Dystrophin gene analysis as a method of screening of carrier females in Egyptian families with DMD\BMD patients with comparison study of the deletion patterns as a primary step for prenatal diagnosis

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By

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Contents

GENETIC GLOSSARY

Genetic term	Definition
Allele	An alternative form of a gene; any one of several mutational forms of a gene
Amniocentesis	Prenatal diagnosis method using cells in the amniotic fluid to determine the number and kind of chromosomes of the fetus and, when indicated, perform biochemical studies
Amplification	Any process by which specific DNA sequences are replicated disproportionately greater than their representation in the parent molecules.
Antisense oligonucleotide	A synthetic oligonucleotide or an RNA molecule which has a sequence that is complementary to a naturally occurring mRNA molecule.
bp	Base pair : unit of length of DNA equal one nucleotide.
Carrier	An individual heterozygous for a single recessive gene.
Chorionic villus sampling	An invasive prenatal diagnostic procedure involving removal of villi from the human chorion to obtain chromosomes and cell products for diagnosis of disorders in the human embryo.
Chromosome	In the eukaryotic nucleus, one of the threadlike structures consisting of chromatin and carry genetic information arranged in a linear sequence.
Coding sequence	The segment of DNA whose sequence is decoded during gene expression to give a polypeptide or mature RNA product.

Complementary DNA (c DNA)	DNA Strands which form a stable double-stranded structure.
Codon	A sequence of three nucleotides in mRNA that specifies an amino acid.
Consanguinity	Genetic relationship. Consanguineous individuals have at least one common ancestor in the preceding few generations.
Deletion	The loss of a segment of the genetic material from a chromosome.
Duplication	Duplication of a region of DNA that contains a gene; it may occur as an error in homologous recombination, a retrotransposition event, or duplication of an entire chromosome.
Electrophoresis	A method of separating large molecules (such as DNA fragments or proteins) from a mixture of similar molecules. An electric current is passed through a medium containing the mixture, and each kind of molecule travels through the medium at a different rate, depending on its electrical charge and size. Agarose and acrylamide gels are the media commonly used for electrophoresis of proteins and nucleic acids.
Exon	Segment of a gene which is decoded to give an mRNA product or mature RNA product. Individual exons may contain coding DNA and /or noncoding DNA.
Exon skipping	A form of alternative splicing in which splice junction sites that are normally involved in RNA splicing are not used by the splicing apparatus, resulting in the loss of whole exon sequences from the spliced RNA.
5' - end	The end of a polynucleotide with a free (or phosphorylated or capped) 5' - hydroxyl group; transcription/translation begins at this end.

Fluorescence in situ hybridization (FISH)	A form of a chromosome in situ hybridization in which the nucleic acid probe is labeled by incorporation of a fluorophore, a chemical group which fluoresces when exposed to UV irradiation.
Fragile-X syndrome	X-linked trait; the second most common identifiable cause of genetic mental deficiency.
Frame-shift mutation	A mutation which alters the normal translational reading frame of a DNA sequence.
Gene	A segment of DNA which normally specifies a functional polypeptide or RNA product
Genetic counseling	The educational process that helps individuals, couples, or families to understand genetic information and issues that may have an impact on them.
Genome	All of the genes carried by a single gamete; the DNA content of an individual, which includes all 44 autosomes, 2 sex chromosomes, and the mitochondrial DNA.
Genomic breakpoints	The endpoint of where the deletions actually occur.
Genotype	The genetic constitution of an organism
Germ cell	The gametes (egg and sperm cells)the precursor cells from which the gamete derive by cell division.
Germ line	The continuation of a set of genetic information from one generation to the next.
Germ line mosaicim	An individual who has a subset of germline cells carrying a mutation which is not found in other germline cells.
Heterozygote	Having two alleles that are different for a given gene.
Homologus gene	Chromosomes that pair during meiosis; each homologue is a duplicate of one chromosome from

	each parent.
Homozygote	Having identical alleles at one or more loci in homologous chromosome segments.
Hot spot	A mutational hotspot is any sequence which is associated with an abnormally high frequency of mutation.
Insertion	A chromosome abnormality in which a piece of DNA is incorporated into a gene and thereby disrupts the gene's normal function.
Introns	A segment of DNA (between exons) that is transcribed into nuclear RNA, but are removed in the subsequent processing into mRNA.
Kilobase (kb)	Unit of length for DNA fragments equal to 1000 nucleotides.
Knockout	Deactivation of specific genes; used in laboratory organisms to study gene function.
Linkage analysis	Analysis of pedigree the tracking of a gene through a family by following the inheritance of a (closely associated) gene or trait and a DNA marker.
Lyonization	The process of X chromosome inactivation in mammals.
Mendelian inheritance	One method in which genetic traits are passed from parents to offspring. Named for Gregor Mendel, who first studied and recognized the existence of genes and this method of inheritance.
Meiosis	Reductive cell division occuring exclusively in testis and ovary and resulting in the production of haploid cells, including sperm cells and egg cells.
Missense mutation	A nucleotide substitution which results in amino acid change.
Mitosis	Cell division in somatic cells (nuclear division).
mRNA	Messenger RNA; an RNA molecular that functions during translation to specify the

	sequence of amino acids in a nascent polypeptide.
Mutation	Process by which genes undergo a structural change.
Non-sense mutation	A mutation in which a codon is changed to a stop codon, resulting in a truncated protein product.
Nucleotide	One of the monomeric units from which DNA or RNA polymers are constructed; consists of a purine or pyrimidine base, a pentose sugar and a phosphoric acid group.
PCR	Polymerase chain reaction; a technique for copying the complementary strands of a target DNA molecule simultaneously for a series of cycles until the desired amount is obtained.
Pedigree	A diagram of the heredity of a particular trait through many generations of a family.
Phenotype	Observable characteristics of an organism produced by the organism's genotype interacting with the environment.
Point mutation	A mutation causing a small alteration in the DNA sequence at a locus often single nucleotide change.
Polymerase	Any enzyme that catalyzes the formation of DNA or RNA from deoxyribonucleotides or ribonucleotides.
Positional cloning	Cloning of a gene which is dependent only on knowledge of its subchromosomallocation.
Primer	Individual in a family who brought the family to medical attention.
Proband	Single-stranded DNA labeled with radioactive isotopes or tagged in other ways for ease in identification.
Probe	A DNA site to which RNA polymerase will bind and initiate transcription.
Promoter	The sequence of DNA or RNA located between the start-code sequence (initiation codon) and the

	stop-code sequence (termination codon).
Reading frame	The translational reading frame describes the mechanism which moves a ribosome three nucleotides at a time during translation.
Recessive	A gene that is phenotypically manifest in the homozygous state but is masked in the presence of a dominant allele.
Southern blotting	A technique for transferring electrophoretically resolved DNA segments from an agarose gel to a nitrocellulose filter paper sheet via capillary action; the DNA segment of interest is probed with a radioactive, complementary nucleic acid, and its position is determined by autoradiography.
Splicing	Conventionally refers to RNA splicing, in which RNA sequences transcribed from introns are excised and discarded while those transcribed from exons are spliced together in the same linear order as the exons. DNA splicing is a much rare event but naturally occurs in B and T lymphocytes.
Stem cell	Undifferentiated, primitive cells in the bone marrow that have the ability both to multiply and to differentiate into specific blood cells.
3' - end	The end of a polynucleotide with a free (or phosphorylated) 3' - hydroxyl group.
Transcript	RNA copy synthesized from a sequence of DNA (a gene); the first step in gene expression
Uniparental disomy	The state of an individual or cell having two members of a pair of homologous chromosomes; the normal state in humans.
Up-regulation	An increase in the number of receptors on the surface of target cells, making the cells more sensitive
Vector	A self-replicating DNA molecule that transfers a DNA segment between host cells.

Western blotting	A process in which proteins are size-fractionated in a polyacrylamide gel prior to transfer to a nitrocellulose membrane for probing with an antibody.
X chromosome in - activation	The repression of one of the two X-chromosomes in the somatic cells of females as a method of dosage compensation; at an early embryonic stage in the normal female, one of the two X-chromosomes undergoes inactivation, apparently at random, from this point on all descendent cells will have the same X-chromosome inactivated as the cell from which they arose, thus a female is a mosaic composed of two types of cells, one which expresses only the paternal X-chromosome, and another which expresses only the maternal X-chromosome.

LIST OF ABBREVIATIONS

ACE	Angiotensin-converting enzyme
AFOs	Ankle-foot-orthoses
AON	Antisense oligonucleotides
BMD	Becker muscular dystrophy
bp	Base pair
Ca	calcium
Cav-3	Caveolin 3
cDNA	Complementary DNA
CK	serum Creatin kinase
COOH	Carboxy
C-terminal	Carboxy- terminal
CYS	Cysteine
DAPs	Dystrophin associated proteins
DBN	Dystrobrevin
DGC	Dystroglycan
DMD	Duchenne muscular dystrophy
DNA	Deoxyribonucleic acid
Dys	Dystrophin
Dysf	Dysferlin

FISH	Fluorescence in situ hybridization
FVC	Forced vital capacity
Kb	Kilo base
KDa	Kilo Dalton
KAFOs	Knee-ankle-foot-orthoses
Mb	Mega base
MIM number	A catalog number for an inherited disorder or a phenotypic trait as listed in Victor Mckusick's Mendelian Inheritance in Man, available as a book and electronically (OMIM).
MRI	Magnetic resonance imaging
MW	Molecular weight
NH2	Ammonia
nNOS	Neuronal nitric oxidase synthase
nt	Nucleotide
PCR	Polymerase chain reaction
PGD	Preimplantation genetic diagnosis
RFLPs	Restriction fragment length polymorphism
RNA	Ribonucleic acid
SCARMD	Severe childhood autosomal recessive muscular dystrophy
SGC	Sarcoglycan
SPN	

Syn	Syntrophin
XLDCM	X linked dilated cardiomyopathy

LIST OF TABLES