K-State receives patent for noncontroversial source of stem cells

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Kansas State University has been a issued a patent for a plentiful and noncontroversial source of stem cells from a substance in the umbilical cord.

The patent addresses procedures to isolate, culture and bank stem cells found in Wharton's jelly -- the substance that cushions blood vessels in the umbilical cord. These cells are called cord matrix stems cells and are different than those obtained from the blood cells in umbilical cords. The patent is for work by K-State's Mark Weiss and Deryl Troyer, professors of anatomy and physiology; Duane Davis, professor of animal sciences and industry; and former K-State professor Kathy Mitchell. Troyer and Davis were the first to find this previously unidentified source of stem cells.

The patent for Cultures, Products and Methods Using Umbilical Cord Matrix Cells was issued earlier this year to the Kansas State University Research Foundation, or KSURF. The Foundation is a non-profit corporation responsible for managing the technology transfer activities of K-State.

While stem cell research is again stirring debate, the K-State team calls their discovery an effective alternative.

"While there are ethical controversies with stem cells gathered from other tissues in the body, stem cells in Wharton's jelly can be harvested noninvasively and therefore are not controversial," Davis said.

Conservatively, the jelly contains well over a million stem cells, he said.

"Any amniote -- that includes birds, reptiles and mammals -- has an umbilical cord or something like it, so this applies to humans as well as animals," Davis said.

In further studies the researchers found the stem cells in Wharton's jelly to be primitive in nature, meaning the cells could undergo more divisions than most adult stem cells, giving them a wide range of regenerative potential. This makes them useful for diverse applications.

The K-State team has explored numerous applications for the stem cells, including using them to repair the nervous system; transporting capsules of anti-cancer drugs directly into tumors; and xenotransplantion of the cells. Each time, the cells have elicited little immune response, meaning they weren't rejected by the host's body, Davis said.

"As far as their role in cancer therapy, they are an excellent weapon," Troyer said. His team has genetically engineered the cells to secrete anti-cancer proteins. He is developing them for delivery of nanomedicines. The team's findings also indicate the cells naturally produce antibodies that make tumors shrink.

"They do have the regenerative potential for joint injuries, and could be used in humans as well as companion animals like dogs, horses and cats, as a way to treat injuries or degenerative diseases and improve the quality of life," Davis said.

Outside of their applications to healing bodily injuries and treating cancer, Troyer and Davis said the potential exists for the cells to be used in delivery of other useful therapeutic molecules, possibly even the delivery of vaccines.

"They also may prove to be a way to deliver very expensive drugs in small amounts to treat specific diseases in cattle or pigs," Davis said. "One thing we've shown is that if you take a newborn pig before it has nursed and administer these cells by mouth, they actually graft in the intestine."

Since the team first published results showing that Wharton's jelly contains stem cells, many publications around the world have appeared, indicating major international interest in potential applications of the cells.

Provided by Kansas State University

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