6 FOURTH MONTH (1/2x)

The fetus is growing rapidly and now looks more like a human baby. The face and hands become more defined. The fetus may now weight about 2.8 ounces and measure up to 4.6 inches long. As the fetus grows, it requires a larger and more efficient life support system. By the fourth month, this system is fully developed. The **placenta** (pluh-CENT-uh) (P) is the main organ of support. It contains a soft structure of blood vessels belonging to the baby. The blood vessels in the placenta continue to develop and multiply throughout the pregnancy. By the time of the baby's birth, the total surface area of the placenta is large enough to cover a tennis court! The placenta performs several other roles. It acts like a cushion for the fetus. It produces heat, keeping the fetus about 1 degree warmer than the mother. It produces a hormone called **progesterone** (pro-JEST-er-own) which helps sustain the pregnancy. The **umbilical cord** (um-BILL-ih-kull kord) (U) connects the fetus to the placenta. Between the fourth and fifth months, the mother may be able to feel the fetus moving inside her. This is called quickening.

7 FIVE AND ONE HALF MONTHS (1/5x)

By the sixth month, the fetus is looking more and more like a fully-formed baby. A fine fuzz of soft hairs, called **lanugo** (lah-NEW-go) (L), covers the fetus from head to toe. It will be shed before birth. The fetus is also covered by a thick, white, creamy substance called **vernix** (VER-nees) (V), that protects the fetus' skin from its watery environment.

Now the fetus is showing changes of activity during the day. The mother may be aware of cycles during which the fetus is very active, moving and kicking, and then other periods of quiet. The fetus can react to sounds and even light coming from outside the womb. A baby born at six months may be able to live on its own, but only with intensive medical care.

8 NINTH MONTH (1/4x)

In the last few months inside the womb, the fetus continues to grow. The fetus will begin adding layers of fat, and the mother will notice a corresponding weight gain. Now the fetus' eyes can open, it can suck its thumb and recognize the sound of its mother's voice. Finally, the fetus begins preparing itself for birth. It changes position in the womb, generally turning itself head down. The placenta begins to degenerate. Spurred on by its own internal clock, the fetus begins the second journey of its life, into the outside world.

Photocredits: 1L - CC Studio/Science Photo Library; 2L, 2R - Dr. L.B. Shettles, College of Physicians & Surgeons, Columbia University; 3,6,8 - Petit Format/Nestle/Science Source; 4 - John Giannicchi, Science Source; 5 - Dr. G. Moscosco, Science Photo Library; 7 - Biophoto Assoc., Photo Resources, Inc.

HUMAN FETAL DEVELOPMENT

INTRODUCTION

There is something wonderful about new beginnings; a new school year, new friends, new love. Perhaps the most wonderful beginning of all is the one that we all share: the beginning of life. Every one of us begins life inside a tiny sphere: a translucent, fragile structure no larger than the dot on the letter i. That sphere is an egg cell, produced by the mother's ovary. Once it is fertilized by a father's sperm cell, the egg embarks on a miraculous, nine-month journey. This journey will transform the egg from a single cell into a living, breathing, laughing baby. *How does this incredible transformation happen?*

In this lesson set, you will learn more about this process. You will find out about the different stages of development, from a **zygote** (ZI-goat) into an **embryo** (EM-bree-oh), and then a **fetus** (FEET-us). You will also learn about several factors that can affect the future health of the developing fetus.

The magnification given, for example, Microslide 1 - Ova (200x), means that the microscope was set at that power when the photograph was taken.

1 OVA - l.s. (200x) / SPERM - l.s. (1800x)

An ova, or egg, once released from a woman's ovary travels through the **fallopian tube** (fah-LOPE-ee-un) to the **uterus** (YOU-ter-us). For conception to occur, the ova must join with a sperm cell during the 24- to 48-hour period immediately after it is released from the ovary.

Study the left half of the slide. You can see the ova at (O). The egg is surrounded by a protective layer of cells (P) that keeps unwanted intruders out. The cells also help nourish the egg. Examine the right half of the slide. It shows human sperm cells magnified 1,800 times. Sperm are made up of a head (H) and a long tail called a **flagellum** (flah-JELL-um) (F). Using the flagellum which acts as a propeller, millions of sperm race toward the egg as it moves along the fallopian tube. The egg welcomes only one sperm from among the contenders, and seals itself off from all others. All of the remaining sperm will die. Once the successful sperm has entered the egg, it sheds its tail. It is now called the male pro-nucleus. The male pro-nucleus contains exactly one-half of the genetic material needed to create a complete human being. The other half is contained in the female pro-nucleus (the nucleus of the ova).

The two pro-nuclei join in the middle of the cell and their chromosomes intermingle. Each pro-nucleus supplies 23 chromosomes. The normal number of chromosomes in a human being is 46. When the union of the two sets of chromosomes is complete, the egg immediately divides into two cells. These are the first two cells of the baby-to-be. The developing ball of cells is now called a zygote.

By Helaine Becker

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