

# HPS202 – weekly learning outcomes

Weeks 1 – 11 (week 5 and 10 being reading only weeks)

## Week 1: Biological Development

### A) Genetics

#### 1. Describe DNA

DNA, short for deoxyribonucleic acid, is the molecule that contains the genetic code of organisms. DNA is in each cell in the organism and tells cells what proteins to make.

#### 2. Describe how characteristics are inherited from our biological mother and father.

- Genetic inheritance occurs due to genetic material, in the form of [DNA](#), being passed from parents to their offspring. When organisms reproduce, all the information for growth, survival, and reproduction for the next generation is found in the DNA passed down from the parent generation.
- In sexual reproduction, the genetic material of two parents is combined and passed on to one individual. Although the offspring receives a combination of genetic material from two parents, certain genes from each parent will dominate the expression of different traits.
- Traits are passed on unchanged to offspring via 'units of inheritance'. These units are now known as 'alleles'. An allele is a particular form of a gene and they are passed from parents to their offspring.
- offspring inherit one allele from each parent for each characteristic.
- some alleles may not be expressed in an individual but can still be passed on to the next generation.
- Humans have 46 which geneticist typically group into pairs.
- Thus it is said we have 23 pairs of chromosomes.

#### 3. Describe the following types of inheritance:

##### i. Dominant & Recessive

**Recessive:** Need two copies of the gene for the trait to be expressed (one from biological father, the other from biological mother).

**Dominant:** Need only one copy of the gene for the trait to be expressed (can be from either parent).

##### ii. Co-dominant genes

- Codominance means that neither allele can mask the expression of the other allele. An example in humans would be the ABO blood group, where alleles A and alleles B are both expressed. So if an individual inherits allele A from their mother and allele B from their father, they have blood type AB.

- codominance occurs when the phenotypes of both parents are simultaneously expressed in the same offspring organism

#### **4. Understand the difference between Genotype & Phenotype**

A genotype is the combination of two alleles, one received from each parent.

The physical expression of a genotype is called the phenotype. The specific combination of the two alleles (the genotype) influences the physical expression (the phenotype) of the physical trait that the alleles carry information for. The phenotype can also be influenced by the environment

### **B) Prenatal Development & Teratogenic Influences**

#### **5. Describe the three prenatal periods.**

The process of prenatal development occurs in three main stages. The first two weeks after conception are known as the germinal stage, the third through the eighth week is known as the embryonic period, and the time from the ninth week until birth is known as the fetal period.

Prenatal development is a time of remarkable change that helps set the stage for future [psychological](#) development. The brain develops over the course of the prenatal period, but it will continue to go through more changes during the early years of childhood

#### **Germinal Period/Period of the Zygote**

- The germinal stage begins at conception when the sperm and egg cell unite in one of the two fallopian tubes. The fertilized egg is called a zygote.
- Rapid cell division and creation of a blastocyst.
- Implanted into the uterus.
- Creation of embryonic disc

#### **Embryonic Period**

- Three layers of cells created from the embryonic disc which later become different body parts.
- Structural development.
- Duration: Implantation of the blastocyst to the 8th week

#### **Period of the Foetus**

- Maturation of body parts and organs.
- Duration 8th week to birth

In general, major defects of the body and internal organs are more likely to occur between 3 to 12 embryo / fetal weeks. This is the same as 5 to 14 gestational weeks (weeks since the first day of your last period). This is also referred to as the first trimester.

#### **6. Understand the concept of a teratogen.**

- Typically, prenatal development is guided by genes.
- Environmental influences can also assert influence