

## **Researchers link diabetic complication, nerve damage in bone marrow**

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A research team led by a Michigan State University professor has discovered a link between diabetes and bone marrow nerve damage that may help treat one of the disease's most common and potentially blindness-causing complications.

The key to better treating retinopathy - damage to blood vessels in the retina that affects up to 80 percent of <u>diabetic patients</u> - lies not in the retina but in damage to the nerves found in bone marrow that leads to the abnormal release of <u>stem cells</u>, said Julia Busik, an associate professor in MSU's Department of Physiology.

"With retinopathy, <u>blood vessels</u> grow abnormally in the retina, distort vision and eventually can cause <u>blindness</u>," said Busik, whose research appears in a recent issue of the <u>Journal of Experimental Medicine</u>. "There has been a lot of progress in treating the complication, but most treatments use a laser that is painful to the patient and destroys parts of the retina."

Busik and her team found that <u>nerve damage</u> in diabetic bone marrow where stem cells known as endothelial progenitor cells reside - affects the daily release of those EPCs into the <u>bloodstream</u>. Normally EPCs would exit the bone marrow and repair damage done in the vascular system during sleep.

Using animal models, the research team observed that the pattern of EPC release is faulty in diabetic bone marrow, creating abnormally low



levels of EPCs during sleep, when they are needed most. That decrease in EPC release from a diabetic patient's bone marrow preceded the development of retinopathy.

"When the bone marrow suffers nerve damage in diabetic patients, it no longer provides a signal for the timely release of these reparative stem cells," Busik said.

This novel finding shows that bone marrow nerve damage represents a new therapeutic target for treatment of all diabetic vascular complications, such as retinopathy.

"This opens up new avenues to better treatments outside of the retina that focus on stem cells and the causes of the nerve damage in bone marrow," said Busik, whose collaborators included other researchers from MSU and the University of Florida. "We know what happens in the retina and have treatments that are very invasive; we now can look at a host of other options."

Those options include looking at ways to prevent the original nerve damage in the bone marrow and potentially repairing or replacing the damaged endothelial progenitor cells.

Busik's work was funded by the National Institutes of Health, the Juvenile Diabetes Research Foundation and the Michigan Agricultural Experiment Station.

Future work needs to be done to explain why the nerve damage in <u>bone</u> <u>marrow</u> occurs in diabetic patients to begin with, she said.

Provided by Michigan State University



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