



# Kernels

Spring/Summer 2013

Healthy  
Carbo-Loading



More Reasons for  
Wheat Foods



Plus  
Great Recipes, Getting  
Inside the Wheat Kernel  
and more...



Wheat Foods Council  
WheatFoods.org



## A Word From Judi Adams

With warmer weather, it's time to get outside and take advantage of all the opportunities for physical activity, from a walk in the park, to planting a garden, playing a sport, or, even running a marathon. As runners train for high intensity endurance races this spring, this issue of *Kernels* offers a primer about how to healthfully carb-load by eating carbohydrates like wheat foods to maximize energy for the big race. We offer a sample menu, and suggest two new Wheat Foods Council recipes perfect for a healthy and delicious energy boost whether you're running a race or just running to the store.

In the area of research, April was National Autism Awareness Month, and the Wheat Foods Council shares with you new evidence that wheat foods fortified with folic acid may reduce the risk of Autism Spectrum Disorders. To learn more, read the article by Michele Tuttle, MPH, RD, who shares the most up-to-date findings from a new folic acid/autism study.

The Wheat Foods Council is committed to increasing the awareness of dietary grains as an essential component of a healthful diet. In this issue of *Kernels*, Victoria Shanta Retelny, RD, writes about the health benefits of fiber for children and how to include high fiber whole wheat foods in a child's diet.

You can also explore the heart of a wheat kernel and discover the parts of this age-old grain that has stood the test of time in "Grains of Truth - Deconstructing a Wheat Kernel."

Enjoy!

Judi Adams, MS RDN,  
President, Wheat Foods Council

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## A Whole New Start with Grains

By Victoria Shanta Retelny, RD, LDN

Just like adults, children should eat a variety of whole grains every day. The 2010 Dietary Guidelines for Americans recommends at least 3 1-ounce servings of grain foods a day for girls 9-18 and boys 9-13 years old. Smaller children (2-3 years old) only need 3 total servings a day. Replacing empty calories with nutrient-packed whole grains is a smart swap at every age. However, for children who are learning how to eat healthfully, reinforcing good nutrition practices is important. Children learn by example – and their taste preferences begin early, so exposing them to whole grains at a young age will lead to a lifetime of appreciation and enjoyment of whole grain foods.

Among the health benefits of whole grains are their ample supply of dietary fiber, which helps stabilize blood sugar, control cholesterol and blood pressure, as well as satisfy the appetite on fewer calories – which can help maintain a healthy body weight. Also, whole grains contain vitamin E, vitamin B6, magnesium, zinc, copper, manganese and potassium – all key nutrients for a child's growth and development.

You can incorporate whole grains into your favorite main dishes, sides or desserts. For example, whole wheat is used in many children's favorite food products; with six classes of wheat grown in the U.S., there are various kid-friendly products that come from wheat with different tastes, textures and meal appeal.

Let's take a closer look at the wheat family and what foods they are in:

- Hard Red Wheat – is used in baking breads, hard rolls and flat breads; it's used in cereals and noodles, too.
- Hard Red Spring - is used in hearth breads, rolls, croissants, bagels and pizza crust. It's also added to flour blends.
- Soft Red Winter – is silky, soft wheat that has a weak gluten structure and is used in breakfast cereal, baking cookies, crackers, pretzels, pastries and flat breads.
- Soft White – is low-moisture and provides a whiter product – perfect for cakes, pastries and Asian noodles.
- Hard White – is new on the U.S. wheat scene and it's great for whole wheat breads, spaghetti-style noodles, as well as pan breads and flat breads.
- Durum – is the hardest wheat of them all due to its high protein content and gluten strength. Its rich amber color makes it unmistakable in pasta, couscous and Mediterranean breads.

Here are some fun whole wheat snacks for kids:

- Whole wheat crackers and hummus
- Mini-cheese quesadilla on whole wheat tortillas
- Flat bread pizzas
- Whole wheat macaroni and cheese cups
- Mini whole wheat bagel and peanut butter
- Whole wheat cereal and low-fat milk

Here's a fun and tasty recipe, you can make at home with your kids.

### Cheesy Broccoli Bakes

Serves 2

What could be better than cheesy broccoli with whole wheat bread crumbs? This is tasty with cauliflower, too.

Steam a cup of broccoli florets until bright green in a steamer pot with water (or microwave for 1 minute) and remove from heat. Toss broccoli with 2 teaspoons olive oil, a pinch of salt and 1 tablespoon of bread crumbs (see recipe below for simple whole wheat bread crumbs). Divide the mixture into 2 ramekins and cover each with ¼ cup of grated cheese, such as cheddar, mozzarella and/or Swiss. Bake in a 350 degree oven until cheese is melted, about 2 -3 minutes.

Child Tasks: toss broccoli with olive oil, salt, bread-crumbs, and add cheese

#### Simple Whole Wheat Bread Crumbs

Use day-old whole wheat bread and dice it roughly into chunks and place on a cookie sheet. Bake on a baking sheet at 350 degrees for 10-15 minutes until hard and golden brown. Remove from oven and let cool. Put into a food processor or blender and pulse for a few minutes until it's a crumb consistency. Sprinkle a teaspoon of garlic powder, a pinch of salt and oregano into the crumbs for more flavor. Place into a plastic container and store in a cool, dark place or freeze for later use.

Victoria Shanta Retelny, RDN, LDN, is the author of *The Essential Guide to Healthy Healing Foods*. She is a nationally-recognized nutrition expert and mom of two active youngsters. She lives to eat well with her family in Chicago. Follow her on Twitter @vsnutrition or email her at [victoriashantaretelny.com](mailto:victoriashantaretelny.com).

# Healthy Carb-Loading Maximizes Energy for the Big Race

Spring has arrived, and runners are hitting the trails. Many endurance runners have been training throughout the cold months for the numerous spring road races across the country.

With the growing popularity of endurance competitions, like triathlons, half-marathons and marathons, runners must choose among countless training and nutrition strategies to best fuel their bodies. Carb-loading, or increasing the intake of carbohydrates to maximize the amount of energy stored in the body's muscles, has long been practiced by all levels of runners to improve athletic performance and decrease fatigue.



stored in the muscles is critical to increased endurance. When glycogen stores are exhausted, the body must burn stored fat, which is harder to convert resulting in the dramatic fatigue referred to as "hitting the wall."

## Choose Grains

Eating foods containing whole and enriched grains is a healthy, efficient way to carb-load. Foods like pasta, whole wheat bagels, and grain bars, assist with glycogen stores, and they also contain essential B vitamins which help maintain a healthy nervous system, increase energy, lower cholesterol, and improve heart health. Research shows that adults who eat three servings of whole grains daily have less abdominal fat and avoid unwanted weight gain.

## How Much?

About two to three days before a long training run or the actual race, increase carbohydrates to about 70-85 percent of the body's daily calories – around 4 grams of carbs for every pound of body weight. That's about 600 grams or 2,400 calories of carbs per day for a 150 lb. runner. Since the amount of training typically decreases as race day nears, the glycogen from the extra carbohydrates will accumulate in the muscles resulting in stored energy for the race.

The column on the right shows a sample daily carb-load menu for a 150 lb. runner, including two Wheat Foods Council recipes in this issue of *Kernels*:

## Putting It All Together

Runners should practice eating more carbs and less fat and protein two to three days before their last long run to see which foods digest better than others. One week before race day, stick to eating those carbohydrates that worked. It's important to eat small amounts of low-fat proteins like eggs, yogurt, turkey, lean beef or chicken.

There is no need to increase overall food intake; just replace some fats and proteins with carbohydrates. Some healthy 50 gram grain foods for a meal or snack include 2 cups of whole grain cereal, a whole grain bagel, 2 slices of multi-grain bread or a cup of pasta.

The night before the race, it's best to eat a small, carb-laden meal early evening. If more is needed, have a carb-heavy breakfast and lunch. The morning of the race eat breakfast, about 150 grams of carbohydrates such as a bagel and yogurt.

Healthy carb-loading may help maintain the stamina to accomplish the entire race while avoiding a huge lag in energy and overwhelming fatigue. Remember to carb-up with delicious grains after those long training runs and the marathon itself. Eating grains to replace glycogen stores and protein to aid muscle recovery is a healthy way to remain energized for the next race!



## Breakfast

1 bagel with 2 tablespoons strawberry jam (71g)  
1 medium banana (27g)  
8oz fruit yogurt (41g)  
8oz orange juice (26g)

### Morning Snack

2 granola bars (29g)  
12oz milk, fat free (19g)



## Lunch

Brie, Apple and Smoked Turkey Croissant Panini (41g)  
12 baby carrots (10g)  
8oz fruit juice (26g)  
Afternoon Snack  
8 oz low-fat yogurt (42g)  
10 wheat crackers (14g)  
2 medium apples (50g)

## Dinner



Peanut Noodles with Mango and Watercress (57g)  
1 cup broccoli, steamed (11g)  
12oz milk, fat free (18g)  
Tossed salad with reduced fat Italian dressing (10g)  
1 small wheat dinner roll (13g)

### Evening snack

½ cup strawberry slices (6g)  
¼ cup walnuts (4g)  
1 ½ cups chocolate frozen yogurt, fat free, sugar free (55g)



# More Reasons to Include Fortified Wheat Foods:

## Folic Acid May Reduce Risk of Autism Spectrum Disorders, Neural Tube Defects, and Stroke

Healthy eating matters and the impact of a healthy diet may begin a lot sooner than most people think. From the moment of conception, the nutrients that are available to a developing fetus in the womb can shape the rest of that individual's life. While all nutrients are important to life, lack of folate and folic acid dramatically influences brain and neural development and the effects may be more widespread than previously thought. Approximately 1 in 3,000 children are born with a neural tube defect (NTD). Now it appears likely that folic acid may have a positive impact on much more than decreasing the risk of neural tube defects.

In 2008, nearly 1 in 88 children in the US were born with Autism Spectrum Disorders (ASD), a 78% increase since 2002. A study of more than 85,000 children born in Norway between 2002 and 2008 indicates that folic acid supplementation four weeks before conception to eight weeks post-conception lowers the risk of the most severe types of ASD by 40%. The women studied took folic acid supplements; Norway does not have a mandatory program of folic acid fortification of food products.

Folate, one of the many B vitamins, is responsible for proper cell division. Without it, or with inadequate levels, mistakes happen when cells are rapidly dividing as they are during fetal development.

Folate is available in commonly eaten foods such as whole wheat, dark leafy greens like spinach, and beans (e.g., lentils, pinto beans). In addition, folic acid, the dietary supplement form

of folate, has been added to the US food supply since 1998. (See the chart for dietary folate equivalents available from common foods.)

The US began fortifying enriched flours, breads, rolls, buns, farina, rice, pasta and noodle products with folic acid after studies revealed that supplementation may reduce the risk of NTDs such as spina bifida by up to 70%. (A small percentage of corn grits and cornmeal products are enriched and those that are must be fortified with folic acid).



While the complex carbohydrates in bread, rice, and other grain-based foods are known for providing essential fuel the body needs, women of child-bearing age especially need to make sure they are getting plenty of nutritious enriched grains since they are an important source of folic acid. In fact, enriched grains are the

primary source of folic acid in Americans' diets and contain twice as much folic acid as whole wheat.

While folate deficiency is not widespread in the US, certain population groups are at higher risk for inadequate intake. All women of child-bearing age and pregnant women are at higher risk for deficiency, but Hispanic women and non-Hispanic black women are at the highest risk for low folate status. In addition, folate deficiency is often linked with poor diet, alcoholism, and, sometimes, malabsorptive disorders such as celiac disease, and inflammatory bowel disease.

It's not only pregnant women who need to be aware of folate. Folate and other B vitamins are involved in homocysteine metabolism. An el-

evated homocysteine level is associated with an increased risk of cardiovascular disease, stroke, and cognitive disorders (depression, dementia and Alzheimer's disease). Several clinical trials have confirmed that while folic acid does reduce homocysteine levels, it does not reduce the risk of cardiovascular disease. It does, however appear to reduce the risk of stroke by as much as 12%. Research on the effects of folate on cognitive disorders is still being evaluated but it appears that folic acid may improve responsiveness to antidepressant medication especially in women with low folate status.

In the US, the fortification level is 0.7 mg folic acid per pound of flour. At this level, a slice of enriched bread will contain 37 µg and a half-cup of cooked pasta 60 µg. If consumers ate at least six ounces from the bread and grains group daily, this would enable them to reach the Daily Recommended Intake of 400 µg. For example, three ounces of bread (bagels, tortillas, English muffins, etc.) would total 81 µg; a cup of pasta, 120 µg; and a fortified breakfast cereal with at least 200 µg would fulfill the requirement for women of childbearing age.

The Centers for Disease Control and Prevention (CDC) named folic acid fortification of enriched grain products as one of the top 10 public health achievements in the first decade of the 21st century, in recognition of its contribution to a remarkable 36% drop in neural tube defects from 1996-2006.

#### References:

Association Between Maternal Use of Folic Acid Supplements and Risk of Autism Spectrum Disorders in Children  
 Autism Spectrum Disorder: Data & Statistics  
 Birth Defects: Data & Statistics  
 Dietary Supplement Fact: Folate  
 Grains of Truth: Folic Acid

FOOD	FOLATE µg/SERVING	
Ready-to-eat breakfast cereals (read labels for exact amount)	1 ounce	100-400
Enriched wheat flour tortilla	1, 8" tortilla	98
Corn flour tortilla	1, 6" tortilla	48
Enriched pasta	½ cup cooked	80
Whole wheat bread	1 slice (1 oz.)	14
Enriched white bread	1 slice (1 oz.)	37
Asparagus	½ cup cooked	121
Kidney beans	½ cup cooked	114
Lentils	½ cup cooked	179
Navy beans	½ cup cooked	127
Orange	1 medium	48
Orange juice, fresh squeezed	½ cup	37
Pinto beans	½ cup cooked	148
Spinach, raw	½ cup	29
Spinach, boiled	½ cup	131
Sunflower seeds, dry roasted	½ cup	152
Beef liver, braised	3 ounces	184

\*\*DFE is a measure developed to account for the difference in the absorption of food folate and synthetic folic acid from dietary supplements or foods fortified with folic acid.

The bottom line: everyone benefits from consuming enough folate, but it is very, very important that all women of childbearing age consume folic acid or folate every day either through foods or supplements whether they are planning to become pregnant or not (up to 50% of pregnancies in the US are unplanned).



# Wheat Eats For Energy

## Brie, Apple and Smoked Turkey Croissant Panini

Makes 2

### Ingredients

2 medium croissants, regular or whole wheat, sliced in half crosswise  
2 tablespoons cranberry mustard or honey mustard  
4 ounces thinly sliced smoked turkey breast  
2 sweet or dill gherkins, thinly sliced lengthwise  
2 slices brie, about 1 ounce each  
½ medium Granny Smith apple, unpeeled, thinly sliced



### Directions

Spread mustard on the cut sides of the croissants. On one side of each croissant lay half the turkey, gherkins, brie and apple. Top each sandwich with the other half of the croissant.

If you are using a panini press, place the sandwiches in the press, close it and cook over low heat for about 4 minutes, until the cheese has melted and the bread is crisp.

If you do not have a panini press, put the sandwiches in a non-stick skillet, or a regular skillet that has been lightly coated with cooking spray, and set another skillet (large enough to cover the sandwiches, but small enough to sit down inside the first skillet) on top of the sandwiches. Weigh the top skillet down with a small, heavy saucepan, a tea kettle filled with water, or other heat proof weight (a clean brick will work, for example). Cook over low heat for 2 minutes. Remove the top skillet, flip the sandwich, replace the top skillet (and weight) and cook for about 2 more minutes, until the cheese has melted and the bread is crisp. Cut each sandwich in half and serve hot.

\*Approximate nutritional value per serving:

440 calories; 21 g total fat; 12 g saturated fat; 90 mg cholesterol; 1290 mg sodium; 41 g carbohydrate; 3 g dietary fiber; 22 g protein; 74 mcg DFE (folate).

## Peanut Noodles With Mango and Watercress

Serves 8



### Ingredients

#### Sauce

¼ cup peanut butter  
¼ cup low sodium soy sauce  
2 tablespoons sugar  
¼ cup sesame oil  
2 tablespoons Worcestershire sauce  
2 tablespoons lime juice  
¼ cup plus 2 tablespoons low-sodium chicken broth, or water  
1 tablespoon chopped fresh ginger  
2 cloves garlic, peeled and coarsely chopped  
Freshly ground black pepper, to taste

#### Linguine

1 pound linguine, cooked and cooled  
2 cups small watercress, sprigs (1 bunch)  
1 mango, pitted and diced  
½ cup chopped scallions  
¼ cup chopped fresh mint, optional  
¼ cup chopped peanuts

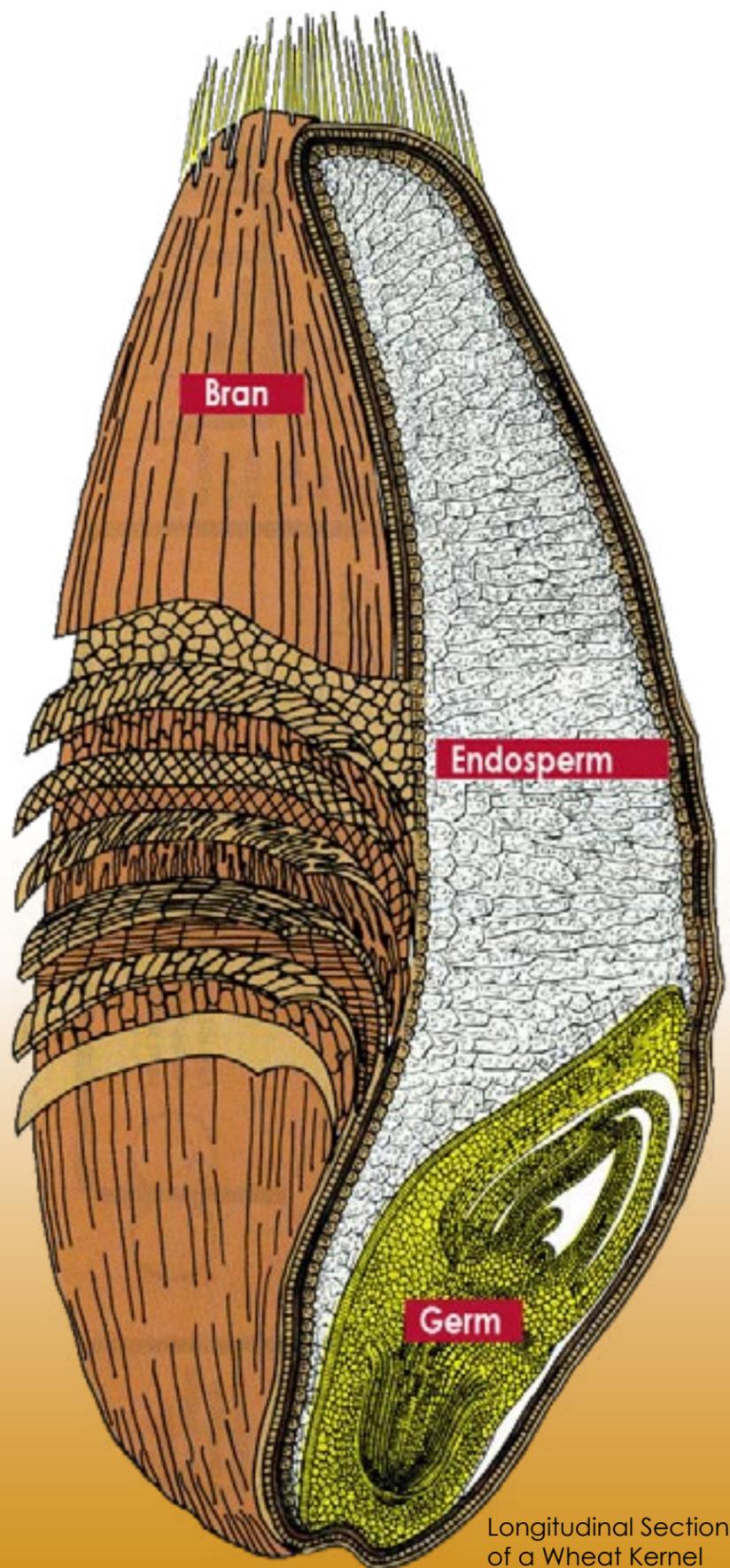
### Directions

Put all the sauce ingredients into the food processor or blender. Process until smooth.

Put the linguine, watercress, mango, scallions and mint into a large bowl. Add the sauce and toss until the linguine is well coated. Sprinkle with peanuts and serve.

\*Approximate nutritional value per serving:

400 calories; 15 g total fat; 3 g saturated fat; 310 mg sodium; 57 g carbohydrates; 5 g dietary fiber; 13 g protein; 16 mcg DFE (folate).



Longitudinal Section  
of a Wheat Kernel

# Deconstructing a Wheat Kernel

Like all grains, wheat began as a wild grass, and may in fact have been the very first crop in history. Historians believe the wheat kernel originated in the “cradle of civilization,” the Tigris and Euphrates river valley, near present day Iraq. In their natural state growing in the fields, whole grains begin as a dry, one-seeded fruit commonly called a kernel. The kernel—also known as the “caryopsis” or wheat berry—is the seed from which the wheat plant grows. It’s also the part we grind to produce flour or semolina. Each kernel contains three distinct, edible parts that are separated during the milling process.

**Endosperm** Comprising about 83 percent of the kernel weight, the endosperm is the germ’s food supply. It’s also the source of white flour. In its natural state, the endosperm provides essential energy to the young wheat plant, allowing the plant to send roots down for water and nutrients and shoot sprouts up for sunlight.

**Bran** Approximately 14.5 percent of the kernel weight, the bran is the multi-layered, hard outer covering of the wheat kernel. Bran is included in whole wheat flour and can also be purchased as a stand-alone grain. Bran consists of important antioxidants, B vitamins and fiber.

**Germ** Comprising only 2.5 percent of the kernel weight, the germ is the embryo, or sprouting section, of the kernel. The germ is the part of the wheat kernel that will sprout and grow into a new wheat plant. During the milling process, the germ is often separated from flour because the fat content limits the flour’s shelf-life. It is stabilized and then put back in to keep the flour “whole.” Like the bran, the germ contains many B vitamins. It also consists of protein, minerals and healthy fats.

These three parts are protected by an inedible husk that shields the kernel from potential hazards such as sunlight, pests, water and disease. Wheat kernels vary in both texture and color, from white or red to sometimes even purple.

**Whole Grains vs. Enriched Grains** More than 17,000 years ago, humans gathered the seeds of wheat plants as an important food source. After rubbing off the inedible husk covering the wheat kernel, they consumed the kernels raw, parched or simmered.

Today, whole grain products still contain the entire kernel of grain. As the name suggests, a whole grain is any grain that maintains all three of its parts in the same proportion found in the original kernel. The bran (outer layer) provides the bulk of the fiber (insoluble), B vitamins, trace minerals, and a small amount of protein. The middle layer — the endosperm — is the primary source of protein and carbohydrates, and also contains B vitamins, iron and soluble fiber. The germ (inner part) is a rich source of trace minerals, unsaturated fats, B vitamins, antioxidants and phytochemicals, as well as a minimal amount of high quality protein.

Enriched grains are produced using only the endosperm of the kernel. Some of the nutrients that are milled out during the production process are replaced through enrichment. Slice for slice, enriched white bread — as well as other enriched grain products — are a good source of iron and B vitamins, as well as complex carbohydrates. Additionally, enriched grain products have two times more folic acid than whole wheat products.

# Wheat's Up

## Taking It to the States

"Wheat, Gluten and Health: The Science Behind Gut Health and Food Intolerances" is the title of a Wheat Foods Council presentation delivered at several state Academy of Nutrition and Dietetics (AND) meetings this spring by noted carbohydrate expert and nutrition educator Julie Miller Jones, Distinguished Scholar and Professor Emerita of nutrition in the Department of Family, Consumer and Nutritional Sciences at the St. Catherine University in St. Paul, MN.

Dr. Jones explains

- The role of a healthy gut and gut microbiome in health and wellness.
- How gut bacteria are affected by age, medications, and diet.
- How gut health and the micro biome is an important contributor to overall health and food intolerances.
- The exponential rise in the public's concerns and avoidance of gluten, wheat, and the perception that a gluten-free diet is healthier than a wheat inclusive diet.



The presentation will be available later this year as a webinar for continuing education credits on the WFC Network website.

## Wheat: Healthy Choices for Every Meal

Targeted to supermarket RDs but packed with information for dietitians and other nutrition professionals, the WFC launched its "Wheat: Healthy Choice for Every Meal" tool kit in February 2013. The kit includes three blogs/newsletter articles, in-store cooking demo ideas, sample tweets and a listing of WFC recipes. Kit materials may be accessed online here.



## Setting the Record Straight

The WFC is taking National Geographic to task for numerous inaccuracies about wheat, wheat breeding and celiac disease in an article entitled "Gut Reactions" appearing in the April 2013 issue. In a letter to editor Chris Johns on behalf of the WFC, Dr. Brett Carver, Wheat Genetics Chair at Oklahoma State University and chair of the US National Wheat Improvement Committee, characterized the article as "a very one-sided, inadequate coverage of an extremely complicated issue." For the full text of Dr. Carver's letter, [click here](#).

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