

Effect of p53 gene in cancer.

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Description

P53 gene was also known to be TP53 gene. In some cases it was called as tumour protein. It is a gene that helps in coding for a protein that is responsible in control and regulation of the cell division and cell cycle. As we all know that tumour is result of uncontrolled cell division, as this p53 gene helps in regulation of cell division it is also referred to as tumour suppressor gene. P53 gene is also known as guardian of the genome as it plays a key role in protecting the cell from mutations. The protein has a molecular weight of 53 Kilo Daltons so it is called as p53 gene [1].

Discussion

The p53 gene is located on 17th chromosome of human DNA. It is phosphor protein that is made of 393 amino acids with 4 units each with specific function or activity. The first unit gene helps in activation of transcription factors. The second unit or domain functions in recognizing the specific DNA sequencing. The third unit helps in tetramerisation of the protein and the fourth unit helps in identification of DNA that is damaged. The p53 gene plays an important role in regulating cell division, cell cycle and cell death which is also called as apoptosis. Due to mutations or amino acid modification in p53 gene results in loss of control over the cell cycle and cell division. This results in uncontrolled cell divisions that may sometimes lead to cancer. As per statistical analysis more than 50% of the cancer is formed due to the P53 mutational changes [2]. P53 gene has three major functions that include control of growth, repairing the damaged DNA and apoptosis of the cell containing abnormal DNA. Usually the concentration of p53 gene is low in normal cells but increased by stress signals created from the damaged DNA [3]. Growth is regulated by preventing the DNA replication. The damaged DNA is repaired by promoting the transcription of proteins that help in DNA repair. The apoptosis is done for killing the cells that contain abnormal DNA which undergo uncontrolled cell divisions [4]. The p53 protein controls the expression of following genes for various activities. The TP53 gene provides instructions for making a protein called tumor protein p53 (or p53). This protein acts as a tumor suppressor, which means that it regulates cell division by

keeping cells from growing and dividing (proliferating) too fast or in an uncontrolled way. Growth arrest is expressed by p21, Gadd45, and 14-3-3 σ . The DNA repair is expressed by the gene p53R2. The cell death (apoptosis) is expressed by the genes Bax, Apaf-1, PUMA and NoxA [5].

Conclusion

When p53 protein is damaged the control of tumour formation is minimized thereby increasing the cancer. P53 gene can be damaged by chemicals, radiation, viruses that results in mutations of the p53 gene that may lead to uncontrolled cell division. So p53 gene plays vital and crucial role in maintaining the genetic balance of the cell and also promotes the growth. On the other hand it also involves in apoptosis of the body thereby controlling the overgrowth of the tissues.

References

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