

Intraocular Cell-Based Production of Glucagon-Like Peptide-1 in the Anterior Chamber

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Purpose. To examine the intraocular production of glucagon-like peptide-1 (GLP-1) by CellBeads implanted into the anterior chamber.

Methods. The experimental study included 12 New Zealand white rabbits and a GLP-1 fusion peptide secreting cell line encapsulated into alginate hydrogel beads. The group of animals was divided into three subgroups receiving 5, 10 or 20 GLP-1 CellBeads per animal, respectively. Aqueous humour samples were taken at baseline and at one and two weeks after implantation.

Results. Compared with the baseline value, the GLP-1 concentration in the aqueous humour samples increased significantly ($P=0.001$) from values below the detectability level of 2 pM at baseline to 20.7 ± 15.4 pM at one week after the implantation, and decreased significantly ($P=0.001$) to a concentration of 8.9 ± 7.9 pM at 2 weeks after the implantation. That value was still significantly ($P=0.002$) higher than the baseline value. The concentration of GLP-1 in the aqueous humour increased significantly with the number of beads implanted ($P=0.01$; correlation coefficient $r=0.73$).

Conclusion. The results suggest that GLP-1 is produced by cells embedded in an alginate hydrogel and implanted into the anterior chamber, without detection of major incompatibilities such as rise in intraocular pressure or immunologic reaction against the xenogenic cells. The intracameral cell-based drug therapy with GLP-1 producing CellBeads is feasible.