Durham, NC – A team of researchers from **Gifu Pharmaceutical University** and **Gifu University**
in
Japan
has published results demonstrating that a type of
protein found in stem cells taken from adipose
(fat)
tissue
can reverse and prevent age-related, light-induced retinal damage
in a mouse model, offering hope for those faced with permanent vision loss.

The research, published in the latest issue of **STEM CELLS Translational Medicine**, has determined that a single injection of adipose-derived stem cells (ASCs) reduced the retinal damage induced by light exposure in mice. Also, the study found that adipose-derived stem cells in conditioned medium inhibited the retinal damage by hydrogen peroxide and visible light both in the medium and in live mice.

Moreover the research revealed that a type of protein called progranulin found in the ASCs might be what plays the pivotal role in protecting against light-induced eye damage.

Excessive light exposure leads to photoreceptor degeneration and several studies have suggested that a long-term history of exposure to light may have some impact on the incidence of age-related macular degeneration. Photoreceptor loss is the primary cause of blindness in degenerative diseases such as age-related macular degeneration and retinitis pigmentosa.

“However, there are few effective therapeutic strategies for these diseases,” said the study’s authors, Hideaki Hara, Ph.D., R.Ph., and Kazuhiro Tsuruma, Ph.D., R.Ph.

“Recent studies have demonstrated that bone marrow-derived stem cells protect against central nervous system degeneration with limited results. Just like the bone marrow stem cells, ASCs also self-renew and have the ability to change, or differentiate, as they grow. But since they come from fat, they can be obtained more easily under local anesthesia and in large

quantities."

The fat tissue used in the study was taken from a mouse, altered in the lab and then tested in retinal cells (from mice) in vitro, where it proved to have a protective effect. These results led the team to then test their theory on a live group of mice that had retinal damage after exposure to high levels of light.

Five days after receiving injections of the ASCs, the animals were tested for photoreceptor degeneration and retinal dysfunction. The results showed the degeneration had been significantly inhibited.

"Progranulin was identified as a major secreted protein of ASCs, which showed protective effects against retinal damage in culture and in animal tests using mice," Drs. Hara and Tsuruma said. "As such, it may be a potential target for the treatment of degenerative diseases of the retina such as age-related macular degeneration and retinitis pigmentosa. The ASCs reduced photoreceptor degeneration without engraftment, which is concordant with the results of previous studies using bone marrow stem cells."

"This study, suggesting that the protein progranulin may play a pivotal role in protecting against retinal light-induced damage, points to the potential for new therapeutic approaches to degenerative diseases of the retina," said, Anthony Atala, MD, editor of STEM CELLS Translational Medicine and director of the Wake Forest Institute for Regenerative Medicine.