that are very harmful for the human body. So far, manufacturers and advertisers have never mentioned anything in this line.”

“However, recent investigations prove that these health drinks often contain chemicals as harmful as cadmium, arsenic and lead. It is common knowledge that all three of these substances can lead to slow poisoning, which ultimately results in death.”

“The investigation included positioning spy cameras to the departmental stores of the country, and asking the sales persons about the possible health risks posed by the drinks.”

“While on the one hand the sales people tried their best to get the drinks off the shelves, not one of them mentioned, even in passing, anything about the health hazards that the drinks may pose, although researchers claim that taken in excessive amounts, these health drinks can actually cause grave harm to the individual.”

“Alarmingly enough, some of the sales persons also stressed that an excessive intake of these health drinks, that is, more than what is recommended by the physician or mentioned in the package is not likely to bring the person to any harm.”

“However, experts are of the opinion that taking too much of the drinks is likely to result in a lot of problems, like dehydration, kidney problems and difficulty in digestion.”

http://www.consumerreports.org/cro/magazine-archive/2010/july/food/protein-drinks/overview/index.htm
https://sakai.rutgers.edu/access/content/group/9ecea1d6-c7f0-4d61-aba7-63bb700e15b2/Protein%20Shakes/original%20consumer%20report%20article.pdf
http://altmed.creighton.edu/ProteinSupplement/History.htm

<u>Possible Sources of Contaminants (YC and CH)</u>
A company called Divisco Food International Inc., has manufacturing facilities based in Shanghai. Their whey protein, known as BiPro, is manufactured according to the following steps.

1. *Fresh milk is tested, approved by Quality Assurance experts and pasteurized.*
2. *The casein, or "curd", and a portion of the milk-fat are separated out to make cheese.*
3. *The remaining liquid whey goes through a series of fine, specialty filters to separate the whey protein from the lactose and other ingredients in the liquid whey.*
4. *Concentrated liquid whey enters an ion exchange tower to further concentrate and purify the whey protein. Ion exchange is a gentle process and does not denature, or "break down", the whey protein.*
5. *Next, the product enters a drying tower to remove water.*
6. *The final step is to package the pure whey protein isolate powder into various size containers for use*

   **Italic text taken directly from: http://www.wheyoflife.org/faq.cfm#2

In step one we see that the only regulation of the product is testing of the milk as it come into the facility. However, because the whey protein is made in Shanghai, the regulatory agencies are significantly different. We see recalls all the time of products made in Asia where contaminants, specifically lead, were not identified until they reached the US.
Companies often have contracts with third party manufacturers to produce individual components of a product. This can be a scary situation, because there is no pressure on the company whose name is not going on the product to test for contaminants. For example, EAS has recalled their entire line of EAS Peak Performance Energy Drinks. (EAS is the manufacture company of Myoplex.) The recall is due to a unknown quality control problem with an unnamed third party manufacture.

Although whey protein is the main protein ingredient; company also includes calcium caseinate, milk-protein isolate, taurine, L-glutamine, sodium caseinate, egg albumin, and alpha-ketoglutaric acid. Any of these ingredient can also be contaminated. For example, isolate egg albumin could be contaminated from the bad eggs of the 2010 recall.

Heavy Metal Contaminants (YC)
Although heavy metals exist naturally in our environment and may also enter our bodies by various means other than protein supplements, with multiple servings per day, metal contaminant accumulate in our bodies in a more rapid rate by consuming protein drinks. The daily limits of protein drinks metal contaminants from U.S. Pharmacopeia (USP) are: arsenic - 15µg; lead - 10µg; cadmium - 5µg; mercury - 15µg. The level of cadmium, lead and arsenic either exceed or just below USP with three protein drinks serving per day, use by most protein drink consumers. Long term chronic arsenic exposure is associated with cardiovascular disease and skin cancer. Cadmium is not only associated with renal dysfunction, but also mimics estrogen, a female hormone, and induces activities similar to estrogen in the body. Both lead and mercury lead disturb the development of neural system. Fetus in mother's uterus is especially sensitive to mercury than adult; neurodevelopment defect can result if mercury is ingested by the mother to certain extent.

Renal effects of cadmium body burden of the general population:
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T1B-49M0KFW-2D5&_user=526750&_coverDate=09/22/1990&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&view=c&_searchStrId=1527823753&_rerunOrigin=scholar.googl

e&_acct=C000023759&_version=1&_urlVersion=0&_userid=526750&md5=7c2769039c666b7bc592b50b8430c179&searchtype=a
Cadmium mimics that in vivo effects of estrogen in the uterus and mammary gland: http://www.gopalkrishana.com/deepa/nm902.pdf
Mercury in the environment: http://www.usgs.gov/themes/factsheet/146-00/
WiKipedia – Arsenic: http://en.wikipedia.org/wiki/Arsenic

Arsenic (CH)

Arsenic (As) is an alloyed metal element found all over the world in natural sources. Arsenic often builds up in the environment around manufacturing facilities that make things such as pressure treated wood, electronics, and glass. Orchards also use arsenic as a pesticide. In these areas, as well as areas with naturally high concentrations of the metal, water contamination is a major ongoing concern. The EPA does not recommend concentrations in drinking water over .01mg/L. This is because short term exposure can cause severe skin damage, causing blistering and eventually skin cancer and keratoses. Long term exposure has been shown to cause vascular damage and nerve damage, leading to vascular diseases, hypertension, and neurological disorders. Studies also have shown links to increased risk of cancer, more specifically skin, bladder, lung, and kidney cancers.

Of all the protein drinks that the consumer report article analyzed, every single one had some concentration of arsenic. The most alarming of these was the Myoplex Original Rich Dark Chocolate Shake, with a concentration of 16.9ug arsenic in 3 servings. The limit put forward by the U.S. Pharmacopeia is 15ug per day. The other drink that was reaching close to that limit was Muscle Milk. All three flavors tested were found to have between 11.2ug and 14.3ug in three servings. It is most likely that the arsenic contaminants found in these drinks are coming from the water source, rather than the powder mix. If it is in the powder mix, such as with Muscle Milk, than the arsenic could be concentrated into a solid when the drink ingredients are dehydrated.

http://water.epa.gov/drink/contaminants/index.cfm#List
http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/index.cfm
Hopenhayn, C. Arsenic in Drinking Water: Impact on Human Health. *Elements*. (2006). p103-107.

Cadmium (CH)

Cadmium is another alloy heavy metal found in many protein drink powders. It is a naturally occurring element found in metal deposits around the world. However, additional cadmium is often introduced to the environment from manufacturing. In the production of galvanized pipes, cadmium is used in the process of smelting, exposing workers to cadmium dust and fumes. Metal refineries also use cadmium, creating dust. These particles are then spread outside of the manufacturing facilities and are introduced into the water source. A third source of cadmium into the environment is through disposal sites of batteries and paint. Both of these products contain cadmium, which will seep into the ground water from landfills. The surrounding population then intakes cadmium not only from the drinking water, but also from food sources. Shell fish in particular have a sever biomagnifications effect. High fiber diets also increase cadmium exposure, because the cadmium in the soil of farms builds up during wheat production.

As exposure continues, cadmium will build up in the kidney. This is especially true for people will low iron concentrations. The low iron increases absorbtion by the gastrointestinal tract. The cadmium is then accumulated in the liver and kidney. This results in renal tubular damage followed by severe kidney damage. Kidney damage is marked by an inability to properly filter the blood, and thus a buildup of many proteins in the blood.

The EPA recommends a cadmium concentration of no more than .005mg/L in drinking water supplies. OSHA recommends no more than .002mg/m^3 for respiratory dust. The U.S. Pharmacopeia limits human consumption to 5ug per day total. The consumer report article found two protein drinks which exceeded the 5ug limit in 3 servings. Myoplex Original Rich Dark Chocolate had 5.1ug and Muscle Milk Chocolate had 5.6ug. Although these were the only two which exceeded the limit with 3 servings, it is important to note that cadmium is often found in many wheat and fish products, so a person's diet will often exceed the limit with protein drinks only contributing as one source of cadmium. For instance Core Series Lean Dessert Protein Puddings contained 3.7ug cadmium. And the GNC Lean Shake Chocolate contained 3.9ug. The cadmium in these drinks is probably due to contamination of the individual ingredients. Because cadmium from soil will biomagnified in plants, and then again biomagnified in animal products, the milk protein bases of mixes may have severally high concentrations of cadmium, based on where the livestock and feed are being produced.

http://water.epa.gov/drink/contaminants/index.cfm#List
http://www.osha.gov/SLTC/cadmium/index.html
http://www.cdc.gov/niosh/idlh/7440439.html
http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=48&tid=15
Jarup, L. Berglund, M. Health effects of cadmium exposure: a review of the literature and a risk estimate. Scand J Work Environ Health. (1998)

Lead (CH)

Lead is yet another heavy metal that was found in the tested protein drinks. Lead is found both naturally in soil deposits, as well as being introduced to the environment through manufacturing sources. One of the more frightening sources of lead into our water system, comes from the decomposition of old water line materials, with feeds the directly into your home. Although consumption of lead through food and drink is harmful, the most dangerous exposure is breathing lead dust. Consumption of lead can lead to all types of medical problems. Like most heavy metals lead will affect the brain most severely. This is especially true for children and young adults whose brains have not fully developed. Some studies have linked lead to the high prevalence of ADD and ADHA in children. Prolonged exposure can lead to high blood pressure and kidney damage in adults.

Lead is so dangerous that the EPA has listed its acceptable level in drinking water as zero. Even the smallest amounts will begin to have adverse effects on health. The problem is that often times the lead levels when they leave water treatment plants is zero. The lead accumulated from the old pipes as it is pumped to your home, and in this case into a manufacturing facility making protein drinks. U.S. Pharmacopeia has given a limit consumption level of 10ug/day for an adult. It is therefore disturbing that so many of the drinks contained lead. The worst by far, however,

were Muscle Milk Chocolate with 13.5ug and Muscle Milk Vanilla Crème with 12.2ug in three servings. The source of this lead is most likely from manufacturing facilities in poorer Asian countries that are not up to standard with new pluming.

www.epa.gov/lead/

Mercury (YC)

Mercury (Hg) exists in the environment in several forms and alters between different forms depend upon environmental conditions. Methyl-mercury (MeHg) is the most toxic form, and exist in water body of several regions of the U.S., including the Northeast. MeHg is absorbed readily and excreted slowly once ingest, which is the main route for human to be exposed to MeHg. It affects immune, neural, genetic and enzyme system in a harmful fashion. Once the neural system is damaged by MeHg, loss of sensory and motor discoordination could result. MeHg is especially harmful to neural development to growing fetus. Neurodevelopment defects may result if MeHg is ingested by the mother during pregnancy. Through manufacturing processes, forms of Hg enter protein drinks from the water body, and accumulated in human body.

Pro-hormones(YC)

Pro-hormones are popular supplement used by muscle builders. Pro-hormones used for body building purposes are the molecular precursor of anabolic steroids, such as testosterone. Testosterone is a male sexual hormone and is required for normal development of secondary sex characteristics including increase muscle size and mass. Even since steroid is banned in the Anabolic Steroid Control Act of 1990, pro-hormones have become the alternative supplements for body builders. After entering the body, pro-hormones go into the synthetic pathways of anabolic hormones and are converted to active hormones. It has been popular for the pase two decades by body builders due to its legal role. The most common forms are androstenediones, norandrostenediones, androstenediols and norandrostenediols. Recently, pro-hormones are found to have the same side effects as anabolic steroids, and have been listed as control substances under the Anabolic Steroid Act of 2004, signed by President Bush. Most pro-hormones, if consumed, are in form of supplemental pills for body builders who intend to take it. However, there are pro-hormones found in protein supplement drinks that are not listed in the ingredients label, mentioned in the original Consumer Report article. For protein drink consumers who do not have the intention of taking pro-hormones, protein drink could put their health into jeopardy.

Pro-hormones disturb the natural hormonal balance in the body. This disturbance can happen through two mechanisms: decrease of bodily hormonal secretion through feedback mechanism and aromatization of androgenic hormones (male hormones) to estrogenic hormones (female hormones). The synthesis and secretion of androgenic hormone is controlled by gonadotropic hormones, FSH and LH, from the hypothalamus. FSH and LH not only induce androgenic hormones secretion, but are also required for the maintenance of structural and functional integrity of the testis. Under normal condition, excess androgenic hormones in the blood inhibit the synthesis and secretion of FSH and LH from the hypothalamus to prevent hyper-stimulation. This is the negative feedback mechanism of gonad hormones. The increase concentration of androgenic hormone due to intake of androgenic hormone precursor can induce the similar negative feedback. FSH and LH are inhibited by the external androgenic hormones. If taken in a

long term, insufficient FSH and LH can cause failure in maintaining structural and functional integrity of the testis. Even if the source of external pro-hormone has stopped, the person's normal function of secretion androgenic hormones could be permanently compromised.

Aromatization of androgenic hormones to estrogenic hormones is the other disturbance; feminization is a consequence from this disturbance. Male hormones and female hormones have the same precursor and similar synthetic pathways. The type of sex hormone being secreted from a secreting cell is determined by its enzymatic makeup. Naturally, a small amount of estrogenic hormones exist in male body; many types of cells, such as brain, breast, and adipose tissue, in male body have the enzymatic makeup to transform androgenic hormones into estrogenic hormones. The concentration required for estrogenic hormones to be effective is much lower than that for androgenic hormones. In fact, estrogen concentration in a male body is similar to a woman in her lowest estrogenic level of her cycle. An estrogenic hormonal level above this normal level causes feminization. The synthetic reaction of estrogenic hormone is only one step away from androgenic hormone synthesis. Therefore, excess androgenic hormone consumption can easily lead to synthesis of estrogenic hormones and cause feminization of the individual. Nandrolone, a pro-hormone found in a protein drink without being listed on the ingredient label, has found to affect normal growth and sexual development on children and adolescent. If taken by pregnant women, the raised androgenic hormone concentration in the body can cause masculinization of fetus. Also, there were cases where pro-hormone affected individuals undergoing puberty where sterile and feminization on male resulted.

Basic Medical Endocrinology, Goodman, H. Maurice.
WiKipedia - Pro-hormone: http://en.wikipedia.org/wiki/Prohormone
Pro-hormone supplements:
http://www.bodybuildingsupplementnews.com/index.php/prohormones.html
Pro-hormone side effects: http://www.buzzle.com/articles/prohormone-side-effects.html
Drug Info – nandrolone: http://www.drugs.com/pro/nandrolone.html

High Protein Diets (NK)

Most people think that our body has no mechanism of storing proteins unlike carbohydrates and fats so it is better to intake high protein diet than fats and carbohydrates. Unfortunately, this is not the case protein rich diets can be equally harmful when taken in excess. Research has shown that Consumption of too much protein can have adverse long term effects on the renal system. More specifically, when too much protein is used to create energy, the liver reacts by creating ketones. Ketones are usually toxic to human body that can cause serious issues with the central nervous system when level rise too high in the bloodstream. Our body has natural defense system in the kidneys to help filter ketones out of the blood stream in order to maintain acid-base homeostasis. But increase in protein intake causes increase in renal plasma flow and glomerular hyperfiltration resulting in progressive kidney damage due to overwork. Additionally, the process of filtering excess acid load from the bloodstream by kidneys also requires the usage of a large amount of body's water supply. This can lead to additional problems related to dehydration. Another issue which is often neglected is getting too much protein can cause decrease in calcium levels in the body. It is because the acids released by the body as it digests protein are absorbed with the help of calcium. So, if the body is calcium deficient your body will start taking calcium from your bones making the bones brittle and week. One study done by the researchers on the effect of high protein diet in older and younger people showed the same results as above. Despite, study showed significant decrease in renal function of older people

than younger people because aging is associated with the decline in kidney function with decreased glomerular filtration rate and decreased ability in excrete acid. Another major side effect from kidney or liver dysfunction due to high protein diet is that kidneys fails to process protein efficiently into urea or don't excrete it efficiently through urine. The result may be uric acid kidney stones or uremic poisoning. The pain associated with gout is caused due to uric acid crystals are caused by uric acid crystals collecting in the spaces around joints. Doctors may recommend a low-protein diet as part of the treatment in these situations.

Te other side effects seen in the consumption of too much protein in a diet are as follows:

- Unpleasant body odor and bad breath - if the person is only consuming protein in their diet then that person actually start smelling like a carnivore as its body will start accumulating ketones.
- Increased risk of high blood fat levels - high-protein foods are often also high in animal fats, particularly saturated fats and cholesterol, which raise blood fat levels and increase the risk of heart disease, and certain types of cancer.
- Loss of muscle tissue – People don't realize that eating too much protein and cutting the carbohydrates completely in your diet will actually cause loss of muscle mass I n the body because now your body is burning the proteins as an energy source rather than carbohydrates.
- Risk of deficiency diseases - cutting out fruits and vegetables, which are our main source of antioxidant vitamins such as beta carotene, and vitamin C, protective bioflavonoids, and certain minerals, to eliminate carbohydrate from the diet, exposes you to the risk of developing a whole range of deficiency diseases; cutting out wholegrain cereals also exposes you to the risk of developing vitamin B and E deficiencies constipation - carbohydrates such as fruit, vegetables, grains and cereals, particularly the wholegrain varieties, are the main source of dietary fibre in the diet; eliminating these foods will inevitably cause severe constipation, which in the long-run can lead to diverticulitis, irritable bowel syndrome, and may even make you more susceptible to bowel cancer.

Most of the people are not aware of the facts that needs to be considered while consuming too much of protein. Some of the factors that play crucial role in determining ones protein intake is their life style whether they are very active or not, their body weight or if they are vegetarian or non-vegetarian. Recent research has shown that people who exercise everyday and athletes or body builders definitely requires extra proteins to restore the proper function of their muscles and avoiding them from torn out because of strenuous activity. But the question arises is how much extra do they need so their normal function of the body stays under control. As a general rule, between 10 percent and 15 percent of your total calories should come from protein. So, if you consume 2,000 calories per day, at least 200 should come from protein, or about 50 grams. You should try to eat around one gram of protein per one kilogram of body wt, or around 0.4 grams per pound. The total will be the number of grams of protein you should consume each day. So, if you weigh 120 pounds, you should eat about 50 grams of protein. So, here a healthy person should consume 0.4g per pound but the research says that for body builders and athletes require 0.86g per kg as the low protein dose and 2.40g per kg as high protein dose. And in the conclusion the research did not find any functional abnormality in the body. In lessen, people has

to be more aware of their own personal requirement for the protein rather than just mimicking other people in the gym or any other exercise setting.

In older people who are unable to take care of them as well as deprived of balanced nutritional diet were recommended to take Boost or Ensure as a substitute to instant nutrition. But the question arises is that how safe are these drinks for older people in regards to their deteriorated health? Consumer reports claims that these drinks have more nutritional value than just concentrating on high protein in the diet. They are a combination of sugar, water, unsaturated oils and a variety of vitamins and minerals. These drinks are highly recommended by doctors to the middle aged people and the older people for their malnutrition in addition to their regular diet. These drinks help gain extra calories and fat in the older people who have unexplainable weight loss due to their diet but doctor usually evaluate their patient for the reason of weight loss before recommending these drinks. In addition, these drinks are very popular in the hospital for the patients who cannot eat or drink due to surgeries or older people to make sure their body is getting enough nutrition. So, Boost or ensure types of drinks are made for older people who can't eat to stay nourished. However, the research has shown that these drinks can only be used as a supplement to the diet in the older people but not as a replacement of meals. The studies have shown that these nutritional drinks actually cause interactions with the prescription drug as well as over the counter drugs taken by the elderly population. In addition this can further cause damage to the other organs of the body.
The bottom line is that the nutritional drinks are not the magic fix for the lack of eating or malnutrition in the older people. These drinks are not bad when used as a supplement to the regular meals in the snack quantity.

www.montefiore.org/services/geriatrics
etd.ohiolink.edu/send-pdf.cgi/Wagner%20Erin%20A.pdf?
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Tarnopolsky MA, Atkinson SA, MacDougall JD, Chesley A, Phillips S, Schwarcz HP (November 1992). "Evaluation of protein requirements for trained strength athletes". *Journal of Applied Physiology* 73 (5): 1986–95. PMID 1474076. http://www.webmd.com/diet/guide/high-protein-diet-weight-loss
Reibero SM, Rogero MM, Bacuraeu RF. Effect of different protein intake and physical training on growth and nutritional status of rats. Journal of nutritional science and vitaminology. Vol: 56(3):177-84, 2010.
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The Service Project: Spreading Awareness

Our service project primarily focuses on the spreading awareness regarding dangers associated with and contaminants found in high protein drinks. Initially, we approached this project through researching online about the contaminants and the harmful effects of consuming High protein drinks. During literary research we came across Dr. Kathy Burns who is a Scientist concerned about her son consuming these high protein drinks, for which FDA has no standards. So, she

being the first one to test for some of the metals contaminants found in these protein drinks posing serious health problems in the future. In addition when Dr. Burns confirmed and tested the potential contaminants (As, Cd, Ag) found in these drinks she reported her results to FDA but no actions were taken. During phone interview with Dr. Burns she led us to some important websites as well as to Ms. Judy Braiman who works in consumer department in New York City and helped her to test these contaminants in her lab. Aside from this, to broaden our prospective towards how the health professional people feel about their patients consuming high protein drinks one of our group person Chelsea Holman interviewed personally a chiropractor Dr. Perry Wolk-Weiss. Dr. Wolk-Weiss in his personal life likes to works out on an everyday basis and see patients mostly athletes with back, knee, shoulder etc injuries. Dr. Wolk-Weiss gave us the permission to put his interview on our YouTube video for which we are very thankful to him. His interview was very informative and educational in regards to consumption of high protein drinks. After gathering enough information we proceeded towards our mission of service project. Furthermore, after gaining so much information about the Protein shakes our primary focus was not limited to only spread awareness but also to find out about how much people know about consuming protein drinks and from where did they found this information on how much protein they should be consuming on daily basis. We picked the Busch campus and the college avenue campus gyms for our service project. We approached some ratio of men to women to find out their knowledge about the protein drinks by posing questions like how many times they workout and for how long? Where do they get their protein requirement for the day? Etc. All of our information and video tapes interviews were put together into a "public service announcement" type video. The video was designed to have some shock factor to it, as well as inform people of the dangers associated with protein drinks. The video and a short description of the dangers was sent to several main stream news media, with the hope that they will further research these threats and spread the information which we have gathered. The news outlets that we contacted were; CNN, MSNBC, News12 NJ, Fox News, CBS news, and ABC news. We hope that our service project video will be educational for everybody.

Email Sent to Media

To whom it may concern,

We are a group of Rutgers students studying nutrition in the 21st century. We recently completed a project on the dangerous side effects of protein drinks. Recently a Consumer Report article brought to light the dangerous contaminants found in many premade and powdered protein shakes. We spend several months researching these and other allegations and this is what we found.

Commercial protein drinks are meant for boosting protein level in the body; however, undesired substances also enter the body through protein supplemental drinks and cause undesired effects. Heavy metal contaminant is one of the undesired substance, and can accumulate to a risky level with multiple servings of protein drinks per day. U.S. Pharmacopeia (USP) set the daily limit for heavy contaminants of arsenic - 15µg; lead - 10µg; cadmium - 5µg; mercury - 15µg. Arsenic, lead, and cadmium are all found to be close to the daily limit. Pro-hormones are also found, with or without being listed on the ingredient label. Pro-hormones are found to disturb natural hormonal balance in the body and may be harmful in growth or sex development in adolescents and children, and other undesired side effects on adults. Besides, high protein level is not

necessarily beneficial to the body and causes an extra burden to kidneys. Most U.S. adult can obtain sufficient protein in their diet from natural sources.

After discovering this we created a short video describing all of these dangers and getting the opinions of college age students who use these drinks. The video can be viewed at http://www.youtube.com/watch?v=Z2ungm4sOWM.
We are sending you this email, because we hope that by bringing the issue to more main stream media, we can begin to decrease the use of these products among young adults. Thank you so much for your time.

-Chelsea Holman, Nainy Kathuria, and Yirong Chen

Editorials

Chelsea Holman
Sent to Natural Health Magazine (11/3/10)

It is astonishing how many "quick fix" products we are bombarded with on a daily basis. One of the newest trends is the line of protein drinks designed to build muscle and promote health. Bulk is the word of the day for teenage and 20something boys, just like tan and skinny is for young girls. When parents are dealing with drugs, alcohol, and failing grades, hanging out with friends at the gym seems like the healthiest thing kids do these days. However, recent publications are showing the dangers associated with the protein drinks these young people are consuming, not only at the gym but as many as three times a day. Not only is an extremely high protein diet damaging to kidneys, but now some of the post prominent brands have been shown to have all types of heavy metal contaminants. We know the terrifying effects of things like lead and arsenic. So the next time you child walks in the door with a box of "milk" ask them what they are really doing to their bodies.

Yirong Chen
Sent to Targum (11/5/10)

Title: Do you really need protein drinks to supplement your diet?

Commercial protein drinks are usually used by athletes, baby boomers, pregnant women, and teenagers to boost protein level in the body for various purposes. However, Consumer Report recently investigates the content of the popular brands of protein drink, both in powder and liquid forms and posted in July 2010 article. Heavy metal contaminants were found existing prevalently in these products.

The heavy metals contaminants found in the protein drinks are arsenic, cadmium, lead, and mercury, which entered the product through manufacturing processes. Due to multiple servings per day by most consumers, the maximum level of consumption proposed by U. S. Pharmacopeia (USP) could be exceeded. USP has a daily maximum limit for cadmium of 5μg, arsenic of 15 μg, lead of 10 μg, and mercury of 15μg. Amount 15 products tested by consumer report, if consumed three servings a day, 1 has arsenic level above daily limit, 3 just below or close to limit; 2 have cadmium level above daily limit; 2 have lead level above limit, and some of them contain mercury. Long term chronic arsenic exposure is associated with cardiovascular disease and skin cancer. Cadmium is not only associated with renal dysfunction, but also mimics estrogen, a female hormone, and induces activities similar to estrogen in the body. Both lead and mercury lead disturb the development of neural system. Fetus in mother's uterus is especially sensitive to mercury than adult; neurodevelopment defect can result if mercury is ingested by the mother to certain extent.

Protein drink does not benefit your body by adding more proteins; excess protein requires extra work from the kidney and can do damage to the bone. Glutamine, the most abundant amino acid in human body and claimed by the manufacture to be the most supplemental needed, has no significant effect on healthy young adult with resistance training in terms of muscle performance, body composition, or muscle protein degradation. Excess protein requires kidneys to do extra work to excrete acid content in the blood to balance during metabolic processes. To buffer this

acid excretion process, extra bone resorption is needed. Bone density and strength decreases, and the chance of fracturing the bone or osteoporosis increase.

Most adult in the U. S. can obtain enough protein from diet. Average protein consumption in the U.S. from diet is already 82 to 100 grams/day according to federal health survey data. Daily protein requirement for sedentary individual is 0.4 times your per pound body weight and 1 grams / pound body weight for athletes. This is said to be 48 grams for a 120 pound female and 72 for a 180 pound male for non-athletes people and 120 grams to 180 grams for athlete people whose weight is in this range. The extra protein requirement for athletes could be easily fulfilled by having one or two chicken breast that contains 54 to 108 grams of protein. Milk, eggs, beans, fish, meats are all natural protein sources that is better and cheaper than protein drinks.

Is it really worthwhile to purchase protein drinks to increase protein level in the body. When you can obtain most of the required protein nutrient from diet, why running the risk of accumulating heavy metal contaminant in your body? Besides, protein drinks is in no way more financially sufficient than other natural protein sources. Next time when you feel the need of boosting protein level in your body, pay attention to other sources than protein drinks.

Nainy Kathuria
Sent to New York Times (11/2/10)

Changing lifestyles and health awareness within people is a demand for the health and nutrition industry. But the question arises is how important and safe it is to substitute your balanced diet to high protein diet? High protein shakes are very popular among all athletes. Substitution of High protein shakes instead of carbohydrates for building muscles or loosing weight may not be the wise choice. In addition, the popularity of high protein diet is not uncommon between the elderly people. Unfortunately, doctors put their elder patients on the high protein diet after being aware of the fact that as you get older your kidney function decreases. Most people think that proteins are not digested in our body so they are better choice over carbohydrates and fats neglecting the fact that everything in excess is bad even proteins. The high protein diets largely affect the acid-base homeostasis in the body which eventually leads to kidney damage. It starts in the liver which forms ketones in response to excess protein in the body. It then leads to glomerular hyperfiltration in the kidneys which eventually causes Kidney damage due to overwork. We all can get enough protein from our regular diets and do not require the extra proteins for our daily activity. However, the problem in our fast moving society keeps us busy which keeps us from cooking and eating healthy homemade food. Gulping high protein shakes in excess containing metals like Arsenic, cadmium and lead has long term side effects. FDA does not mandate high standards for High protein shakes as they do for other food or drug related items. Long term use of these protein shakes which contains these harmful chemicals can lead to serious health problems.