Nude mice inoculated with MT-2 cells supporting SIV replication in vivo:a small animal model for anti-HIV efficacy evaluation

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Abstract

Background and Purpose: The previous humanized mouse model for HIV/AIDS study loses the superiority of easy operation and justifiable cost. In this study, an economical and easy-to-operate small animal model supporting SIV replication in vivo was established. Experimental approach: Three-week-old male BALB/c nude mice were transplanted with SIV infected MT-2 cells by single intraperitoneal injection to establish the SIV infection model. The change in plasma viral load and the colonization of MT-2 cells in vivo were investigated. Changes of the immune system were evaluated by ELISA assay and flow cytometry assay. Results: The success rates of this model were 100% and all mice in the model group had detectable plasma viral loads $(4.98\pm0.35\ \tilde{\ }5.39\pm0.31\ log10\ SIV\ RNA\ copies\ /\ mL)$ in peripheral blood. It is our speculation that the virus replication in mice was mainly due to the proliferation of SIV-infected MT-2 cells that distributed and colonized in abdominal cavities as well as lymph nodes, releasing free virions to maintain infection. It is worth mentioning that there was a statistically significant downtrend in the plasma viral loads of the HAART group. Administration of HAART somewhat reversed this trend of SIV-associated B cell exhaustion and immune collapse. Conclusions and Implications: Therefore, it is reasonable to believe that the model proposed in this study could be a valuable tool to evaluate antiviral effects and immune regulation efficacy in vivo.

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(A) Schematic view Control Model HAART MT-2 • BALB/c nude mice RT-qPCR & ELISA HE staining SIV plasma viral load Plasma concentrations of IgG Histopathological changes Flow Cytometry Intervention effect of HAART B lymphocyte populations NK lymphocyte populations Flow Cytometry & IF on this model MT-2 cells colonization in mice activated B lymphocyte populations

- (1) the SIV can replicate within the nude mice body continuously;
 (2) the free virus replication can induce the immune activity of B cells and NK cells;
 (3) the model holds great potential in evaluating anti-SIV/HIV effect of drug candidates

(B) Time line Stop HAART Administration Start HAART Sampling Modeling Observing Observing Week0 (day0) Week1 (day7) Week7 (day49) Week8 (day56) Week3 (day21) Week5(day35)







