Short Communication

MRNA COVID-19 Vaccine and Hope to Cure Cancer

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Abstract

There is hope that cancer patient should benefit from mRNA COVID-19 vaccination. Some of the most advanced candidate vaccines are encapsulated in carriers of lipids, and small liposomes are expected to accumulate in tumor tissue through the enhanced effect of permeation and retention. However, the extent to which solid tumors might take a significant part of the vaccine dose, so it is still unknown. This requires a careful evaluation of these promising vaccines of mRNA COVID-19 managed as carriers of lipids for patients with solid tumors, including a possible revaluation of the assay for optimal protection of this specification and the fragile population.

Clinical Trial Story

Bobby Fentress learned to know mRNA months before the rest of the world. About a year before the Fentress got its two doses of mRNA COVID-19 vaccines, the painting contractor was infused with a personalized version for the fight against cancer. 68 year male Fentress was a participant soon in a clinical study designed to see if a vaccine made with the same technology used to prevent COVID-19 could increase the enough immune system to search and destroy persistent cancer cells.

The companies such as the Moderna and Pfizer, whose names are familiar with mRNA COVID-19 vaccines, are expected to stimulate the bodies of cancer patients and waiting for outcomes that treatment to fight advanced tumors. If effective, what is not known for at least another one or two years, could add to the arsenal of immune therapies designed so that the body fights against its own tumors.

Background

COVID-19 Pandemic has promoted the worldwide development of vaccine at an accelerated pace, and more than 180 projects are currently reached the clinical evaluation phases [1]. The identification of direct SARS-COV-2 Spike protein (S) of the enzyme angiotensin-converting enzyme-2 has led to the development of two categories of vaccines equal directing this protein [2]. The first is based on an inactivated virus that expresses the Spike protein (S), after specific genetic manipulation. The second is based on the injection of nucleotides (i.e., DNA or mRNA) that guide the synthesis of protein s from the organism.

Until now, the forms of mRNA were the first to reach third phase of the tests with a promising return. For reasons of physical-chemical and biological stability, the mRNA Spike protein (S) must be encapsulated in liposomes and delivered as lipid nanoparticles. Among the priority populations to benefit from vaccination of COVID-19 will be the most fragile people, such as cancer patients, for whom COVID-19 can be mainly unfavorable [3].

There is a very old story of anti-cancer agents in liposomes such as vectors Drugs in cancer patients, including the supply of nucleotides, such as small interfering RNA [4]. Liposomes interferences, is projected to accumulate in passive focus tumor tissues, a better known phenomenon as the best permeation and retention effect (EPR). Most tumor vasculatures are characterized by 200 nm due to fenestrations non- junctive endothelial cells, a small layer of smooth musculature, lack of control of homeostatic blood flow, the reduced

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expression of angiotensin II receptors and high levels of vascular permeability factors [5]. All these features explain how losses with losses can be in the tumor environment, which makes nanoparticles easily, leave the flow of blood cells and tumor flow, as long as its size is less than 200 nm. Abridged lymphatic drainage further elucidates why nanoparticles will accrue in the tumor micro environment after leakage escape [6]. The experimental data in tumor have already demonstrated how the EPR effect depended depending on the size of the liposomes, is to say, minor size of tumor accumulation. In general, the EPR effect leads to 5-10% of the injected dose found in larger nanoparticle tumors, and up to 25% for the little ones, at least in models [7]. Interesting there is a positive correlation was also found between the accumulation of liposomes in tumors and vascular density: the densest than the vessels, the greater the spread of tumors [7]. In humans, the EPR effect was confirmed, which is, the highest concentrations of drug in tumors solid they observed in patients treated with cytotoxic agents liposomal cancer than those with administration [8]. Drug free as far as the fact that some of the most advanced COVID-19 vaccine candidates are based on providing mRNA using liposomes, this also raises the question of possible hiring vaccines from tumor fabrics. In fact, as for the majority of proteins that are delivered using lipid carriers, two of the candidates for vaccination in advance (i.e., the mRNA-1273 and BNT162b2 of Pfizer) are delivered is smaller than 200 nm nanoparticles [9, 10]. Therefore, they are also prone to EPR effect, with a possible significant tumor accumulation in the environment, since for any other drug given as liposomes. At what point is this specific delivery for tumor cells could be a problem in patients with solid tumors and, therefore, remains to be evaluated. In fact, part of the vaccine dose could be captured by the tumors, rather than distribute rapidly and quickly to the spleen to trigger an immunogenic effect. This could lead to a possible change of protection COVID-19, and the results of the first clinical studies have already suggested an early stage the importance of dosing for the effective COVID-19 [10]. A result of protection, as the extent of the vaccine dosage COVID-19 must be re-evaluated with respect to a possible assumption of a possible intake of liposomes of tumor tissues deserve consideration. Vaccines COVID-19 are provided as lipids airlines are administered intramuscularly (IM), and preclinical data have already shown that the protein encapsulated in liposomes and given through the administration of IM lead to systemic distribution in Body [11]. Another possible consequence of the specific delivery of the specific delivery of the Spike protein as liposomal form to cancer cells could be modified tumor immunity, with a possible potential impact on the evolution of the disease and a possible change in the sensitivity of immunotherapy. Because these effects are still unknown, this requires specific studies by deciphering the impact of liposome vaccine in tumor biology.

Endnote

The careful evaluation of the effectiveness of these promising vaccines mRNA COVID-19 administered as carriers of fat should be applied to patients with solid tumors, including a possible revaluation of the assay for optimal protection this specific population. Meanwhile, a huge level vaccination campaign should be started urgently in cancer patients, considering alternative ways of COVID-19 vaccines (i.e. not administered as liposomes) would be reasonable, at least for patients with solid tumors. The alternative vaccine panel that reaches the final development phases extends and this would allow cancer patients to benefit from an agricultural vaccination campaign against COVID-19, at least until complete knowledge is obtained compared to the specific distribution of vaccines administered as liposomes In patients with solid tumors.

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