Cancer Vaccine: Not Science Fiction, Just Science

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Hanna Norsted is a virologist and scientific writer for Acta Dermato-Venereologica. Below find her reflections on taking advantage of virotherapy also for cancer. In our website http://www.medicaljournals.se/forum/forum/ you can find this message as a Discussion post where you can discuss this. Please visit and give your views and comments on this.

In recent years, the number of vaccine sceptics has slowly but steadily increased. First, it was the MMR scare in the 1990s, when autism was erroneously linked to the measles vaccine (1), and then we had Tamiflu and its terrible side effects (2). But not only have we started to fear vaccines, we also hear of alarms of outbreaks of ebola, bird flu and MERS. What could possibly come next? The answer is virotherapy.

Scientists are using viruses to treat diseases with remarkable results. In early May it was reported that the Mayo Clinic had managed to send a woman with incurable myeloma into complete remission with a high dose of measles virus (3). And the Harvard Stem Cell Institute used stem cells loaded with herpes simplex virus to treat glioblastoma in mice (4). The scientists behind the study believe it is an approach that can be used to treat breast, lung, and skin cancers that metastasise the brain.

In Australia, a research group has demonstrated that treatment with melanoma cells infected with vaccinia virus induces a clinical response and survival of advanced metastatic melanoma (5). The method, which is called Vaccinia Melanoma Cell Lysate (VMCL) vaccine has been tried once before with promising results. In this study, Coventry et al. used a larger cohort (54 patients) with surgically non-resectable advanced Stage IV/III in-transit metastatic melanoma. They received a single dose intradermally every 2 weeks for 6 months, then monthly for 6 months. If stabilisation or a complete response was obtained, the patients received a dose every 3 months thereafter. Overall survival was assessed by survival in months from the start of vaccination to the time of analysis or death of the patient. This study resulted in a clinically meaningful response in 78% of patients. The 5-year survival estimate was 15% but more than 29% survived 23 months or longer. The longest survivor is currently alive 10 years after treatment. This is an indication that survival could be prolonged considerably compared to other treatments.

Viral vectors have been used in gene therapy for a long time, most famously in 2000 to treat patients with severe combined immunodeficiency. That study was a success as 8 patients developed a functional immune system, but 7 years later 50% had developed leukaemia (6). Brendon Coventry, lead author of the Australian study, believe their approach with boosting of VMCL may enhance the endogenous immune response to the tumour in a similar manner as allergen desensitisation. However, the authors also mention that in multiple cancer therapy approaches the timing is crucial too. If the timing is wrong it is possible to drive the immune response to induce tolerance instead. This method perhaps needs a little tweaking, but could mean a major advancement in the control of cancer.

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