It seems Spring may have arrived a bit earlier this year than last. Looking around the stores we are greeted by bright spring colors and bunnies with delightful carrots.

When I was choosing this volume’s vitamin I kept coming back to beta-carotene, which is present in carrots. However, I cannot talk about beta-carotene without also discussing Vitamin A as the two are closely related.

Beta-carotene and Vitamin A are needed to maintain the health of our cells which can protect against heart disease and cancers. They also help keep our skin and eyes healthy. These benefits are seen with dietary sources of beta-carotene and Vitamin A (fruits, vegetables, milk etc). However, taking beta-carotene and Vitamin A supplements can have negative health affects.

During the late 1990’s studies examining the effect of beta-carotene supplementation on reducing lung cancer risk actually showed an increased incidence in those who are at higher lung cancer risk (e.g. smokers, ex-smokers).

This issue of Nutrition Nibbles will discuss both beta-carotene and Vitamin A, the benefits, risks and food sources. As stated earlier, before adding any type of supplement (vitamin, mineral or herbal) you should talk with your health care provider and pharmacist.

If you have questions or comments regarding the content of Nutrition Nibbles or wish to be added to the mailing list please contact me at sfranci4@uwyo.edu or 328-2647.

Eat Well!

Sarah L. Francis, PhD, MHS, RD
Extension Nutrition and Food Safety Educator

“I never worry about diets. The only carrots that interest me are the number you get in a diamond.”

~ Mae West~
Beta-carotene was discovered in the early 1800’s by the scientist Wachenroder when he was able to capture the compound from carrot roots; hence the term carotene. Beta-carotene is a “provitamin” which means that after you eat a food rich in beta-carotene (e.g. carrots) it goes through a series of reactions in the intestines that changes it to Vitamin A.

Beta-carotene is also an antioxidant, which means it helps protect cells from damage (For a thorough explanation, please refer to Nutrition Nibbles Sept/October 2007 Volume 5). Beta-carotene is a carotenoid which is the yellow, orange and red pigments (color) made by plants. Most carotenoids in the human diet are provided by fruits and vegetables.

High dietary carotenoid intake (7-11 servings of fruits and vegetables daily) is related to lower risk for cancer, heart disease and other chronic diseases.

**ABSORPTION**

Carotenoid absorption requires fat. About three to five grams of fat with a meal has been shown to help increase how much carotenoid is absorbed (Eating your carrots with low-fat ranch is actually helpful!).

Other ways to increase how much carotenoid is able to be absorbed include preparation methods including chopping, pureeing, and cooking. These methods help break the internal “structure” holding the carotenoids thereby releasing them. This doesn’t mean you are not getting health benefits from eating beta-carotene rich foods raw, you are; just not to the same level.

**Beta-Carotene Intake Recommendations:**

- Eat at least 5 servings of fruits and vegetables daily (provides about 6-8 milligrams of beta-carotene). The Institute of Medicine says eating 3-6 milligrams of beta-carotene rich foods daily will keep beta-carotene blood levels high enough to protect against chronic disease.

- Get your antioxidants (such as beta-carotene) from whole foods likes vegetables, fruits and whole grains rather than supplements.

- Consume healthy fats with your beta-carotene rich foods to increase absorption.

**Sources:**


FOOD SOURCES OF BETA-CAROTENE

<table>
<thead>
<tr>
<th>FOOD</th>
<th>SERVING</th>
<th>Beta-Carotene (micrograms)</th>
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</thead>
<tbody>
<tr>
<td>Carrot juice, canned</td>
<td>1 cup</td>
<td>21,955</td>
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<tr>
<td>Pumpkin, canned</td>
<td>1 cup</td>
<td>17,003</td>
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<tr>
<td>Sweet potato, baked</td>
<td>1 medium</td>
<td>16,803</td>
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<tr>
<td>Spinach, frozen, cooked</td>
<td>1 cup</td>
<td>13,750</td>
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<tr>
<td>Carrots, cooked</td>
<td>1 cup</td>
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<td>Collards, frozen, cooked</td>
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<tr>
<td>Kale, frozen, cooked</td>
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<td>11,470</td>
</tr>
<tr>
<td>Turnip greens, frozen, cooked</td>
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<td>10,593</td>
</tr>
<tr>
<td>Pumpkin pie</td>
<td>1 piece</td>
<td>7,366</td>
</tr>
<tr>
<td>Dandelion greens, cooked</td>
<td>1 cup</td>
<td>6,248</td>
</tr>
<tr>
<td>Winter squash, cooked</td>
<td>1 cup</td>
<td>5,726</td>
</tr>
<tr>
<td>Cantaloupe, raw</td>
<td>1 cup</td>
<td>3,232</td>
</tr>
</tbody>
</table>


RECIPE BOX: Glazed Carrots (Serves 4-6 people)

The below recipe is a delicious side dish that complements any meal. In my family we often use this recipe for our holiday celebrations. The preparation method of cooking and added fat helps increase the amount of beta-carotene that will be converted to Vitamin A in the body.

Ingredients:
8 Carrots, cooked and cut length wise
1/3 cup Brown Sugar
2 tablespoons Margarine

Directions:
Heat brown sugar and margarine in a skillet until the sugar dissolves. Add the cooked carrots. Cook over medium heat and turn until well glazed (about 12 minutes).

Nutritional Analysis (1/6th of recipe):
96 calories; 3 grams fat; 1 gram saturated fat; 0 mg cholesterol; 69 mg sodium; 17 grams total carbohydrates; 2 grams fiber; 0 grams protein
ALL ABOUT VITAMIN A

Vitamin A is a fat-soluble vitamin, which means extra is stored in the body for times of lower intake. Vitamin A plays a role in vision, bone growth, cell division, immunity, and reproduction. According to the 2000 National Health and Nutrition Examination Survey (NHANES) the major dietary sources of Vitamin A in the US diet are: milk, margarine, eggs, beef liver and fortified breakfast cereals. The major sources of provitamin A carotenoids include carrots, cantaloupe, sweet potatoes and spinach. NHANES data also indicate that most Americans are consuming enough Vitamin A.

TWO FORMS OF VITAMIN A

PREFORMED VITAMIN A
Most usable (retinol)

**SOURCES**
- Liver
- Whole milk
- Some fortified foods (e.g. skim milk)

PROVITAMIN A
Converted to retinol in the intestines

**SOURCES**
- Colorful fruits and vegetables

*About one-third of Vitamin A consumed by men and women is this form.*

Vitamin A Deficiency

In the US a Vitamin A deficiency is usually related to strict dietary restrictions and excessive alcohol intake. Below is what can happen if a person has Vitamin A deficiency.

- Night blindness (one of the first signs)
- Blindness due to the drying of the cornea in the eye
- Decreased ability to fight infections

Learn how nutrition can help prevent and/or treat heart disease
Cook and taste heart-healthy foods

PARTICIPATE AND RECEIVE
A heart healthy cookbook
Education materials
Diet and activity assessments

WHO SHOULD PARTICIPATE?
Anyone over the age of 18

HOW MUCH DOES IT COST?
$20/person (scholarships are available upon request)

WHEN ARE CLASSES SCHEDULED?

RAWLINS:
Thursdays: April 9, 16, 23, and 30; 6:00 p.m. to 8:00 p.m.
Carbon Building, Room 368
Fridays: April 10, 17, 24 and May 1; 10:00 a.m. to 12:00 p.m.
Carbon Building, Room 368

SARATOGA:
Tuesdays: May 5, 12, 19, 26; 6:00 p.m. to 8:00 p.m.
Saratoga Public Library

LARAMIE:
Tuesdays: June 9, 16, 23, 30; 6:00 p.m. to 8:00 p.m.
Albany County Fairgrounds

FOR MORE INFORMATION CONTACT DR. SARAH L. FRANCIS
307-328-2647

PROVIDED BY THE UNIVERSITY OF WYOMING EXTENSION NUTRITION AND FOOD SAFETY PROGRAM
CARBON AND ALBANY COUNTIES
“Supermarket Savvy” is a two-hour, aisle-by-aisle tour of Valley Foods in Saratoga. During the tour you will receive information about how to make healthier food selections without giving up taste, convenience and enjoyment in eating. Previous participants have found the information presented to be valuable to their everyday dietary practices.

**WHEN:** Saturday, May 2\textsuperscript{nd}
**TIME:** 9:00 am
**COST:** $5 per person (scholarships are available)
**WHERE:** Meet at the Public Health Office
(Old Town Hall, 201 S. River, Saratoga)

Pre-registration is required.
The deadline is 5:00 p.m. Monday, April 27\textsuperscript{th}.

Registration forms are available at Valley Foods and the Carbon County Extension Office (Rawlins).

For more information call Dr. Sarah L. Francis: 307-328-2647
**Recommended Dietary Allowances (RDAs) for Vitamin A**

Below are the recommended intakes for Vitamin A. Please refer to the provided food lists for the amount of Vitamin A in common foods (page 9).

**RAE:** Retinol Activity Equivalents which account for the different retinol activity levels of Vitamin A and carotenoids.

**IU:** International Units which are used on supplement labels.

### Children:
- 1-3 years: 300 micrograms RAE (1,000 IU)
- 4-8 years: 400 micrograms RAE (1,320 IU)
- 9-13 years: 600 micrograms RAE (2,000 IU)

### Males:
- 14+ years: 900 micrograms RAE (3,000 IU)

### Females:
- 14+ years: 700 micrograms RAE (2,310 IU)
- 14-18 years (pregnant): 750 micrograms RAE (2,500 IU)
- 14-18 years (lactation): 1200 micrograms RAE (4,000 IU)
- 19+ years (pregnant): 770 micrograms RAE (2,565 IU)
- 19+ years (lactation): 1300 micrograms RAE (4,300 IU)

### Health Conditions That Can Lead to Vitamin A Deficiency

**Celiac Disease**
- Genetic disorder
- Caused by a gluten allergy (found in wheat and some other grains) that can trigger damage to the intestines
- **Treatment:** eat a gluten-free diet to avoid associated diarrhea and other symptoms

**Crohn’s Disease**
- Disorder of the digestive tract
- Can lead to diarrhea, fat malabsorption and malnutrition
- **Treatment:** medical intervention and diet therapy

**Pancreatic Disorders (not including diabetes)**
- The pancreas makes many enzymes needed to help with digestion. When the pancreas is unable to make these enzymes fat cannot be absorbed.
- **Treatment:** doctors often prescribe fat-soluble vitamins such as Vitamin A

Source:
**Background**

Early studies during the 1980’s suggested that using antioxidant supplements like beta-carotene and Vitamin A may prevent cancer-causing compounds (carcinogens) from damaging cells. Two large clinical trials were developed to test this theory: The Alpha-Tocopherol, Beta-Carotene Cancer Prevention (ATBC) Study and the Beta-Carotene and Retinol Efficacy Trial (CARET).

**Study Design**

**ATBC Study:**
Enrolled 29,000 male smokers

Took place in Finland

Participants were randomly assigned* to receive: beta-carotene, Vitamin E, beta-carotene + Vitamin E supplements or a placebo (sugar pill)

**CARET Study:**
Enrolled more than 18,000 women and men who were former smokers, smokers or had asbestos exposure.

Took place in the U.S.

*Randomly assigned means that the researchers didn’t give a specific supplement to a certain type of participant. It is usually decided by a computer program or the order in which people sign-up.

**Results**

**ATBC Study:** After an average of six years, follow-up data showed participants who took supplements had a 16% higher incidence of lung cancer. The death rate (from all causes) was 8% higher in participants who took beta-carotene supplements. Eight years after the trial stopped the lung cancer and death rates for those taking beta-carotene supplements declined.

**CARET Study:** After about a four-year follow-up period, participants assigned to beta-carotene supplements had a 28% higher incidence of lung cancer and 17% increase in death rates. This study was halted early and participants ceased taking the supplements.

**Conclusions**

Beta-carotene supplements were not shown to be harmful to non smokers, but have not been shown to be of added benefit.

**THESE RESULTS ARE ONLY APPLICABLE TO SUPPLEMENTS, NOT FOOD SOURCES OF BETA-CAROTENE.**

Since Vitamin A is a fat soluble vitamin toxicity is a possibility. Vitamin A toxicity can lead to:

- Birth defects
- Reduced bone density
- Liver abnormalities
- Central nervous system disorders

Some toxicity symptoms can occur after eating a lot of preformed Vitamin A sources in a short period of time. This is usually seen when someone takes too many Vitamin A supplements.

**Toxicity Symptoms Include:**

- Headache
- Dizziness
- Nausea and Vomiting
- Blurred Vision
- Muscular Uncoordination

Source:

### ANIMAL SOURCES OF VITAMIN A

<table>
<thead>
<tr>
<th>FOOD</th>
<th>VITAMIN A (IU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver, beef, cooked, 3 ounces</td>
<td>27,185</td>
</tr>
<tr>
<td>Liver, chicken, cooked, 3 ounces</td>
<td>12,325</td>
</tr>
<tr>
<td>Milk, fortified skim, 1 cup</td>
<td>500</td>
</tr>
<tr>
<td>Cheese, cheddar, 1 ounce</td>
<td>284</td>
</tr>
<tr>
<td>Milk, whole (3.25% fat), 1 cup</td>
<td>249</td>
</tr>
<tr>
<td>Egg substitute, 1/4 cup</td>
<td>226</td>
</tr>
</tbody>
</table>

Source:
**Kids Corner**
by Cathleen Craig, BS

**Crazy About Carrots**

Carrots contain more beta-carotene than any other vegetable! Beta-carotene turns into Vitamin A in the body and helps you see better in the dark, keeps your skin healthy, and helps keep you from getting sick. Beta-carotene gives fruit and vegetables their orange and yellow color. Some foods high in beta-carotene are carrots, red peppers, mango, melon, and apricots.

**Did You Know?**

In the Middle Ages, carrot juice was used to make butter a more appealing color in winter.

The name ‘Carrot’ is Celtic, and means ‘red of color’

**Carrots Helped Win World War II!**

During WWII, England’s government said the reason their Royal Air Force pilots were able to see the Nazi bombers at night was because they were eating a lot of carrots. This rumor kept England’s airborne radar a secret. It was the radar that was helping them find the Nazi bombers in the dark, not super carrot vision!

http://www.carrotmuseum.co.uk/history4.html

**To learn more interesting things about carrots check out the World Carrot Museum at www.carrotmuseum.com**

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**Kitchen Cupboard**

**Safety Tips:**

- Wash carrots in hot water with a vegetable brush or with your hands to remove germs! Don’t use soap to clean them because it could make you sick.
- When taking an item out of the oven do not lean directly over the pan. Instead, stand off to the side when opening the oven to avoid getting burnt by the heat, steam, and things like boiling oil.

**Cooking Terms**

- Bake— to cook with dry heat in an oven, better for you because it uses less fat
- Julienne— to cut food into thin matchstick-like strips
- Slice— to cut food into thin even slices

**Kitchen Utensils**

- Spatula— A long handled tool with a flat blade used to pick up or turn food over
- Baking Sheet— A flat metal pan used for baking
- Cutting Board— A board used as a firm surface for cutting food and to protect the counter top
Find the Carrot!
Find all the hidden carrots in the forest and help the hungry rabbit feast on his meal.

Q: What did the rabbit say to the carrot?
A: It's been nice gnawing you.

Did you know?!
Carrots come in a variety of colors red, black, yellow, white, purple, and green. The orange carrots we know were developed by a Dutch scientist for the House of Orange, a Dutch royal family.

The average person will consume 10,866 carrots in a lifetime!

Carrot Chips (like potato chips but better)!

Materials: knife, cutting board, baking sheet, spatula, oven mitts, oven.
Ingredients: carrots, salt or other seasoning, olive oil or non stick spray

Directions:
1. Preheat the oven to 350 degrees Fahrenheit.
2. Spray a baking sheet with a light coat of oil or coat carrots with small amount of oil (put the oil in a ziplock bag, add the carrots, seal the bag, and shake).
2. Slice or julienne your desired carrots. Try to make them about 1/4 inch (2.54 cm) thick.
3. Place the carrots on the baking sheet without overlapping them.
4. Sprinkle with salt, pepper, or other seasonings.
5. Place the baking sheet in the oven and bake for about 5 minutes (or until the edges turn brown).
6. Turn the chips over and bake for another 5-10 minutes. Remove from the oven and enjoy!
CENT$IBLE NUTRITION PROGRAM

Free nutrition classes for those who qualify. Classes are tailored to meet the participants' needs and wants

**Duration:**
Classes meet weekly (1-2 hours) for 5-14 weeks

**Incentives:**
1. A free computer diet analysis
2. Cookbook
3. Nutrition and cooking lessons adapted to your needs.

The Cent$ible Nutrition Program empowers individuals and families to select foods that fit within their budget, and are nutritionally sound choices.

**FOR MORE INFORMATION OR TO ASK ABOUT CLASS TIMES CALL:**
328-2642 (Carbon County) or 721-2571 (Albany County)