**Attachment Inhibitor** – A new class of anti-HIV medicines are intended to protect cells from HIV infection by preventing the virus from attaching to new cells and breaking through the cell membrane. One medicine in development attaches to gp120, a part of the HIV virus, and inhibits the entry of virus into cells by blocking the interaction between gp120 and cell receptors.

**Less Toxicity/Greater Potency** – One medicine in development is a chemically-modified version of an already approved treatment for HIV infection. It is hoped that the altered version will improve absorption and efficacy, while decreasing the levels of kidney toxicity seen in the current treatment. The novel structure of the altered medicine results in decreased levels of the active ingredient circulating in the body, leading to less systemic exposure and toxicity. It is also more than 200-times more potent in vitro against all major HIV subtypes resistant to current therapies.

**Integrase Inhibitor** – An antiretroviral medicine in development is part of a class of anti-HIV medicines that interfere with HIV replication by blocking the action of integrase, an enzyme that inserts the HIV virus into the DNA of a human cell. Integrase inhibitors target a distinct step in the HIV entry cycle. To date only one other integrase inhibitor has been approved in the U.S.

**Gene Modification** – CCR5 is a co-receptor on the surface of cells that allows the HIV virus to enter and infect T-cells. Without this receptor on the cell surface, HIV cannot infect the cells. One cell therapy currently in clinical trials is designed to modify the DNA sequence encoding CCR5 by exposing the patient’s own cells to a proprietary technology that renders these cells permanently resistant to the HIV virus. The patient’s cells are extracted from the patient, modified and then reinserted.

**Topical Vaccine to Treat HIV** – A vaccine candidate in development is a topical, therapeutic vaccine, administered through a skin patch. The vaccine is comprised of DNA plasmids carrying HIV genes that are designed to stimulate HIV-specific T-cell immune responses, which suppress virus replication and destroy and eliminate the HIV-infected cells. In clinical trials, the vaccine has been shown to decrease viral load in patients by 70 percent.

**Changing the Genetics of HIV** – A novel antisense medicine in development uses a genetic delivery vehicle (or vector) derived from HIV-1 itself, thus removing disease-causing aspects of the virus. The delivery vehicle appears to sustain the expression of genes delivered to the infected cells for a longer period of time – requiring a minimal number of infusions – and may delay the progression of AIDS and restore the patient’s immune system. It appears to bind directly to HIV RNA and consequently changes the genetics and biology of HIV, including molecular diversity and the ability of the virus to replicate.
Training the Immune System to Target HIV – A therapeutic vaccine in development targets the low-mutating (conserved) parts from the p24 protein in the HIV virus. The vaccine consists of four peptides that are modified to increase the immune response against the conserved parts of the p24 protein. A sustained immune response against the p24 protein has shown to be associated with delayed disease progression.

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