

Study finds stem cells in deer antler

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A team of researchers in Seoul, Korea have reported finding evidence that deer antlers - unique in that they regenerate annually - contain multipotent stem cells that could be useful for tissue regeneration in veterinary medicine.

The study appears as an early e-publication for the journal *Cell Transplantation*, and is now freely available [on-line](#).

"We successfully isolated and characterized antler tissue-derived [multipotent stem cells](#) and confirmed that the isolated cells are self-renewing and can differentiate into multiple lineages," said study co-author Dr. Kyung-Sun Kang of the College of Veterinary Medicine at Seoul National University. "Using optimized culture conditions, deer antler displayed vigorous [cell proliferation](#)."

Deer antler has been an issue in the news recently when [professional athletes](#) allegedly therapeutically used deer antler sprays, said to contain the insulin-like growth factor, IGF-1, to recover from injuries. The Korean research team did not investigate the potential for deer antler to be used in human therapies, but suggested that it could be used in veterinary medicine due to the impact of two important factors; the regenerative and the proliferative capabilities of the stem cells they isolated.

Stem cells, cells with the capability to differentiate into varieties of cells, have been isolated from a number of tissues, including bone marrow, fat tissues, umbilical cord blood, placenta and menstrual blood. [Stem cell](#)

[research](#) in the last two decades has focused on both [pluripotent stem cells](#), able to differentiate into all cell types of the body, and multipotent stem cells, able to differentiate into some but not all cell types, the latter of which has a longer history of study as they were identified earlier.

Researchers have sought to use transplanted stem cells for many regenerative purposes – from using them to regenerate [neural cells](#) following stroke or [spinal cord injuries](#), to using stem cells to help regenerate failing or injured organs.

Deer antler is of interest, said the researchers, "because antlers are very peculiar organs in that they are lost and re-grown annually....a rare example of a completely regenerating organ in mammals."

According to the researchers, they subjected deer antler to differentiation assays for osteogenic (bone), adipogenic (fat) and chondrogenic (cartilage) lineages under culture conditions specific for each lineage to confirm the multi-lineage differentiation ability of antler multipotent stem cells. They concluded that deer antler tissue might be a "valuable source of stem cells" that could "be a potentially useful source of regenerative therapeutics in veterinary science."

The researchers noted that the development of deer-specific antibodies "is essential to confirm the identification of antler multipotent stem cells".

They specifically noted that injury to wild animals, including deer, might be treated using deer antler derived cells. They also pointed out that studies involving the use of horse stem cells have found clinical application of equine-derived stem cells.

"Deer-vehicle collision is frequent, inducing bone fracture," they wrote. "Antler multipotent stem cells could be used for therapeutic application

for wild animal treatments and tissue engineering."

"This study highlights a novel source of [stem cells](#) for use in veterinary reparative therapies for wild animals" said Dr. Alison Willing, Professor at the Center of Excellence for Aging and Brain Repair, University of South Florida. "Future studies of these cells will allow their full potential as a therapy to be discerned."

More information: Seo, M-S.; Park, S-B.; Choi, S-W.; Kim, J-J.; Kim, H. S.; Kang, K. S. Isolation and characterization of antler derived multipotent stem cells. Cell Transplant. Appeared or available online: January 2, 2013.

Provided by Cell Transplantation Center of Excellence for Aging and Brain Repair

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