

# The Immune system Evasion Strategies Adopted by Cancer

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## Abstract

Cancer is not a single disease but uncontrolled, fast proliferating cells can be checked by one common method. Initial methods of cancer treatments such as Chemo and radio therapies are now less in use. Many new methods of treatments based on immunology were evolved, some of those became a sort of “game changers” in cancer therapy. Nevertheless cancer is also “Smart”, now it has evolved the ways and means to survive by evading the immune system.

**Keyword:** Immune system; evasion strategies; Cancer

## Human efforts from escaping cancer

Even some of the food items, such as cruciferous vegetables, curcumin, ginger, tea, some of the vitamins and foliates that we eat have the capacity to kill the cancer cells [1] which are circulating in our body. Nevertheless, cancer is the leading cause of death worldwide. An estimated 19.3 million new cancer cases (18.1 million excluding nonmelanoma skin cancer) and almost 10.0 million cancer deaths (9.9 million excluding nonmelanoma skin cancer) occurred in 2020.[2] Scientists are continuously trying to invent new methods for treatment of cancers[3] The uncontrolled growth of cancer cells initially controlled by Chemotherapy and radiotherapy and their combinations [4] The chemo and radio therapies are one of the hardest things with “recovery time,” particularly as it relates to fatigue from the treatment. The most common early side effects of these therapies are fatigue, hair loss and dry mouth problems. Late side effects can take months or even years to develop. In spite of the fact that a patient is cured a large study has found that people who have survived cancer and its treatment are more likely to die sooner and have a shorter lifespan compared to those who have never had cancer. Therefore, chemo and radio therapies were not the methods of choice for treatment, however, there was no other choice earlier.

## Highlights of Immunotherapy

Then immunotherapies come in vogue for cancer treatment [5-7] indeed, it is most likely that our immune system fights off cancer or pre-cancer conditions on a regular basis without even our knowing it. Dr. Tan says. “Over time that balance becomes lost.”[8] Presently, cancer immunotherapy is an innovative treatment. For some cancers these therapies have become a sort of “game changer”. The types of immunotherapies include immune checkpoint inhibitors (ICIs), cellular immunotherapy, exosome immunotherapy [9]. These therapies create an immune microenvironment and modulate intestinal microbiota and tumor

gene mutation. By employing these therapies drug resistance and adverse drug reactions are avoided. However, there is still a lot of scope to reduce side effects and improve the targeting of therapy [10] unlike chemotherapy, which acts directly on cancerous tumors, immunotherapy treats patients by acting on their immune system. Immunotherapy can boost the immune response in the body as well as teach the immune system how to identify and destroy cancer cells. May work better if you also have immunotherapy [11]. It causes fewer side effects than other treatments. This is because it targets just your immune system and not all the cells in your body. The cancer may be less likely to return. Some immunotherapy treatments help the immune system stop or slow the growth of cancer cells. Others help the immune system destroy cancer cells or stop the cancer from spreading to other parts of the body. The immune system can clearly recognize cancer cells as different, yet often it is unable to stop them from growing.

All pathological invasions in the human body face many hurdles to pass through in spite of mild to severe invasions taking place. It is clear that Nature has provided some sort of tools to every life to continue to survive even in odd circumstances. Scientists have made a breakthrough in the development of potential drugs that can kill cancer cells. They have discovered a method of synthesizing organic compounds that are four times more fatal to cancer cells and leave non-cancerous cells unharmed. Their research can assist in the creation of new anticancer drugs with minimal side effects.

## Escaping the immune system

Immune cells recognize danger through a group of molecules found on the surface of all cells in the body [12]. This helps them inspect potential problems closely and decide whether to attack. But when a cancer reaches the ‘escape phase’ it can change. The ‘cancer immunoeediting phase’ or the “Escape phase” in which tumors can evade immune by producing several immune suppressive cytokines, either by the cancer cells or by the non-

cancerous cells present in the tumor microenvironment. The 'cancer immunoediting phase' or the "Escape phase" in which tumors can evade immune by producing several immune suppressive cytokines, either by the cancer cells or by the non-cancerous cells present in the tumor microenvironment (13). The molecules that would otherwise reveal the cancer to the immune system are lost, and killer T cells move past, unaware of the danger the cancer cell could cause.

“Cancer cells also develop ways to inactivate immune cells by producing molecules that make them stop working.” They also change their local environment, so it becomes a hostile place for immune cells to work [14, 15]. Tumor cells that evade detection can be explained by the following proposed mechanisms: down regulation of major histocompatibility class (MHC) I expression - allowing antigen to go unrecognised. The main reason the human body is unable to fight cancer is because it cannot recognize it. This is because cancer cells consist of the patient's own DNA, which the body's immune system recognizes as natural [16]. A new mouse study by researchers at the Francis Crick Institute uncovered a protein that aids tumors evade the immune system. It's exciting to find a previously unknown mechanism for how our body recognizes and tackles tumors. This opens new avenues for developing drugs that increase the number of patients with different types of cancer who might benefit from innovative immunotherapies [17]. The scientists identified secreted gelsolin, a protein that is present in blood plasma and is also secreted by cancer cells, and discovered how it interferes with the immune system's defenses by blocking a receptor inside dendritic cells. Clinical data and samples from cancer patients with 10 different types of the disease were analyzed, and the researchers observed that individuals with liver, head and neck, and stomach cancers, who have lower levels of this protein in their tumors had higher chances of survival [18].

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