

Nutrition at Conception

by Anitra C. Carr, Ph.D.

Nutrition status at conception is not a concept we often think about. However, a recent study carried out at the University of Auckland has shown convincingly that poor nutrition at the time of conception and very early in pregnancy can trigger premature birth¹. Although the experiments were carried out in sheep, the results may still be applicable to humans and could account for some of the 40% of unexplained premature births each year in New Zealand and other developed countries. In support of this, data collected during the Dutch famine in the second World War showed that pre-conception starvation, which causes damage to the egg and sperm, affected foetal health more profoundly than if the starvation occurred during pregnancy². Other related studies have found that reduced maternal nutrition, in women with anorexia for example, can cause lower birth weight in babies born after the full gestation period. Interestingly, the world-renowned Dunedin longitudinal health study has shown that low birth weight in full-term babies has an important, adverse effect on later intellectual growth and behaviour³. Thus, appropriate nutrition appears to be very important not only during pregnancy, but also pre-conception.

Recent research from CSIRO scientists has shown that a lack of nutrients can be as damaging to our genetic material as radiation or toxic chemicals and it has been suggested that DNA health clinics should be established in order to screen individuals for nutrient deficiencies. This would be particularly important for prospective parents as in the instant that the sperm and the egg combine, an irreversible genetic blueprint is formed for the future development of the baby. Furthermore, following conception the growth of the embryo is so rapid that unless all the essential nutrients are readily available vital stages of development can be compromised. One of the most well known is a deficiency of folic acid, which can result in a neural tube defect such as spina bifida. Other research has shown that children whose mothers had a diet that was lacking in nutrients during pregnancy are at greater risk of developing diabetes and obesity later in life⁴. In order to explore this further, experiments were carried out in mice and showed that changing a female mouse's diet can alter patterns of DNA modification, which in turn influences the patterns of gene expression in her offspring. For example,

if female mice were fed a diet low in specific nutrients, including folic acid, their offspring tended to develop obesity, diabetes and cancer, and they didn't live as long as normal. Interestingly, when the mice were given the specific nutrients as supplements, the effects were reversed.

The health of the egg and sperm is also of crucial importance. Since spermatogenesis takes about 10 - 11 weeks and maturation of an egg can take up to six months, appropriate preparation should ideally be made at least three months prior to conception (called "conscious conception"²). It is important to note that women who have been on the contraceptive pill are likely to be deficient in a large number of important nutrients. Therefore, it is advisable to cease taking the Pill at least three to six months before attempting conception. Drugs, such as alcohol, tobacco, caffeine and medications, should also be avoided for at least three months before conceiving because not only can they impair fertility, but they can also cause nutrient deficiencies and possibly contribute to birth defects. Abstaining from alcohol etc may sound pretty tough to some people and, unfortunately, there are those who believe that they need to be drunk before having intercourse. However, my husband and I managed to abstain from alcohol for the three months prior to conception (not that we were big drinkers anyway), and since I have stopped nursing, I have had no urge to go back.

Protein is an essential nutrient for both the prospective mother and father. There are studies showing a strong link between low birth weight, infant mortality and congenital defects and protein intake. Adequate protein is vital for the number and quality of eggs produced and the fertilization process, as well as the early development of the embryo and is essential to form the baby's muscles and organs. For men, protein is necessary for optimum functioning of the testes and healthy sperm production and a deficiency can lead to chromosome aberrations. Thus, the implications can be serious for vegetarians and vegans who get little, if any, primary protein. Interestingly, there are few, if any, indigenous cultures that do not have some sort of primary protein in their diet. The quality of protein is more important than the quantity, as too much protein can cause just as many problems as too little protein^{2,4}. Fish is a good source because not only does it contain easily digestible protein, but it has no saturated fats and is high in minerals and essential fatty acids.

My husband and I had been vegetarian for 10 and 15 years, respectively, prior to conception, and many years before we had also been vegan (for about six months) as I had read that eating a vegan diet was a good way of cleansing the body prior to planning to have a child. However, I lost a lot of weight on this diet, and as such we went back to a mostly vegetarian diet, with a little fish every now and then. Unfortunately,

I believe I was still quite protein deficient prior to conceiving, and although I had a relatively trouble-free pregnancy and labour, I can't help wondering if I did not recover from childbirth as quickly as I may have if I had eaten more protein prior to and during the pregnancy. Furthermore, while my daughter was nursing she may not have been receiving sufficient nutrients through my milk; she was always such a skinny wee thing.

I recently read a book called "Eat Right for Your Type" ⁵ which classifies people into different body types based on their blood types as an indicator of their constitutions. According to this book, some people (eg those with Type A blood) do better on vegetarian diets than others (eg people with Type O blood); this is an interesting concept as it implies that almost half of the population would do better on a mostly vegetarian diet! Since I am Type O (while my husband is Type A), it is not surprising that I lost weight and became protein deficient on a purely vegetarian diet. Now that my daughter (who is the same blood type as me) is eating solids we make sure that we eat fish regularly and also have chicken every now and then so that she does not become protein deficient during her important growth years. Interestingly, there are children as young as two and three years old who are choosing not to eat meat. Therefore, parents need to be sensitive to the individual dietary needs of their children as each is a unique being.

Happy and healthy conceiving!

Notes

1. Young, E. (2003). Poor diet leads to premature birth. New Scientist, Australia, May 3. NZPA (2003). Birth Breakthrough. The Press, Christchurch, April 28.
2. Naish, F. (1991). Natural Fertility. Sally Milner Publishing, Rozelle. This book is a concise guide to avoiding or achieving conception.
3. Reid, B. (1993). Looking into a child's future. Time Magazine, USA, September 20. Moore, C. (1994). Human secrets uncovered. The Press, Christchurch, July 25.
4. Phillips, H. (2003). You are what you eat. New Scientist, Australia, March 15.
5. D'Adamo, P. and Whitney, C. (1998). Eat Right for Your Type. Century, London. This book is an individualised diet solution to staying healthy, living longer and achieving your ideal weight.