Antibodies for Glaucoma Research

Detecting glaucoma-associated myocilin with antibodies that bind to different conformational states

These novel recombinant antibodies selectively bind the olfactomedin domain of myocilin and can detect differences in its conformational states. This invention from Georgia Tech aims to address shortcomings in existing research; previously, available antibodies have recognized several epitopes across the myocilin protein but were unable to distinguish between correctly folded and mutated or misfolded forms—a critical difference as misfolded forms are linked to ocular disease. As a result, research on therapeutic development for glaucoma and ocular disease has lacked the ability to discriminate between properly folded myocilin and myocilin that is adopting a disease state in a given sample.

This technology aims to improve upon this limitation by providing antibodies that specifically bind to correctly folded myocilin or specifically bind to misfolded myocilin, while also providing methods for validating cells and tissues that are frequently used in glaucoma research. Together, these improvements open the potential for the development of pharmaceutical compositions to treat glaucoma or prevent glaucoma-induced damage to the eye.

Summary Bullets

- **Precise**: Distinguishes between correctly folded and mutated forms from samples, allowing for more precise research and interventions
- **Powerful**: Enables a more complete and robust understanding of myocilin antibody targets and their applications in potential glaucoma treatments
- **Enabling**: Opens new opportunities for development of pharmaceuticals to treat or prevent damage to the eye caused by glaucoma

Solution Advantages

- **Precise**: Distinguishes between correctly folded and mutated forms from samples, allowing for more precise research and interventions
- **Powerful**: Enables a more complete and robust understanding of myocilin antibody targets and their applications in potential glaucoma treatments
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Potential Commercial Applications

- Biological research
- Pharmaceutical compositions for glaucoma treatment and prevention of glaucoma-induced damage

Background and More Information

Primary open-angle glaucoma is the second leading cause of irreversible blindness worldwide. Mutations in the MYOC gene that encodes for myocilin are causative for some forms of juvenile and adult-onset primary open-angle glaucoma. In the glaucoma research field, anti-myocilin antibodies are an important tool, used to track the protein in a variety of human samples and animal models, as well as validate cell lines.

In a recent study that tested commercial myocilin antibodies recommended by the research to identify specific epitopes, these antibodies recognized several epitopes across the myocilin protein, but were unable to distinguish between correctly folded and mutated misfolded forms. This is a significant limitation, as mutated, misfolded forms are linked to ocular disease. Without the ability to distinguish between folded and misfolded forms of myocilin, there is less insight gained from studies because myocilin is prone both to amyloid aggregation. A more precise understanding of myocilin antibody targets, including conformational specificity, will therefore aid in standardizing protocols and in turn, leading to a better understanding of eye physiology and disease.

Inventors

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IP Status

<p>Patent application has been filed</p>: US17/925098

Publications

Antibodies Used to Detect Glaucoma-Associated Myocilin: More or Less Than Meets the Eye?, Investigative Ophthalmology and Visual Science - May 2019

Images

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