

PSY242: Prenatal & Neonatal Psychology: NA
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Chapter 6 Embryonic Development

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Required Video: Tyrone Hayes + Penelope Jagessar Chaffer: The toxic baby?

Six years ago, film maker Penelope Jagessar Chaffer was pregnant with her first baby. During her first scan, it was discovered that the fetus had a birth defect, in connection with the exposure of estrogenic chemicals in her womb. As a second scan was performed, it detected the absence of the fetus's heartbeat. Penelope's baby had demised. She approached scientist Tyrone Hayes, who mastered the study of amphibians and obtained knowledge through his research on Atrazine. Atrazine is the biggest selling product for the largest chemical corporation in the world. It is the number one poison found in drinking water, ground water, baby plastic bottles, and in children's sippy cups. It creates destruction by causing a hormone imbalance. In Hayes's investigations, frogs with minimal exposure to Atrazine can grow multiple testes and ovaries. The male frogs go through an alteration of becoming female frogs, losing their testosterone hormone and begin producing the female hormone estrogen. Atrazine can produce tumors, breast cancer, leukemia, birth defects and even cause abortion. The statistics in the United Kingdom and in the United States, displayed the increase of twenty percent of leukemia in children. Over the course of twenty years, Canada escalated four times, the diagnosis of asthma in one of ten children. With the increase of six hundred percent in the United States, one of ten children are diagnosed with autism, autism spectrum disorders and learning disabilities, including a two hundred percent rise of birth defects. Numerous plastic infant bottles were found with Bisphenol A, (BPA). BPA is a potent estrogen found in polycarbonate plastic and can pass into a baby's formula. In 2003, the European Union passed a law, banning the use of Bisphenol A (BPA) in infant's bottles and sipping cups. The United States Senate declined to debate this horrific and serious problem.

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3. There are several possible sources that can create implantation problems. During the germinal stage, if a zygote does not exist, it is an indication of absent or additional genetic matter. Turner's syndrome, or mutilated chromosomes such as Down syndrome, can provoke a miscarriage and incapacitate the zygote to survive successfully. Endometriosis is diagnosed in females, when the appearance of abnormal tissues grows outside their uterus. The menstruation flow operates in retrograde. As the tissues shed, it can be found on the fallopian tubes, ovaries, bladder, lower abdomen, pelvic area, and other internal areas of the body. The accumulation of endometrial tissues can obstruct fertilization. Because endometriosis can be inherited, twenty-five to fifty percent of women are unable to conceive and thirty to forty percent of women are unable to reproduce. A further complication is when uterine fibroids are discovered in the uterus. Although, they are considered non-cancerous tumors, it can increase in size, as a grapefruit. This can occlude the cervix or fallopian tube and hinders the blastocyst from implantation. Estrogen levels and blood flow can augment fibroids during pregnancy. Fibroids can initiate premature labor because of the small space in the uterus. Previous sexually transmitted infections play a factor for complications in implantation. Bacterial infections such as chlamydia, gonorrhea, and pelvic inflammatory disease (PID) are a high risk for infertility. Pelvic inflammatory disease is an infection to the female's reproductive organs. Chlamydia can damage the reproductive system permanently and can generate possible fatal ectopic pregnancy. Gonorrhea can extend to the uterus, to the fallopian tubes, cause pelvic inflammatory disease and can induce an ectopic pregnancy.

4. An ectopic pregnancy or tubal pregnancy occurs, when the blastocyst implants outside the uterus, generally in a fallopian tube. During an ectopic pregnancy, the blastocyst can get trapped or stuck in the fallopian tube, unable to mobilize towards the uterus. The blastocyst can also implant or position itself in the cervix, ovaries and in the pelvic cavity. Ectopic pregnancies can be generated by bacterial infections caused by sexual transmitted infections and by endometriosis. The scar tissues from bacterial infections can impede or block the blastocyst's journey to the uterus. The morning after pill also known as the emergency contraception, and birth control pills, have been associated as a high-risk for ectopic pregnancy. It is related to the elevated hormone levels of estrogen and progesterone. The birth control method of an Intrauterine device (IUD), a previous tubal pregnancy and abnormal fallopian tubes caused by birth defects, is a risk factor for ectopic pregnancy. Because the embryo cannot survive outside the uterus, without the proper treatment it can affect the life of its mother. The consequence of an untreated tubal pregnancy is death. It can rupture the fallopian tube and destroy the surrounding maternal structures. Massive internal bleeding and blood loss, along with intense abdominal pain, is a medical emergency that requires medical attention. The intervention of a surgical procedure called Laparoscopy, is necessary to remove the implanted embryo from its location.

5. There are several medical resources that couples can attempt when having difficulty in conceiving a child. Oral medications such as Clomid (clomiphene) and Serophene are commonly prescribed to women to use as a treatment for infertility. Clomid is used to stimulate ovulation and is effective eighty percent of the time. With the treatment of this medication, the Follicle Stimulating Hormone (FSH) levels increase to promote the formation of the ova. The Luteinizing Hormone (LH) levels increase to act on the ovaries, to make the follicles release their ova (s), and to produce hormones in preparation for the uterus to be implanted. The common side effects of fertility drugs are nausea, insomnia, fatigue, weight gain, irritability, depression, breast tenderness and ovarian swelling. In addition, multiple pregnancy (twins or more) can occur during the treatment of fertility drugs. Artificial Insemination is recommended when endometriosis is present in the female, infertility in the male is confirmed, and when sexual activity requires great effort. The accumulation of sperms is gathered but carefully sorted out to eliminate abnormal sperms. The procedure in artificial insemination consists of stored sperms injected into a catheter and inserted straight into the female's uterus. The rates of accomplishments range between forty and fifty percent and may escalate with the use of fertility medications. The most popular medical procedure to achieve conception is through In Virto Fertilization (IVF). The procedure consists of the ova removed from the ovary combined with the sperm for fertilization. This process is usually performed in a petri dish or in a test tube. Zygotes are placed in the female's uterus through a thin tube catheter. The side effects are ectopic pregnancy, miscarriages, and ovarian hyperstimulation syndrome among others. In addition, multiple conception is common through the intervention of In Virto Fertilization.

8. A placenta is a temporary organ formed like the shape of a pancake that evolves in the uterus during pregnancy. The placenta consists of cells from the mother and from the embryo/fetus which unite and work together. It attaches onto the uterine walls to provide nourishments and oxygen to the growing fetus through the umbilical cord for survival. Besides the nourishments and oxygen, teratogens such as alcohol, illegal substances and viruses can be transferred from the mother's blood stream to the fetus. Apart from the teratogens, an additional function of the placenta is to get rid of urine and excrement matter. The placenta aids the fetus to breathe, as oxygen and carbon dioxide flow from the mother's hemoglobin. Depending on the level of the mother's hemoglobin cells, determines the availability of oxygen. For example, if the hemoglobin cells are low or shows anemia, the oxygen to the fetus decreases. It produces a high risk of miscarriage, premature birth, or Intrauterine growth retardation. Because the fetal kidneys are in the process of development, the placenta temporarily takes over the function of the kidneys by filtering the blood, managing fluids, and supplying minerals. The placenta distributes fundamental components such as amino acids, vitamins, and water among other elements to the fetus. Serious complications in pregnancy can occur, when the placenta to a certain degree or completely covers the cervix. This is called Placenta Previa. To avoid the breaking of the placenta from the uterine wall when the cervix expands, a caesarean section is necessary to prevent hemorrhage. Placental abruption is when placenta detaches to a certain degree or completely from the uterine wall before time. This is significant as it can cause fetal death, miscarriages, or premature delivery.

9. The umbilical cord is the connection of a flexible cordlike structure to the fetus's navel and to the mother's placenta during pregnancy. It originates from the remains of the yolk sac and from the allantois throughout the course of the embryonic stage. The yolk sac is produced from cells that separated from the blastocyst's inner cell mass. It consists of vitelline fluid which provide nourishments to the embryo in the early stages of existence. At ten weeks of gestation, the development of the placenta and the umbilical cord have evolved, making the yolk sac superfluous. The allantois is created from the blastocyst's cells and is designed to collect waste from the embryo. In 1656, Doctor Thomas Wharton was the first to identify the anatomical structure of the umbilical cord. The Wharton's Jelly is a gelatinous connective tissue within the umbilical cord that contains flexible fibers. Its purpose is to dispense cushion, protection, and structural support so that the umbilical cord can operate productively in the course of fetal motions. Females who obtain a fine nutrition during pregnancy, produce an extensive volume of Wharton's Jelly. However, small volumes of Wharton's Jelly can be correlated with miscarriages and fetal complications. In addition, if the Wharton's Jelly is missing or if the amount is minimum, it can produce the umbilical complications that includes twisting, knotting, and kinking. The umbilical cord consists of one vein and two arteries. The role of the vein is the transportation of oxygen, and nourishments from the placenta to the fetus. The purpose of the two arteries is to transport waste products from the fetus circulation and be eliminated through its mother. The umbilical cord varies in lengths. Some cords are short, measuring 13 inches and are present in multiple pregnancies. Some cords are long, measuring 26 inches and can present the danger of fetal entanglement. The umbilical cord from the placenta is cut when the baby is born, and the umbilical cord stump falls of the baby's navel between 2 and 3 weeks later.

10. The amniotic fluid is the transparent watery liquid inside the amniotic sac that include proteins, fats, carbohydrates, and several electrolytes. The embryo/fetus is in a float interior position of the amniotic sac. The amniotic sac consists of two pliable and strong thin layers. The amnion is the inner layer, and the outer layer is called the chorion which unites with the placenta and becomes part of it. The amniotic sac helps protect the fetus from injuries. The amniotic fluid maintains the fetus warm, furnishes space for fetus to move around freely, keeps the umbilical cord and placenta separate, and nourishes the developing fetus by obtaining one hundred calories per day. An indication of going into labor, is when the amniotic sac bursts, releasing first the mucus and then the amniotic fluid. The amniotic fluids continuously change during pregnancy and through ultrasounds the amniotic fluids can be measured. If the amniotic fluid is high, it is called polyhydramnios, which can cause possible birth defects, miscarriages, premature labor, and premature rupture of the amniotic sac. If the amniotic fluid is low, it is called oligohydramnios, which can indicate birth defects in early pregnancy or insufficient fetal growth later in the pregnancy. In addition, low amniotic fluids can increase the risk of miscarriages and stillbirth.

References

Maret, Stephen. *Introduction to Prenatal Psychology*. Second Edition. ISBN#9780578089980.

Pps. 61 -83.

<https://www.youtube.com/watch?v=X9NFPZGyDPg&t=5s>