Y. Cheboune et al., J Vaccines Vaccin 2012, 3:4
http://dx.doi.org/10.4172/2157-7560.S1.007

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Vaccines and Vaccination

August 20-22, 2012 Hilton Chicago/Northbrook, USA

A novel non-integrative one-cycle lentiviral genome derived from a naturally attenuated animal lentivirus as HIV-1 vaccine

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Development of safe and efficacious HIV vaccines remains a priority to stop the epidemics in humans. Protective immunity induced by live-attenuated viruses in macaques against highly pathogenic challenge viruses provided the proof of the concept of such a strategy. DNA vaccines are potent inducers of virus-specific T cell responses, and studies have shown that alone or with recombinant viral vaccines, DNA vaccines can provide protection against challenges with homologous pathogenic AIDS viruses. Therefore, novel safe DNA vaccines and strategies that mimic natural lentivirus infection are hardly needed to generate safe and efficacious HIV vaccines. We have developed lentivectors as DNA vaccines and have shown that they were efficient alone at inducing unique T cell responses and protection of vaccinated macaques from AIDS against a homologous pathogenic virus. We engineered a novel one-cycle replication non-integrative lentivector driven by the 5' and 3' LTRs from the genome of a naturally attenuated lentivirus of goats, CAEV, that have constitutive promoters. This vaccine was shown to express all viral proteins that were assembled into viral particles which undergo a unique cycle of replication in cell culture systems. We NOD/SCID-γ2-hu mice and macaques with our vaccine DNA and showed that all animals developed potent antigen specific immune responses that we characterized longitudinally. Interestingly, the kinetics of induced T cell responses correlated with the kinetics of virus antigen expression. In our ongoing longitudinal study we are closely monitoring the development of the induced antigen-immune responses prior to challenge experiments.

Biography

Yahia Chebloune has completed his Ph.D at the age of 30 years from Claude Bernard Lyon-1 University and postdoctoral studies from University of Kansas School of Medicine. He is Research director at the CNRS and Joseph Fourier University of Grenoble, leading the group of Pathogenesis and Lentivirus Vaccination. He has published more than 80 papers in reputed journals and serving as an editorial board member of repute. His recent work is focusing on development of HIV-1 vaccine using the naturally attenuated animal lentivirus, CAEV as model and to study the mechanisms involved in latency/persistence of HIV/SIV in relation with pathogenesis.

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