

**IBT Researchers Discover Receptor's Role in Cataracts,
Related Eye Diseases**

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Researchers at the Texas A&M Health Science Center Institute of Biosciences and Technology at Houston have uncovered a receptor's role as the cause of certain eye diseases, including glaucoma, and its regulation could help in development of corresponding treatments.

The study is currently available online in the *Proceedings of the National Academy of Sciences* and will be in an upcoming issue of the journal.

"G-protein coupled receptors (GPCRs) regulate a variety of physiological functions, from vision, olfaction, taste and reproductive biology to cardiovascular functions," said Mingyao Liu, Ph.D., professor in the Center for Cancer and Stem Cell Biology at HSC-IBT and senior author. "GPCRs are the largest membrane receptor family in the human genome. Our study focuses on *Gpr48*, a new hormone receptor in animals and humans."

Development of the anterior eye segment in mammals is critical for normal ocular functions. Abnormal development results in glaucoma (clouding of the eye), a leading cause of blindness that affects an estimated 70 million people worldwide.

In their study, Dr. Liu and his colleagues found a GPCR called *Gpr48* plays an important role in anterior segment development. *Gpr48* is also key in various physiological functions throughout the body and widely expressed in multiple organs at both embryonic and adult stages. Recent studies have shown that *Gpr48* plays important roles in growth retardation, renal and reproductive system development, and carcinoma cell invasion and spread.

Deletion of the *Gpr48* receptor in mice resulted in various forms of anterior segment dysgenesis (ASD), including microphthalmia (small eyes), iris hypoplasia (underdeveloped iris), iridocorneal angle malformation (irregular angle of the iris and cornea), cornea dysgenesis (clouding of the cornea) and

cataracts. The ASD was formed by removal of *Gpr48* combined with a decreased expression of *Pitx2*, a key gene regulating iris and anterior segment development.

As a result of this study, future research could validate *Gpr48* as a potential therapeutic target for the treatment of ASD, Dr. Liu said.

"G-protein coupled receptors are key drug targets, and more than 50 percent of the drugs sold in the market are targeting this family of receptors and their signaling pathways," Dr. Liu said. "Identification of *Gpr48* and the signaling pathways regulated by this receptor will help us develop new therapeutic drugs that target this receptor in specific human diseases."

Other HSC-IBT contributors to the *PNAS* study were James F. Martin, M.D., Ph.D., professor in the Center for Cancer and Stem Cell Biology; Brad A. Amendt, Ph.D., associate professor in the Center for Environmental and Genetic Medicine; and Jinsheng Weng, Jian Luo, Xuhong Cheng, Di Ai, Dali Li, and Jun Wang, graduate research assistants.

Also contributing were Chang Jin, Xiangtian Zhou, Jia Qu and Lili Tu of the School of Optometry and Ophthalmology and Eye Hospital at Wenzhou Medical College in China. Luo and Li are with the Institute of Biomedical Sciences and School of Life Sciences at East China Normal University, and Dr. Liu is a guest professor with East China Normal University and Wenzhou Medical College.

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The Texas A&M Health Science Center provides the state with health education, outreach and research. Its seven colleges located in communities throughout Texas are Baylor College of Dentistry, the College of Medicine, the College of Nursing, the Graduate School of Biomedical Sciences, the Institute of Biosciences and Technology, the Irma Lerma Rangel College of Pharmacy, and the School of Rural Public Health.

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