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RESEARCH ARTICLE

CANCER: GENE INTERACTION AND CELL SIGNALLING

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Abstract

Cancer, a menace to society is mainly linked back to genetics. It is caused due to loss of function or gain of function mechanisms of the genes. The current treatment modalities include the use of chemotherapeutics, radiation and surgery. The article talks about alternative modalities that can be introduced and new targets to treat cancer.

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Introduction:-

In today's environment, it's becoming increasingly difficult to ignore the role of cancer in social health. Although a huge budget is allocated to cancer research every year, cancer remains the second global cause of death. Alterations disrupt normal cell function, cause cancerous cells to over-proliferate, and avoid mechanisms that might typically control their growth, division, and migration. A disruption in signalling pathways, a mutation that might lead to overexpression of certain genes that can, in turn, activate the signalling pathway and send it into an override mode that leads to diseases such as cancers. The success rates for current cancer treatments are strongly influenced by the stage at which the disease is diagnosed. When cancer is detected early and tumour cells are still localized to their initial site of origin, cure rates tend to be very high, even for cancers that would otherwise have a poor prognosis. Unfortunately, many cancers are difficult to detect in their early stages and by the time they're diagnosed, metastasis may have already occurred. According to WHO cancer accounted for nearly 10 million deaths in 2020. If cancers were routinely detected at an earlier stage, many cancer deaths might be prevented.

Targeting these signalling pathways products not only for the use as biomarkers for early detection of certain cancers but also for targeted treatment of cancers. The current treatment strategies are not very specific, they are not only costly but also followed by many side effects despite the hard work being put behind by doctors and researchers to reduce those said side effects.

The use of genetic and immunological therapies by gene silencing techniques or monoclonal antibodies designed specifically to act on a specific component of the signalling pathway for the treatment of cancers can be employed. A better understanding of these signalling pathways is very important for this to work. When it involves identifying critical mediators of signalling or even identifying previously unknown signalling pathways that could be therapeutically targeted, high-throughput screening in vitro or model organisms could be used.

RNA interference (RNAi), a mechanism for gene silencing. Such a mechanism possesses the ability in targeting cancer-related genes. Oncogenes, mutated tumour suppressor genes and many other genes involved in tumour progression are good targets for gene silencing by RNAi-based therapy due to the precise functional mechanism, high potential, and high specificity of gene silencing by RNAi and lack of side-effects

compared to chemotherapies. The major advantage of RNAi in cancer therapy is targeting multiple genes of various cellular pathways involved in tumour progression.

This type of treatment helps develop suitable personalized drugs for a specific patient. Personalized drugs are likely to be simpler than others in controlling tumour growth.