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Modulating Oncolytic VSV and Enhancing Host Cell Targets by Statins for Cancer Immunotherapy

Technology:

Cancer patients may be treated by administering Vesicular Stomatitis Virus (VSV) and simvastatin (Sim) to modulate oncolytic viral therapy and synergistically enhance cancer cell death. By this method, two major barriers of using oncolytic viruses for cancer immunotherapy can be overcome: 1) clearance by the innate immune system, which can rapidly destroy oncolytic viruses, and 2) minimizing the risk of uncontrollable systemic viral infections to normal cells. Sim is protective to normal cells and has dual mode of action towards the virus, depending on the dosage. Low dosages allow for fast viral growth in cancer cells and higher dosages kills the virus. Initially, a low concentration of Sim is administered to increase replication of oncolytic VSV. After this initial priming (at least 2 hours later), the VSV itself is administered. The pretreatment with Sim allows for natural antiviral proteins present at the nuclear pore complex, namely Rae1 and Nup98, to be upregulated in host cells. After an overnight period of viral incubation, Sim is administered at a second, higher dosage level, causing the statin to exhibit an antiviral effect on the VSV, an enhanced rate of cancer cell death and further protection of normal cells.

At least 4 hours after the second Sim administration, a different anticancer therapeutic substance (PLX4032, or vemurafenib) is administered. PLX4032, is an inhibitor of the RAS/Raf/ERK pathway. The invention has been demonstrated in HeLa cells to date.

Opportunity:

Immunotherapy is a novel approach that shows promising clinical efficacy for treating cancer. In October 2015, the FDA approved the first-in-class genetically modified oncolytic viral therapy in the US for patients with melanoma.

Nova Southeastern University is seeking to develop collaborative partnerships and licensing opportunities for this technology.

Inventors: Drs. Paula Faria-Waziry, Luigi Cubeddu, Ana Castejon. Dr. Faria-Waziry is the PI of a recent Department of Defense award to use a similar approach that explores pathogen/host interactions to treat immune-related conditions. Dr. Faria-Waziry is with the Halmos College of Natural Sciences and Oceanography.

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