Gene:

A unit of inheritance responsible for the inheritance of a specific trait that occurs with every cell division. A single allele for each locus is inherited from each parent. Polymorphisms:
The occurrence in the same population of two or more alleles of a particular gene. Most polymorphisms are neutral or nearly neutral and have no effects on the phenotype. However, in some cases, they may have some effect on the phenotype, including causing a change in the function of a protein or altering the protein's specificity and binding properties. 

Gene expression can be influenced by a variety of factors, including environmental exposures, cellular context, and epigenetic modifications. Gene expression is the process by which an organism uses its genetic information to produce functional molecules, such as proteins. It is a complex and dynamic process that involves multiple steps, including transcription, translation, and post-transcriptional modifications. 

Inheritance patterns used to describe the transmission of genes from parents to offspring include autosomal dominant, autosomal recessive, X-linked, and Y-linked inheritance. 

In autosomal dominant inheritance, both males and females are affected, and affected parents have a 50% chance of passing on the trait to their children. 

In autosomal recessive inheritance, only those individuals who receive two copies of the defective allele (one from each parent) will develop the disease. 

In X-linked inheritance, the gene is located on the X chromosome, and affected males typically have a single copy of the gene on their Y chromosome. 

In Y-linked inheritance, the gene is located on the Y chromosome, and affected males typically have two copies of the gene on their Y chromosome. 

Gene therapy involves the introduction of a normal gene into a cell or organism to correct a genetic disorder or to treat a disease. 

Gene editing involves the manipulation of the DNA sequence within a cell or organism to correct a genetic disorder or to treat a disease. 

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The Human Genome Project provided a detailed map of the human genome that allowed researchers to identify the locations of genes and their corresponding proteins. The project was a significant milestone in the field of genetics and has paved the way for numerous advances in medicine and biotechnology. 

It is important to note that the Human Genome Project was completed in 2003, and since then, there have been many advances in the field of genetics that have greatly expanded our understanding of the human genome. 

These advances include the development of new technologies for sequencing genomes, the identification of new genes and genetic variants, and the development of new approaches for treating genetic disorders.
which one of the X chromosomes in each somatic cell is rendered inactive. This results in a balance between the X chromosomes and maternal genes, which is necessary because males have only one X chromosome and may be either deficient or receive a maternal allele that may not be functional. Published online on August 22, 2018. Copyright 2018 by the American College of Obstetricians and Gynecologists. All rights reserved. This part of this publication may be reproduced, except as a reasonable system, printed in the format, in any form or by any means, electronic, mechanical, photostatting, recording, or otherwise, without prior written permission from the publisher. Requests for authorization to make photocopies of any part of this publication should be directed to the American College of Obstetricians and Gynecologists, ACORE, 409 12th Street, SW, PO Box 96920, Washington, DC 20090-6920. Modern genetics in obstetrics and gynecology. ACOG Technology Assessment in Obstetrics and Gynecology No. 14. American College of Obstetricians and Gynecologists, 1999. This information is intended to provide assistance to clinicians in providing obstetric and gynecologic care, and use of this information is voluntary. This information should not be considered as inclusive of all proper treatments or methods of care. Variations in practice may be warranted when, in the reasonable judgment of the treating clinician, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology. The American College of Obstetricians and Gynecologists reviews its publications regularly. However, it publishes them to reflect the best available evidence. The updated or reclassified evidence can be found at www.acog.org. The American College of Obstetricians and Gynecologists recognizes that each patient’s situation is unique and that decisions must be made based on the physician’s best clinical judgment. Adherence to any guidance is voluntary. The American College of Obstetricians and Gynecologists makes no warranties of any kind, either expressed or implied. The American College of Obstetricians and Gynecologists does not guarantee, warrant, or endorse the products or services of any firm, organization, or person. Neither the American College of Obstetricians and Gynecologists nor its officers, directors, members, employees, or agents will be liable for any loss, damage, or expense, either direct or consequential, claimed to have resulted from any loss of profit or opportunity or from any decision made or failure to make any decision made on the basis of any information presented in this publication. The American College of Obstetricians and Gynecologists has neither solicited nor accepted any commercial involvement in the development of the contents of this published product.