Definition of key terms

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Germ cells (or gametes): Reproductive cells, or eggs and sperm, and their progenitor cells. Mature sperm and eggs contain half the number of chromosomes of a somatic cell, and they're able to unite to form a new embryo and offspring.

Somatic cells: any cell of a living organism other than the reproductive cells.

Chromosomes: A threadlike gene carrying structure of nucleic acids (DNA) and protein found in the nucleus of most living cells. Humans normally have 46 chromosomes in each cell, divided into 23 pairs. Chromosomes carry genetic information in the form of genes.

Genes: Made up of DNA strand, genes act as a blueprint for how to build all cells, tissues and organs in the organism. Every person has two copies of each gene, one inherited from each parent. There are estimated 20,000 - 25,000 protein-coding genes in humans. Most genes are the same in all people, but a small number of genes (less than 1 percent of the total) are slightly different between people.

Alleles: Humans have two copies of each gene called alleles, with one inherited from each parent. Alleles can have small differences in their sequence of DNA bases on the same place on a chromosome. These small differences contribute to each person's unique physical features.

Germline: The reproductive genes and cells that are passed on to children and future generations.

Meiosis: a type of cell division that results in four daughter cells, each with half the number of chromosomes of the parent cell, as in the production of gametes. Only germ cells can undergo meiosis.

Haploid: having a single set of unpaired chromosomes

Mitosis: A type of cell division that results in two daughter cells, each having the same number and kind of chromosomes as the parent nucleus, typical of ordinary tissue growth.

Diploid: having two complete sets of chromosomes, one from each parent.

Zygote: A single-cell embryo resulting from fertilization of an egg with sperm.

Gene correction: A type of genetic engineering in which a mutant gene is repaired.

Homology-directed repair: A mechanism in cells to repair double-strand DNA breaks. The most common form of HDR is homologous recombination. When the homologue DNA piece is absent, another process called non-homologous end joining can take place instead. In a new study led by Shoukhrat Mitalipov, Ph.D., and colleagues, the homologue DNA piece is the wild-type allele from the mother.

Non-homologous end joining (NHEJ): An imprecise pathway that patches up double-strand breaks in DNA, resulting in mutations. It is inappropriate for gene correction because it introduces additional mutations in the form of insertions or deletions at the site of the DNA double-strand break.

Mosaicism: The presence of two or more populations of cells within the same embryo or organism that have a different genetic makeup.

DNA: Deoxyribonucleic acid, packaged into thread-like structures known as chromosomes. DNA is the chemical basis of heredity. The information in DNA is stored as a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). Human DNA, collectively known as the genome, consists of about 3 billion bases, and more than 99 percent of those bases are the same in all people. DNA bases pair up with each other, A with T and C with G, to form units called base pairs. Each base is also attached to a sugar molecule and a phosphate molecule. Together a base, sugar and phosphate are called a nucleotide. Nucleotides are arranged in two long strands that form a spiral called a double helix. Each strand of DNA in the double helix can serve as a pattern for duplicating the sequence of bases. This is critical when cells divide because each new cell needs to have an exact copy of the DNA present in the old cell.