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Professor Simona Doniņa: Immunologist, oncologist, chemotherapist

Do cancer patients need an immunologist?

The magazine's editor-in-chief posed this question as the theme of this article. I would answer: "Yes, if the immunologist is also an oncologist." And I'll explain why. An oncologist with a specialisation in immunology is familiar with the biology of tumours and the incredibly complex interaction between the tumour and the immune system of the body. She knows all of the methods used to treat tumours, their combinations and correct order, including their potential side effects that can affect the immune system and finally also knows the various immunotherapy options used to treat tumours.

To understand when it's necessary to visit an immunologist and exactly what this specialty means, we first have to explain that in our country (Latvia) immunology is an extra specialty for doctors. That means that a doctor must first specialise in one area of medicine such as dermatology, internal medicine, podiatry, oncology or neurology and then continue their studies in immunology which allows the doctor to better understand the inner workings of the immune system, its disturbances and potential treatment methods. This knowledge of immunology only complements the experience which the doctor has already acquired in their main field of medicine.

An oncologist with a specialisation in immunology is familiar with the biology of tumours and the incredibly complex interaction between tumours and the immune system of the body. She must know all of the methods used to treat tumours, their combinations and correct order, including their potential side effects that can affect the immune system. They must know the various immunotherapy options, how to explain them to patients and, when necessary, how to use them.

The immune system plays a large role in how tumours are formed, but active people with fully functioning immune systems can also develop tumours. Why does that happen? One possible explanation is related to the main function of the immune system: to separate the familiar from all things foreign, preserving its own cells, while destroying foreign bodies. Because tumours develop from the body's own cells, which differ only slightly from healthy cells, it's often difficult for the immune system to recognise them. The more these tumour cells differ from our body's own healthy cells, the easier it is for the immune system to locate and fight against them. This process is called immunoediting. This is the ideal version during which the tumour is destroyed when it has only just begun developing.

If the altered cells aren't recognised and destroyed at the very beginning of the disease, the next phase of the immunoediting process begins, which is called the

equilibrium phase, when the tumour cells live within the body, but are kept in check by the immune system allowing the body to coexist with the malignant cells. In this phase, not unlike the first, we don't even know that the tumour is beginning to develop, because there are no masses which the patient or doctor can feel and the tumour still cannot be seen in an x-ray or a CT scan. Even a positron emission tomography or PET/CT scan cannot detect it if the tumour is smaller than three to five millimetres, its usual size at this stage. The tumour can remain like this for years on end.

When the aforementioned equilibrium, which we can describe as coexistence, is upset, an event for which no one really knows the cause, the tumour actively begins evading the immune system's surveillance and begins growing uncontrollably. The immune system is nearly powerless at this stage. The tumour can now be detected in visual diagnostic searches or can be felt and sometimes the patient also develops acute complaints.

We still don't know how to completely avoid the formation of tumours by using the immune system itself. By that I mean that there are no preventative immunotherapies, no pills or drops available that we can take to eliminate the possibility of ever developing a tumour. It's also not possible to activate and mobilise the body's defence mechanisms in advance for a "rainy day" as the cells of the immune system are only viable for a concrete period of time finally dying only to be replaced once again by new cells from bone marrow.

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The main oncological treatment therapies are surgery, radiation therapy and medicamentous treatments. In the majority of cases these methods leave a negative effect on the functions of the immune system, but a large number of these patients experience a spontaneous return of immune functions without the use of additional medications. Those who don't experience this should see an immunologist with a specialty in oncology.

An immune-oncologist can, if necessary, offer advice during chemotherapy and radiation therapy, if the patient's immune system has experienced problems due to a lack of immune cells in the blood, if there are complaints or clinical symptoms that seem to stem from disorders of the immune system or if there are immune system deficiencies due to a specific therapy, also known as secondary immune deficiencies. These deficiencies can be determined and measured by clinical testing of the patient. It's best if these lab results can be compared before and after the patient's treatment.

Naturally, we most often treat patients with medications, but I'd like to add that there are many things, that can't be averted solely with drugs, for instance a patient's lifestyle, habits, psycho-emotional stress. Sometimes an immunologist is like a psychologist – the more one converses with the patient and the more information one uncovers, the less prescriptions one has to write in the end.

Medicamentous therapies are a significant tool in the treatment of malignant tumours. And for many years this has meant much more than just chemotherapy and hormone therapy. **Goal-directed therapy** has increased significantly in the past decades and this is when a certain medication acts against a specific structure in the cells of a tumour or the cell itself delaying the cell's ability to divide and multiply. In recent years we've heard a lot more about the development of immunotherapy and **tumour immunotherapy**.

Cancer immunotherapy is a treatment method where medications activate the immune system's cells allowing them to work harder, or to explain it in a different way, to harness the body's own ability to fight against a tumour. There are a number of different immunotherapy methods:

- Biologically active substances produced by the immune cells
- immune cells
- oncolytic viruses
- antibodies that attract immune cells keeping them active

For a variety of reasons we have very little experience with these antibodies in our country (Latvia). The most common therapies administered in Latvia include immune system signalling proteins called cytokines and oncolytic viruses, as well as so-called immunomodulators, which adjust immune responses. Immunologists with a specialty in oncology can administer these treatment methods when necessary.

Even if a tumour has been surgically removed or if chemotherapy or immunotherapy have been administered, there's always a risk of tumour recurrence. Currently the best an immunologist can do is to return the patient's body back to the equilibrium phase, where the immune system is capable of controlling potential tumour cells. A formula that will guarantee the non-recurrence of the disease is as yet unknown.

CITĀTS: I recommend you not use all kinds of medications that claim to have miraculous healing powers

There are situations in the late stages when tumours are widespread and so-called specific therapies aren't applicable. Then the immuno-oncologist can try to maintain the patient's quality of life with immune modulating medications to allow the body to coexist with the tumour.

I think that patients who experience a diminished immune system should make an appointment with an immuno-oncologist. Symptoms that indicate a patient already had a weak immune system prior to developing cancer include frequent viral illnesses, cold sores or boils that occur with abnormal frequency and long healing times for cuts and bruises. People who also have chronic illnesses, such as diabetes or an autoimmune disease that are often treated with immune system suppressing medications, should also consult an immuno-oncologist.

If you've undergone a gruelling chemotherapy and/or radiation therapy treatment, it would also be wise to consult an immuno-oncologist to determine how your body has reacted to the treatment and to see if immunological help is necessary, instead of immediately trying all manner of drugs that supposedly "stimulate and improve" the immune system. I recommend you not use all kinds of medications that claim to have miraculous healing powers, but rather to consult with your doctor before using any food additive, supplement, vitamin or microelement.

An immuno-oncologist is one of the doctors that actively participates in the care of a cancer patient. This specialist can explain the role that the immune system plays in the event of a tumour, can diagnose and treat the deficiencies of the immune system which have occurred as a result of a specific course of therapy, can treat tumours with one of the medicamentous therapy methods – immunotherapy – and can help the patient coexist with a tumour if, for whatever reason, the tumour is inoperable or untreatable with radiation or chemotherapy.

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