Experts examine causes, treatment and prevention of glaucoma

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Although scientists know progressive degeneration of retinal ganglion cells and their axons is the primary cause of glaucoma, researchers have yet to identify a way to stop or prevent the degeneration.

The challenge to find a solution brought together a panel of 39 scientists to discuss the factors that may contribute to the disease. The report from the Fourth Annual ARVO/Pfizer Ophthalmics Research Institute Conference examined four areas of research into the cause of glaucomatous neurodegeneration and is published in the March 2009 issue of Association for Research in Vision and Ophthalmology's peer-reviewed journal *Investigative Ophthalmology & Visual Science* (IOVS).

The World Health Organization estimates that 65 million people worldwide have the disease, which is the second-leading cause of blindness. According to the report by Gülgün Tezel, MD, "The Role of Glia, Mitochondria, and the Immune System in Glaucoma: Fourth Annual ARVO/Pfizer Ophthalmics Research Institute Conference," recent research indicates that a variety of independent events on the cellular level of the eye can interact to contribute to glaucoma.

One conference session addressed the function of glial cells, which play many roles in support of neurons throughout the body, including those in the visual system. When glaucoma stress conditions appear, glial cells may not be able to adequately support neurons or perform their other functions, especially in older patients.

In another session, researchers discussed problems related to mitochondria, which provide energy to neurons and may prove to be a pathway to prevent neural degeneration in glaucoma patients.

"Targeting mitochondrial events using a specific chemical inhibitor or genetic manipulation appears to be a logical approach for neuroprotection," the report stated.

A discussion on immune response and its effect on glaucoma suggested that the response may initially slow the degeneration of the critical neurons, but the immunity protection itself may lead to problems if not properly controlled. The session called for more study about whether immune activity creates or worsens the neuron degeneration in glaucoma.

The conference concluded with a call for more research on how these factors interact, and asked participants to search for a better understanding of the precise cellular mechanisms related to glaucoma to help find treatments that manipulate the immune system into repairing neural tissue and improving the outlook for those susceptible to glaucoma.

Source: Association for Research in Vision and Ophthalmology