Interferon

Interferons (IFNs) are a group of cell signaling proteins made and released by host cells in response to the presence of pathogens, such as viruses, bacteria, parasites, or tumor cells. In a typical scenario, a virus-infected cell will release interferons causing nearby cells to heighten their anti-viral defenses.

IFNs belong to the large class of proteins known as cytokines, molecules used for communication between cells to trigger the protective defenses of the immune system that help eradicate pathogens.

Interferons are named for their ability to “interfere” with viral replication by protecting cells from virus infections. IFNs also have various other functions: they activate immune cells, such as natural killer cells and macrophages; they increase host defenses by up-regulating antigen presentation by virtue of increasing the expression of major histocompatibility complex (MHC) antigens. Certain symptoms of infections, such as fever, muscle pain and “flu-like symptoms”, are also caused by the production of IFNs and other cytokines.

More than twenty distinct IFN genes and proteins have been identified in animals, including humans. They are typically divided among three classes: Type I IFN, Type II IFN, and Type III IFN. IFNs belonging to all three classes are important for fighting viral infections and for the regulation of the immune system.

Interferon-β (IFN-β) has been found to downregulate O6 methylguanine DNA methyltransferase and sensitize glioma cells to chemoradiation therapy. The effectiveness of IFN-β and temozolomide (TMZ) combination therapy for newly diagnosed glioblastomas was previously reported. However, there is no clinical report of recurrent of malignant gliomas treated with the combination of IFN-β and TMZ.

In a present study, Kawaji et al. reported 7 cases of gliomas classified as uncontrollable with adjuvant TMZ monotherapy, who were then treated with IFN-β and TMZ combination therapy. The magnetic resonance imaging findings and clinical symptoms improved in the majority of the cases, with tolerable adverse events and minimal residual disability. The overall survival (OS) time from the date of the initial surgery exceeded 13 months, suggesting that this combination therapy was successful in improving the prognosis of malignant gliomas refractory to adjuvant TMZ monotherapy [1)].

Complications

Reversible cerebral vasoconstrictive syndrome

Interferon-alfa

see Interferon-alfa.

Interferon gamma

Interferon gamma

1)
Kawaji H, Tokuyama T, Yamasaki T, Amano S, Sakai N, Namba H. Interferon-β and temozolomide combination therapy for temozolomide monotherapy-refractory malignant gliomas. Mol Clin Oncol. 2015 Jul;3(4):909-913. Epub 2015 Apr 8. PubMed PMID: 26171205.