

Starting the Good Life in the Womb

Pregnant women who eat right, watch their weight and stay active can actually improve their unborn babies' chances of growing into healthy adults.

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Sept. 17, 2007 issue - Most pregnant women know they can hurt their babies by smoking, drinking alcohol and taking drugs that can cause birth defects. But they also may be able to "program" the baby in the womb to be a healthier adult. New research suggests that mothers-to-be can reduce the risk that their babies will develop obesity, high blood pressure, heart disease and diabetes by monitoring their own diet, exercise and weight.

The science behind this is relatively new and still somewhat controversial. In the late 1980s, a British physician and epidemiologist named David Barker noticed that a group of Englishmen who were born small had a higher incidence of heart disease. Studies showed that rates of obesity, high blood pressure and diabetes—illnesses that often are associated with heart disease—are higher in men born small. Barker proposed that poor nutrition in the womb may have "programmed" the men to develop illness 50 years or more later.

The "Barker Hypothesis" is still hotly debated, but it is gaining acceptance as the evidence builds. Because organs develop at different times, it appears that the effects of too little food during pregnancy vary by trimester. One example comes from study of the Dutch Hunger Winter, a brief but severe famine that occurred during World War II. Pregnant women who didn't get enough to eat in their first trimester had babies who were more likely to develop heart disease. If they were in their second trimester, their babies were at risk for kidney disease. A poor diet in the last three months led to babies who had problems with insulin regulation, a precursor of diabetes.

More-recent research has focused on the negative effects of too much food during pregnancy. Women who gain excessive weight during pregnancy are more likely to have babies who are born large for their age and who become overweight in childhood. A recent study from the National Birth Defect Prevention Study found that obesity in pregnancy also increases a baby's risk for birth defects, including those of the spinal cord, heart and limbs.

A mother's nutrition and exercise patterns during pregnancy influence the long-term health of the baby by shaping her baby's metabolism. "Metabolism" includes everything that allows your body to turn food into energy—from the organ systems that process food and waste to the energy-producing chemical reactions that take place inside every cell. It is the collective engine that keeps you alive.

A mother's body may influence her baby's metabolism on many levels: the way organs develop, how appetite signals get released in the brain, how genes are activated, even the metabolic chemistry inside the baby's cells. Research now shows that the environment of the womb helps determine how a baby's metabolism is put together, or "programs" it for later health. The science of fetal programming is still new; it will be a long time before we have all the answers, since these health effects emerge over a lifetime. But several principles already are clear for a pregnant woman.

The first is to get healthy before pregnancy. Weighing too little or too much not only hampers fertility but can set the stage for metabolic problems in pregnancy. Doctors used to think of body fat as nothing more than inert insulation, but they know now that fat is an active tissue that releases hormones and plays a key role in keeping the metabolism running. Women should also eat a balanced diet and take prenatal vitamins before pregnancy to ensure that their bodies provide a good environment from the beginning.

The amount of weight gain is also critical. Women who gain too little weight during pregnancy are more likely to give birth to small babies, while women who gain too much weight are likely to have large babies. Paradoxically, both situations can predispose a child to metabolic disease. The weight gain should come slowly at first—about two to eight pounds in the first trimester, and one pound per week after that for normal-weight women. Obese women (with a body-mass index, or BMI, higher than 29) should gain no more than 15 pounds.

During pregnancy, women are already more susceptible to metabolic problems such as gestational diabetes and preeclampsia (high blood pressure), so choosing foods that help your metabolism run smoothly is important. Eating whole grains and foods rich in protein and fiber while avoiding foods high in sugar can help even out rises and falls in blood sugar. Pregnant women should eat about 300 extra calories per day while they're pregnant. But, as always, the quality of the calories matters even more. It's important to eat a diet rich in nutrients, since a lack of specific nutrients in the womb can hamper a baby's long-term health. A clear example is folic acid, without which the brain and spinal cord do not develop properly. But new research is uncovering other nutrients that may have subtler but long-lasting effects on health.

Studies suggest that women could benefit from taking omega-3 fatty-acid supplements, particularly those containing docosahexaenoic acid (DHA, for short), a type of fat that has been shown to help prevent prematurity and contribute to healthy brain development. A recent study found that women with more vitamin D in their bodies have children with stronger bones; adequate vitamin D is also needed for organ development.

Women may have different nutrient needs because of genetic differences, but to be safe every woman should take a daily prenatal vitamin before and during pregnancy. But supplements,

whether in the form of a pill, a fortified shake or energy bar, don't replace the nutrients found in fruits, vegetables, low-fat meats, whole grains and other foods.

The energy you expend is as important as what you take in. Regular activity helps keep a woman's metabolism running smoothly and offsets problems of pregnancy like varicose veins, leg cramps and lower back pain. Pregnant women should avoid high-impact activities, especially late in their pregnancies.

All this may sound daunting, but most of the changes are simple ones that will improve a mother's long-term health as well as her children's.

Walker, the Conrad Taff Professor of Pediatrics at Harvard Medical School, and Humphries, a science writer, have written "The Harvard Medical School Guide to Healthy Eating During Pregnancy."