



## AIDS Vaccines in the Future

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**D**uring the last over 20 years, 64 million people have been infected with HIV. Worldwide, the number of HIV-infected individuals is equally distributed between male & female. Most of them (80%) live in sub-saharan Africa & south/southeast Asia. Unfortunately, this AIDS epidemic is rapidly spreading to other part of the world such as eastern Europe & Central Asia.

About 3 million people died of AIDS & approximately 5 million people were newly infected in 2002, despite extensive education & public health approaches. This current circumstances indicate that another approach such as AIDS vaccine is urgently needed for stopping the spread of HIV. In order to develop an effective AIDS vaccine, a suitable animal model should be used for evaluating vaccine candidates. In contrast to chimpanzee, macaques are infected with monkey AIDS virus, a cousin of HIV-1, at high level & develop AIDS-like diseases, like humans infected with HIV-1.

There are two kinds of monkey AIDS viruses used for evaluating AIDS vaccine efficacy, such as SIVmac & SHIV(Simian Human Immunodeficiency Virus), an artificial, laboratory - made hybrid monkey AIDS virus.

Since 1984, during the past 20 years, a number of vaccine candidates has been tested for their vaccine efficacy using SIVmac as a challenge virus. However, any vaccine candidates are able to achieve marked & durable control of a SIVmac infection, except a live attenuated vaccine which was demonstrated to have serious problems regarding safety.

Recently, it has been reported that SHIV give rise to a surprisingly impressive, consistent outcome in multiple studies, despite the diversity of vaccines. These positive results in SHIV-macaque animal model led us to believe that an effective AIDS vaccine is available soon. However, there are growing concerns that this newfound optimism may be based on misleading science, because SHIV infection causes different diseases that are like flu and rapid progression to AIDS & death. Thus, the protection in the SHIV model may be irrelevant to protecting humans against HIV. Since SIVmac infection is more likely to mimic the actual circumstance of HIV infection, vaccine concept that gave positive results in SHIV model has been strongly suggested to be retested against SIVmac model. The results of Merck's recent study on 3 April at a Keystone Symposium on HIV vaccine in Banff, Canada, indicated that DNA/adenovirus (gag) vaccines of Merck Co., which reported to successfully control SHIV infection failed to control SIVmac infection at all in mamuA\*01 negative monkey. These results suggest that potential AIDS vaccines which will be entering large scale of clinical trials sooner or later may be reconsidered or improved. The second problem in vaccine development is that every laboratories use their own protocols and virus stocks to test vaccine candidates. Since we can get basically any results we want, depending on the experimental condition we use, it is also required for comparing vaccine candidates head to head using the same

protocol & the same dose of virus from one virus stock. So, European researchers from 6 different countries established European network for an AIDS vaccine evaluation in primates (ENVEP) to test their vaccine candidates in SIVmac infection model, hard-to-protect animal model using the same protocol & virus stock. In this collaborative work, our team (POSTECH) joined ENVEP to directly compare our AIDS vaccine with 8 different vaccine candidates developed in EU. In this AIDS vaccine trial, 50 cynomolgus monkeys and 70 rhesus monkeys were used to evaluate a different vaccine candidates.

In this presentation, I will discuss about our recent results of the collaborative study.