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C.80-AIDS Vaccine Thai RV 144 . Correlate of Protection: Envelope gp120 v2 Loop, Which Induces Protective Neutralizing IgG Antibodies, Is A Marine Conus Mu-Conotoxin Binding To The Voltage-Gated Na⁺ Sodium Channel

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Thai RV 144 vaccine efficacy is 31%; protective IgG target the gp120 V1-V2 loops. We analyse the V2 loop (Zolla-Pazner S, 2013) by amino acid (AA) sequences comparison by BLASTP with visual search and three-dimensional (3D) structure (Xue T, 2003; Pallaghy PK, 1997). The 2 Thai vaccine strains V2 loops were screened on toxins binding to the voltage-gated Na⁺ channel (NaCh).

Results

1) 3 mu-conotoxin active site AAs (K13, Q14, K16) (Conus Geographicus, Kinoshitai, Striatus, Betulinus chimera) (Ekberg J, 2008) are found in the Thai V2 loop (V172 crucial):

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Thai V2 166-RDKKQ-KVHALFY-R-178
conotoxin 10-RDKKQCKVHALCCGR-24

2) The vaccine MN strain V2 loop mimics the scorpion toxin N-terminus active site (Kharrat R, 1989); its deletion abolishes the toxicity (El Ayeb M, 1986). Interestingly antibodies against N-terminus induce broad cross-reactive protection (Devaux C, 1999). The toxin precursor (Cn II-13, AaH, Bot IX chimera) (Possani LD, 2000) is included.

MN strain 157-CSFQMTGLEDKVKKEYALLYK-178
Scorpion -13-CLFMTGVEAEIKVKKEGYALQYK-10

3) V2/V3 loops of HIV-2/SIV PBJ14 (fatal AIDS) were 3D superimposed on spider atratoxin (Atx)/versustoxin, 2 NaCh ligands. V2 YxxxWYxxDxxC is conserved in HIV-2. V3 is SGLVFH:

Atx 4-KR MK Y AWYNQQ C TGLFKKC-42
HIV-2 KK MK Y AWY QD C SGLVFH

The scorpion venom concept of AIDS (Tran GMK, 1989) is confirmed by the homology between the Thai V2 loop and mu-conotoxin, a NaCh ligand. Omega-3, a NaCh modifier, is efficient in AIDS (Caprani A, 2012). AIDS vaccine should target V2/V3, and avoid mitigating IgA (Haynes BF, 2012).

Topics: 1. HIV and Hepatitis pathogenesis and treatment, 2. Adaptive immunity and Vaccines