Prenatal Unit 2 essays

1. I watched the video about epigenetics. It's main idea is that whatever we do right now is going to influence future generations of people, since our DNA is influenced by various social and environmental factors. Our cells have DNA but they don't know what to do with it, they need instructions from the outside which they get through methyl groups made from carbon and hydrogen. As a result, certain genes can be expressed or not. Epigenetic tags are developed through the whole course of our lives and some of them get stuck to our genomes and get passed from generation to generation. A study that took place in Sweden, Norbotten, in the place that was somewhat isolated from the rest of the world showed that people who grew up during the good periods of time when it was plenty of food were likely to die 6 years later than the people who were less fortunate. It could be understood in the timeframe of the immediate generation, but surprisingly applied to the generations of people after the difficult period of time. Thus, certain epigenetic tags responsible for a shorter lifespan were passed to following generations.
2. Spermatogenesis starts in the seminiferous tubules of the testicles when spermatogenia are generated. Each germ cell contains 46 chromosomes. During mitosis these 46 chromosomes replicate and split into 2 separate cells (46 chromosomes each), called spermatocytes. These divide further into secondary spermatocytes that only have 23 chromosomes. The last cell division results in spermatids or immature sperm. Mature sperm each still contains 23 chromosomes and consists of the tail, the body and the head. The whole process of sperm production takes approximately 70 days.

Sperm production can be affected by various factors such as temperature, stress, various medications, drug and alcohol use, environmental factors, hormonal changes, infections and testicular injuries.

3. Ova productions happens in ovaries and begins before a girl is born. On the 50th day of gestation female fetus' ovaries start producing primitive cells that multiply fast. The number of these cells reaches 7 million by the 5th month while still in a womb and decrease to 700000 to 2 million at birth. Most of these immature ova never become mature due to the limited cycle since on average a woman's body only produce 200-400 fully grown ova.

   Ovum production starts with the primary oocyte that has 46 chromosomes. In the process of mitosis, the chromosomes replicate and the cell splits in half with 46 chromosomes each. Them, these sells split again, replicate and split again. Only one of these 4 daughter cells appear in the end of this process. This cell, called ovum, is stored in the follicles of the ovaries. Follicles also have to develop and mature. The process takes 375 days and results in forming a mature follicle that contains one ovum. In the first half of the menstrual cycle this follicle changes and eventually burst which allows the ovum to escape the ovary and go into the fallopian tube.

   This process can be affected by a great variety of factors like hormone imbalance, age, life style, substance abuse and environmental factors.

4. Male and female bodies are designed to maximize the chances of conception. The form and function of the sex organs are structured to increase the likelihood of an ovum meeting a sperm. Sperm is mixed with various fluids that provide nutrients for the

sperm. Their alkaline composition protects sperm from the acidity of a vagina. Women's muscular contractions and the forward-thrusting movements of the penis help the sperm get in and through the cervical opening of the uterus. Once the sperm reaches the top of the uterus, they swim into fallopian tubes which reducers the chances of conception in half if one of the tubes doesn't have an ovum. In the moment of conception the sperm fuses with the ovum and produces a zygote. This cell multiply into over 200 types of cells of a full-grown adult. Once a sperm reaches an ovum it starts chemically drill into the outer layer of the ovum. It binds itself to the ovum and capacitates the enzymes contained in the acrosome at the very tip of the sperm head. Once the sperm passes through the plasma membrane it gets pulled into the ovum by ovum-produced contractions. When it happens, the ovum hardens the outside membrane and blocks all the rest of the sperm from entry.

5. Down Syndrome is cause by extra genetic material at the 21st autosome. It is presented by distinct facial features like a flattened nasal bridge and small skin folds on the inner corners of the eyes and possible physical traits such as shorter neck, shorter height, large tongue, hearing impairment and muscle hypotonia. Down Syndrome causes cognitive impairment and mild to moderate mental retardation. Higher rates of heart disease, leukemia, epilepsy and Alzheimer's disease are also associated with Down Syndrome. Maternal age is the most clearly identified risk factor of the syndrome. William's Syndrome (pixieism) is caused by missing information at chromosome 7. It's characterized by "elfin"-like facial features, intellectual function deficits and good social skills. William's Syndrome individuals are likely to be left-handed.

6. Huntington's Disease is carried by a dominant gene on chromosome 4. The faulty protein production causes degeneration in the body cells. This disease usually manifests between ages 30-50 although earlier onset are also possible. Huntington's disease results in progressive physical, cognitive, and psychiatric symptoms. No cure is available but the symptoms can be managed by medications and physical and speech therapy.

   Cystic Fibrosis is caused by a mutated gene in chromosome 7. It's found almost exclusively among people of European descent. The gene mutation causes disruption of pancreas-based metabolic functions. Cysts and scaring occurs within the pancreas. Excess mucus develops throughout the whole body which causes frequent lung infections and gastrointestinal problems. Most of the individuals with CF are infertile. Average life expectancy is 36.8 years. No cure is available, but symptoms can be somewhat managed.

   Phenylketonuria (PKU) is caused by a defective gene on chromosome 12 that prevents the synthesis of the enzyme phenylalanine hydroxylase which is essential for converting phenylalanine from protein foods to tyrosine. Excessive accumulation of phenylalanine causes neurological damage since essential amino acids are not able to reach the body cells. Without treatment PKU can result in intellectual impairment, spasmodic uncontrolled muscle movements, seizures and hyperactivity.

7. Genetic counseling gives the information that can affect people or their families. It includes the analysis of medical records, family histories and genetic tests to determine the risk factors. The benefits of such approach are hard to underestimate since it helps

to see the possible problem before it shows. It lets parents raise their chances to have healthy children.