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August 27, 2015

Stem Cell Treatments Help Rats Live Longer, Healthier Lives

A new study appearing in *STEM CELLS Translational Medicine* indicates that stem cell injections helped rats live almost a third longer than normal. In addition, the treated animals remained both physically and mentally active longer throughout their life spans.

The study was conducted by researchers in Korea, led by Yun-Bae Kim, D.V.M., Ph.D., at Chungbuk National University's College of Veterinary Medicine, and Jeong Chan Ra, D.V.M., Ph.D., at the Biostar Stem Cell Research Center, Biostar Group, in Seoul.

Aging is characterized by the loss of regenerative capacity of cells and tissues, leading to the shrinkage of body mass and increased susceptibility to stress. "When new cells are not able to replace the ones that die, tissue integrity and functions decline. Therefore, it has been suggested that exhaustion of stem cells may be a major cause of aging in humans and that the proliferative potential of stem cells is related to life span," said Dr. Kim.

His group wondered whether replenishing stem cells might have an anti-aging effect. Their curiosity was sparked by studies conducted on mice suffering from progeria, an extremely rare genetic disorder that causes premature aging. The animals' lives were extended after receiving stem cell treatments. Other studies indicated improved cognitive function in mice with Alzheimer's disease that were also treated with stem cells.

The Kim-Ra team decided to test whether stem cell treatments might have the same benefits for healthy animals.

To carry out their study, they divided 10-month-old male rats into two groups and intravenously transplanted each group with either human amniotic-membrane-derived mesenchymal stem cells (AMMSCs) or adipose-tissue-derived mesenchymal stem cells (ADMSCs). The transplantations were carried out once a month for the remainder of the animals' lives. The animals were compared to a control group of 7-month-old rats that received no cells.

At the end of the 20-month study, only 30 percent of the control group survived, compared to 70 percent and 100 percent of the animals in the AMMSC and ADMSC groups, respectively. "Collectively, the mean life span of the rats (604.6 days) was extended to 746.0 days (23.4 percent increase) and 793.8 days (31.3 percent increase) by treatment with AMMSCs and ADMSCs, respectively. The animals also remained both cognitively and physically active longer than normal, too," Dr. Kim said.

"We think these improvements in cognitive and motor functions might be due to the increased ACh (acetylcholine concentration, a major neurotransmitter or message sender) levels in the brain and muscles originating not only from the transplanted stem cells, but also from restored neurons," Dr. Ra added. "These results could be a starting point for more studies on ways to achieve similar results in humans, extending their health and lifespans using their own stem cells, too."

"As this line of research progresses, it will be interesting to learn more about the mechanisms behind these results and whether they will apply to other species," said Anthony Atala, M.D., Editor-in-Chief of *STEM CELLS Translational Medicine* and Director of the Wake Forest Institute for Regenerative Medicine.

Article: "Healthspan-Extending Activity of Human Amniotic Membrane- and Adipose Tissue-Derived Stem Cells in F344 Rats," Yun-Bae Kim, Jeong Chan Ra, Sung Geun Kanget al. (DOI: 10.5966/sctm.2015-0011). The article can be accessed at <http://StemCellsTM.com/> (<http://stemcellstm.alphamedpress.org/content/early/2015/08/26/sctm.2015-0011.abstract>).