

AAN 69th ANNUAL MEETING ABSTRACT

Media Contacts:

Renee Tessman, rtessman@aan.com, (612) 928-6137

Michelle Uher, muher@aan.com, (612) 928-6120

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Abstract Title: Symptomatic and objective clinical improvement in progressive multiple sclerosis patients treated with autologous Epstein–Barr virus-specific T cell therapy: Interim results of a phase I trial

Press Release Title: Preliminary Study Suggests Possible New Treatment for MS

Objective: To determine the safety of treating progressive multiple sclerosis (MS) patients with autologous Epstein–Barr virus (EBV)-specific T cells.

Authors: Michael Pender, Peter Csurhes, Corey Smith, Nanette Douglas, Michelle Neller, Leone Beagley, Sweera Rehan, Tracey Hopkins, Kate Thompson, Stefan Blum, Kerry Green, Zara Ioannides, Alan Coulthard, Kaye Hooper, Scott Burrows, Rajiv Khanna

Background: Mounting evidence indicates a role for EBV in MS pathogenesis. EBV-infected autoreactive B cells might accumulate in the CNS because of defective cytotoxic CD8⁺ T-cell immunity.

Design/Methods: In this trial we administer autologous EBV-specific T cells to patients with progressive MS (EDSS 5.0–8.0). Each patient receives their own T cells stimulated *ex vivo* to enhance reactivity to EBV nuclear antigen-1, latent membrane protein 1 (LMP1) and LMP2A, and is followed through 26 weeks. Four escalating dose infusions are administered biweekly.

Results: To date, four SPMS patients and one PPMS patient have been treated. No significant adverse events have been observed. Three patients experienced symptomatic and objective clinical improvement, which commenced 2–8 weeks after the first infusion and was most marked in the two patients receiving T cells with the highest EBV reactivity. Striking improvement occurred in one SPMS patient, with normalization of lower extremity tone and plantar (Babinski) responses for the first time in 16 years, increased walking distance with walker from 100 meters at baseline and for the previous 5 years to 1200 meters, marked reduction in fatigue, increased manual dexterity, and improvements in lower extremity power, reflexes and sensation. A second SPMS patient had reduced fatigue, increased productivity and improved balance. The third responder (PPMS) had improved color vision, visual acuity and manual dexterity and reduced fatigue, lower extremity spasms and urinary urgency. These data are consistent with prior data from the first patient ever treated (SPMS compassionate use) who experienced reduced fatigue and lower extremity spasms, and improved cognition, hand function and productivity.

Conclusions: This is the first report of clinical improvement in a prospective trial of autologous EBV-specific T cells to treat progressive MS patients. Further studies are planned.

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