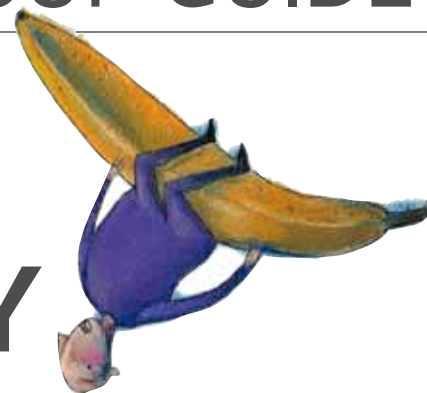


THE BARIX™ SUPPORT GROUP GUIDE

For Education and Support of all Barix Clinics Patients

HUNGER & SATIETY



Hun' ger: noun *the drive to find and eat food*

Sa 'ti'e 'ty: noun *the state of being satisfactorily full and unable to take on more*

The body has a complex system that influences both our desire to eat and our sense of satisfaction from food. Although there has been tremendous research in this area, we still have a lot to learn. It almost seems that the more we learn, the more we realize how little we really know about the mechanisms that control our drive to eat. We seem to know even less about how to control the hunger that often leads to eating more than necessary for a healthful body weight. Although most gastric bypass patients lose the majority of their excess weight and maintain that weight loss, there are still many questions regarding the hunger/satiety mechanism. Many gastric bypass patients comment that they do not feel hungry. In fact, many days, they could care less if they eat or

not. Others report that they are hungry all of the time and never seem to achieve a sense of satisfaction. A common concern is not being able to sense when to stop eating. Here's what we do know about the physiological and psychological factors influencing hunger and satiety and what may work to control food intake.

To live, we must eat. Our body gives us signals to indicate that we need to eat and signals that indicate that our nutrient requirements have been met. Here is an overview of how it works.

"As you lose weight, the fat cell will shrink in size. When this happens your body senses a famine and myriad of reactions take place that trigger your body to refill the fat cell."

Foods that we eat, supply our bodies with energy (calories) from fats, proteins, and carbohydrates. When food is eaten, the stomach stretches. This stretching causes the nerves in the stomach and small intestine to send signals to the brain to stop eating. As these nutrients enter the small intestine, more signals are sent to the brain to stop eating. After nutrients are absorbed from the small intestine and enter the bloodstream, the brain continues to receive signals. The liver reinforces these signals. After the

food leaves the stomach, nutrients are absorbed from the intestine and nutrients in the blood are moved into the cells, hunger signals are sent to the brain and the cycle begins again.

In addition to this immediate hunger/satiety feedback system, there is a complex system in place that endeavors to maintain our energy stores. It seems that once a fat cell is created, it is very difficult (if not impossible) to lose that fat cell. As you lose weight, the fat cell will shrink in size. When this happens your body senses a famine and myriad of reactions take place that trigger your body to refill the fat cell. Your body was well designed with a drive to obtain adequate nutrition and to withstand famines as you can see by these protective mechanisms.

- **Leptin** works to keep body fat at its present level. Leptin is a hormone that is produced by fat cells. More leptin is produced as fat cells grow, triggering a decrease in food intake. When fat stores shrink, as weight is lost, less leptin is released and an increase in food intake is stimulated. Leptin appears to be a satiety hormone that reduces appetite. Researchers are finding that overweight individuals may be resistant to the satiety effects of leptin, similar to an insulin resistance.

Cont. on Page 2

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- **Adiponectin**, the hormone found in fat cells, helps insulin to move sugar from the blood stream into the cells where it is used for energy. Studies indicate that the more fat a body has, the less adiponectin fat cells secrete. A n i m a l studies find that when adiponectin is injected into mice, the mice lose weight without altering the amount of food consumed, indicating that adiponectin increases metabolism.



- **Ghrelin** production increases in the stomach when weight is lost. Ghrelin increases appetite, making it very difficult to keep calorie intake low enough to maintain a recent weight loss. Researches have found that ghrelin levels in dieters increased by 24% after a 17% weight loss—not too promising for keeping the pounds off. Ghrelin levels may, at least in part, explain the lack of appetite experienced by many gastric bypass patients. Ghrelin levels in gastric bypass patients were 77% lower than normal weight non-dieters. Another study backed this up by measuring the ghrelin levels in obese individuals before and after gastric bypass surgery. The study found a 30% decrease in ghrelin levels following surgery.
- **PYY** is a hormone secreted by the gut to indicate that a person is full. Obese individuals seem to have less PYY than normal weight people. Initial studies indicate that injections of PYY may decrease food intake.
- **Insulin** is secreted by the pancreas when blood sugar levels rise. Insulin moves sugar from the bloodstream into the cells where it can be used for energy. After consuming a food or beverage high in concentrated sugar, too much insulin may be released. After all of

the sugar has moved into the cells, higher levels of insulin remain in the blood stream. This triggers hunger.

- **Histamine and serotonin** may work to control hunger. Higher levels of serotonin tend to produce a calm mood, sleepiness and decrease the desire to eat.
- **Sleep, or rather a lack of adequate sleep**, affects the hunger/satiety system. Study after study is supporting the idea that a lack of sleep triggers reactions that lead to weight gain. Researchers have found a decrease in the appetite controlling hormone leptin and an increase in the appetite enhancing hormone ghrelin in subjects with chronic sleep loss (5 hours of sleep a night). Other studies support this by showing an increase in food intake and cravings following single nights of inadequate sleep. In a less sedentary environment, this push to increase calories would make sense. If a person slept less, they would be active for more hours of the day, requiring additional energy to sustain their weight. In our culture, few additional calories are needed for computer surfing, commuting or TV viewing.
- **Stress levels** can affect hunger. A higher level of the stress hormone cortisol, in those genetically prone to obesity, may cause an increase in hunger.

In addition to the physiological factors, cultural, psychological factors, and environmental factors also play a role in the hunger/ satiety system.

- **Variety**. Having a wide variety of foods to choose from increases food intake—eventually leading to weight gain. Variety can be in the form of taste, texture, colors and/or temperature. When given one food, people experience “sensory-specific satiety”. This means that they may become tired of a food and stop eating when they are full. When a greater variety of foods are available, the tendency is to eat larger amounts of foods. This is thought to be due to a greater enjoyment and increased sensory stimulation.

- **Comfort**. Food has been paired with the rewards of comfort, nurturing, and positive social experiences over the years.
- **External Cues**. The external cues of time, smells and visual cues can have a huge impact on the desire to eat. Some individuals have a stronger response to external cues.

“While research continues, it is unlikely that a ‘magic pill’ will be found.”

Have you ever felt that you could gain weight by just walking by a bakery? Studies now show that in some individuals, the smell, sound and visual cues of a steak grilling raises insulin levels.

- **Emotional states and personal beliefs** affect the way we eat.
- **Environmental factors** such as the availability of food, time of day, social obligations, food characteristics, temperature and humidity of our surroundings all affect our eating habits.

While research continues and treatments for obesity develop, it is unlikely that a “magic pill” will be found. The complex workings of the human body may require adjustment of several of these hormones to promote a level of hunger and satiety that encourages a healthy body weight. And in addition, there are all of the cultural, psychological factors and environmental factors to overcome.

Bariatric surgery provides an effective tool that helps to overcome many of the factors that lead to overeating. Developing skills, engaging in healthful lifestyle habits, and managing high-risk situations can maximize the effectiveness of bariatric surgery. Laurel Mellin, founder of *The Solution* program states, “We need to be able to create a lifestyle that meets our needs for pleasure, relaxation, and satisfaction so we don’t have to turn to food.”

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DEVELOPING SKILLS

The Solution program participants develop skills to nurture themselves internally without the need for external solutions (including overeating). To learn more about *The Solution*, go to the website www.thepathway.org.

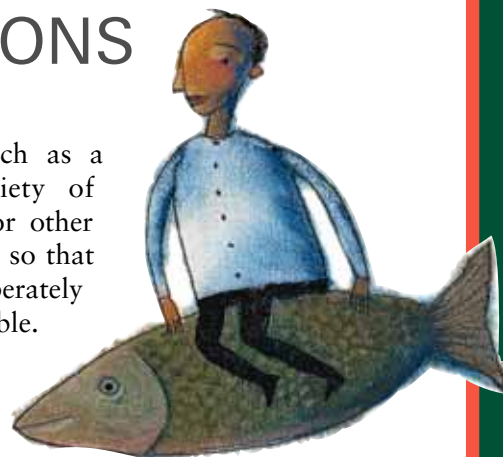
Learn to manage your stress level. See the April 2004 issue of the Barix Support Group Guide at www.barixclinics.com for more information.

HEALTHFUL LIFESTYLE HABITS

- Limit sugars to control large increases and decreases in insulin levels. Sugars in the diet should come from whole fruits and vegetables, low-fat dairy products and vegetables.
- Become a restrained eater. In today's toxic food environment where a wide variety of attractive food is available on an almost constant basis, a moderate amount of dietary restraint is needed. Rigid dieting can backfire so find some sugar free treats to enjoy in moderation.
- Some foods are more satisfying. Foods with higher levels of fiber, protein and water tend to be more satisfying.
- Eat six small meals throughout the day to control nutrient blood levels. This keeps the blood level of nutrients more constant and hunger is easier to control.
- Physical activity is especially important in overweight individuals to control hunger. Exercise stabilizes insulin production and increases glucagon production. Low intensity exercise also limits cortisol production. Exercise does not seem to cause an increase in hunger in overweight individuals.

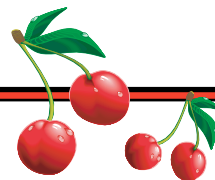
MANAGING HIGH RISK SITUATIONS

- Prepare for high-risk situations such as a beautiful spread of a wide variety of attractive food choices at a party or other social event. Eat lightly before going so that you don't show up starving. Deliberately move yourself away from the food table.
- Limit the variety of snack foods kept at home. If you have to run out to the store, you will be less likely to indulge.
- Take snacks and meals to work from home and avoid the company cafeteria and vending machine area.



Simple Fruit Cobbler

Submitted by Karon F.



4 cups (2 cans) no added sugar apple or cherry pie filling
2 teaspoons cinnamon or nutmeg
1 1/2 cups Jiffy® Baking Mix

1/2 cup skim milk
1 egg
3 tablespoons melted margarine
3 tablespoons Splenda®

Preheat oven to 400°. Combine apples and cinnamon in a bowl. Pour into baking dish sprayed with pan spray. Mix remaining ingredients until blended. Drop by spoonfuls onto fruit. Sprinkle Splenda on top. Bake 15 minutes at 400°; reduce heat to 350° degrees for 20 minutes. Serve warm with sugar free ice cream if desired. Makes eight servings.

NUTRITION INFORMATION PER SERVING: 173 calories, 4 grams protein, 6 grams fat, 28 grams carbohydrate, 318 mg sodium.

White Chicken Chili

Submitted by Kelly S.



1-1/2 boneless, skinless chicken breasts
1 large onion, chopped (about 1 cup)
2 cloves garlic, minced
1 can (14 oz) chicken broth
1 tsp. ground cumin
1 tsp. dried oregano leaves

1/2 tsp. salt
1/4 tsp. red pepper sauce
2 cans (15.8 oz size) great northern beans
1 can (15.25 oz size) corn (chickpeas may be substituted)
2 Tbsp. Fresh cilantro, chopped

Place chicken, onion, garlic, broth, cumin, oregano, salt, and red pepper sauce in a large pot. Add water to cover chicken. Cook on medium heat until chicken done. Use a meat thermometer in the largest part of the breast to insure that a safe temperature of 180° is reached. Remove chicken from the pan, shred and return to the pot. Add beans, cilantro and additional water if needed. Cook for an additional 20 minutes and serve. Makes 12 servings.

NUTRITION INFORMATION PER SERVING: 150 calories, 23 grams protein, 3 grams fat, 17 grams carbohydrate, 466 mg sodium.

IT WORKED FOR ME!



Start your morning with a high protein beverage. This can be a glass of no added sugar chocolate milk, a cup of high protein hot cocoa, a ready-to-drink protein shake or a high protein smoothie. Sip on it while you are getting ready or during the commute to work.

Many traditional breakfast foods (cereal, toast) are not a good source of protein so replacing breakfast with a high protein beverage can make a huge impact on your total daily protein intake.



To receive a free **RECONSTRUCTIVE SURGERY GUIDE**, CALL 800-282-0066 or send us an email at rc@barixclinics.com with your name and contact information.

Our reconstructive surgery program is currently performed at our centers in Michigan, Ohio, Illinois, Pennsylvania, and Texas—and we are planning to expand our program at our Scottsdale, AZ, facility in the next few months.

Thanks to Karon F. and Kelly S. for the recipes. Please send comments, ideas, recipes, and "It Worked For Me" tips to Deb Hart, RD, LD at dhart@foresthealth.com.

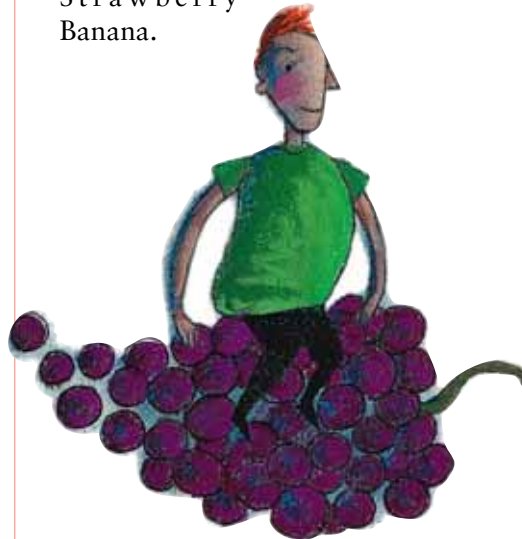
BARIX CLINICS™
America's Leader in Bariatric Surgery

What's New!

Blue Bunny Carb Freedom Yogurt

Blue Bunny has come out with two new products to make your life more delicious. Blue Bunny Carb Freedom Yogurt packs 9 grams of protein (3 grams fat, 5 gram sugar—from milk) into a 6 oz serving.

Carb Freedom comes in Black Cherry, Blueberry, Raspberry, Blackberry Cream, Peach, Strawberry, Vanilla Cream and Strawberry Banana.



IncreDiples Dip

Spicy Buffalo, Taco Fiesta and Fajita Lime IncreDiples promise to deliver excitement to your veggies, chips or other favorite foods.

At 30 calories per 2 tablespoon serving (1 gram fat, 2 grams sugar, 2 grams protein and 210–270 mg sodium) you can afford to add some zippy dipping.

Look for Blue Bunny products at your local grocery. If they don't carry Blue Bunny brand products, request them. Visit Blue Bunny's web site for new product information and recipes, www.bluebunny.com.

OTHERS CARE. PLEASE SHARE.



Please tell us about the lives that have changed because you shared your weight-loss story. Submit your story on the "Share Your Success" section of the Patient website. What you have to say may be printed in this publication or on our website and can serve as inspiration to all.

REFER a Friend: Call 800-282-0066 or REQUEST a FREE INFORMATION GUIDE for a FRIEND: www.barixinfo.com/sgg