



## Human Genes are Turned On and Off by Diet

Scientists once believed that genetic information was fixed at the time of fertilization, and therefore was beyond any outside influences. This has been found to be untrue. Good genes are “turned on” by a healthy environment, just as “bad genes” are silenced by a healthy environment. In practical terms “a healthy environment” means a diet based on a plentiful supply of starches, vegetables, and fruits (avoiding animal-derived foods and oils). The [biochemistry](#) involved is complex, but may be of interest to you.

Genetics is the study of heredity in general and genes (DNA) in particular. Changes in genes occur only over long periods of time (measured in tens of thousands of years) through evolution, whereas *expression* of the information stored in our genes changes rapidly and is effected by pressures from the outside environment. Epigenetics is the study of these timely adaptations. (The Greek prefix *epi-* in “epigenetics” refers to biologic changes that occur that are “on top of” or “in addition to” those directed by our basic set of genes that we inherit from our parents.)

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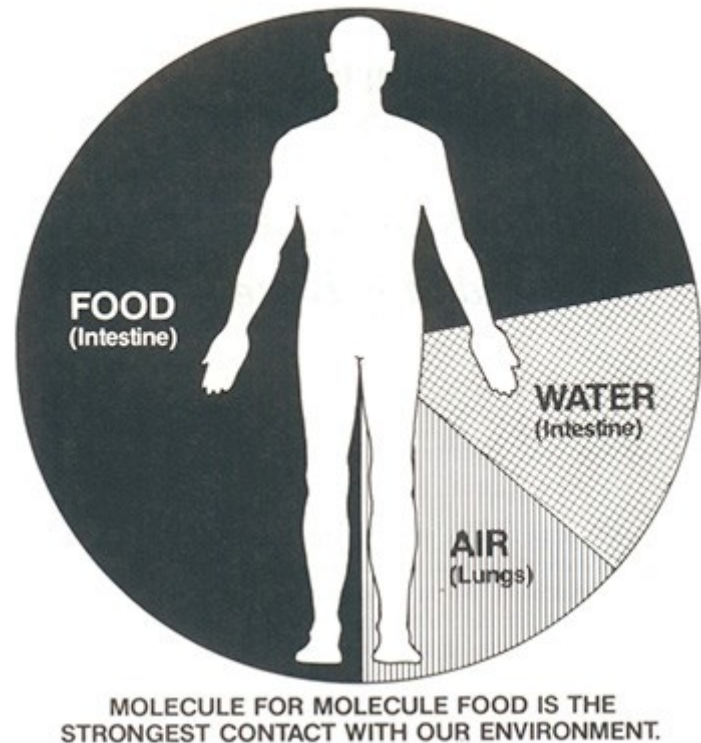
## Human Genes are Turned On and Off by Diet

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Genetics is the study of heredity in general and genes (DNA) in particular. Changes in genes occur only over long periods of time (measured in tens of thousands of years) through evolution, whereas *expression* of the information stored in our genes changes rapidly and is effected by pressures from the outside environment. Epigenetics is the study of these timely adaptations. (The Greek prefix *epi-* in “epigenetics” refers to biologic changes that occur that are “on top of” or “in addition to” those directed by our basic set of genes that we inherit from our parents.)

### Reading the Genetic Code

The most fundamental form of epigenetics accounts for our entire development. Life begins with genetic information from the father (sperm) and the mother (egg) joining together to form a fertilized egg; thereby the basic genetic code for a person is established. Within this one cell is all the information required to grow all the parts of a baby, including perfectly formed hair, a nose, lips, a heart, and two legs. To accomplish this remarkable differentiation during the development of the embryo, specific segments of the genetic code (DNA) either become active or remain silent at specific times within specific cells. For a nose to grow on a child’s face, the “nose genes” in a few embryonic cells must be turned on while unrelated genes are turned off. Exactly how these precisely orchestrated events play out is still a mystery.



How different genes are expressed is also the result of changes in our environment. This plasticity of our genetic material has been clearly demonstrated by “[twin studies](#).” Identical twins begin life as a single fertilized egg that splits into two with identical genes in each egg. If the expression of our genetic code were fixed then identical twins would remain identical throughout life. They would develop similarly and go on to have the same health issues. However, that is not what is observed. Furthermore, as twins age, their [DNA actually becomes more dissimilar](#). The differences are even more apparent when twins are raised in distinctly different environments (this happens when they are separated after birth, for example).

### Diet-induced Epigenetic Changes Are Also Inherited

Epigenetic changes that appear in sperm or egg cells prior to fertilization can be transferred to subsequent generations. For example, the effects of severe starvation that took place in the German-occupied Netherlands during the Dutch famine of WWII (1944–1945) were subsequently seen in following generations of Dutch children. Epigenetic changes that allowed a pregnant mother to survive on 580 calories a day for six months appeared in their offspring. In essence, “thrifty genes” were turned on in the fetus in preparation for survival during very lean times. Unfortunately, this enhanced efficiency turned out to be detrimental because post WWII were times of plenty in Western Europe, with an abundance of meat, dairy products, cakes, and cookies.

Daughters born to mothers starved during the Dutch famine were found to have even higher risks of diseases typically caused by over-nutrition. They had over [twice the risk of breast cancer](#), more [hypertension](#), and developed [heart disease](#) three years sooner than daughters born to mothers who were well nourished during pregnancy. In line with adaptations made to survive in a world of food scarcity, the daughters born to “starved” mothers were also found to be [more capable of reproduction](#) than girls born to

mothers who were well nourished. Prolific reproduction enhances survival of the species.

Another example of the influences of food shortages on epigenetic changes is provided by the [study of several generations of people](#) from Overkalix, Sweden. Records show that during the years of 1800, 1812, 1821, 1836 and 1856 there was total crop failure followed by extreme suffering. However, 1801, 1822, 1828, 1844 and 1863 were years of food abundance. Not surprisingly, Swedish men exposed during preadolescence to the periods of famine were less likely to die of cardiovascular disease. What was surprising is that similar advantages were passed on to the next generations. Grandsons (of once starving men) were at [one-fourth the risk of developing type-2 diabetes](#), and died on average six years later in life than the grandsons of fathers who were well nourished during a similar time in life.

These differences in the health of offspring from the Dutch and Swedish famines may seem to be contradictory: Mothers pregnant during lean times passed on epigenetic changes that harmed their daughters in times of plenty, whereas fathers passed on changes that seemed to help their grandsons, even though these offspring also ate a rich diet. Adequate explanations for the different outcomes are not available, but both observations point to the fact that sudden changes in the environment (the availability and type of food) can cause rapid changes in gene expressions that are remembered and passed down to subsequent generations.

### Epigenetics in Times of Over-Nutrition

We now live in a world where diseases caused by over-nutrition are far more common than diseases of under-nutrition (starvation). Based on observations from times of under-nutrition, we can expect that our bodies are efficiently making epigenetic changes that will enhance the human race. Genes are being turned on to deal with excesses of fat, protein, cholesterol, and environmental chemicals; all at levels never before faced by past populations. Although epigenetic changes may blunt the impact of all this toxicity, they cannot compensate fully. And as before, these adaptations will be passed on to subsequent generations with unknown results to their health.

Fortunately, modifications in gene expression now being caused by over-nutrition are reversible. Studies of people and laboratory animals have identified many chemicals found in foods that result in both helpful and harmful gene expressions. Not surprisingly, plants make beneficial chemicals. For example, folate from plants causes favorable epigenetic changes. For maximum benefit and minimal risk, this natural chemical must be consumed in the right package—like a bean or banana—not as a pill.

Folate-deficiency causes birth defects (neural tube defects), so the obvious solution would be to enrich a reproductive woman's diet with foliage (plants)—the natural source of folate. Instead, women have been told to take folic acid pills before pregnancy, and the food supply in many countries has been supplemented (folic acid is added to flours and cereal products). Folic acid supplied in this manner, as an isolated concentrated nutrient, results in fewer birth defects but offers [no added protection](#) against the risk of death, cancer, and heart disease for the general population.

Animal foods, such as meat, poultry, cheese, milk, and eggs are well recognized as the primary cause of obesity, heart disease, and common cancers in people following the Western diet. Choline, a chemical found in [high concentration in animal foods](#), has profound effects on gene expression and is considered to be an important factor in our [modern day diseases](#).

Finally, [calorie-restricted diets](#) have been shown to result in epigenetic changes that are associated with weight loss, and a reduced risk of developing diabetes, heart disease, and cancers. Other than by involuntary starvation (as seen with the Danes and Swedes), the natural, appetite-satisfying, health-enhancing way to restrict calories is to replace meat, dairy, and oils in the diet with starches (beans, corn, potatoes, rice, etc.), vegetables, and fruits.

The science of epigenetics is new and interactions between our environment and our genes are complex. But we know enough about epigenetics to [stem the tide](#) in the rise of obesity, heart disease, and cancers for people living in western societies for now and the future. Proper nurturing (by health-supportive foods) will bring out the best in our genes. The fact that the vast majority of people have survived successfully on plant- (more exactly, [starch-](#)) [based diets](#) for all of verifiable human history should be sufficient evidence for us to make the right food choices now.

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Dear McDougall Newsletter Readers:

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Before powerful drugs to suppress signs and symptoms of disease became popular in the second half of the 20th century, the medical profession was very interested in helping people regain their lost health through these natural methods. That art has been largely lost, with the exception of a few programs such as the McDougall Program and the [Natural Hygiene movement](#).

The *Immerman Files* library is divided into different topics and subtopics in order to make it easier to navigate. You can look up a specific disease or subjects, such as fasting, toxemia, aging, and inflammation. With materials in hand, you will be able to back up your efforts to solve your health problems with safe and effective diet and lifestyle changes. I encourage you to print relevant studies and bring them to your healthcare provider for further discussion.

Best of health,

Alan M. Immerman, D.C.  
Chiropractic Physician  
Natural Hygienist and Natural Health Consultant  
3515 E. Carol Ave.  
Phoenix, AZ 85028  
(602) 368-9496  
F (866) 567-6762  
[aimmerman@cox.net](mailto:aimmerman@cox.net)  
[www.AZChiropractors.org](http://www.AZChiropractors.org)  
<http://HealthUnlimitedImmermanTextbook.pdf>

*When you remove the cause of disease, the body heals itself!*



Alan M. Immerman, D.C. has been licensed as a chiropractic physician in Arizona since 1980. He has practiced Natural Hygiene and preached detoxification, fasting, and a vegan diet for almost forty years. In 1989, he published a book entitled *Health Unlimited!* (Dr. McDougall wrote an introduction for this book). Dr. Immerman is a certified fasting supervisor and was Director of Research for the American Natural Hygiene Society in the 1980s. He can be reached at [aimmerman1@cox.net](mailto:aimmerman1@cox.net).

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Sign up Now for the February 21 to 23, 2014 ASW

Speakers Scheduled for the February 21 to 23, 2014 Advanced Study Weekend

[T. Colin Campbell, PhD](#) – Co-author of The China Study.

[Marlene Zuk, PhD](#) – Author of Paleofantasy: What Evolution Really Tells Us about Sex, Diet, and How We Live.

[James Hill, PhD](#) -- Co-founder of the National Weight Control Registry.

[Caldwell Esselstyn, Jr., MD](#) – Author of Prevent and Reverse Heart Disease.

[Susan Levin, RD](#) – Director of nutrition education for the Physicians Committee for Responsible Medicine (PCRM).

[David Simon](#) -- Lawyer, advocate for sustainable consumption, and author of the book Meatonomics.

[Michael Greger, MD](#) – Creator of nutritionfacts.org.

[Ramses Bravo](#) (Chef) – Author of Bravo: Health-promoting Meals from TrueNorth Kitchen.

Plus: Doug Lisle, PhD, Jeff Novick, RD, and John McDougall, MD

And more to come.

[Slideshow of September 2013 Advanced Study Weekend](#)

## Featured Recipes

For 2013, all of the recipes served at the Advanced Study Weekend have changed. Below are a few of our favorites.



## Featured Recipes



### MOROCCAN RED LENTIL SOUP

Versions of this lentil soup with tomatoes and chickpeas are served all over Morocco during the festival of Ramadan and to celebrate special occasions throughout the year. This is my interpretation.

Preparation Time: 15 minutes

Cooking Time: 55 minutes

Servings: 4-6

We serve it with whole grain flatbread to scoop up the juices, or ladle the soup over brown rice.

1 onion, chopped  
 4 ribs celery, chopped  
 6 cups vegetable broth  
 1½ cups chopped tomatoes  
 1 cup dried red lentils  
 1 can (15 ounce) chickpeas, drained and rinsed  
 1 bay leaf  
 ½ teaspoon ground cinnamon  
 ½ teaspoon ground ginger  
 ½ teaspoon ground turmeric  
 ¼ teaspoon freshly ground black pepper  
 1/3 cup orzo  
 ½ cup chopped cilantro  
 2 tablespoons fresh lemon juice.

Pour ½ cup of water into a large soup pot along with the onion and celery. Cook, stirring occasionally, until the vegetables begin to soften, about 5 minutes. Add the broth, tomatoes, lentils, chickpeas, bay leaf, cinnamon, ginger, turmeric, coriander, and black pepper. Bring to a boil, reduce the heat to a simmer, then cover and simmer until the lentils are tender, about 45 minutes.

Stir in the orzo, cilantro, and lemon juice. Cook 10 minutes longer, until the orzo is al dente.

Serve hot.

### McVEGGIE BURGERS

Preparation Time: 30 minutes

Baking Time: 30 minutes

Servings: Makes 16 burgers

20 ounces firm water-packed tofu, drained well  
 12.3 ounces silken tofu  
 10-ounce package of frozen chopped spinach, thawed  
 ½ cup water  
 1 large onion, chopped  
 ½ pound mushrooms, chopped  
 3 cloves garlic, pressed  
 3 cups quick oats  
 2 tablespoons soy sauce  
 2 tablespoons vegetarian Worcestershire sauce  
 2 tablespoons Dijon mustard

1 teaspoon paprika  
1 teaspoon lemon juice  
½ teaspoon ground black pepper

Preheat oven to 350°F

Place both kinds of the tofu in a food processor and process until fairly smooth, stopping several times to scrape down the bowl. Transfer processed tofu to a large bowl and set aside.

Drain the spinach well and press any excess water out with your hands. (Spinach should be very dry). Set aside.

Place the water, onion, mushrooms, and garlic in a large non-stick frying pan. Cook, stirring frequently until onion has softened and all liquid has been absorbed, about 10-12 minutes. Set aside.

Add the oats and the seasonings to the tofu mixture and mix well. Add the spinach and mix in well, using your hands. Add the onion mixture and continue to mix with your hands until all ingredients are well combined.

Take a small amount and form into a ball shape (a bit larger than a golf ball), then flatten into a burger-sized patty about ¾-inch thick and place on a non-stick baking sheet. (If you do not have a good non-stick baking sheet, then lightly oil your baking sheet first). Repeat this process until all the mixture is used. (It will help to lightly moisten your hands several times during this process).

Bake for 20 minutes, then flip over and bake an additional 10 minutes. Cool on racks after removing from the oven. Serve in a whole wheat bun with your favorite condiments.

HINTS: These may be prepared ahead and refrigerated or frozen for future use. They reheat well in the microwave, in the oven, or on a grill or griddle.

## STELLA BLUES TOFU SCRAMBLE

My daughter, Heather, and I love the tofu scramble at Stella Blues Café on Maui, where they serve it with country-style potatoes and onions. This is my rendition of the dish, and I like it even better than the original. We serve it on its own, over potato pancakes, or with a side of hash browned potatoes for breakfast, lunch, or dinner.

Preparation Time: 15 minutes

Cooking Time: 12 minutes

Servings: 4

4 cups small broccoli florets  
1 bunch scallions (green and white parts) chopped  
1 pound fresh mushrooms, sliced  
1 pound firm tofu, drained and cut into ½-inch cubes  
¾ cup tahini sauce  
2 teaspoons regular or reduced-sodium soy sauce  
Sriracha hot sauce (optional)



Steam the broccoli over boiling water just until it is tender, about 5 minutes. Remove from the heat, drain, and set aside.

Put the scallions and mushrooms in a large nonstick skillet with 2 tablespoons of water. Cook over medium-high heat, stirring frequently, for 5 minutes, until they begin to soften. Add the tofu and cook for 3 minutes. Add the tahini sauce, soy sauce, the re-served broccoli, and a few squirts of Sriracha, if you wish. Mix and cook 2 to 3 minutes, until everything is heated through and the sauce has thickened slightly.

Serve immediately.

TIP: To easily make this soy-free, our Operations Manager, Tiffany Hobson, makes this dish with 3 cups cubed, cooked potatoes instead of the tofu.

### TAHINI SAUCE

We use this sauce in our Stella Blues Tofu Scramble and falafel wraps. This is a higher-fat sauce because of the tahini, so use it sparingly. For a spicier taste, stir in a squirt or two of Sriracha or other hot sauce.

Preparation Time: 5 minutes

Servings: Makes 2 cups

¾ cup raw or toasted tahini (sesame paste)

¼ cup fresh lemon juice

2 cloves garlic, crushed or minced

Combine the tahini, lemon juice, garlic, and 1 cup of water in a food processor or blender and process or blend until smooth. Use immediately, or transfer to an airtight container and refrigerate for up to 3 days.

### Recipes from Ellen Jaffe Jones



Ellen was the guest chef at our last weekend. Her delicious recipes served at the event are below.

Ellen Jaffe Jones began a plant-based diet 32 years ago after she almost died of a colon blockage. She recently wrote *Eat Vegan on \$4 a Day* after watching too many stories saying eating healthfully on a budget was impossible. She has taught cooking classes for Physicians Committee for Responsible Medicine. Ellen is currently 3rd in running in Florida in the 200, 400 and 1500 meters, 4th in the 100 meters, and credits her running success to a vegan diet. Her newest book, *Kitchen Divided-Vegan Dishes for Semi-Vegan Households* was born after recognition of how many "mixed marriages" exist in new and long-term vegan relationships. She calls herself the "Veg Coach" and "The Broccoli Rep."

### CALABACITAS (BURRITO FILLING)

Serves: 10 Cost: \$.25/serving

This makes a wonderful side dish if you choose not to use it in a burrito. To "stretch" it, serve it on ten (10-inch) whole-grain flour tortillas. It's amazing how many children say they don't like vegetables. But I've never met a child yet who didn't love this vegetable-packed recipe.

1 small yellow onion, finely chopped

2 tablespoons water

2 small zucchini, quartered lengthwise and sliced

4 ounces white button mushrooms, sliced

1/2 teaspoon chili powder

1/2 teaspoon ground cumin

1/4 cup frozen corn

Ground pepper to taste

Put the onion and 1 tablespoon of the water in a large skillet over medium-high heat and cook and stir until the water has evaporated. Stir in the remaining 1 tablespoon of the water, the zucchini, and mushrooms, cover, and cook for 10 minutes, or until the zucchini and mushrooms have released their juices. Decrease the heat to low. Stir in the chili powder and cumin, cover, and cook for 5 minutes, or until the mushrooms are soft. Stir in the corn and cook for 5 minutes to heat through. Season with pepper to taste.



TIP: Children love to be involved in creating their meals. They can build their own burritos when you serve Calabacitas with small bowls of condiments, such as avocado slices, vegan cheese, sliced olives, parsley sprigs, salsa, and chopped tomatoes.

## TASTE OF THAI SAUTÉ

Serves: 6 Cost: \$1.50/serving

This colorful, creamy sauté has the rich flavors of your favorite restaurant takeout, but without the high price tag.

½ cup liquid vegetable broth  
1 onion, chopped  
1 tablespoon minced fresh ginger  
3 garlic cloves, minced  
¼ teaspoon crushed red pepper flakes  
1 teaspoon ground coriander  
1 teaspoon ground cumin  
1 red bell pepper, finely chopped  
1 cup carrot slices  
1 cup cut green beans  
2 cups vegetable broth  
½ cup chopped fresh Thai basil or sweet basil  
2 tablespoons low-sodium soy sauce  
1 teaspoon ground turmeric  
1 eggplant, cut into bite-sized pieces  
2 cups cauliflower florets  
1 tablespoon freshly squeezed lime juice  
1 teaspoon agave nectar or maple syrup  
3 cups cooked brown rice or millet

Heat half of the vegetable broth in a wok or large skillet over medium-high heat. Add the onion and ginger and cook and stir for 1 minute. Add the garlic and red pepper flakes and cook and stir for about 30 seconds, or until fragrant. Add more broth as needed to prevent sticking. Add the coriander, cumin, and turmeric and cook and stir for 30 seconds. Add the eggplant, cauliflower, bell pepper, carrot, and green beans and stir well to coat the vegetables with the seasonings. Stir in the vegetable stock and bring to a boil. Decrease the heat to low and cook, uncovered, for 3 minutes, adding water if needed to keep the ingredients from sticking to the skillet. Cook, stirring occasionally, for 5 minutes, or until the vegetables are tender but not over-cooked. Add the basil, soy sauce, lime juice, and agave nectar and cook and stir for 1 minute.

Serve over rice.

## LOAD 'EM UP BURRITOS

Serves: 8-10 Cost: \$1.25/Serving

Dinners are happy occasions when kids feel that they have control over what they eat. Like Calabacitas, this recipe works well when served with small bowls of condiments. The ingredients are not set in stone, so include any nutritious toppings that the kids request.

1 ½ cups cooked or canned kidney beans, drained and rinsed  
1 can (6 ounces) unsalted tomato paste  
10 (10-inch) whole-grain flour tortillas  
10 (6-inch) corn tortillas  
1 tablespoon water  
12 ounces white button mushrooms, thinly sliced  
1 sweet onion, chopped  
4 large carrots, shredded

2 cups shredded romaine lettuce  
1 can (6 ounces) small olives, drained and sliced  
1 to 2 tomatoes, chopped  
1 avocado, diced (optional)  
4 ounces alfalfa sprouts (optional)  
1/2 cup raw sunflower seeds (optional)  
3 radishes, sliced or shredded (optional)

Preheat the oven to 350 degrees F. Put the beans and tomato paste in a food processor and pulse for 2 to 3 minutes, or until smooth. Alternatively, put the beans in a medium bowl, mash them thoroughly with a fork, and stir in the tomato paste until well mixed. Put the whole-grain flour tortillas in a large glass baking dish, and put the corn tortillas in a separate large glass baking dish. Allow the tortillas to curl a little so that they fit. Spread some of the bean mixture on top of each tortilla to make burritos and bake for 5 to 10 minutes, or until the tortillas are toasty and just golden around the edges.

While the burritos are baking, put the water in a small skillet over medium heat. Add the mushrooms and onion, keeping them separated, and cook over medium heat for 10 minutes, adding more water as it evaporates, 1 tablespoon at a time, until the onion is translucent.

Arrange the mushrooms, onion, carrots, lettuce, olives, tomatoes, and the optional avocado, alfalfa sprouts, sunflower seeds, and radishes in separate piles on a large platter or in individual serving bowls. Serve the burritos with the top-pings on the side.

### SAVE-CASH QUINOA LOAF

Serves: 8 Cost: \$.75/serving

Fiber, protein, and vegetables are all rolled into one in this flavor-packed loaf. Add a leafy green salad for an affordable, satisfying dinner.

1/2 cup plus 3 tablespoons water  
8 ounces white button mushrooms, sliced  
3/4 cups cooked or canned garbanzo beans, drained and rinsed  
3/4 cup rolled oats  
2 cups cooked quinoa  
1 cup frozen green peas  
1/2 cup chopped fresh parsley, or 1 tablespoon minced fresh thyme, or both  
10 sundried tomatoes, soaked in water for 1 hour, drained, and chopped  
1/2 cup chopped red onion (about 1/2 onion)  
Salt (optional)  
Ground pepper (optional)

Preheat the oven to 350 degrees F.

Put 1 tablespoon of the water and the mushrooms in a large skillet and cook, stirring occasionally, over medium-high heat for 6 to 8 minutes. Add 2 more tablespoons of the water, 1 tablespoon at a time, as it evaporates. Transfer the mushrooms to a large bowl and set aside.

Put the beans, oats, and remaining 1/2 cup water in a food processor and pulse until almost smooth. Combine the bean mixture, quinoa, peas, parsley, tomatoes, onion, and salt and pepper to taste with the mushrooms in the large bowl and stir well. Transfer the mixture to the prepared loaf pan and gently press down. Bake for 1 to 1 1/4 hours, or until firm and golden brown. Remove from the oven and cool for 10 minutes before slicing and serving.

TIP: Leftover slices are delectable in sandwiches or stuffed into whole wheat pita bread.