

When I was a young graduate student (just a few years ago), I was taught that all genetic information resided in our DNA.

During conception, we picked up some DNA from our dad & some from our mom, and that DNA was what made us a unique individual. We knew that environmental influences could affect our health personally, but never dreamed that the effects of those environmental influences could be passed on to our kids.

But today we know that environmental influences can actually modify our DNA and that those modifications can be passed on to our offspring - a process called epigenetics.

Which brings me to the question I posed today: "Can what we eat affect our kids?"

According to two articles that appeared this month in The FASEB Journal, the answer just might be yes!

Previous clinical studies had shown when mothers consumed high-fat, high-sugar diets during pregnancy, their children were more likely to have a preference for high-fat, high-sugar foods - which would likely predispose them to obesity later in life.

But with humans, it is really difficult to sort out how much of that effect was caused by what the mom ate during pregnancy and how much was caused by how the family ate as the kids were growing up.

So both of these studies were done in rodents.

In the first study (Ong & Muhlhausler, FASEB J, 25: 2167-2179, 2011) female rats were maintained on either standard rat chow or a "junk-food diet" high in fat and sugar during pregnancy and lactation. The weanling rats were then separated from their moms and exposed to a variety of foods and allowed to choose what they wanted to eat.

Both the male and female offspring of the "junk-food" moms showed a marked preference for high fat foods. They also showed alterations in hormones of the opioid and dopaminergic central reward pathways that may have been pre-conditioned them to require higher intakes of fat to experience pleasure from eating.

In the second study (Jousse et al, FASEB J, doi: 10.1096/fj.11-181792) female mice were maintained on either standard mouse chow or a low-protein diet during pregnancy and lactation.

In this case the offspring of the low-protein fed moms had a lower body weight and less adiposity throughout their life.

But what made this study particularly significant was that the investigators were able to show that the

low-protein diet in the moms resulted in a specific modification in the DNA of the leptin gene in their offspring.

This DNA modification led to a greater expression of leptin following a meal in those offspring compared to the offspring of the moms who consumed regular mice chow during pregnancy & lactation - which makes sense because leptin inhibits appetite.

Thus, this study not only shows that the diet of the moms influenced the eating behavior and body composition of their offspring, but that this change in eating behavior was caused by a permanent modification of their DNA.

So what is the bottom line for you? In the first place, the science of epigenetics is relatively new and these particular studies were done in rodents, not in humans. It will be many years before we will be able to make specific recommendations as to what your diet should be like during pregnancy and lactation if you wish to make beneficial modifications to your baby's DNA.

In particular, I certainly do not mean to suggest that a low protein diet would be beneficial during pregnancy & lactation. No responsible nutrition expert would make that recommendation.

However, I did want to make you aware that what you eat during pregnancy & lactation may influence the health of your children - not just at the time of their birth - but throughout their life, and that a "junk-food" diet just may not be your best choice.

This is a new paradigm. Most prenatal nutrition advice is currently based on what it takes to have a healthy baby - not on what it might take for your child to experience better health throughout their life.

What about your diet before conception - and what about guys?

Those studies have yet to be done, but I would not be surprised if we find out that what we eat affects our DNA as well.

So, a good diet prior to conception is likely to be important too. And since both men and women contribute DNA to our children this advice may apply to all of us.

To Your Health!

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