

HIV-1 infected macrophages under cold atmospheric plasma jet treatment.

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It was recently shown cold atmospheric plasma jets can be widely used for decontamination and sterilization, and appeared to be quite effective in virus deactivation. In this work we report on the interaction of the cold atmospheric plasma (CAP) jet with human blood cells infected with HIV-1 for therapeutic applications in treatment of HIV patients.

The studies were carried out on normal and infected macrophages, isolated from human blood. Macrophages, cells of innate immune system, constantly circulating for tissue surveillance, express the receptor CD4 and CCR5 and are targets for HIV-1 virus. HIV-1 ADA (macrophage tropic virus) and HIV-1 LAI (T-cell tropic virus) pseudotyped with VSV-G envelope were used for macrophage infection. We used CAP jet with helium flow only and with addition of oxygen (~2%) in the case of cells/virus treatment. The impact of CAP jet on cells was evaluated through viability studies using MTT assays; the reverse transcriptase was used to estimate the rates of infection in the cells.

It was found that CAP does not affect the viability of the human macrophages. However, CAP can reduce the rates of the HIV-1 infection in the infected macrophages. Thus, the CAP jet can have a potential application for anti-HIV therapeutic approaches.