The Spiritual and Natural Growth, Development, and Birth of an Infant




Natalie Buick

Anatomy and Physiology

Kempton New Church School

If you are reading this, that means you have been given the precious gift of life. But you may ask, when does life begin? How does such a miracle come into being? The answers are wrapped up intimately with the formation of an unborn infant and the event of an infant's first breath after birth.

The miracle of a new little person entering this world has taken place as long as people have existed, and yet it is still an amazing and joyful event with each new little face. The growth of the fetus inside the mother takes roughly nine months from conception, and slowly grows from a single cell into a small human, with tiny fingers and toes and all the organs and systems he will need to live outside of his mother. This is the natural formation of this new little person; there is also a spiritual formation occurring that causes the growth of the body to occur the way it does. This spiritual growth is namely the development of the vessels called the will and the understanding seated in the brain, which are being prepared to receive the influx of Divine love and wisdom from the Lord upon birth (DW 3.2).

This paper is going to explore first the physical formation and birth of an infant and the changes that occur at the shift from prenatal to postnatal life, and then the intimately connected spiritual growth and birth of this new little person, and how this development is also illustrates our regeneration.

Everyone of us was a baby at one point, so we have all gone through this process, though we do not remember it. Conception, gestation, and birth is the beginning to everyone's life, and this amazing, delicate process forms millions of new people all over the world.

The first step of life is fertilization. Fertilization, or conception, is when the ovum, the female reproductive cell, and sperm cell, the male reproductive cell, join in the fallopian tube, which completes the baby's genetic code (Cleveland Clinic, 2014). After the ovum is fertilized it is called a zygote, which immediately starts to replicate and form into a cluster of cells, called a blastocyst (Chen, 2017). The blastocyst then travels to the uterus of the mother and implants in the uterine wall. At this same time the mother's

cervix is sealed with a mucus plug to enable the growth of blastocyst, now big enough to be called an embryo (Chen, 2017). The embryo then begins to develop rapidly, and in the next three weeks has already formed its first nerve cells (Cleveland Clinic, 2014).

Pregnancy is often divided into three month trimesters that together make up the nine month gestation period before birth (Cleveland Clinic, 2014). Each trimester contains important developments for the baby. In the first month of the first trimester, rapid changes happen to the uterus and the growing embryo. While the embryo is small it is given nutrients through the blood vessels in the thick lining of the uterus until the placenta is formed (Chen, 2017).

A major change in the embryo occurs with the formation of the amniotic sac around the embryo itself. This sac will gradually fill with liquid, which helps to protect the unborn child throughout development (Cleveland Clinic, 2014). Another important change at this point in development is the new presence and growth of the placenta (Cleveland Clinic, 2014). The placenta is an organ only found in pregnant women. It plays a vital role in the feeding and formation of the baby, and is expelled after the baby is born (A.P.A., 2017). The placenta forms outside of the amniotic sac and attaches to the walls of the uterus by the umbilical cord. It is the intermediate organ that connects the baby and the mother. The mother's blood and the baby's blood both enter the placenta but are kept from mingling. Even though the blood of the mother and baby never come in contact, gases, hormones, nutrients, and waste are still able to be transferred from one to the other (A.P.A., 2017). The formation of the placenta, amniotic sac and much more has started by the end of only the first month of gestation. By this point the embryo also has a visible little face and suggestions of eyes and a mouth (Cleveland Clinic, 2014).

The second month brings major development of the central nervous system, which at this point in development is called the neural tube. The neural tube consists of the brain, spinal cord, and other nervous system extensions (Cleveland Clinic, 2014). The heart also is developing, and a heartbeat is detectable for the first time. The digestive system and sensory organs begin to develop, and cartilage begins to be

replaced by bone. By the end of the second month the embryo is only a inch long and weighs 1/30 of an ounce, but it's heart is already beating and it is starting to take a human form. After 8 weeks the embryo is big enough to be called a fetus (Cleveland Clinic, 2014).

The third month is the end of the first trimester, and by this time all organs, systems and structures are present in the fetus, although they are not fully formed in the little 4 inch body, weighing 1 ounce (Cleveland Clinic, 2014). Arms, legs, fingers and toes are formed enough to be recognized, and the motor neurons are now functional in the fists and mouth. Reproductive organs are also forming but not easily identified on an ultrasound. At the end of the first trimester the most critical development is complete, so the possibility of a miscarriage after this point drops considerably (Cleveland Clinic, 2014).

In the early months of the second trimester the fetus continues to grow and develop. The sex of the baby can be determined early in the second trimester, and the central nervous system starts to function in entirety (Cleveland Clinic, 2014). In the middle of the second trimester the muscles of the fetus are developing, so the baby starts to kick and move, and can even get hiccups. By the end of the second trimester the baby can open its eyes, and respond to audible stimulus. After 23 weeks, if the baby is born prematurely it can survive with intensive care. The fetus is typically 10 inches and weighs ½-1 pound by this point (Cleveland Clinic, 2014).

By the third trimester, the fetus is mainly focused on growing larger and completing systems (Cleveland Clinic, 2014). Fat reserves are built up and other systems are developed enough to function in the world outside of the mother's protection. The baby's brain develops at a rapid pace. Hearing and sight are developed completely and he can respond to various forms of stimuli, like sound, light, temperature, and pain. The baby also kicks more, blinks, and turns his head, but as he grows, movement is restricted because of the tight space.

When the unborn child comes to full term, he changes his position in the uterus, usually head down and drops in the pelvis towards the birth canal. At this point the baby is usually between 18-20 inches and weighs 7 pounds (Cleveland Clinic, 2014).

Once the baby is fully developed, he is ready to be born. The initiation of labor comes in the form of hormone transmissions between the mother and baby (Adewale, 2018). When fully formed and cramped in the now tight space, the baby begins to release the stress hormone cortisol. Cortisol is a steroid hormone produced in the adrenal glands, and its secretion is controlled by the HPA endocrine axis (H.H.N., 2018). It is universally received by most cells in the body. Cortisol levels rise especially in the days approaching birth in both the baby and the uterus of the mother (Adewale, 2018). This increased cortisol level generates an increase in the steroid hormone estriol, which in turn inhibits the production of another hormone called progesterone. Both progesterone and estriol are produced in the placenta. Progesterone inhibits the cervix from contracting, so once the progesterones levels decrease, the smooth muscle linings of the uterus are readied for uterine contractions. Many different varieties of estrogen hormones including estriol are sent to help coordinate uterine contractions (Adewale, 2018).

The mother's body also produces a hormone called prostaglandin (Adewale, 2018). Prostaglandin is produced in almost every cell in the body, and has many uses (O'Brien,1995). In relation to childbirth, prostaglandin helps initiate uterine contractions, decrease progesterone levels, and relax the muscles of the cervix (Adewale, 2018). There are prostaglandin receptors throughout the myometrial tissue in the uterus and in the cervix which conducts uterine contractions (O'Brien,1995). The cervical and pelvic muscles need to be relaxed is order for the cervix to stretch enough to allow the baby to be born. This is also initiated by the hormone relaxin, which is produced by the ovaries and placenta and has binding sites in mainly the muscles of the cervix and uterus (Tetsuya, K., 1998, Adewale, 2018).

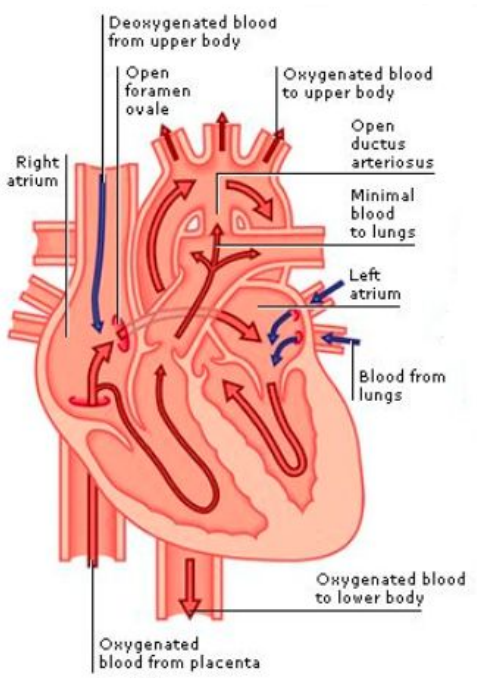
Another important hormone in labor and birth is oxytocin (Pappas, 2015). Oxytocin is produced in the hypothalamus and plays a key role in initiating labor. It also

helps stimulate lactation in the mother to nurse her baby, and encourages mother-baby bonding after birth, in both the mother and the baby (Oxytocin, n.d., Pappas, 2015).

This hormonal activity happens in the first and second stages of labor (Milton, 2017). The first stage starts with regular uterine contractions and end in a full cervical dilation of 10 cm. The second stage is the delivery of the baby, and the third stage is the placenta being expelled from the mother's body (Milton, 2017).

Major changes happen throughout an infant's body directly after birth. The first big change from prenatal conditions to postnatal conditions is the transition from a fetal circulatory system to that of an adult or postnatal human being. This is also closely connected to the changes of the respiratory system. The respiratory system of the infant needs to be initiated in order to provide the infant's body with oxygen, and the circulatory system needs to pump blood through the baby's lungs as well as the rest of the body after the he emerges from the birth canal. Before birth, the placenta serve as a conveyer of nutrients and oxygen from the mother to the baby, but after birth the infant needs to breath on his own (Hillman & Kallapur, 2012).

The fetal circulatory system works differently than the adult system. In fetal circulation blood enters the right atrium by the ductus venosus, a vein connecting to the umbilical vein, up through the vena cava and the umbilical cord (Hillman & Kallapur, 2012). Once inside the right atrium, blood is directed through the foramen ovale, an opening in the atrial wall, into the left atrium and then left ventricle to be pumped through the aorta, mainly reaching to the brain. The majority of the blood pumped into the right ventricle is then pumped out through the ductus arteriosus, an opening off of the pulmonary artery that also connects to the aorta. This eliminates the travel of most blood through the fetal lungs because they are not yet active, and the blood is already oxygenated by the mother (Hillman & Kallapur, 2012).



Fetal heart

Unlike the fetal circulatory system, the adult or postnatal circulatory system is adapted to life outside of the uterus (Cleveland Clinic, 2014). Once the baby is born and the umbilical cord is cut, blood pressure rises in the left ventricle and the foramen ovale is forced shut to equalize pressure between the left and right sides of the heart, starting the regular flow of blood through the lungs (Cleveland Clinic, 2014, Cardiovascular System n.d.).

The increase of blood flow in the baby's pulmonary circulation initiates the closure of the ductus arteriosus, the opening into the aorta of the pulmonary artery, also completing the change from fetal circulation to adult circulation. Because of the added blood pressure from the movement of muscles and other factors, the amount of blood the baby circulated before birth almost doubles after birth (Hillman & Kallapur, 2012).

The first breath is perhaps a more visible change in a baby once he is born. During pregnancy the lungs of the fetus are developed fully, but they do not begin functioning until after birth, because the fetus receives oxygenated blood from the mother when in utero (Hillman & Kallapur, 2012). Upon the start of the birth process, the production of the hormones cortisol, thyroid hormones, and catecholamines are increased which reach the lungs and encourage a decrease in production of fluid inside

the fetal lungs, therefore preparing them for their first breath. This stimulation of hormone production, however, only happens in a natural birth. In the case of a C-section, those hormones are not triggered to be released, and this may be one of the many causes of infant fatality before C-sections were safe and properly done (Hillman & Kallapur, 2012).

The stimulus that initiates a baby's first breath is unknown to scientists (Hillman & Kallapur, 2012). However there are hypotheses that it could be connected to the severing of the placenta (cutting the umbilical cord), as well as the baby's response to the jolting change in temperature and tactile surroundings, or various other factors. This miracle of a baby's first breath is mostly unassisted by medical attendants. Another amazing thing is that most preterm babies will also be able to start breathing once born, even if they have not grown to full term, as long as their lungs are developed enough to support the exchange in gases (Hillman & Kallapur, 2012).

There are many complex processes that go into the growth, development and birth of a baby that scientists still do not understand, and will never know completely. But from what we do know, the birth of a new human being is still a miracle of life that brings heaven close and fulfills the Lord's greatest intended use for human beings to perform.

Like every other system and growth in the body, the development of an unborn child is caused by the spiritual growth and development that needs a natural foundation. There are many things happening spiritually when a baby is formed and developed in the womb and then born into the world. The spiritual growth most intimately corresponding to the newly forming human being, is the development of the will and the understanding. These are the vessels that receive love and wisdom from the Lord seated in the brain and nervous system that will serve a person after his first breath (DW 3.2). Another correspondence in a larger sense, is the connection between the stages and processes of pregnancy, and the stages and processes of regeneration (DW 4).

In every human being there is the marriage of love and wisdom to some degree, which allows a person to function and act from his will and understanding as an individual (DLW 401.3). This marriage can be illustrated by the heart and lungs, and how they function together. In the adult circulatory system the heart pumps blood that has been oxygenated by the lungs out to the body. In the fetal circulatory system however, the lungs are not yet functioning, so only the heart is beating. This fact is the physical effect of the Lord's Divine love pouring into the body of an unborn child. It causes the heart to beat, but does not yet open the lungs, because the marriage of love and wisdom has not yet occured (DLW 401.3).

The Lord is with an unborn child from the moment of conception, and at that moment, life begins in that single cell and will develop into a new human being in the image and likeness of God. Life itself is the Lord with us, the influx of the Divine, and without this we would not exist (DW 2.1). An infant in this state, lives from the Lord's life, not yet from life that seems to be his own, and thus he is unable to think or act from himself, only respond to stimulus (DW 3.3).

Since the unborn infant does not have his own life separate from Lord, he therefore does not receive Divine love and wisdom as of himself, but is formed by the Lord's Divine love directly (DW 3.6). Once the baby is fully formed and ready to be brought into the world, the 'first of the effect' or influx, is initiated by the Lord (AC 3298). This means that the baby acts, as if of himself, to come into the world to fill his lungs and breathe, which then opens his will and understanding to the influx from the Lord independent from his mother. With this first breath a new life begins, separate from the Lord, who can now think and act of himself and therefore be led to heaven (AC 3298).

This is the direct spiritual action that takes place with each individual during the process of conception, development and birth. Another correspondence of pregnancy, which is less directly grounded in this process, is the stages of the regeneration of man, or the process of being born again in the light of heaven.

> It is known that the soul of man commences in the ovum of the mother, and is afterwards perfected in her womb, and is there encompassed with a tender body, and this of such a nature that through it the soul may be able to act in a manner suited to the world into which it is born. The case is the same when man is born again, that is, when he is being regenerated. *(*AC 3570:4)

This passage from the work of the Heavenly Doctrine, *Arcana Coelestia*, draws the connection of the physical growth and development of an unborn child, to man's regeneration, or the process of being born again. The only difference between the development of the physical body, or pregnancy, and the spiritual body, regeneration, is that for a person to regenerate and be born again he needs to have use of his will and understanding, so he may choose, as if of himself, to be regenerated and led to heaven. However, if he is truly being regenerated, he will realize that all life is from the Lord, and he isn't really doing anything from himself, but asking the Lord do it for him. (DW 4).

The three trimesters of pregnancy can be compared to our own lives as we hopefully progress through the regeneration process. The first trimester comprises of the formation of the basic structures of an unborn child in the womb. This can be compared to our childhood, where we store up remains and basic knowledges of the Lord's truth. In the second trimester the unborn child begins to move and respond to stimulus. This can be compared to young adulthood, where a person becomes rational and starts to make decisions for himself on how he wants to live his life, hopefully according to the Lord's commandments. The third trimester is the completion period, where final development occurs, preparing the unborn child for life outside of the womb. This can be compared to adulthood and old age. At the end of this state a person is finishing life on this earth and starting to look towards the next life.

Throughout the whole gestation period, an unborn infant does not breathe on his own, but takes his first breath once he is born. In relation to the regeneration process,

this could correspond to when a person is regenerated by the Lord and receives a new will, and is then prepared for heaven after a full life on earth.

While these two states, that of an unborn infant and an adult in the world, seem to be different, they really converge into the same state, because although we may believe that we act from ourselves, the Lord is really giving us life continually. If a person regenerates he will see that he can do nothing from himself and is entirely dependant on the Lord. The physical state of the unborn child, who has not yet been born into the realizations of the will and understanding, is the most natural, visible form of our dependence on the Lord and His Love. In the case of rebirth, we all should wish to receive a new will and understanding so that we can raise our minds in a new way and recognize the Lord as our Heavenly Father and Creator (DW 4.2).

The Lord is constantly giving every single person who was ever born life so that he may continue to exist and hopefully be useful. To be able to live a useful life on earth and then later in heaven, we need to first be born as an infant, and then work towards and be a part of the regenerative gestation period. Then, we can be born again into the light of heaven and receive a new will and understanding from the Lord.

At the beginning of this paper two questions were posed, hopefully you can now answer them. ‘When does life begin?’ Physical life begins when a baby takes his first breath after birth, thus beginning to receive Divine love and wisdom into his will and understanding from the Lord. Spiritual life begins when someone takes his first spiritual breath, meaning when he receives a new will and understanding from the Lord. ‘How does such a miracle come into being?’ The miracle of life comes directly from the Lord in the form of His love, which is constantly flowing into us from the very beginning, the moment of conception, to the rest of eternity.

Works Cited

Adewale, H. (2018). Childbirth: The Role of Hormones in Labor and Delivery. Retrieved from https://study.com/academy/lesson/childbirth-the-role-of-hormones-in-labor-and-delivery.html

American Pregnancy Association. (2017, April 18). The Fetal Life-Support System: Placenta, Umbilical Cord, & Amniotic Sac. Retrieved April 24, 2018, from http://americanpregnancy.org/while-pregnant/fetal-life-support-system/

Arcana Coelestia, n. 3298, Potts.
N. 3570.4.

Cardiovascular System: Brief summary. (n.d.). Retrieved May 17, 2018, from http://www.embryology.ch/anglais/pcardio/resumecardio01.html

Chen, Peter J. (2017, August 26). Fetal development. Retrieved from https://medlineplus.gov/ency/article/002398.htm

Cleveland Clinic. (2014, Sept. 9). Fetal Development: Stages of Growth. Retrieved April 12, 2018, from https://my.clevelandclinic.org/health/articles/7247-fetal-development-stages-of-growth

Cleveland Clinic. (2017, Dec 18). Patent Foramen Ovale (PFO). Retrieved April 30, 2018, from https://my.clevelandclinic.org/health/diseases/17326-patent-foramen-ovale-pfo

Divine Love and Wisdom, n. 401.3, Ager.

Divine Wisdom, n. 2.1, Whitehead.

N. 3.2,

N. 3.3,

N. 3.6,

N. 4,

N. 4.2.

Hillman, N., Kallapur, S. G., & Jobe, A. (2012). Physiology of Transition from intrauterine to Extrauterine Life. *Clinics in Perinatology*, 39(4), 769–783. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3504352/

Hormone Health Network (2018). What is Cortisol? Retrieved May 17, 2018, from https://www.hormone.org/hormones-and-health/hormones/cortisol

Milton, S. H. (2017, Nov. 16). Normal Labor and Delivery. Retrieved from https://emedicine.medscape.com/article/260036-overview

O'Brien, W. F. (1995, December). The role of prostaglandins in labor and delivery. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/8665768

Oxytocin, (n.d.). Retrieved May 17, 2018, from http://www.vivo.colostate.edu/hbooks/pathphys/endocrine/hypopit/oxytocin.html

Pappas, S. (2015, June 4). Oxytocin: Facts About the 'Cuddle Hormone'. Retrieved from https://www.livescience.com/42198-what-is-oxytocin.html

Tetsuya, K., Lukas, G., Min, G., Trupin, S., Campbell, E. T., & Sherwood, O. D. (1998, October 01). Identification of Specific Relaxin-Binding Cells in the Human Female 1 | Biology of Reproduction | Retrieved from https://academic.oup.com/biolreprod/article/59/4/991/2741128