

# Our Children, Our Nutrition



Volume 14

A publication of Arkansas Children's Nutrition Center

Spring 2013

## Feature Publication:

**Ronis, M.J., Shankar, K., Gomez-Acevedo, H., Hennings, L., Singhal, R., Blackburn, M., Badger, T.M. 2012. Mammary gland morphology and gene expression differ in female rats treated with 17 beta-estradiol or fed soy protein isolate. *Endocrinology*. 153(12):6021-6032.** Research studies have suggested that soy foods have many potential positive health benefits such as improved cholesterol levels, increased insulin sensitivity or improved bone quality. However, soy foods have also been suggested to have potential harmful effects due to the fact that soy contains molecules whose structures are close to hormones found in our bodies. In this study, we compared the effects of the soy protein isolate, found in soy infant formula, with the major female hormone 17 $\beta$ -estradiol on the gene expression and structure of mammary glands. We found that 17 $\beta$ -estradiol altered the expression of 780 genes, whereas soy protein isolate altered the expression of 53 genes, which only 10 were in common with the changes observed with the 17 $\beta$ -estradiol. In addition, estrogen receptor binding to its activating factor was increased by 17 $\beta$ -estradiol but not by soy protein isolate. Finally, soy protein isolate and 17 $\beta$ -estradiol had different effects on the mammary gland structure. These data suggest soy protein isolate does not mimic the effects of 17 $\beta$ -estradiol in mammary glands and therefore that the risk of harmful effects from soy protein isolates in soy infant formulas is likely to be negligible. Moreover, our data is consistent with epidemiological studies of breast cancer incidence in Asian populations which suggest that eating soy foods reduces rather than increases the risk of breast cancer.

## Our Children, Our Nutrition

is published by  
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Arkansas Children's Nutrition Center is part of the National Human Nutrition Research Centers Program funded by the U.S. Department of Agriculture's Agricultural Research Service. It is housed on the campus of one of the ten largest children's hospitals in the United States. Arkansas Children's Nutrition Center is a partnership between Arkansas Children's Hospital, the Arkansas Children's Hospital Research Institute and the University of Arkansas for Medical Sciences.



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## Nutrition and the developing brain: You are what you eat

By Terry Pivik, Senior Investigator and Director of the Brain Function Laboratory

Nutrition fuels brain development and functioning throughout life. The critical nature of the brain-nutrition relationship is most evident in the impairments in neurobehavioral development observed when there is insufficient nutrition or when there are deficiencies in specific nutrients known to be essential for normal brain development, such as folic acid, iron, iodine, vitamin D and special fats.

The influence of nutrition on brain development begins in the womb. The fastest stage of brain development occurs during fetal growth and is totally dependent on the health and diet of the mother. However, brain development is incomplete at birth and significant changes continue to take place during the first five years of postnatal life. During this time, proper nutrient intake continues to be essential for the development of brain structure and function, but interactions of nutrients with other factors—like home environment and parent-child relationships—assume increasingly important roles in this development.

Nutrients not only provide the biochemicals needed to build the brain, but are able to modify how it is being built. This capability results from the influence of nutrients on the expression of genetic factors that affect brain growth and function. These nutrient-related alterations may be expected to have enduring effects on brain function. Understanding these effects will provide valuable information about factors that influence behavior, cognitive functions, and physical health. One obvious approach to gaining this understanding is to compare brain development and function in infants receiving different diets. However, reports comparing breastfed and milk formula-fed infants on measures of behavioral and cognitive development have not found consistent or

remarkable differences. It is possible that assessments of general behavioral development may not be sufficiently sensitive to differences in brain processes underlying more specific aspects of behavior such as attention and information processing, and that the use of more detailed measures of brain function might reveal previously undetected diet-related influences. Current techniques involving the recording of brain electrical and metabolic activities have provided such measures and have made it possible to describe brain functioning in greater detail than ever before and on time scales that more closely approximate the speed at which normal information processing occurs.

Surprisingly, there have been few studies that have used these techniques to address questions relating diet to brain development and function in healthy infants. Among such studies, the most comprehensive investigation is currently being conducted at the Arkansas Children's Nutrition Center. This project, named the Beginnings Study, has been tracking brain development and function along with behavioral development from birth to childhood (6 years) in healthy infants fed one of the three major infant diets—breast milk, milk formula or soy formula. A particularly important feature of the study is that development is being documented in the same children. This provides a unique perspective on the long term development of individual children.

The Beginnings Study has been underway for more than a decade and is scheduled to be completed in 2017. Findings thus far have shown that study measures for all groups are in the normal range, and that behavioral development is generally similar across groups. However, differences among diet groups have been observed in the development of brain electrical activity and in brain responses related to attention,

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## Meet the Staff: Holly and Sarah

**Holly** Scott is licensed through the State Psychology Board as a Licensed Psychological Examiner. She has a Bachelor of Arts degree in Psychology, and a Master of Science degree in Counseling Psychology, both from the University of Central Arkansas. Before joining the ACNC team, Holly worked as a mental/behavioral health therapist. Holly loves psychology, cats, knitting and comedy!



**Sarah** Beall is also a Psychological Examiner. She graduated cum laude from UCA's Honors College in 2005 with a Bachelor of Arts in History, and in 2012, she graduated from UCA's Master's in Counseling Psychology program. Sarah's recent work has been in psychoeducational testing and counseling. Sarah enjoys playing with her two whippets, camping, reading and thrift store shopping.



**Our families,  
Our research,  
Our vision,  
Our team,  
Our ACNC...**

## CONTAINER GARDENING

by Casey Atwood, Registered Dietitian

Gardening is a great experience to share with your children. Not only does gardening help educate about food production and the earth's resources, but it also helps nourish us. You can grow fresh veggies even if you do not have a big garden plot. Container gardening is easy to do with a few tools, can be done in a small space, and provides a bountiful harvest of nourishing produce at a fraction of the supermarket cost.

Here are some tips on growing container tomatoes:

1. Get a big container, usually the bigger the better. A 5-gallon bucket from a local home-improvement or hardware store works great! Don't forget to drill a few holes in the bottom for better drainage.
2. Plant one tomato plant per container.
3. Make sure you water your plants daily, enough to keep the soil moist but not drenched.

4. Some potting soils do not have the nutrients needed for plants. Adding some organic fertilizer or compost to your soil will give your plant the nutrients it needs to grow. See fertilizer for details on how much to add—a little bit goes a long way.

5. SUN!! Tomatoes need at least 6+ hours of sun per day. And they like it HOT!! Arkansas summers are a perfect time!

Tomatoes are a great beginning to container gardening. Other vegetables to try- lettuce, beans, snap peas and herbs all do well in a container.



### Recipe: gazpacho

#### Ingredients

5 large tomatoes, quartered  
1 cucumber, peeled and chopped  
1 green or red bell pepper, chopped  
2 cloves garlic, minced (or smashed in a mortar and pestle)  
2 tablespoons olive oil  
Salt and pepper to taste

#### Directions

Place all ingredients in a food processor or blender and process until smooth (or you can leave slightly chunky). Serve immediately or chill before eating.

#### Nutrition

Serving Size 3/4 cup  
Amount Per Serving  
Calories 79 Calories from Fat 52  
% Daily Value\*  
Total Fat 5.7g 9%  
Saturated Fat 0.8g 4%  
Trans Fat 0.0g 0%

Cholesterol 0.0mg 0%  
Sodium 7.7mg 0%  
Total Carbohydrate 6.8g 2%  
Dietary Fiber 2.0g 8%  
Sugars 4.2g  
Protein 1.5g  
Vitamin A 17% Calcium 2%  
Vitamin C 49% Iron 3%

\*All percentages are daily values based on a 2000 calorie diet

The Delta Garden Study has created a great cookbook with wonderful recipes for your summer produce. We wanted to share this fantastic gazpacho recipe for your garden tomatoes, but check out the DGS website for more recipe ideas. <http://arten-garden.com/images/recipe.pdf>. The Delta Garden Study (DGS) is funded by the USDA Agricultural Research Service, Delta Obesity Prevention Research Unit under Agreement No. 58-6251-8-039 through the Childhood Obesity Prevention Research Program at the Arkansas Children's Hospital Research Institute. The Delta Garden Study measures the impact of school gardens on youth fruit and vegetable intake, physical activity, academic achievement and school bonding.

*Brain Development, continued from page 1*

memory and language functions. While final interpretation of these outcomes must await completion of the study, it is clear that diet-related variations in brain function are present and are contributing to individual differences in cognitive development. These findings suggest that the phrase "you are what you eat"—coined in the 1800s to emphasize the influence of nutrition on mental and physical health in adults—holds true from the beginning of life.

# How to Prevent Diabetes

by Elizabeth Hayes, Nutritionist

Over consumption of diets high in fats and sugar can result in the development of obesity and insulin resistance. This, in combination with lack of physical activity which decreases muscle mass and bone quality in children, can contribute to long-term health problems in adults such as type II diabetes. The Mayo Clinic suggests that healthy lifestyle choices can help you prevent type II diabetes. Below are a few tips to help you decrease your risk.

- **Eat nutritious or nutrient dense foods.** Choose foods low in fat and calories for your family. Focus on fruits, vegetables, lean protein, low-fat dairy products and whole grains. Serve your family water instead of drinks with added sugar.
- **Get physical.** Aim for 30 minutes

of moderate physical activity a day, and make sure your child gets plenty of physical activity each day as well. Take a brisk walk together. Ride a bike. Swim laps. If you can't fit in a long workout, spread 10-minute or longer sessions throughout the day. Take your children to a local playground to have them climb, stair step, and go across the monkey bars- all great ways to incorporate strength exercises and increase muscle mass.

- **Know where you stand.** Knowing what your BMI is can give you a clear understanding of where you weigh in with your health. A great website to help calculate your personal BMI is <http://nhlbisupport.com/bmi/>. You will need your current weight and height.

- **Lose excess pounds.** If you are overweight, losing 5 to 10 percent of your body weight can reduce your risk of diabetes. To keep your weight in a healthy range, focus on permanent changes to your eating and exercise habits. Motivate yourself by remembering the benefits of losing weight, such as a healthier heart, more energy and improved self-esteem.

Even if you have diabetes in your family, diet and exercise can help you prevent the disease. If you've already been diagnosed with diabetes, the same healthy lifestyle choices can help you prevent potentially serious complications. And if you have prediabetes, healthy lifestyle changes can slow or stop the development of prediabetes into diabetes.

## What is Diabetes?

Diabetes, often referred to by doctors as diabetes mellitus, refers to a group of conditions that affect how the body uses blood glucose, commonly referred to as "blood sugar". Diabetes is caused by an inadequate production of insulin or the body improperly responding to insulin, or both. When you eat, the food is broken down into glucose then travels through the body in the bloodstream. In order for the glucose, or energy, to get into the cells, the body needs insulin to "unlock the cell door". Without insulin, sugar stays in the bloodstream and, at high levels, causes poor circulation which can lead to serious health problems.

There are currently three different types of diabetes, Type I, Type II and Gestational. Type II diabetes is the most common type of diabetes. It is described by the National Institute of Health as a condition in which the body becomes resistant to the effects of insulin or doesn't make enough insulin. High amounts of body fat "blocks the door", causing the need for more insulin to "unlock it". This is called insulin resistance. This resistance forces the pancreas to work harder to produce more insulin to move the glucose from the bloodstream into the cells.

Traditionally, Type II diabetes was known as "adult onset diabetes", however, due to the high childhood obesity rates, teens and young adults are now being diagnosed with type II diabetes as well. Obese adolescents are more likely to have prediabetes, a condition in which blood glucose levels indicate a high risk for development of diabetes. Certain factors can increase the risk of developing type II diabetes:

- **Body Mass Index:** BMI is calculated using a person's weight and height. BMI does not measure body fat directly, but it is a reasonable indicator of body fatness for most people. The more overweight, and the longer you are overweight, the greater your risk of developing diabetes. Overweight refers to any adult with a body mass index (BMI) of more than 25 while obese refers to any adult with a BMI of more than 30. A child's weight status is determined using an age- and sex-specific percentile for BMI rather than the BMI categories used for adults because children's body composition changes as they get older and varies between boys and girls. Overweight is defined as a BMI at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex.
- **Inactivity:** Physical activity can positively influence your body composition. Weight gain and obesity are caused by an energy imbalance, an overconsumption of calories compared to how much your body actually needs. Lack of consistent physical activity can also lead to a decrease in muscle mass and bone quality.
- **Family History:** Your risk increases if a parent or sibling has type II diabetes.

For more information about Diabetes, please visit [mayoclinic.com/health/diabetes](http://mayoclinic.com/health/diabetes).

## 10 tips

Nutrition Education Series

## build a healthy meal

### 10 tips for healthy meals



**A healthy meal starts with more vegetables and fruits and smaller portions of protein and grains.** Think about how you can adjust the portions on your plate to get more of what you need without too many calories. And don't forget dairy—make it the beverage with your meal or add fat-free or low-fat dairy products to your plate.

**1 make half your plate veggies and fruits**  
Vegetables and fruits are full of nutrients and may help to promote good health. Choose red, orange, and dark-green vegetables such as tomatoes, sweet potatoes, and broccoli.

**2 add lean protein**  
Choose protein foods, such as lean beef and pork, or chicken, turkey, beans, or tofu. Twice a week, make seafood the protein on your plate.



**3 include whole grains**  
Aim to make at least half your grains whole grains. Look for the words "100% whole grain" or "100% whole wheat" on the food label. Whole grains provide more nutrients, like fiber, than refined grains.

**4 don't forget the dairy**  
Pair your meal with a cup of fat-free or low-fat milk. They provide the same amount of calcium and other essential nutrients as whole milk, but less fat and calories. Don't drink milk? Try soy milk (soy beverage) as your beverage or include fat-free or low-fat yogurt in your meal.



**5 avoid extra fat**  
Using heavy gravies or sauces will add fat and calories to otherwise healthy choices. For example, steamed broccoli is great, but avoid topping it with cheese sauce. Try other options, like a sprinkling of low-fat parmesan cheese or a squeeze of lemon.

**6 take your time**  
Savor your food. Eat slowly, enjoy the taste and textures, and pay attention to how you feel. Be mindful. Eating very quickly may cause you to eat too much.

**7 use a smaller plate**  
Use a smaller plate at meals to help with portion control. That way you can finish your entire plate and feel satisfied without overeating.

**8 take control of your food**  
Eat at home more often so you know exactly what you are eating. If you eat out, check and compare the nutrition information. Choose healthier options such as baked instead of fried.

**9 try new foods**  
Keep it interesting by picking out new foods you've never tried before, like mango, lentils, or kale. You may find a new favorite! Trade fun and tasty recipes with friends or find them online.



**10 satisfy your sweet tooth in a healthy way**  
Indulge in a naturally sweet dessert dish—fruit! Serve a fresh fruit cocktail or a fruit parfait made with yogurt. For a hot dessert, bake apples and top with cinnamon.

USDA United States Department of Agriculture Center for Nutrition Policy and Promotion

DG TipSheet No. 7 June 2011 USDA is an equal opportunity provider and employer.

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Text **RESEARCH** to **772937** to receive information about clinical trials currently enrolling at ACH

## Currently Enrolling:

### Glowing Study

The purpose of this study is to learn how the health of a mom at conception affects the health of her child. Families are followed through pregnancy and until the child is 2 years old.

### Qualifications

Women must be less than 10-weeks pregnant or planning to become pregnant with their second child. Moms must be healthy at conception and meet specific entry criteria.

### Compensation

Monetary compensation is provided, as well as diapers for one year.

### Brain Function

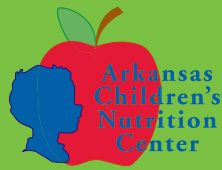
Now enrolling for short-term studies exploring some of the important questions about how body composition relates to brain function in childhood. Participants attend two study visits on the campus of Arkansas Children's Hospital.

### Qualifications

Children participating in these studies must be healthy and between 8 – 10 years of age.

### Compensation

Monetary compensation is provided for completion of each visit.



**To learn more: 501-364-3309**  
email: [acncstudies@uams.edu](mailto:acncstudies@uams.edu)

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