UDK 616.832-004-085 / Ser J Exp Clin Res 2008; 9 (3): 89 – 92

REDUCING THE PHAGOCYTIC ABILITY OF MONOCYTES IN PATIENTS WITH MULTIPLE SCLEROSIS

Nemanja Zdravkovic[1], Sladjana Pajovic[1], Gordana Radosavljevic[1], Dusica Zdravkovic[1] Ivan Jovanovic[1], Suzana Popovic[1], Dejan Baskic[1], Slobodan Zdravkovic[2] Nebojsa Arsenijevic[1]
[1]Department of Microbiology and Immunology, Medical faculty, University of Kragujevac
[2]Neurology department, Clinical Center in Kragujevac, Serbia

SMANJENJE FAGOCITNE SPOSOBNOSTI MONOCITA KOD PACIJENATA OBOLELIH OD MULTIPLE SKLEROZE

Nemanja Zdravković[1], Sladjana Pajović[1], Gordana Radosavljević[1], Dušica Zdravković[1] Ivan Jovanović[1], Suzana Popović[1], Dejan Baskić[1], Slobodan Zdravković[2] Nebojša Arsenijević[1]
[1]Katedra za Mikrobiologiju i imunologiju, Medicinski fakultet, Univerzitet u Kragujevcu,
[2]Neurološka klinika, Klinički centar u Kragujevcu, Srbija

Received / Primljen: 29. 05. 2008. Accepted / Prihvaćen: 15.10.2008.

ABSTRACT

Multiple sclerosis (MS) is an immune-mediated disease of the CNS that is characterised by inflammation, demyelination, and axon loss. It is an autoimmune disorder involving inflammatory T cells (CD4+, CD8+) and auto-antibodies against myelin antigens such as myelin basic protein (MBP), proteolipid protein (PLP) and myelin oligodendrocyte glycoprotein (MOG). During the process of the autoimmune inflammatory attack in the CNS a large amount of apoptotic T cells is generated. Microglia and blood monocyte-derived macrophages play the most important part in the efficient clearance of these cells. Their ability to engulf the apoptotic cells efficiently is accompanied by an array of anti-inflammatory effects that are important in reaching the remitting phase.

We observed the ability of monocytes to efficiently clear apoptotic T cells in individuals with MS. It was found that the percentage of monocyte-induced phagocytosis of apoptotic lymphocytes as well as the phagocytic potential of monocytes significantly decreased ($p = 0.000$) in people with MS compared to healthy controls. Our results suggest that the reduction in the ability of monocytes to efficiently engulf a large number of apoptotic cells is connected to the inflammatory process in diseases such as MS.

Keywords: phagocytosis, monocytes, T cell, apoptosis, multiple sclerosis

SAŽETAK

Multipla skleroza (MS) je imunski posredovano oboljenje centralnog nervnog sistema (CNS) koju karakteri{e zapaljenje, demijelinizacija i gubitak aksona. To je autoimunsko oboljenje u kome učestvuju zapaljenske T ćelije (CD4+, CD8+) i autoantitela prema antigenima mijelina, kao {to su mijelinski bazni protein (MBP), proteolipidni protein (PLP) i mijelinski oligodendrocitni glikoprotein (MOG). Tokom ovog autoimunskog zapaljenskog procesa stvara se veliki broj apoptotičnih T ćelija u CNS-u. Mikroglija i makrofagi (koji potiču od monocita) imaju najvažniju ulogu u efikasnom uklanjanju ovih ćelija. Njihova sposobnost da fagocituju apoptotične ćelije je praćena nizom antizapaljenskih efekata. što je značajano za ulazak bolesti u fazu remisije.

U ovoj studiji smo pratili sposobnost monocita kod ljudi obolelih od multiple skleroze (MS) da efikasno uklanjaju apoptotične T ćelije. Prona{li smo da je procenat monocitne fagocitoze apoptotičnih limfocita i fagocitni potencijal monocita značajno smanjen ($p = 0,000$) kod pacijenata obolelih od MS-a. Ovakvo smanjenje sposobnosti monocita da efikasno fagocituju veliki broj apoptotičnih ćelija je povezano sa zapaljenskim procesom u oboljenju kao što je MS.

Ključne reči: fagocitoza, monocit, T limfocit, apoptoza, multipla skleroza

INTRODUCTION

Multiple sclerosis (MS) is an immune-mediated disease of the CNS that is characterised by inflammation, demyelination, and axon loss. Traditionally, MS is considered to be a $CD4^+$ T helper 1 (Th1)-mediated disease (1, 2), but these T cells alone are not sufficient to produce the typical neuropathology of the disease (3, 4). It has been shown that MS is an autoimmune disease with a heterogeneity of pathogenetic mechanisms responsible for myelin destruction (5, 6). Myelin is damaged due to an autoimmune attack consisting of several pathways and molecules. The most important myelin antigens are myelin basic protein (MBP), proteolipid protein (PLP) and myelin oligodendrocyte glycoprotein (MOG) (7-9).

In actively demyelinating lesions, T cells (CD4+, CD8+) and macrophages are dominant cells that participate in the inflammatory reaction (10 - 12). Apoptotic cell death of inflammatory T cells is an established mechanism to terminate an autoimmune inflammatory response in the rodent or human CNS. The apoptosis leukocytes lose the ability to release toxic components through receptor signals so that they are confined with-

Correspondence: Nemanja Zdravković; Kočićeva 4, 34000 Kragujevac, Srbija; 064 8776688; zdravkovic_nemanja@yahoo.com.