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.
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**

<table>
<thead>
<tr>
<th>Serving Size</th>
<th>3/4 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>79</td>
</tr>
<tr>
<td>% Daily Value*</td>
<td>Fat 52%</td>
</tr>
<tr>
<td>Total Fat</td>
<td>5.7g</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>0.8g</td>
</tr>
<tr>
<td>Trans Fat</td>
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</tr>
</tbody>
</table>

*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://artegarden.com/images/recipe.pdf](http://artegarden.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://nhlbi.surgeongeneral.gov/nhlbi/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.
- **Avoid fried foods.** Serve steamed vegetables instead of fried.

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.
**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.

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**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.

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**To learn more:** 501-364-3309  
email: acncstudies@uams.edu