The illness that touches the lives of more than 90 million people just now - cancer. A group of over 100 types of diseases that involves abnormal cell growth causes about 8.8 million deaths every year. But not all cancers are deadly. Thanks to the recently incorporated approach known as immunotherapy that employs the patient's immune cells to fight with cancer cells, several cancers (including skin and lung) are now successfully treated. However, other cancers, such as pancreatic and in particular brain cancers, keep immune cell "soldiers" to stay away from the tumor combat zone.

The defense tactics used by growing tumor depends on secreted factors that work as a smokescreen against immune cell detection. So, by the time the tumor is big enough to be detected and diagnosed, the immune cells "soldiers" are already losing the fight. Thus, to prevail the whole war, only disarming of cancer will give the immune system army the edge to fight on.

One of the treatments that knows-how to defuse cancer smokescreen is oncolytic virus therapy. These viruses are simultaneously killing cancer cells and triggering the secretion of factors that act as a honeypot for the immune cell. By such strategy, therapeutic viruses drawn in the immune army to finalize the struggle.

However, what is working excellently in a laboratory test is less effective in patients. In tests, cancer cells are effectively infected in the controlled experimental condition, resulting in the rise of secretion of honeypot bait encapsulated within vesicles. There is no limitation of the nutrient, oxygen, or time restriction. However, in patients' viruses must be injected within in a short time window: post-surgery but before the application of standard care. This allows for only single dose of injection, often with limited efficacy, so it requires optimization and intensification.

Surgery that removes cancer cells is the first step of current care for brain tumor patients. So, these cancer cells can be transferred to the laboratory, infected with viruses and the honeypot encapsulated within vesicles can be harvested. Because brain tumor recurrence is as a ticking bomb, the time for intervention is short. So, the goal here will be to test if by using well-controlled condition of infection of patient-derived cancer cells we can harvest honeypot carrying vesicles that will serve as a critical backup for immune system army to fight on.

Oncolytic virus therapy is already approved by the U.S. Food and Drug Administration as an approach that both kills cancer cells and fights to advance the victory of immune army. Because oncolytic viruses are not toxic to healthy cells, the major limitation for its therapeutic potential is inadequate efficacy in patients. So, moving virus infection back to laboratory bench to increase the efficiency of its job will result in increased production of vesicles that from now on will fight side-by-side with the immune army. Thus, vesicles presenting patient-specific "tags" to be seen by the immune cell "soldiers," will keep working on once the tumor is removed, preventing recurrent growth.

While the time is right for immunotherapy and currently tested approaches have yielded a high chance of success they still suffer from high cost and less than universal success rate. The strategy proposed here is not only low-hanging fruit as it uses naturally existing cellular process of vesicle secretion, but it also has significantly reduced cost of preparation of the personalized vaccine. If such approach will work against the tumor as aggressive as a brain tumor - whose incidences is increased under the circumstances that are disproportionally more frequently faced by military personnel - will be beneficial for the development of therapy for other cancers.