

The [herpes simplex virus](#) thymidine kinase (HSV-TK) gene is a viral gene that has been widely used in gene therapy research, particularly in the context of suicide gene therapy. HSV-TK is an enzyme that plays a role in the replication of the herpes simplex virus.

In suicide gene therapy using the HSV-TK gene, the gene is introduced into target cells, which can be cancer cells or other specific cells. Once inside the target cells, the HSV-TK gene produces the HSV-TK enzyme. The introduced enzyme has the ability to convert a non-toxic prodrug, typically ganciclovir, into a toxic compound.

After administration of the prodrug, cells expressing the HSV-TK enzyme will convert the prodrug into its toxic form, leading to cell death. The idea behind this approach is to selectively target and eliminate specific cells, such as cancer cells while sparing healthy cells that do not express the HSV-TK gene.

The use of the HSV-TK gene in suicide gene therapy has been studied in preclinical and clinical settings, primarily for the treatment of various types of cancer. It is important to note that the efficacy and safety of suicide gene therapy, including the use of the HSV-TK gene, are still being evaluated in ongoing research and clinical trials.

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