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Understanding genetic mutations in cancer for gene mutation-based therapy

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Cancer, a dreadful disease is linked with the mutation of genes. Some genetic mutations influence the protein functions and cause healthy cells to become cancerous. Every gene of a human cell is expressed in a limited manner but when this manner gets disrupted, abnormal gene expression occurs and this leads to cell abnormalities. One of the abnormalities is the conversion of normal cells into cancer cells. Due to genetic mutations in certain genes, cell differentiation gets accelerated and uncontrolled cell division occurs. In particular, TP53 is a gene that is responsible for regulating cells by encoding p53 protein. Mutations in the TP53 gene cause loss of the ability to regulate cells and thus cell division gets accelerated, which ultimately leads to cancer formation, e.g. breast cancer, adrenocortical carcinoma, etc. Hence, mutation is an important area of study for cancer treatment. Mutations cause many expression problems, such as the formation of truncated proteins, loss of functionalities of proteins, impairment in the DNA repair system, etc. These are the few reasons that a cell loses its control and divides in an unregulated way. Mutations are of many types, such as insertion-deletion, non-synonymous, etc. Each mutation has a significant impact on a mutated gene expression. Many studies have been performed pertaining to mutations and many strategies have been discovered to fight against mutations. In terms of treatment, besides drug therapy, gene therapy is one of the significant discoveries to treat cancer. Gene therapy can replace the mutated gene with a healthy gene; it can also knock out or silence mutated genes with which unregulated gene expressions could get halted. Hence, it can be thought of as a way to fight cancer. Mutations are being studied both computationally and practically. Every day some new mutations are being discovered as a source of many diseases or cancers. The mutational study is opening new ways to treat cancer. Specific treatment can be given to the patient if mutation locations are known to therapists. Therefore, the death toll of cancers can be lifted if the focus is given to mutational-based treatment studies.

Keywords: Cancer, Mutation, Gene therapy, Gene expression, TP53 gene mutation, Gene mutation

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