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Genetic counselling: "Mendelian and Non-Mendelian Inheritance"

Monogenic disorders (monogenic traits) are disorders caused by variation in a single gene and are typically recognized by their striking familial inheritance patterns. Examples include sickle cell anemia, cystic fibrosis, Huntington disease, and Duchenne muscular dystrophy. By contrast, complex disorders (complex traits) are those in which multiple genes play a role, often together with environmental factors. These include many complex disorders such as cardiovascular disease, asthma, diabetes, and cancer susceptibility. Alleles are typically expressed by one letter. The capital form of the letter represents the dominant allele, while the lowercase version of the letter represents the recessive allele. Children get one allele for a trait from their father and the other allele for a trait from their mother. These two alleles come together to decide what the actual phenotype of a trait is going to be. A phenotype is the physical representation of a trait, such as brown hair, blue eyes, or freckles. If a child receives either one or two dominant alleles, they will show the dominant phenotype. If a child receives two recessive alleles, they will show the recessive phenotype. Non-Mendelian inheritance is any pattern of inheritance in which traits do not segregate in accordance with Mendel's laws. These laws describe the inheritance of traits linked to single genes on chromosomes in the nucleus. In Mendelian inheritance, each parent contributes one of two possible alleles for a trait. If the genotypes of both parents in a genetic cross are known, Mendel's laws can be used to determine the distribution of phenotypes expected for the population of offspring. There are several situations in which the proportions of phenotypes observed in the progeny do not match the predicted values. Non-Mendelian inheritance plays a role in several disease processes. Here we will learn about the different type of inheritance and how we can detected.

Biography

Massoud Houshmand has completed his PhD in Medical Molecular Genetic from Gothenburg University, Gothenburg, Sweden. He is the Head of the Genetic Diagnostic Laboratory, Faculty Member of National Institute for Genetic Engineering and Biotechnology and Responsible Director of Personalized Medicine journal. He has organized about 22 workshops and seminars and has published more than 220 papers and 17 books. He is the Winner of Best Iranian Researcher in Medical Genetic 2010, Winner of ISESCO prizes in Science & Technology 2014 and winner of Best Iranian Researcher 2015.

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