August 14, 2018

Project title

T cell responses to Herpes simplex virus type 1 in Alzheimer's disease

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Research area:

Clinical immunology

Brief description

Reactivated Herpes simplex virus type 1 (HSV1) infection has been linked to increased risk of Alzheimer's disease (AD). Virus-specific T cells are involved in the prevention of HSV1 reactivations. This mechanism could be disturbed in AD, either by allowing more frequent reactivation, leading to increased exposure to active virus, or by overactivation, contributing to inflammation-mediated neurodegeneration. Little is known of the role of the peripheral immune system in AD development, but immunosenescence of T cells could play a role. The overall aim is to investigate if HSV1-specific T cell immunity differs between AD patients and non-demented controls.

Aim

To investigate if HSV1-specific T cell immunity differs between AD patients and non-demented controls.

Background

Reactivated Herpes simplex virus type 1 (HSV1) infection has been linked to increased risk of Alzheimer's disease (AD). Virus-specific T cells are involved in the prevention of HSV1 reactivations. This mechanism could be disturbed in AD, either by allowing more frequent reactivation, leading to increased exposure to active virus, or by overactivation, contributing to inflammation-mediated neurodegeneration. Little is known of the role of the peripheral immune system in AD development, but immunosenescence of T cells could play a role.

Project plan

Methods: T cell cytokine responses to stimulation with HSV1 antigen will be studied using intracellular cytokine staining and flow cytometry, to estimate the frequency of HSV1-specific T-cells in peripheral blood. Specifically, IFN-γ response to stimulation will be quantified, using intracellular staining and flow cytometry, comparing 50 AD patients and 52 non-demented controls from biobank PBMC samples. HSV1 seropositivity will be analyzed in corresponding serum samples using the Herpes Select kit.
Importance: The interplay between HSV and the virus-specific peripheral cellular immune response has not previously been studied in AD. The results of the present study will clarify the role of HSV1-specific T cell immunity in AD. This information could provide a possible mechanism for the pathogenic significance of the peripheral immune system and indicate a possible new focus for intervention studies in early AD.

Student role:
The project is in its method development phase. The student will learn standard laboratory techniques, including PBMC isolation and preservation, intracellular cytokine staining and flow cytometry. Moreover, the student will continue developing and finalizing the method and then apply the method on patient samples, under appropriate supervision. Previous laboratory experience, and/or an interest in cellular immunology, is preferred. This project is run at Molecular Geriatrics, Rudbeck laboratory (Dep. of Public health and Caring Sciences), in collaboration with Infectious Diseases (Dep. of Medical Sciences) and Clinical immunology (Dep. of Immunology, Genetics, and Pathology).

Contact details

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