

In view of this information, strategies are being investigated which could counte...

[Technology](#), [Development](#)



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Article Review

Article Review: The Surprising Role of Amyloid Fibrils in HIV Infection

Summary

Human Immunodeficiency virus which causes Acquired Immune Deficiency Syndrome has been around for some time. The initial identification was done about three decades ago. HIV is a global epidemic that poses an aggressive public health threat. The developing world suffers a greater percentage of the scourge with 68% of worldwide adult figures of people with HIV and AIDS residing in the developing countries. Moreover, 90% of worldwide figures of people living with HIV and AIDS also reside in developing countries.

Heterosexual transmission makes up a large chunk of transmission. The efficiency of HIV transmission through the sexual route is dictated by several factors, including the viral load, immune competence of the individual and the particular sexual practice that the individual embarks upon. HIV is regarded as a weak pathogen and it has a low infectivity. However, the higher the viral load in individuals, the higher the chances that transmission will occur from that individual to another person if there is contact of body fluid via mucosal surfaces. Semen is regarded as a major vehicle for the

transmission of the virus via sexual intercourse. It has been found out that semen can facilitate the infection in cells including macrophages and CD4+ cells. This led to the hypothesis that the seminal fluid contains substances that play a key role in the transmission of HIV by increasing the efficiency of infectivity of the virus. Previous research has shown this to be true. A list of all peptides and protein which are contained in seminal fluid was created and all of them screened for enhancement or inhibition of HIV infection. The results came back to reveal that a proteolytic fragment of prostatic acid phosphatase (PAP) was responsible for this enhancement. This fragment corresponded to residues 248-286 of the prostatic acid phosphatase. Curiously, the researchers also found out that PAP only became active after some agitation or short-term storage. Further analysis also showed that the fragments of PAP formed fibrils of amyloid which was confirmed by increase in fluorescence in Thioflavin-T, binding to Congo red stain and its content of a beta sheet. The amyloid fibrils were named Semen-derived Enhancer of Viral Infection (SEVI). This amyloid fibrils were confirmed as the active form of the PAP residue that enhanced HIV infection. The augmentation of HIV infection was said to increase by more than 10⁵ folds and also, the number of virions needed for infection to take place was reduced to between 1-3 from the initial 1000-100000. This is said to be similar to conditions found in mucosal transmission of the virus. In short, this amyloid is an essential component of the transmission of the virus between individuals and some other studies have implicated this amyloid in the pathogenesis of Alzheimer's disease among other things.

It was also theorized that there can be a drastic reduction in the transmission of HIV infection via the sexual route if agents are produced that counteract the action of SEVI. These agents can do this through the inhibition of the formation of these amyloid fibrils, abolish the infection promotion properties of SEVI or even cause dissolution of these fibrils. This could lead to the development of a microbicide that will serve as a way of reducing transmission of HIV sexually.

Discussion

I was fascinated that substances that augment the transmission of HIV can be isolated. Also the prospect of development of substances that could counteract the effect of these amyloids fascinated me. I was of the opinion that if truly these substances can be isolated and antidotes developed, there is a huge potential for the production of drugs that can block the transmission of HIV through the sexual means.

however, the researchers still made a case for the continues pursuit of the role of amyloid fibrils in the transmission of HIV with the argument that multiple preventive measures would actually reduce the transmission of HIV by sexual means apart from the use of oral antiviral agents which have proven to be ineffective over time due to the potential of the HIV virus to mutate easily thereby rendering the antiviral therapy ineffective over time. according to what I have seen in this research article, more research needs to be carried out to determine the actual role of the PAP fibrils and also to determine if they are actually active in vivo and also to develop substances that can counteract the effect of the SEVIs as theorized in this paper.

Reference

Castellano L & Shorter J (2012). The Surprising Role of Amyloid Fibrils in HIV Infection. *Biology* 2012, 1, 58-80; doi: 10. 3390/biology1010058. retrieved from on 5th August, 2013