

How can we imagine the future of anti-tumors therapies?

Editorial

Cancer represents one of the biggest challenges facing health professionals and thus, continuous efforts are made toward finding efficient treatments. Furthermore, cancer has heavy impacts on global economy and the drugs cost limits the access to treatment for patients in many developing countries. Herein, the two main therapeutic struggles to overcome are the diversity in cancer types and the post-treatment tumoral re-growth. The second problem could be overcome by a treatment that target the cancer stem cells, which have a self-renewal property,^{1,2} and that have been associated with drug resistance.^{3,4} Different therapies are currently used including radiotherapy, chemotherapy⁵ and surgery. However, none of them has been shown to completely cure the cancer with a zero risk of tumoral re-growth mainly because these methods are not precise and cannot distinguish between the healthy and the tumoral cells.

Fortunately, the current researches indicate that the future will bring new therapeutic approaches especially that pharmacology is investigating divers aspects including cells receptors,^{6,9} neural signaling,^{10,11} biochemical interactions,^{12,13} toxicology¹⁴ and even traditional medicines.^{9,10,15,16} All that combined with the development of animal models^{13,17-20} to both test drugs and elucidating the pathological pathways. Importantly, immunology constitutes one of the most promising approaches, and developing methods such as specific antibody, immune-agents and immune-modulators^{21,22} may lead to more efficient antitumor efficiency via a more specific immunological targeting along with the use of more selective agents injected at the suitable dosage based on the immunological profile of the cancerous and both the type and the stage of the cancer.

Since some cancers have been linked to some virus, vaccinations are also being considered^{23,24} as preventive approaches. On the other hand, we might take advantages from the cytolytic properties of the virus and inject specific virus at a studied dosage within the tumoral site to kill the tumor cells. In such case we may consider using an antiviral to control the virus effect and protect the healthy cells.

Furthermore, the biochemical and the structural properties are elements on which therapies can be based. Indeed, tumoral cells might express specific molecules that the healthy cells do not express or express differently therefore, specific therapies that target those tumoral-specific molecules such as histone deacetylase²⁵ and signal transduction cascades²⁶ look promising approaches. The mechanisms of action could be enzymatic inhibition, metabolic disorder and other intracellular approaches or inter-cellular communication disturbance of the tumoral cells. Moreover, acting on the tumour-microenvironment²⁷ and create an unbalances within the homeostatic status through targeting the irrigation and the blood supply to the tumoral cells by cryotherapy or surgery represent another approach.

Finally, stem cells transplantations may be used within the cancer therapies^{28,29} or as a way to modulate the immune system activity by replacing some missing elements or by strengthening the activities

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the immune system already has. Following this line of thoughts gene therapy could be combined to the stem cells transplantations to provide the transplanted cells with novel properties via the introduced genes.

The best therapeutic approaches we could imagine might be combining two or more therapies that would be selected based on the cancer type, cancer stage, patient pathological and physiological profile and even both the ethnic group and the gender of the patients.³⁰ However, we still have a very long way before oncologists can evoke a victory against cancer and thus collaborative efforts still required to reach specific and precise therapies with less side effects.

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Conflicts of interest

None.

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