FLORIDA STATE UNIVERSITY NEWS
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FSU researcher studying ways to treat spinal cord injuries at cellular levels

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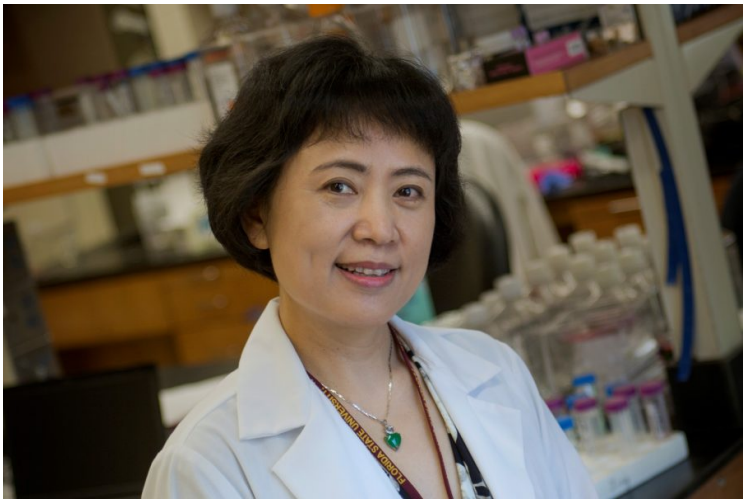

➤ Yi Ren is a professor of biomedical sciences at the Florida State University College of Medicine.

Supported by a new $800,000 National Science Foundation grant, Florida State University College of Medicine Professor Yi Ren is studying the immune response to spinal cord injuries and how cellular functions contribute to paralysis and organ dysfunction.

While instant paralysis is an obvious point of fear in spinal cord injuries, a great deal of the damage actually takes place after the initial trauma.

“Most of the research being done by scientists who focus on spinal cord injuries is about trying to prevent the secondary injury from happening,” said Ren, a biomedical scientist and immunologist.

During a severe spinal cord injury, the myelin sheath that protects nerves and axons — the central nervous system’s primary transmission lines — shatters into tiny pieces. As part of the body’s immune response to such an injury, damaged tissue in the area is filled with macrophages, white blood cells that ingest foreign material.

The macrophages’ job is to act as scavengers and clear myelin debris from the injury site to promote regeneration. Macrophages remain in the injured area for months or even years, which is not necessarily a good thing.

By absorbing debris, macrophages help to prevent inflammation and stimulate tissue healing. However, once the debris is consumed, the macrophages convert from “healing” cells to harmful “killer” cells, destroying axons and amplifying inflammation at the injury site.

Ren’s four-year study funded by the NSF grant aims to better understand the underlying mechanisms in this process.

“After eating the myelin debris, the ‘killer’ macrophages secrete a lot of inflammatory substances and molecules that participate in tissue damage,” Ren said. “We think this is one of the reasons for secondary injury, so now we’d like to target it. We want to study the myelin-laden macrophages’ molecular pattern and find out what roles they play in the pathological process in a spinal cord injury.”

The work will produce an extraordinary amount of data that Ren and her collaborators will use to develop a new statistical method of analysis. She hopes the acquired data will allow her team to find cellular and molecular clues to target local and systemic inflammation that can result from spinal cord injuries.