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Insight into DNA Methylation

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INTRODUCTION

It has become a new challenge for the new generation of medical science to prepare the most effective drug for the proper treatment of different types of cancers[1-7]. To make the treatment, more effective medical scientists have tried to increase the use of nanoparticles so that drug delivery into the exact location becomes possible. Apart from this, the introduction of exosomes is also taking place for recognizing and treatment of various cancers. Similarly, DNA methylation and histone modification have importance in the treatment of tumors. Therefore, the introduction of nanotechnology for drug delivery at the exact location of the human body has seen tremendous success in the passing years. Some specific methods of delivering different chemotherapeutic drugs at the correct place have been discovered to get the most positive impact[8-18].

Cancer mainly spread through the human body because of excessive cell growth and some nano-sized chemotherapeutic drugs has been invented specially for repressing those excessive cell growth. Sometimes, those drugs help to suppress the propagation of cancer-causing genes in the human body. On the other hand, Doxorubicin (DOC) is widely used in these days to control the excessive spread of malignant tumor in the human body. Hence, the introduction of nanoparticles is the only way out in this regard to control numerous cancer-causing cells and genes in human[19-29]. That not only delivers multiple drugs into the exact location but also sometimes helps to diagnose the disease early.

In this process, a methyl group gets added with DNA that retains the DNA structure intact but changes its functionality. Therefore, it helps to destroy the cancerous cells.

Exosomes are mostly used in this kind of early detection of cancerous cells in the human body. Being extracellular organelles, it becomes easier for the exosomes to get both proteomic and genetic information from extended distant intracellular areas. This helps to identify the affected area more easily and early[30-34]. Apart from that, AntimiR-21 is a kind of oligonucleotide that gets combined with nanoparticles to improve its impact on the diseased area. It is a combination of tertiary amine cationic lipid with a quaternary amine, which is distinctively designed with the characteristics of proper pH value.

In these days, the use of exosomes has been increased as an early detector of cancerous genes and cells growth in the human body. Similarly, the use of microRNA has been started to control the excessive gene expression as the microRNAs are capable of doing this by RNA interference into the affected body part. Incorporation of oligonucleotides into the nanoparticle of lipids helps the address the problems of nucleus sensitivity of anti-MiRs. Unless this incorporation, the anti-MiRs will never function properly. Nucleus sensitivity will cause its faster removal from the blood circulating vessels. Along with it, due to high charge density and higher molecular weight anti-MiRs will fail to penetrate the cellular membrane. Apart from this, to control the impact of Bcl-2 and Akt-1 carcinogens in the human body the use of lipid nanoparticles with T7 peptide conjugation are increasing. It is mainly helping to cure cervical and lung carcinomas[35-40]. Not only anti-MiRs or nanoparticles are used in cancer treatment, but also the use of DNA methylation has been increased to understand the cases of somatic cell reprogramming and tumorigenesis[41-51].

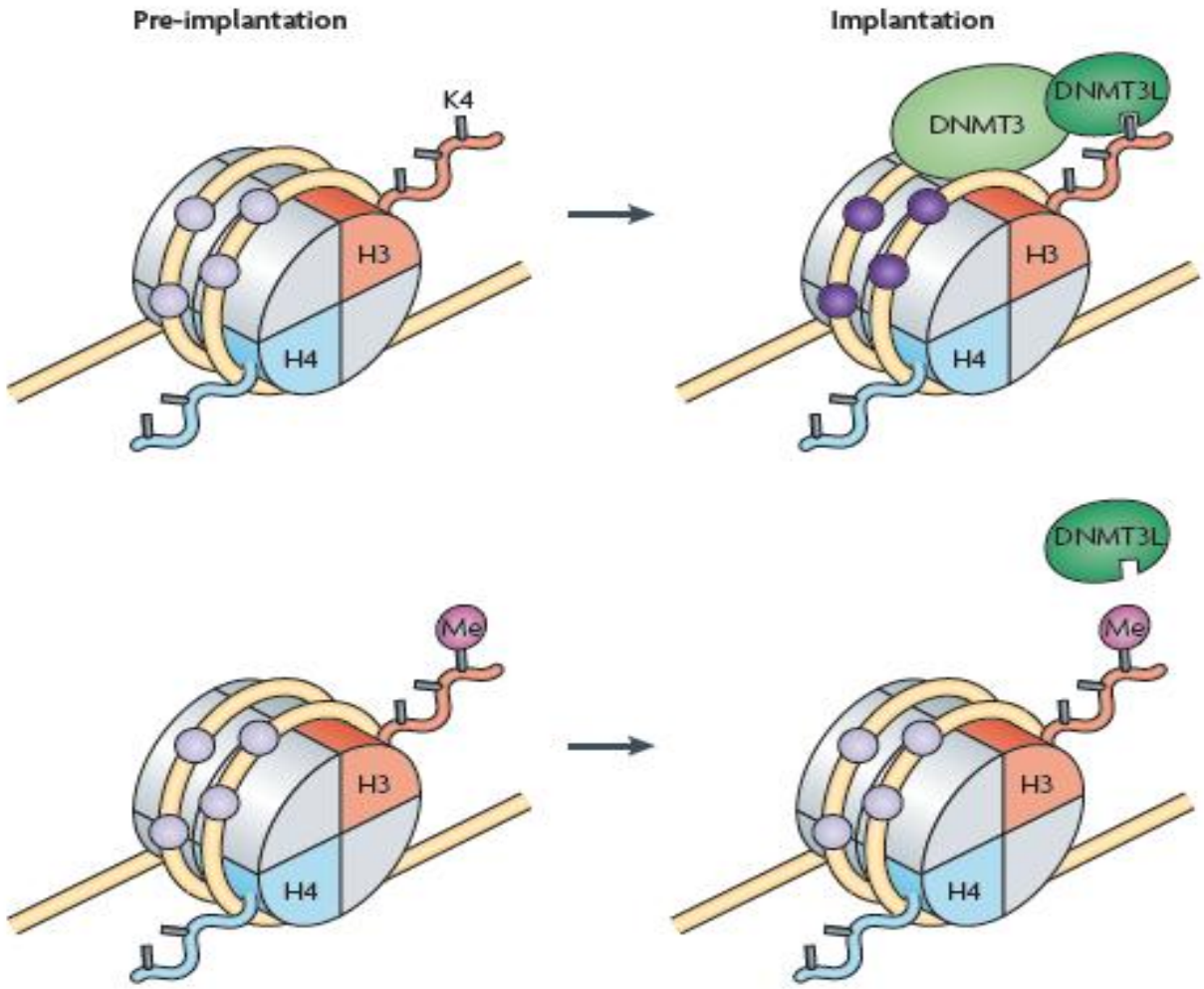

Figure 1: Bimodal DNA Methylation[30].

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