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Stem-cell therapy theory advanced

Chicago firm sees potential against neurologic diseases

By Jon Van

Tribune staff reporter

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PHILADELPHIA -- Human stem cells taken from a patient's bone marrow may help in treating Alzheimer's, Parkinson's and other neurologic diseases, the chairman of a Chicago biotechnology firm told a meeting here Wednesday.

Stem cells are the body's generalized building blocks and have the ability to produce tissue to build bones, nerves and muscle. Kiminobu Sugaya of Chicago's NewNeural LLC has processed human stem cells into nerve cells and implanted them in the brains of aged, demented rats.

The implanted nerve cells improved the rats' memories, Sugaya found, and could one day do the same for humans.

"In the animals we see a tremendous increase in neurons," Sugaya told a meeting of BIO 2005, the biotech industry's largest trade show.

Sugaya said that by using stem cells taken from a patient to create nerve cells, his process avoids triggering a tissue rejection reaction. The technique also avoids the ethical and political issues associated with using cells cloned from a human embryo.

Abortion foes have targeted embryo research as morally wrong, and President Bush opposes allowing the federal government to fund such stem cell research.

California voters have approved spending up to \$3 billion in state funds for stem cell research, including embryonic studies. The embryos typically are unused byproducts of fertility treatments.

Embryo stem cells are desirable to researchers because they have the ability to produce virtually any specialized type of cell. Adult stem cells are less versatile, and bone marrow stem cells cannot normally be coaxed into making nerve cells.

Sugaya said his technique reverses some of the memory in adult stem cells, making them more like embryonic cells.

NewNeural is currently working to better characterize the cells and refine its processes, Sugaya said. It may begin human trials of its products in three to four years.

Several other companies are working on other stem cell-based treatments for neurologic disorders. California-based StemCells Inc. could begin human trials as soon as next year.

Worldwide, about 300 companies are working on cell therapy products, said Dr. Scott Burger, an industry consultant with Advanced Cell & Gene Therapy.

One form of cell therapy, bone marrow transplantation, has been used for decades to treat patients with blood and immune disorders, Burger noted. But expanding cell therapy presents several challenges.

"Biotechnology uses cells to manufacture its products," said Burger. "In cell therapy, the living cells themselves are the product."

Despite the great promise of cell therapy, much of cell function is still a mystery to scientists, Burger said. For that reason, companies like NewNeural will understand the nature of their product only after they begin human trials.

"You continue to learn at every phase of the trial," he said, "and even after all the phases are completed, you still keep learning. With cell therapy, you never fully understand the product."

Unlike traditional drugs that are made to be uniform, cells are diverse and individual to the patient, he said. They require different manufacturing techniques, a new regulatory framework and often are delivered through surgery.

Dr. Stephen Oesterle, senior vice president at Medtronic Inc., said his firm now does nearly \$1 billion a year in its neural treatment business. This centers on devices that deliver medication or electrical stimulation using devices implanted within the patient's body.

While such therapies have greatly helped many patients, they are not cures, Oesterle said. Cell therapies offer the opportunity to actually restore a person's health with a cure, he said.

Surgical techniques Medtronic has devised will become more effective once they are used to deliver cell-based therapies, Oesterle predicted.

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