Acyclovir, a synthetic purine nucleoside analogue is the most widely safe and selective prescribed antiviral drug for the acute and suppressant treatment of primary and recurrent herpes simplex type 1 and 2, and varicella-zoster infections. Acyclovir is activated inside herpesvirus infected cells, where it is converted to acyclovir monophosphate by virus encoded thymidine kinase. Host cell enzymes then phosphorylate it further to acyclovir triphosphate, which is the active form. Acyclovir triphosphate specifically inhibits viral DNA polymerase and once it is added to the growing chain of DNA, the viral replication will be terminated immediately. Since acyclovir is a chain terminator of DNA, it can cause mutation in viral genome and develop viral resistant which is less sensitive to acyclovir treatment. In patients with immune deficiencies the clinically significant viral resistance has been observed and in these patients disease is more likely chronic, severe and, disseminate to areas such as central nervous system. Thus in a patient with normal immune system except few, no clinically significant resistant virus has been documented because the host immune system eliminates the resistant survivors.

This thesis gives an overview on efficiency of acyclovir on resistant herpes simplex viruses after the sensitive viruses have been eliminated in vitro in immunocompetent patients. An attempt was made to provide a confluent mono-layer cell culture for viral replication. Then the titer of each virus isolate was studied after the formed viral plaques were stained and counted. Once the virus titers were found out, the viral sensitivity to acyclovir was investigated when HSV infected cells were treated by different dilution of acyclovir.

The results were logical. The decrease of viral titers were correlated with decrease of virus concentration in viral dilution. Thus the enhancement of virus replication seemed to be depended on the concentration of acyclovir, the replication of virus isolates were decreased by increase of acyclovir. No acyclovir resistant virus strains were obtained in vitro during this study for HSV 1 or HSV 2 isolates.

However no HSV resistant has been found during this experiment, but more investigations with wider range of HSV isolates are required to complete this study.