

Potential technique for controlling HIV post antiretroviral therapy.

HIV has been eliminated from all transfusion blood for 10 years in Europe using a simple but effective form of photodynamic therapy.

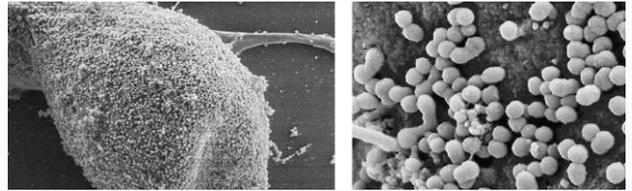
As the virus is easy to eliminate ex-vivo, there is a potential to eliminate it in vitro which could maintain HIV patients after ARVT failure.

Research indicates it is possible to kill 5 Log₁₀ of the viral load in vivo and that the remaining viruses will be incapable of replication.

Protection of erythrocytes and immune cells can be realized by the addition of quenching agents which disable ROS's.

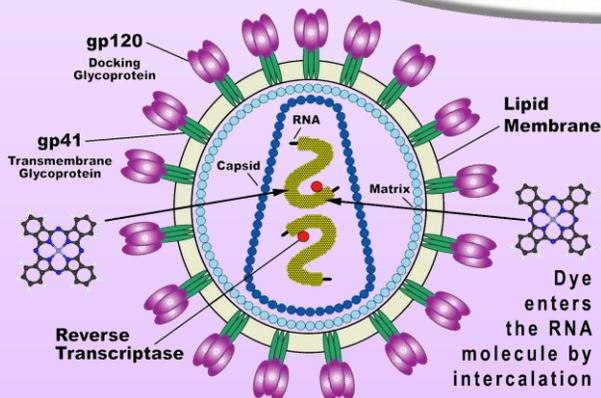
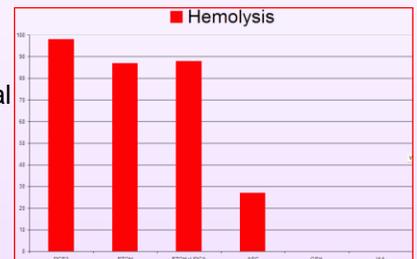
When used for cancer or bacterial infections, the reactive oxygen species are responsible for the effects of photodynamic therapy.

Current research indicates that this is not the case with viral treatment.



While HIV is budding as shown above it is an easy target. When the dye is activated with the correct wavelength of laser at the right power it is possible to get nearly complete destruction of the virus. Our goal at this time is to reduce the viral load to a level which is asymptomatic.

Hemolysis tests show GSH and IAA as nearly ideal protectants for erythrocytes. Hemolysis is too low to measure.



It is known that certain dyes can intercalate into DNA and RNA. This allows selective destruction of HIV, regardless of whether the virus is free, lipid enveloped or intracellular assuming the dye is functionalized to penetrate lipids.

This has been accomplished in whole blood.

The current challenge is to accomplish the same in vivo without damage to the healthy tissues.

We have used an infusion process which has maintained a therapeutic level of the dye in vivo for an hour without hemolysis when irradiated.

Although antiretroviral therapy has been a boon to many HIV victims, it has two major failings.

In time it becomes ineffective and is discontinued, leaving the patient to die. Ongoing research attempts to keep up with HIV mutations but early indications are that the disease is outpacing the introduction of new antiviral agents.

The greater problem is cost. The vast majority of HIV victims exist in third world countries where they have no hope of ever receiving this therapy.

If, as we expect, it is possible to reduce the viral load to near zero, this technology raises the prospect of being able to maintain patients who no longer respond to ARVT, and the cost could be low enough to be affordable for all victims, even the isolated African.

Reference:

Title: Parameters of inhibition of HIV-1 infection by small anionic microbicides.

Authors: Vzorov AN, Bozja J, Dixon DW, Marzilli LG, Compans RW.

Publication: Antiviral Res. 2006 Aug 1