# Behind Every Healthy Baby is a Healthy Placenta©

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A healthy placenta is the single most important factor in producing a healthy baby. The placenta, which is in fact part of the fetus, is critical for all aspects of pregnancy from implantation to delivery. As early as three days after fertilization, the trophoblasts—the major cell type of the placenta—begin to make human chorionic gonadotropin, a hormone which insures that the endometrium will be receptive to the implanting embryo. Over the next few days, these same trophoblasts attach to and invade into the uterine lining, beginning the process of pregnancy. Over the next few weeks the placenta begins to make hormones which control the basic physiology of the mother in such a way that the fetus is supplied with the necessary nutrients and oxygen needed for successful growth. The placenta also protects the fetus from immune attack by the mother, removes waste products from the fetus, induces the mother to bring more blood to the placenta, and near the time of delivery, produces hormones that matures the fetal organs in preparation for life outside of the uterus. In many ways the placenta is the SCUBA system for the fetus while at the same time being the Houston Control Center guiding the mother through pregnancy.

The placenta is dedicated to the survival of the fetus. Even when exposed to a poor maternal environment—for example when the mother is malnourished, diseased, smokes or takes cocaine—the placenta can often compensate by becoming more efficient. Unfortunately, there are limits to the placenta's ability to cope with external stresses. Eventually, if multiple or severe enough, these stresses can lead to placental damage, fetal damage and even intrauterine demise and pregnancy loss.

Just as the rings of a cut tree can tell the story of the tree's life, so too the placenta can disclose the history of the pregnancy. In cases of poor pregnancy outcome, microscopic examination of the placenta often reveals the stresses that caused the fetal damage observed in an affected newborn.

The major pathologic processes observable in the placenta that can adversely affect pregnancy outcome include intrauterine bacterial infections, decreased blood flow to the placenta from the mother and immunologic attack of the placenta by the mother's immune system. Intrauterine infections, most commonly the result of migration of vaginal bacteria through the cervix into the uterine cavity, can lead to severe fetal hypoxia as a result of villous edema (fluid build up within the placenta itself). Both chronic and acute decreases in blood flow to the placenta can cause severe fetal damage and even death. As well as supplying the fetus with nutrition, the placenta is also a barrier between the mother and fetus, protecting the fetus from immune rejection by the mother, a pathologic process that can lead to intrauterine growth retardation or even demise. In addition to these major pathologic categories, many other insults—such as placental separation, cord accidents, trauma, viral and parasitic infections—can adversely affect pregnancy outcome by affecting the function of the placenta.

A trained placental pathologist can examine a placenta and assist in the elucidation of the causes of poor pregnancy outcome. A complete placental examination is most useful shortly after the time of delivery when the affected family is most in need of understanding what happened to their baby. If a full placental examination is not possible at the time of delivery because no placental pathologist is available, then the placenta can be transferred to a center that is prepared to make such an examination. As long as tissue blocks are saved from the placenta, a microscopic examination of the placenta is always possible at a later time if the need arises.

Today, only a few specialized centers for placental examination exist in the US. As the cost of processing and examining placentas decreases, more of the 4 million placentas delivered every year will be able to be examined by appropriately trained physicians. This trend will lead to a better understanding of causes of poor pregnancy outcomes, which in turn will lead to better diagnostic and therapeutic approaches to complicated pregnancies. The ultimate goal of placental examination and research is to insure that wanted babies are healthy babies.

For additional resources see: http://klimanlabs.yale.edu/placenta/



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