Forming a New Life

Conception

Fertilization is the process by which a sperm and ovum unite to create a zygote.

Gestation is the period between conception and birth. It lasts approximately 40 weeks, 9 months or 266 days.

The zygote first develops into an embryo, then into a fetus.

Ovulation is the expulsion of an ovum from an ovary. It occurs once every 28 days.

Multiple births

Two kinds of multiple births

Dizygotic or fraternal twins result when two ova are released at about the same time and both are fertilized.

This is the most common type of multiple births.

Fraternal twins have a hereditary make-up like that of ordinary siblings and may be of the same or different sexes.

Monozygotic or identical twins develop when one fertilized ovum splits into two.

Identical twins have the same genetic endowment and are of the same sex.

Mechanisms of Heredity

Genes are the basic units of heredity.

They contain hereditary information passed on from parents.

Each human cell contains about 100,000 genes.

Genes are located on chromosomes.

Genes are made up of deoxyribonucleic acid or DNA.

Every cell in the body except the sex cells, or gametes has 23 pairs of chromosomes or 46.

The gametes (sperm and ova) have 23 single chromosomes.

Sex Determination

The first 22 pairs of chromosomes are called autosomes.

The 23 pair is sex chromosomes.

Ova contain X chromosomes

Sperm contain X or y chromosomes

XX females

Xy males

Dominant and Recessive Inheritance

Alleles are genes that can produce alternative expressions of a particular trait

Homozygous means that both alleles for a characteristic are the same.

Heterozygous means that the alleles for a characteristic are different.

Polygenic inheritance refers to the interaction of several genes.

Multifactorial transmission refers to the interaction of genetic and environmental factors.

Phenotype refers to observable or expressed characteristics

Genotype refers to underlying genetic makeup

Dominant traits are expressed when one is homozygous or heterozygous for that trait.

Recessive traits are expressed only when one is homozygous for that trait.

Genetic and Chromosomal Abnormalities
Down syndrome

Most common chromosomal defect

Caused by an extra twenty-first chromosome

Risk increases significantly for mothers 35 and older

Mental retardation, heart defects and respiratory problems

Hemophilia
Blood clotting disorder
Sex-linked disorder
Affects males more often than females

Anencephaly
Absence of brain tissue
Death usually occurs soon after birth

Phenylketonuria (PKU)
Metabolic disorder resulting in mental retardation
Caused by recessive inheritance
Modified diet may offset retardation

Sickle-cell anemia
Deformed, fragile red blood cells clog the blood vessels depriving the body of oxygen
Most common among African Americans

Cystic fibrosis
Body makes too much mucus that collects in the lungs and digestive tract
Most common deadly defect among whites

Tay-Sachs disease
Degenerative disease of the brain and nerve cells
Results in death before age 5
Most common among eastern European Jews
Prenatal Development
Stages of Prenatal Development
Germinal Stage (Fertilization-2 weeks)
Organism divides and becomes more complex
Cells differentiate
Embryonic Stage (2 to 8 weeks)

Organs and major body systems develop rapidly
Embryo is most vulnerable to influences of the prenatal environment
Most birth defects occur during the first trimester.

Most spontaneous abortions occur in the first trimester

One-third of conceptions end in miscarriage

Risk factors include: smoking, drinking, previous miscarriages, poor obstetric history, vaginal bleeding, advanced age, uterine abnormalities, and certain infections.

Males are more likely to be spontaneously aborted or stillborn

Fetal Stage (8 Weeks to Birth)

First bone cells appear

Fetus grows rapidly

Fetuses are usually very active

Males develop more slowly than females

Maternal Factors in Prenatal Development
Nutrition
Physical activity
Drug Intake
Medical drugs
Alcohol
Nicotine
Caffeine
Marijuana
Opiates
Cocaine

AIDS
Maternal illness
Age
Blood types
Medical X-rays
Environmental hazards
Paternal factors in prenatal development
Prenatal assessment
Amniocentesis
Chorionic villus sampling
Maternal blood tests

Ultrasound
Umbilical cord blood sampling
Preimplantation genetic diagnosis