

Elucidation of the role of heparan sulfate in neural crest cell differentiation and establishment of a new concept of glaucoma pathogenesis

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【Outline of survey】

Glaucoma is the leading cause of blindness, associated with irreversible optic nerve damage. The most significant factor for the progression of glaucomatous optic nerve damage is intraocular pressure. Disturbed drainage function of the iridocorneal angle in the eye results in increased level of intraocular pressure which accelerates the progression of glaucomatous optic nerve damage. Neural crest cells are the major components of the iridocorneal angle tissue. It has been suggested that the disturbed differentiation of neural crest cells is involved in dysfunction of drainage system in the iridocorneal angle. Our recent results have revealed that the deficiency of heparan sulfate in the neural crest cells induces developmental glaucoma in the mutant mice eyes associated with the iridocorneal angle anomaly. Our research aim is to reveal the essential role of heparan sulfate in the differentiation and migration of neural crest cells, and the molecular interaction between heparan sulfate and morphogens for the iridocorneal angle formation.

【Expected results】

Our research project will reveal not only the role of heparan sulfate in glaucoma pathogenesis but also demonstrate the new concept of the treatment with heparan sulfate for dysfunction of ocular drainage system in glaucomatous eyes. Moreover, the findings will be also expected to discover the molecular mechanism about migration and differentiation of neural crest cells.

【References】

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- Grobe K, Inatani M, Pallerla SR, Castagnola, J, Yamaguchi Y, Esko JD. Cerebral hypoplasia and craniofacial defects in mice lacking heparan sulfate ndst1 gene function. *Development* 2005;132:3777-3786.

【Term of project】 FY2007 - 2011

【Budget allocation】 13,900,000 yen
(2007 direct cost)

【Homepage address】

<http://www2.kuh.kumamoto-u.ac.jp/ganka/kyousitu/naiyou.html>