Hyperactive immune resistance brings blindness in old age

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Age-dependent macular degeneration (AMD) is the commonest cause of blindness in the western industrialised nations. Hereditary changes in the regulation of the immune system influence the risk of contracting AMD. Opthalmologists at the University Clinic in Bonn, working in co-operation with researchers from Göttingen, Regensburg and Great Britain, have now, for the first time, demonstrated that in cases of senile blindness the patient´s immune resistance is hyperactive throughout his entire body.

An Anglo-German research team embracing immunologists from Göttingen University has added a further important aspect to our current knowledge of the processes leading to senile blindness. For the first time, they have been able to show that in the case of patients with AMD their entire immune system is hyperactive. It had not previously been known whether such an immune reaction affecting the entire body played any role in this eye disease.

The investigation was conducted by scientists from Bonn, Göttingen, Regensburg and Oxford under the leadership of Privatdozent Dr. Hendrik Scholl of Bonn University´s Eye Clinic. The results achieved by this research team have now been published in the current edition of the *PLoS ONE*: http://www.plosone.org/article/info:doi/10.1371/journal.pone.0002593

Faults in the (immune) System

The Anglo-German research team worked on the hypothesis that one cause of the appearance of senile blindness, AMD, might be faulty regulation of the so-called complement system. This system is an important element in our hereditary immune resistance, and is involved where inflammatory reactions occur. Previously, it had only been known that changes in genes containing the hereditary information for proteins in the complement system increase the risk of contracting AMD. Some of these proteins activate, others inhibit, the complement system.

The team examined the blood of a total of 112 AMD-patients and 67 healthy control persons for signs of faults in the regulation of their complement systems. They sought out changes in protein concentration which would indicate activation of the complement system. The experiments were conducted in Göttingen University´s Department for Cellular and Molecular Immunology under the leadership of Professor Dr. Martin Oppermann. The investigations of the patients´ blood did, indeed, reveal clear changes in the concentrations of a number of complement proteins which, moreover, correlated closely to the previously identified hereditary factors.

Dormant inflammatory Situation of the Body

"Our study has revealed for the first time that in the case of AMD patients the complement system is hyperactive over the entire body", Dr. Hendrik Scholl declares. The typical substances indicating a permanent inflammatory reaction circulate in the blood. "These results infer that senile blindness may arise from a permanent state of inflammation in the body. This can obviously lie dormant for decades, then in advanced old age can lead to the appearance of symptoms of the disease. According to Dr. Scholl, the point of most acute vision, at the centre of the retina, appears to be the susceptible point.

In Germany, an estimated 4.5 million people suffer from age-dependent

macular degeneration (AMD). With this disease, the point of most acute vision on the retina (macula) becomes subject to progressive deterioration. The patient can no longer read, and he or she loses the ability to lead an independent existence. Opthalmologists had hitherto known comparatively little about the causes of this disease, except that hereditary factors were involved, and also other easily influenced factors, such as smoking.

Source: University of Bonn