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Effect of Bio-Mineral Formulation on Expression of Tumor Suppression Gene Level in Different Cancer Cases

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Abstract

Backgrounds: Cancer is a disease which is characterized by uncontrolled cell division. There are several markers depicting the onset of cancer, out of which expression of the regulatory proteins is most significant and accurate. The p53 is a most targeted gene that regulates the cell cycle and maintains the integrity of DNA. ***Aim & objectives:*** The objective of this study was to evaluate the expression of p53, tumor suppression gene level in different types of cancer. ***Materials and Method:*** The study was conducted at Lavanya Ayurvedic Hospital of Cancer & AIDS & Research Centre, Lucknow. The drug used in this study was a bio-mineral formulation prepared by its own manufacturing unit. After approval of Institutional Ethical committee, the blood samples were collected from the patients after written consent. The test was performed by solid phase sandwich enzyme linked immuno-sorbent assay (ELISA) as per standard protocol of kit. ***Results:*** After one month treatment with drug the post treatment values of p53 of different malignancies were significantly higher than the pre treatment status. ***Conclusions:*** In this pilot study it is concluded that after treatment with the bio-mineral drug the expression pattern of tumor suppression gene, p53 enhances which indicates the effectiveness of drug in different types of cancers.

Keywords: *Bio-mineral formulation; p53 Tumor suppression gene.*

Introduction

Mutation in p53, a tumour suppressor gene, is one of the most common genetic lesions of human cancer. Cancer is one of the life threatening diseases spreading worldwide. It is such a class of diseases which is characterized by excessive and uncontrolled cell division or cell growth or invasion and sometimes metastasis. The cancer may also spread to more distant parts of the body through the lymphatic system or blood stream. There are more than 200 different known cancers which affect humans in all groups and in both sex.[1]

The p53 is a phospho-protein consisting of 393 amino acids in with 4 domains for reorganization of specific DNA sequence, tetra- merization of protein.[2] If it gets mutated, it results in various types of cancers [3,4,5] and has been used as diagnostic markers in cancer.[6,7,8]

Recently there are many strategies for targeting to the regulation of tumor suppression gene. The p53 is one of the most

frequently mutated genes in human cancers which encodes as a protein (p53) or tumor protein 53 suppressor genes. It is reported that approximately half of all cancers have inactivated p53.[9] The p53 is crucial in multi-cellular organisms where it regulates the cell cycle and thus, functions as a tumor suppressor which is involved in preventing cancer. As such, p53 has been described as "the guardian of the genome" because of its role in conserving stability by preventing genome mutation.[10,11] In the light of the fact, present study was conducted to determine p53 expression used as a parameter to evaluate the efficacy of a bio-mineral compound for its application in different type of malignancies such as breast cancer,cervical cancer ,prostate non Hodgkin Lymphoma and ovarian carcinomas.

Materials and Methods

Test Drug

The novel drug used in the present study was a bio-mineral formulation prepared by Lavanya Ayurvedic Hospital and Cancer Research Centre by its own manufacturing unit as per the instructions laid down in our ancient Ayurvedic literature.[12]

Chemical and Other Accessories

Blood 2ml, Refrigerated Centrifuge, Pipettes and tips of 10 µl, 50 µl, 100 µl, 200 µl and1000 µl of capacity, p53 ELISA kit, Elisa reader & Washer, Polypropylene tubes, Vortex mixer, Distilled water, Absorbent paper or towel have been used as per requirement of authenticated brands.

Selection of Cases

The blood samples were collected randomly from the different types of cancer patients of both sexes at Lavanaya Ayurvedic Hospital for Cancer and Aids, Lucknow, after the consent of the patient and on the approval of the institutional ethical committee of the organization. The study was conducted during the period of August 2012-November 2012)

Methods

The blood samples of cancer patients were first collected on the day of admission or consultation, and the second sample collection was on completion of one month treatment. After collection the samples were allowed to stand for 30 minutes and were centrifuge at 2000 rpm for 3 minutes to separate blood cells leaving the serum as supernatant. P53 kit provided a monoclonal antibody specific for p53 estimation has been coated onto the wells of the microtiter strips. Samples, including standards of known p53 concentrations and unknowns are pipette into these wells. As per standard protocol of p53 kit, test was performed by using solid phase sandwich enzyme linked immuno-sorbent assay (ELISA) reader at 450 nm.

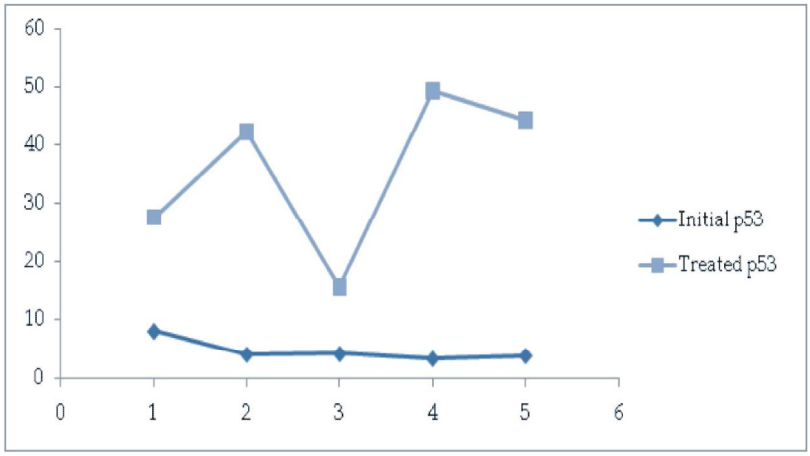
Data Analysis

A linear standard curve was generated by plotting the average absorbance on the vertical axis versus the corresponding p53 standard concentration on the horizontal axis. The amount of p53 in each sample is determined by extrapolating OD values to p53 concentrations using the standard curve. The mean± SD of values of p53 were calculated before and after treatment of selected patients with test drug.

Results

The post treatment p53 values of patients of breast cancer (n=08) 27.7±3.82, cervical cancer (n=04) 42.4±7.5, prostate cancer (n=04) 15.8±3.72, Non Hodgkin Lymphoma (n=01) 49.4 and ovarian cancer (n=01) 44.4 were significantly higher (p value <0.05) than the pre treatment p53 values of patients of breast cancer 8.13±3.99, cervical cancer 4.15±2.61, prostate cancer 4.25±2.47, NHL 3.4 and ovarian cancer 3.9 respectively.

Graph 1: Showing the Effect of Drug on p53 Expression on Pre and Post Treatment



**significantly increase p<0.05*

Discussion

The p53 protein has broad range of biological functions, including regulation of the cell cycle, apoptosis, senescence, DNA metabolism, angiogenesis, cellular differentiation, and the immune response. There are different strategies for targeting to the regulation of tumor suppression gene. In the present study p53 was used as a diagnostic parameter to evaluate the efficacy of a bio-mineral compound in different type of malignancies.In one of the study with a herbo-mineral drug showed almost similar finding in cases of breast cancer, hepatic, leukemia, NHL and ovarian carcinomas.[13] Normal cells contains lesser amounts of p53, however, shows carcinogens trigger the synthesis of large amounts of p53 to arrest in growth, to repair DNA, apoptosis various strategies have been proposed to restore p53 function in cancer cells.[11] A number of groups have four molecules which appear to restore p53 in-vitro,[9] but so for no molecule have been shown to do so. Oncogenes on one hand are well known to be activated by proto-Oncogenes and are suppressed by tumor suppressor genes (TSG). The p53 protein is a guard of DNA and helps in enhancing repair of the damage of DNA done by cancerous pathology. It is reported that approximately half of all cancers have inactivated p53. The p53 is crucial in multi- cellular organisms where it regulates the cell cycle and thus, functions as a tumor suppressor which is involved in preventing cancer. As such, p53 has been described as "the guardian of the genome" because of its role in conserving stability by preventing genome mutation. Molecular diagnosis of Cancers on the basis of p53 would lead to the cost effective test for cancer in short period of time.

In the present study drug seems to conformation of mutant formation of p53 back to an active form and holds a promise. Such a finding is unique with this new drug which holds a great promise as one of the most effective and safe cancero- static drug.

Conclusion

In this pilot study it is concluded that after one month treatment with bio-mineral formulation enhances the expression of p53 values. It indicates the effectiveness of drug over tumor suppression gene in different types of cancers. In this direction related study has been completed on a larger sample size and other related proteins affecting the regulation of the disease.

Conflict of Interest

No any conflict of intrest between authors.

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