

International Conference and Expo on

Cataract and Optometrists Meeting

August 04-05, 2016 Manchester, UK

3D-bioengineering of the conventional outflow tract for high throughput drug or gene transfer screening for glaucoma treatment

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Among ocular pathologies, glaucoma remains the second leading cause of blindness. The exact molecular mechanisms that lead to glaucoma remain to be elucidated; yet have been attributed to damage of the conventional outflow tract. Conventional outflow tissues, a composite of the trabecular meshwork and the Schlemm's canal, regulate and maintain homeostatic responses of aqueous humor outflow. There are no drugs targeting this structure implicated as the cause of glaucoma. This is, in part, due to limits in our understanding of the pathology at the molecular level and lack of an *in vitro* model system for outflow studies. To address this problem, we have successfully engineered a biomimetic conventional outflow tract as a model for understanding of TM outflow physiology and pathology and development of TM targeted therapies. We designed and used a 3D multi-culture system consisting of HTM cells and HSC cells sequentially seeded on a highly porous, micro-fabricated, hydrogel-scaffold. We demonstrated that our biomimetic conventional outflow tract exhibited *in vivo*-like characteristics (ultrastructure, cytoskeletal orientation/organization, marker-gene expression, extracellular matrix (ECM) deposition, and outflow regulation). In particular, the biomimetic conventional outflow tract exhibited homeostatic responses to elevated pressure and physiological responses to pharmacotherapies and gene transfer. This model can be used to understand the physiology of the conventional outflow tract and the pathology of glaucoma, as well as to predict the physiological responses of its *in vivo* counterpart in the development of glaucoma pharmacotherapy. In addition, this modality may also facilitate more rapid development of technologies for glaucoma diagnosis and treatment.

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Analysis on tracing revelation for five years cataract blindness prevention data in Sichuan and Chongqing of China

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Objective: A comparative analysis on cataract blindness prevention data for 5 years tracing in Sichuan and Chongqing, to further understanding blindness prevention main gap between the two provinces and to clarify the focus of the cataract blindness prevention in next five years.

Method: Extract blindness prevention data of 5 years in Sichuan and Chongqing which have been published in China blind net between January 2010 and December 2010 and statistical analysis on reported cases, surgery cases and mode of core data; further clarify the top five main cataract blindness prevention medical institutions and possible market share of cataract blindness surgery.

Result: The top five main cataract blindness prevention medical institutions are mainly private eye institutions; the statistical analyses cataract blindness operation indicate their market share is relatively low (only 19% in Sichuan and 48% in Chongqing).

Conclusions: 1 cataract surgery is a very uncertain market, which is no doubt that strongly need public hospital participation; 2 based on the analysis for 5 consecutive years relative market data, Chongqing fluctuation is bigger, that is the market steady not enough; 3 Chongqing has more people, the existing cataract surgery digestive ability is insufficient, it badly needs much more investment in manpower and material resources.

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