Iran J Basic Med Sci. 2022 Feb;25(2):164-172. doi: 10.22038/IJBMS.2022.61175.13536.

Effect of multi-epitope derived from HIV-1 on REM sleep deprivation-induced spatial memory impairment with respect to the level of immune factors in mice

Roya Lahimgarzadeh [1], Salar Vaseghi [2], Mohammad Nasehi [3 4], Fatemeh Rouhollah [1]

Affiliations

PMID: 35655593 PMCID: PMC9124535 DOI: 10.22038/IJBMS.2022.61175.13536

Free PMC article

Abstract

Objectives: Sleep deprivation (SD) has a negative impact on cognitive functions including learning and memory. Many studies have shown that rapid-eye-movement (REM) SD also disrupts memory performance. In this study, we aimed to investigate the effect of multi-epitope Gag-Pol-Env-Tat derived from Human immunodeficiency virus 1 (HIV-1) on REM SD-induced spatial memory impairment with respect to the levels of interleukin-4 (IL-4), interleukin-17 (IL-17), interferon-gamma (IFN-γ), immunoglobulin G1 (IgG1), immunoglobulin G2a (IgG2a), and lymphocyte proliferation in NMRI mice. We used multi-epitope Gag-Pol-Env-Tat derived from HIV-1 because Gag-Pol-Env-Tat immunogen sequence is one of the most sensitive immunogen sequences of HIV-1 that can significantly augment cellular and humoral immune systems, leading to the improvement of cognitive functions.

Materials and methods: Morris water maze apparatus was used to assess spatial memory, and multi-platform apparatus was used to induce RSD for 24 hr. Multi-epitope derived from HIV-1 was subcutaneously injected at the dose of 20 µgr/ml, once and fourteen days before RSD.

Results: RSD impaired spatial memory and injection of multi-epitope derived from HIV-1 reversed this effect. RSD decreased IL-4, IgG1, and IgG2a levels, while multi-epitope derived from HIV-1 reversed these effects. Multi-epitope derived from HIV-1 also increased lymphocyte proliferation and decreased IL-17 levels in both control and RSD mice.

Conclusion: Multi-epitope derived from HIV-1 may improve memory performance via induction of anti-inflammatory immune response.

Keywords: Epitopes; HIV-1; Immunologic factors; Sleep deprivation; Spatial memory.

Figures

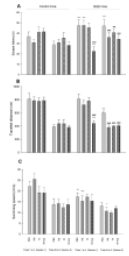

Figure 1 Effect of REM sleep deprivation...

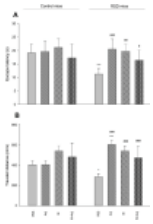

Figure 2 Effect of REM sleep deprivation...

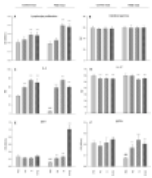

Figure 3 Effect of REM sleep deprivation...

Related information

MedGen

LinkOut - more resources

Full Text Sources

Europe PubMed Central

PubMed Central

Medical

HIV InSite