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Nutrition & Your Child

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USDA/ARS
Children's Nutrition Research Center
at Baylor College of Medicine

Impact of Dr. Samuel Fomon's research can be seen at CNRC

The work of Dr. Samuel Fomon, a leading children's nutrition researcher who died in 2007, serves as the foundation for some of the research currently under way at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine.

Fomon was previously the chairman of the Council of Scientific Advisors to the CNRC and an adjunct professor of pediatrics at Baylor. A biographical sketch of Fomon written by Dr. Buford Nichols, professor emeritus of pediatrics at BCM and former CNRC director, was published recently in the *Journal of Nutrition*. An executive conference room at the CNRC was named in his honor and a watercolor picture of him, painted and donated by his sister-in-law, the artist Frances Smith, is displayed there.

As a professor at the University of Iowa Department of Pediatrics and a pioneer in pediatric nutrition research, Fomon's work focused on factors influencing food intake and growth in normal, full-term infants. He was the author of the most widely recognized textbook on feeding infants during the first year of life. The book, "Infant Nutrition," was unique as one of the few single-authored textbooks in the modern era.

Fomon was the director of the University of Iowa's internationally recognized Infant Metabolic Unit, which later evolved into the Division of Nutrition, in the Department of Pediatrics. In addition to his duties in pediatrics, he became the director of the University of Iowa Graduate Program in Nutrition. In 1993, he became professor emeritus.

Fomon received numerous awards, including the Borden Award from the American Academy of Pediatrics in 1966 and the McCollom Award from the American Institute of Nutrition (now the American Society for Nutrition) in 1979. In 1992, he received the Bristol-Myers Squibb/

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Dinnertime observations:

PARENTS' BEHAVIORS MAY PLAY A ROLE IN OBESITY

Can a parent's behavior at mealtime affect their child? It could be one of the contributing factors in obesity, according to research by a developmental psychologist at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine.

In recent studies, Dr. Sheryl O. Hughes, assistant professor of pediatrics, and her research colleagues found a link between indulgent feeding styles and the weight status of preschoolers.

"There is no question that the obesity epidemic in our country is a significant issue, even for very young children," Hughes said. "Twenty-one percent of preschool aged children are either overweight or obese, and that figure is even higher among minorities. It's important to figure out the contributing factors to obesity when children are young so we can intervene effectively."

One potential intervention area is the parent's feeding style, Hughes said. Feeding styles are parenting styles that are specific to the eating context. They include uninvolved (not concerned about the child's eating environment), indulgent (very nurturing but do not set boundaries), authoritarian (strict disciplinarians) and authoritative (those who are both nurturing and set appropriate boundaries).

Previous studies have shown that indulgent feeding styles are related to higher child weight status, however those studies have relied on parents' own self-reports of their styles. In a recent study, parents not only self-reported their feeding style by completing a questionnaire but CNRC researchers also observed three at-home mealtimes for each family in the study. The study was published in the *International Journal of Behavioral Nutrition and Physical Activity*.

The study included 177 African-American and Hispanic families with preschoolers. Researchers observed and recorded the families' emotional climate (the emotional dynamic between the parent and child) and feeding practices (goal directed feeding behaviors of parents) at mealtime.

To investigate the emotional climate during the meal, researchers focused on four aspects of the parent-child relationship—parent positive affect, negative affect, intrusion, and detachment. These aspects were coded by examining not only what the parent said to the child, but also nonverbal behaviors and tone of voice.

- Positive affect included displays of affection, warmth, or positive regard.
- Negative affect included parents' displays of anger and contempt, or glaring at the child.
- Intrusiveness was defined as the extent to which parents force their own agenda on the child with little regard for the child's feelings.
- Detachment was considered lack of involvement in the child's behavior during dinner, such as ignoring the child.

To better understand the feeding practices used during the meal, the researchers specifically looked for 12 goal-directed feeding behaviors of the parents. Some of these included spoon feeding the child, physically intervening with the child, using verbal prompts to get them to eat, asking the child to eat a small amount of something on their plate, hurrying the child, and disapproving or scolding the child in order to get the child to eat.

Parents who self-described themselves as indulgent were observed through the dinnertime

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Study Verifies 'Recipe' for Recovery from Malnutrition

Worldwide, malnutrition causes 35 percent of deaths in children under age 5 years. Researchers at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine recently studied the effectiveness of two types of ready-to-use therapeutic food that is used to treat severe acute malnutrition.

According to the World Health Organization, nearly 20 million children under the age of 5 years suffer from severe acute malnutrition—defined by a very low weight for height, severe visible wasting or visible swelling due to nutritional edema (also known as kwashiorkor).

Currently, the standard treatment for severe acute malnutrition is outpatient community based management with ready-to-use therapeutic food, which is high in energy and fortified with vitamins. The food contains peanut paste, sugar, milk powder at 25 percent, vitamin and mineral powder and vegetable oil. This treatment typically achieves recovery rates of 90 percent, compared to only 25 percent before this treatment was developed. Dr. Mark Manary, adjunct associate professor of pediatrics at BCM, conducted the first clinical trials with this new approach, and has been an innovator ever since in home-based care for malnourished children.

In this study, Manary and his colleagues sought to decrease the overall cost of the ready-to-use therapeutic food by reducing the milk powder to 10 percent and comparing the effectiveness to the 25 percent milk powder recipe. They measured effectiveness by comparing growth during treatment and the rate of recovery in the two groups. Their findings were published in *The Journal of Nutrition*.

This study was carried out in the Republic of Malawi, a landlocked African country that is among the world's least developed countries, with a population that has a low life expectancy and a high infant mortality rate. A total of 1,874 malnourished children in Malawi between the ages of 6 to 60 months took part in the study. They were weighed and measured every two weeks to measure growth and determine their nutritional status. They participated until they either recovered from severe malnutrition or received eight weeks of treatment.

"We found that children who received the ready-to-use therapeutic food containing 25 percent milk powder had a higher recovery than those children who received the 10 percent milk powder food," said Manary.

When children were grouped based on having edema or not, the group with edema had a higher recovery when treated with 25 percent milk powder. The group without edema had a similar recovery with both recipes.

"The results suggest that milk protein is important for recovery from severe acute malnutrition in children with kwashiorkor," said Manary. "It also highlights the importance of conducting clinical trials prior to making changes in ready-to-use therapeutic food composition to ensure that the effectiveness of the treatment is not reduced.

Others who took part in the study include Eleanor Oakley, Jason Reinking, Heidi Sandige, Indi Trehan and Gregg Kennecy from Washington University School of Medicine and Kenneth Maleta from the University of Malawi College of Medicine.

Funding for this study came from the Hickey Family Foundation and the United States Agency for International Development (USAID).

Lecithin Component May Reduce Fatty Liver, Improve Insulin Sensitivity

A natural product found as a component of the dietary supplement, lecithin, has been shown to increase sensitivity to insulin and reduce fatty liver in mice. This has lead researchers at the USDA/ARS Children's Nutrition Research Center to believe it may be useful in helping individuals with prediabetes delay progression to the full disease state. In fact, testing in humans is now underway.

The component in question, called DLPC (dilauroyl phosphatidylcholine), is an unusual phospholipid and a trace component of the dietary supplement lecithin. Phospholipids are important building blocks of cell membranes, thus they help cells in the body maintain their proper function.

Dr. David D. Moore, CNRC researcher and professor of molecular and cellular biology at Baylor College of Medicine, said, "DLPC is a natural product. Lecithin is a mixture of many compounds, but DLPC is one of them."

The interest in DLPC began when Dr. Jae Man Lee, then a graduate student in the

(Continued on page 4)

Volunteers

Houston-area residents are invited to participate in the following nutrition research projects designed to help CNRC scientists learn more about the nutritional needs of children.

For most studies, financial compensation and free parking are provided, and transportation may be available.

For more information on any CNRC study, call Marilyn Navarrete at 713-798-7002 or e-mail rilynn@bcm.edu

Visit CNRC study opportunities online by scanning the QR code to the right using your smart phone.

TEXTMe New!
14- to 17-year olds are needed for a study to test whether text messages help teens be physically active.

SUGAR METABOLISM New!
Are you 13 to 17 years old? Overweight? Not on any prescription medications? You may qualify to participate in a research study about sugar metabolism in the body.

INTERNET SURVEY FOR PARENTS New!
Do you have a 3- to 5-year old child? Do you like to play video or cell phone games? We would like you to evaluate possible feedback statements to parents about their parenting practice selections in an iPhone game app called "Kiddio." Log on to www.parentingandfood.com or e-mail foodkids@bcm.edu to sign up. If you qualify and complete the Internet survey, you may elect to be entered into a raffle for a $50 gift certificate at the end of the study.

PREGNANCY & CHILD HEALTH New!
Did you have a pregnancy complicated by preeclampsia or a baby with low birth weight? Can a complicated pregnancy in mom put the child at risk for future health problems? To answer this question, we are conducting a research study that looks at pregnancy history and its effect on the child's health. Study involves body composition and blood tests.

Dinnertime Observations *(continued from page 1)*

meals to be high on detachment, low on negative affect and intrusiveness, and made fewer demands on their children to eat, Hughes said.

"Indulgent parents are nurturing but they set few boundaries with their children during meals or around eating," Hughes said. "They want their children to be happy so they are most likely to give them energy dense foods without much thought to the nutritional value." This way, parents do not have to struggle with their child to get them to eat dinner.

The authoritative feeding style is the ideal, she added. Parents in this group were observed to be low on negative affect and intrusion, and they did things like verbally encourage the child to eat without spoon-feeding or scolding the child. In contrast, authoritarian parents can be described as those who are the most demanding with their children. These parents were observed to be highly intrusive during the meal and used many different types of strategies to get their child to eat, including disapproving or scolding their child during the dinner meal.

The study was funded by the USDA, National Institute of Food and Agriculture's National Research Initiative and the Agriculture and Food Research Initiative as well as the National Institute of Health's National Institute of Child Health and Human Development. Others involved in the study included Maria Papaioanou, Matthew Cross and Theresa Nicklas, all of the CNRC; Thomas Power, of Washington State University; Sharon Hall, of the University of Houston Clear Lake; and Richard Shewchuk, of the University of Alabama at Birmingham.

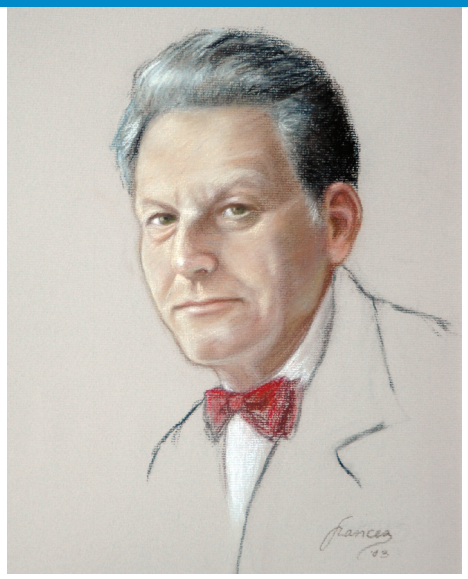
Fomon's Impact *(continued from page 1)*

Mead Johnson Award for distinguished achievement in nutrition research, one of the most prestigious awards in the field.

Fomon's comprehensive research in infant nutrition later became the standard for nutrition and growth of normal-term infants during the critical stage of human development in the first year of life. In addition to his influence worldwide, at the CNRC he served in key advisory roles regarding CNRC's research when the CNRC was launched in 1978.

In the *Journal of Nutrition* article, Nichols highlights Fomon's significant research conducted from 1966 to 2003. Fomon concluded that one-half of the protein intake of infants supports growth and 40 percent of energy intake is stored as body fat. Using the "Fomon reference infant and child"—a standard that was developed by Fomon for nutrition research—researchers at the CNRC conducted a study in 2002 that led to recommendations by the United States and the World Health Organization of 20 percent decreased energy and 25 percent increased protein intake feeding recommendations for children.

"The Fomon-inspired reference child growth-based factorial nutrition recommendations have modified the nutritional policies for all the world's children," Nichols wrote.



Dr. Samuel Fomon

Dr. Nancy Butte, professor of pediatrics at BCM and a CNRC researcher who focuses on childhood obesity, also reflected on the impact of Fomon's work.

"What Dr. Fomon did that was unique was that he studied healthy, normal babies," Butte said. "His research unit was very well run and well respected not just by his colleagues and staff but by the community where he worked. The community completely trusted him and his colleagues to let their children stay in his research unit, and the research contributed much to our understanding of infant nutrition."

"Our work at the CRNC using stable isotope techniques extended Fomon's research further and with his work as the basis, we have been able to advance the field of children's nutrition," Butte continued.

Dr. Dennis Bier, professor of pediatrics and director of the CNRC, remarked, "Sam Fomon was the nutrition field's most accomplished and globally recognized authority on feeding the human infant during the first year of life. His detailed studies of the relationships among different approaches to infant feeding, the various nutrient constituents of human milk and infant formulas, and optimal infant growth and development have become the reference data from which a large majority of current recommendations for feeding infants are derived. This is because his studies were performed meticulously and his data have withstood the test of time."

DIET AND STOMACH PAIN

Does your child have stomach pain that you believe is related to his/her diet? Children between the ages of 7 and 17 are needed for a research study. Researchers are interested in learning more about the role of diet in childhood stomach pain. Participants will be asked to start a specific diet on two separate weekends to determine whether this will help the pain. Food will be provided.

LI'L CAL: A CALORIE AND PHYSICAL ACTIVITY STUDY FOR PRESCHOOLERS

Healthy 3- to 5-year old children are needed for a study on the caloric needs and physical activity of preschoolers while resting and playing. The study includes two visits to the CNRC.

BREAKFAST STUDY

Children who are 8 to 10 years old are needed for a study on breakfast consumption and mental abilities. The study includes three overnight visits to the CNRC. There will be blood draws at each visit (numbing creams and sprays are available).

LACTATION STUDY: PRODUCTION OF MILK SUGARS AND TRIGLYCERIDES

Are you 18 to 35 years old, healthy and exclusively breastfeeding? Is your baby less than 10 weeks old? If so, you are needed for a study investigating factors that affect breast milk production. The study includes a 24-hour stay at Texas Children's Hospital with your baby.

FAMILY EATS

African-American families with children between 8 and 12 years of age are needed for an eight week Internet program on healthy eating. Must have Internet access.

LACTATION STUDY: GENE EXPRESSION

Pregnant mothers who are healthy, between 13 and 35 years of age, who will exclusively breastfeed for the first two months and who will be delivering at St. Luke's or Ben Taub Hospital are needed for a research study that will investigate factors (the regulation of gene expression) that affect breast milk production during the first six weeks.

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LECITHIN COMPONENT *(continued from page 2)*

Program in Developmental Biology in Moore's laboratory, proposed looking for phospholipid compounds that activated an important receptor protein in liver—liver receptor homolog-1 or LRH-1, which regulates the production of bile acids and have recently emerged as important regulators of metabolism.

STIMULATING LRH-1 ACTIVITY

DLPC did affect bile acids and, to the researchers' surprise, also decreased fatty liver and lowered glucose levels in the blood. A report on this work appeared in the journal *Nature*. Moore is now collaborating on a pilot study to find out how well DLPC works in individuals with prediabetes.

"The link between the liver receptor protein LRH-1 and bile acids may contribute to the effect on glucose levels and fat because small, non-toxic increases in bile acid levels can improve one's ability to deal with certain metabolic disorders," Moore said.

CLINICAL STUDY UNDERWAY

The ongoing clinical study, which involves people who are overweight but not diabetic, employs an approved form of DLPC. An initial glucose tolerance test to determine how sensitive the people are to insulin at the start of the study is followed by another after the subjects take DLPC or a placebo for two months.

Others who took part in the basic research include Dr. Yoon Kwang Lee and Jennifer L. Mamrosh of BCM, Dr. Scott A. Busby and Dr. Patrick R. Griffin of Scripps Research Institute in Jupiter, Florida and Dr. Manish C. Pathak and Dr. Eric A. Ortlund of Emory University School of Medicine in Atlanta. (Yoon Kwang Lee is now at Northeastern Ohio Colleges of Medicine and Pharmacy in Rootstown, Ohio).

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