MedicalXpress

Type 1 diabetes alters bone marrow and pro-inflammatory white cell count

October 24 2013

(Medical Xpress)—A new University of Sydney study has found that having Type 1 diabetes alters the normal communication between the human central nervous system and bone marrow, causing inflammatory effects and further disease.

The study, published in the *American Journal of Pathology*, has demonstrated a previously unrecognised link between bone marrow and the central nervous system in both people and rodents with Type 1 diabetes, which in turn affects their immune systems.

The multidisciplinary study, spanning two continents and various laboratories, has shown that Type 1 diabetes modulates the nerve supply and immune function of the bone marrow.

Lead author, PhD student at the University of Sydney, Ping Hu, and senior authors, Professor Maria Grant of the University of Florida at Gainesville and Professor Tailoi Chan-Ling of the University of Sydney have shown that this altered communication leads to an increase in the level of monocytes (white cells) being produced by the bone marrow in both human and rodents with Type 1 diabetes.

In animal studies, the investigators were able to show that these cells infiltrate the brain and cause an increase in inflammatory signals in its sympathetic centers.

By using minocycline, a widely available antibiotic with anti-

inflammatory effects that can cross the blood-brain barrier, the researchers have shown that they can reduce the inflammatory response in the brain seen in Type 1 diabetes.

By targeting this previously unrecognised pathway, the authors suggest that minocycline can reduce the microvascular complications seen in Type 1 diabetes and support the need to target central inflammation in the management of T1D.

"Minocycline is an antibiotic which has anti-inflammatory effects that can cross the blood-brain barrier," Professor Chan-Ling said.

"Our study found the use of this antibiotic could reduce the inflammatory response in the brain seen in Type 1 diabetes in animals, and there are some preliminary patient studies that show minocycline also reduces some diabetic complications in human.

"Further studies are urgently needed to examine the potential of this additional therapeutic pathway in diabetes.

"The use of minocycline, had a distinct effect in minimising the disease as expressed in the brain."

By targeting this previously-unrecognised pathway, the authors suggest minocycline could help to reduce the microvascular complications seen in Type 1 diabetes and support the need to target central inflammation in the management of the condition.

Provided by University of Sydney

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