Multiple Approaches in the Global Fight against HIV/AIDS

Editorial

Volume 2 Issue 5 - 2015

Satyajit Patra*

Division of Biochemistry and Genetics, American International Medical University, St. Lucia

***Corresponding author:** Satyajit Patra, Associate Professor, Division of Biochemistry and Genetics, American International Medical University, Beausejour Road, Gros Islet, St. Lucia, Tel: 1-758-450-0130; Fax: 1-758-450-0138; Email: dr.patra@aimu-edu.us

Received: November 03, 2015 | **Published:** November 05, 2015

Since first capturing public attention in 198, there have been incredible strides in the medical community's understanding of HIV/AIDS and its epidemiology [1]. As physicians and scientist learn more about the diseases, there are calls to develop prophylactic measures, such as vaccines that could protect the greater worldwide population. Currently there is close to 34 million people worldwide who are infected with the disease, according to a 2013 study by the World Health Organization (WHO). In 2014, 1.2 million people died from HIV-related causes globally. There were approximately 36.9 million people living with HIV at the end of 2014 with 2.0 million people becoming newly infected with HIV in 2014 globally [2].

While a combination of anti-retroviral medication is typically prescribed, researchers are on the lookout for new methods to protect people and reduce transmission of the virus. One of the major hindrances on the road to developing an effective vaccine lies within the mechanism of the HIV retrovirus. Because the virus employs reverse transcriptase to synthesize new DNA copies, the viral genome is constantly mutating. Reverse transcriptase is a poor editor and is generally unable to correct mistakes in its synthesized products. In a report from the journal Nature, scientists recently studied African male patient, affected with HIV, and took repeated blood samples from circa the time of his infection until approximately two years later. This patient was able to produce broad spectrum antibodies that combat his disease process by blocking the receptor sites on his innate cells from binding with HIV antigen cells. This immunodefense tactic is typical to approximately 20% of newly infected HIV patients. Scientists hypothesize that if they were able to clone said antibodies that perhaps they could synthesize a working vaccine [3].

Another recent scientific development utilizes bee venom. Researchers at Washington University in St. Louis found that the nanoparticles in bee venom are capable of targeting diseased cells corrupted by HIV while leaving surrounding healthy tissues intact. The bee venom pokes holes in the target cells releasing the naked virus to be degraded by the innate immune response, in a mechanism not unlike CD8+ cytotoxic T-cells and natural killer cells. When researchers added protective 'bumpers' to the bee venom, melittin, the nanoparticles were then able to distinguish between healthy and infected cells. Thus, the melittin-loaded nanoparticles did not engage with the healthy cells. Scientists hope to produce a vaginal gel that utilizes this discovery in order to prevent the spread of HIV [4].

While the previous two recent discoveries are far from being placed on the market and implemented, there are also exciting advances that can guide current healthcare. Drug users, specifically those who inject themselves with needles, are among the target demographics for HIV/AIDS transmission. Researchers have found that habitual drug-injecting persons who took prophylactic anti-retroviral medication were likely to decrease their rate of infection by half. Previously, anti-retroviral medication was thought to be effective solely after infection. Increasingly, scientists are finding that anti-retroviral medication can prevent prophylactically prevent transmission as well [5]. 2,400 Thai habitual drug-injecting persons were given tenofovir, an anti-retroviral medication known as PrEP or pre-exposure prophylaxis. Those who were consistent with their treatment further reduced their infection rate to approximately 74%. These are just some of the many modes by which the scientific and medical communities are attempting to engage with and defeat a global pandemic.

Individuals can reduce the risk of HIV infection by limiting exposure to risk factors. Key approaches for HIV prevention, which are often used in combination, include:

a. Male and female condom use;

b. Testing and counselling for HIV and STIs;

c. Voluntary medical male circumcision;

d. Antiretroviral (ART) use for prevention;

e. Harm reduction for injecting drug users which includes needle and syringe programmes; opioid substitution therapy for people dependent on opioids and other evidence based drug dependence treatment; HIV testing and counselling; HIV treatment and care; access to condoms; and management of STIs, tuberculosis and viral hepatitis;

f. Elimination of mother-to-child transmission of HIV (eMTCT).

In 2014, 73% of the estimated 1.5 million pregnant women living with HIV globally received effective antiretroviral drugs to avoid transmission to their children.

References

1. Centers for Disease Control (CDC) (1981) Kaposi's sarcoma and Pneumocystis pneumonia among homosexual men--New York City and California. MMWR Morb Mortal Wkly Rep 30(25): 305-308.
2. Trotter AB, Hong SY, Srikantiah P, Abeyewickreme I, Bertagnolio S, et al. (2013) Systematic review of HIV drug resistance in Southeast Asia. AIDS Rev 15(3): 162-170.
3. Liao HX, Lynch R, Zhou T, Gao F, Alam SM, et al. (2013) Co-evolution of a broadly neutralizing HIV-1 antibody and founder virus. Nature 496(7446): 469-476.
4. Jallouk AP, Moley KH, Omurtag K, Hu G, Lanza GM, et al. (2014) Nanoparticle incorporation of melittin reduces sperm and vaginal epithelium cytotoxicity. PLoS One 9(4): e95411.
5. Karim SS (2013) HIV pre-exposure prophylaxis in injecting drug users. Lancet 381(9883): 2060-2062.

Citation: Patra S (2015) Multiple Approaches in the Global Fight against HIV/AIDS. J Microbiol Exp 2(5): 00064. DOI: 10.15406/jmen.2015.02.00064