The Negative Long-Term Effect Of Smoking On The Immune System — Ahmad Mahfuz Gazali

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Reducing smoking populations will directly benefit Malaysia by reducing the burden of treating future cancer patients.

Smoking. Image by karosieben from Pixabay.

World Cancer Day is observed annually on 4 February to raise cancer awareness and encourage its prevention, detection, and treatment.

This year, Malaysia celebrated World Cancer Day on February 17, 2024, and the theme for this year is “Close the Care Gap”. The theme of this year’s World Cancer Day emphasises cancer care, focusing on the overall needs of the patients.

Cancer remains one of the most important non-communicable diseases in Malaysia, and is the fourth leading cause of death in public hospitals, and the leading cause of death in private hospitals.

In addition, the yet-to-be-published National Cancer Registry 2017-2021 Report has stated that 168,222 new cases were reported, and the top five cancers reported in Malaysia were breast cancer, colorectal cancer, lung cancer, lymphoma, and liver cancer.

Given the importance of cancer and its effect on society, it is essential to prevent cancer from happening in the first place.

Health Minister Dzulkefly Ahmad has advised Malaysians to continue practising healthy lifestyles through proper nutrition, physical activities, avoiding alcohol, and not smoking.

Smoking is strongly associated with lung cancer, and more than 90 per cent of Malaysian male lung cancer patients have a significant smoking history.

Despite the clear association between smoking and lung cancer, the exact role of the immune system in cancer development has been underappreciated until recently.

Immune checkpoint inhibitors (ICI) such as ipilimumab, pembrolizumab, nivolumab, and others have revolutionises the oncology field far beyond their remarkable clinical efficacy in some patients.

ICIs could be defined as a drug that blocks proteins called checkpoints made by some immune cells, such as T cells and cancer cells.

These checkpoints help keep immune responses from being too strong and sometimes can keep T cells from killing cancer.

When these checkpoints are blocked, T cells can eliminate cancer cells.

Therefore, what are the effects of smoking on our immune system that may subsequently lead to cancer development?

A seminal study published in *Nature* has concluded that smoking affects our immune system.

The study investigated variables that may affect immune responses by studying the immune response of 1,000 healthy volunteers.

One of the most important findings of the study are smoking-induced changes on the immune responses of volunteers.

The scientists studied the immune responses of healthy volunteers by exposing blood samples to various microbes and measuring cytokine concentrations.

Cytokines are signalling proteins that help control inflammation in your body.

Blood samples of healthy volunteers who smoked exhibited elevated levels of cytokines after the stimulation with microbes compared to non-smoking individuals.

In addition, other variables such as BMI, cytomegalovirus infection, sex, age, and genetics affect the cytokine response towards microbes.

However, the most groundbreaking finding of the study was that enhanced cytokine response has been observed in ex-smokers who have quit smoking for 10 to 15 years, suggesting that smoking may induce long-term effects on the immune system.

Further investigation revealed that the long-term effects of smoking on immunity are linked to epigenetic changes, defined as genetic modifications that impact gene activity without changing the DNA sequence.

Elevated circulating cytokines are also known as a low-grade inflammation condition, which normally precedes cancer development via various mechanisms.

The study may suggest a link between smoking, immunity and cancer development.

Other studies demonstrated that passive smokers and e-cigarette users have impaired immune responses.

Given the significant effects of smoking, either active, passive, or vaping, on our health, awareness campaigns must be strengthened and spread throughout the country.

Reducing smoking populations will directly benefit Malaysia by reducing the burden of treating future cancer patients.

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