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Scientists identify the genes that cause blindness produced by corneal edema

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This press release is available in French and Spanish. Scientists of the University of Granada (Spain) and the San Cecilio Teaching Hospital (Granada) have determined for the first time the causes for the blindness produced by corneal oedema and have identified the genes which cause it. The research group of Tissue Engineering of the UGR and the San Cecilio University Hospital, who has recently constructed the first complete artificial cornea, has established in a research work which has just been published in the journal '*Experimental Eye Research*' new findings related to blindness caused by corneal oedema originated by the alteration of the cell barrier of corneal endothelium. When the endothelial cell barrier is unharmed, the cornea remains dehydrated and transparent.

An oedema is a swelling caused by the accumulation of liquid in the tissues of the human body, including cornea. The researchers of Granada have proved that the alteration of the mechanisms that regulate the volume of endothelial cells and their content in ions is the cause for which the endothelial barrier stops being effective in the control of corneal transparency.

Ion concentration

The research work has experimentally established the volume and concentration of ions in cells when they make up the endothelial barrier and when they stop forming it. If, due to a traumatism, cataract surgery, ageing, etc., the barrier of endothelial cells breaks, dispersed cells increase their volume and content in ions, potassium and chlorine. The goal of these changes is to repair the endothelial barrier, prevent corneal oedema and, therefore, the loss of transparency and the resulting blindness. The research carried out in the University of Granada has also determined the genes involved in the control of such process.

Such recent findings suggest new treatments for corneal oedema. The scientists explain that maybe in the not too distant future it will be possible to use eye drops which provide the ions involved or even the possibility of modifying the affected genes by means of gene therapy, which could mend or palliate some of these alterations.

Source: Universidad de Granada

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