

SUMMARY

It has been reported that many haptenic molecules like drugs and xenobiotics bind to body's proteins and elicit antibody response. Xenobiotics have been noted to be associated with body albumin of the people who are regularly exposed to it. Globally, cancer is the second leading cause of fatality, subsequent to cardiovascular diseases. The factors involved in cancer induction are oncogenic viruses, ionizing radiations and environmental pollutants (xenobiotics). Along with previously acting cancer-promoting factors, xenobiotics are considered to largely contribute towards cancer. In addition, various studies have also established the immunosuppressive role of xenobiotics. Thus, inhibition of the immune system can further increase a risk of cancer. The people living in the vicinity of xenobiotic contaminated area or working in the chemical industries have been shown to be in an immunocompromised state and reported to be at a higher risk of developing cancer. Furthermore, repetitive exposure of farmers to xenobiotics like in agricultural fields can manifold aggravate a threat of cancer.

Therefore, it is essential to monitor the influence of xenobiotics on the immune system of healthy individuals and the patients suffering from cancer. Consequently, in the current study, we aimed to determine the presence of antibodies against xenobiotics in the cancer patients and

healthy household contacts and their impact on the progression or regression of the disease.

To monitor the anti-xenobiotics Abs, we collected the blood of cancer patients and their healthy household contacts from the Malwa region of Punjab. The Malwa region is considered to have highest incidence of cancer and is known as the 'Cancer Bowl' of India. One of the reasons suggested for the high frequency of cancer in this region is the excessive usage of agricultural pesticides. Besides, agricultural pesticides diuron, atrazine and carbendazim, we also chose other xenobiotics like naphthalene, benzo(a)pyrene and aflatoxin-B₁ to monitor the presence of antibodies.

As compared to cancer patients, we observed significantly higher antibody titers in the serum of healthy individuals against diuron, atrazine, and carbendazim. Further, similar antibody response was noticed in the case of naphthalene. In the study, we included patients suffering from cancer of breast, ovarian, cervix, oesophagus, lung, gallbladder, prostate, mouth, lip, tongue, pharynx, larynx and Hodgkin's as well as Non-Hodgkin's lymphoma. Additionally, we observed that breast cancer patients showed a low level of anti-xenobiotic antibodies, when compared to their healthy household contacts or healthy female contacts. Hence, low level of anti-xenobiotic antibodies could be one of the reasons for breast cancer development

in the patients. In contrast, the household contacts or female contacts exhibited higher anti-xenobiotic antibodies titers in their serum. Therefore, healthy contacts may be protected by neutralizing ability of anti-xenobiotics antibodies.

These results signify that the antibodies present in the serum of the healthy people may be combining with the xenobiotics and responsible for their clearance from the serum before these chemicals can inflict their carcinogenic activity. In contrast, the low level of antibody response in the cancer patients may not be in a capacity to neutralize the activity of xenobiotics from their serum. Thereby, providing sufficient opportunity to these cancer causing pesticides to incite cancer in these patients.

Furthermore, we examined the effect of diuron and atrazine on T cell, B cells and monocytes. We observed that diuron significantly suppressed the proliferation of T cells, B cells and monocytes. The atrazine showed a mild effect on the proliferation of T cells, B cells and monocytes, whereas it considerably retarded the proliferation of Th1 cells. These results illustrate that xenobiotics diuron and atrazine exposure suppress the function of the cells of the immune system. Therefore, creating a favorable opportunity in the body to develop cancer.

Overall, our results suggest that the presence of antibodies against the xenobiotics is one of the possible reasons for protection against the exposure of xenobiotics and therefore culminating a possibility of predisposing an individual towards cancer. Immunotherapeutic strategies like vaccine constructs using xenobiotics coupled carrier protein for eliciting antibody response can be a judicious approach to prevent people from cancer, who are regularly exposed to these chemicals.