

Ophthalmic Diseases Drug Discovery & Development Solutions



Contact Us







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https://www.protheragen.us/ophthalmic-disease/





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Protheragen Ophthalmic Diseases

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About Protheragen

Protheragen stands at the forefront as a premier, full-service solutions provider, with a profound specialization in the development of drugs and therapies for ophthalmic diseases. Our comprehensive service portfolio encompasses preclinical studies and clinical research services, prominently featuring investigator-initiated trials (IITs). Furthermore, we take pride in our extensive collection of human biospecimens, sourced from both healthy donors and ophthalmic disease patients. These specimens serve as a crucial resource, bolstering your efforts in developing drugs and therapies across diverse ophthalmic disease fields.

Our Mission

Our mission is to catalyze the advancement of rare eye disease drug development, offering pioneering solutions and services to global innovators.

Our Strategy

Our core strategy focuses on nurturing collaborative relationships with esteemed global research pioneers, deeply engaged in pioneering drug development for rare eye diseases.

Our Vision

At Protheragen, we aspire to a future enhanced by our contributions, which will play a pivotal role in the advancement of transformative therapies for rare eye diseases.



One-stop Services



Protheragen's platform integrates diagnostics, therapeutics, disease model development, preclinical research, investigator-initiated trials (IITs), and specialized products for rare eye disease therapy development. By leveraging cutting-edge technologies and extensive expertise, Protheragen aims to address the unmet needs in ophthalmology and drive innovation in this critical field.

Diagnostic Development

Protheragen' diagnostics development services not only focus on the identification of diseasespecific biomarkers but also on the development of noninvasive diagnostic methods. For example, we're exploring tear samples for biomarker detection.

Therapeutic Development

Protheragen' therapeutics development services cover a wide range of ophthalmic diseases, from common conditions such as glaucoma and age-related macular degeneration (AMD) to rare and complex disorders LCA) and RP.

Disease Model Development

To identify potential therapeutic targets and test the efficacy of new therapies, we offer a variety of disease models, including *in vitro* cell culture models, *in vitro* organoid models, and *in vivo* animal models.

Preclinical Research

Providing comprehensive support for the evaluation of new therapeutic agents and delivery systems. Our team of experienced researchers conducts a wide range of preclinical studies, including pharmacokinetics and drug safety evaluation. Investigator-Initiated Trials (IITs) Services

Protheragen' IITs services provide comprehensive support for researchers who are conducting innovative studies on ophthalmic diseases. We offer a range of services, including study design, regulatory support, data management, and statistical analysis.

Therapeutic Targets



Targets for Ophthalmic Disease Therapeutics

Protheragen's therapeutic targets development services are meticulously designed to provide a robust framework for identifying and validating potential therapeutic targets in ophthalmic diseases. Our approach integrates advanced genomic and proteomic analyses, bioinformatics, and functional assays to uncover novel targets with high therapeutic potential. VEGF (Vascular Endothelial Growth Factor) NF-κB (Nuclear Factor Kappa B) VEGFR (VEGF Receptor) HIF-1α (Hypoxia-Inducible Factor-1 Alpha) mTOR (Mammalian Target of Rapamycin) TGF-β (Transforming Growth Factor-beta) TNF-α (Tumor Necrosis Factor-alpha) AMPK (AMP-Activated Protein Kinase) Nrf2 (Nuclear Factor Erythroid 2-Related Factor 2) IL-6 (Interleukin-6) IL-1β (Interleukin-1 beta) ROS (Reactive Oxygen Species) IL-17 (Interleukin-17) NADPH Oxidase IL-33 (Interleukin-33) NOX CXCL12 (Chemokine C-X-C Motif Ligand 12) Catalase CCL2 (Chemokine C-C Motif Ligand 2) Superoxide Dismutase (SOD) **Glutathione Peroxidase** Focal Adhesion Kinase (FAK) Aquaporins Src Kinase MMPs (Matrix Metalloproteinases) PI3K (Phosphoinositide 3-Kinase) TIMP (Tissue Inhibitor of Metalloproteinases) AKT (Protein Kinase B) ERK (Extracellular Signal-Regulated Kinase) Integrins

Diversified Disease Solutions

Protheragen's diversified solutions for ophthalmic diseases represent a comprehensive and innovative approach to addressing the complex needs of eye disorders. Our services include diagnostic development, therapeutic target identification, preclinical research, and clinical trial support. Our expertise in congenital, hereditary, infectious, autoimmune, and neoplastic ophthalmic diseases ensures that each condition receives tailored and effective therapeutic solutions.

Types of Therapeutics				
By Therapeutic Strategies				
Antibiotic Development	Antiviral Drug Development			
Antifungal Drug Development	Anti-inflammatory Drug Development			
Targeted Therapy Development				
By Molecule Types				
Small Molecule Drug Development	Gene Therapy Development			
Cell Therapy Development	Therapeutic Antibody Development			
Therapeutic Peptide Development	Therapeutic Protein Development			

Types of Ophthalmic Diseases



- Congenital Ophthalmic Diseases
- Infectious Ophthalmic Diseases
- Ocular Neoplastic Diseases
- Hereditary Ophthalmic Diseases
- Autoimmune Ophthalmic Diseases

AAVLink[™] Platform for Ophthalmic Disease Therapeutics



Protheragen's *AAVLink*[™] platforms not only simplifies the development process of AAV vectors, but also takes its functionality to a new level, breaking through the barriers of animal-to-human transformation. Through our exclusive AAV platform, we proudly demonstrate our firm commitment to pioneering innovation in the field of gene therapy and vector delivery systems, and we are able to use our AAV vector platform to provide you with one-stop therapy development services for Ophthalmic diseases.



AAV-Find Platform

Discover revolutionary AAV variants with enhanced tissue-specific targeting capabilities to revolutionize precision medicine. By effectively navigating the translational challenges from animal models to human therapeutics, we pave the way for impactful advancements in gene therapy and customized therapeutics strategies.

AAV-Stable Platform

Harnessing inducible cell lines for the stable and scalable manufacturing of AAV vectors, we ensure reliable and efficient production processes. This innovative approach enables us to meet the increasing demand for highquality AAV vectors in a sustainable and controlled manner.

AAV-Expand Platform

By utilizing dual or multiple AAV systems, we triumph over packaging constraints, enabling the delivery of larger therapeutic genes with precision and efficacy. This innovative approach expands the therapeutic potential of AAV vectors, overcoming size limitations and enhancing the scope of gene therapy applications for complex genetic disorders.

Animal Model Development



Disease Type	Model Name	Species	Modeling Method	Key Features
Dry Eye Disease (DED)	NOD Mouse	Mouse	Spontaneous	Autoimmune response, lacrimal gland inflammation
	MRL/lpr Mouse	Mouse	Fas antigen mutation	Autoimmune response, systemic manifestations
	Environmental Stress Model	Mouse	Exposed to desiccating environment	Evaporative stress, reduced tear production
	Drug-Induced Model	Rabbit	Atropine sulfate eye drops	Rapid induction of dry eye symptoms
Corneal Diseases	HSV-1 Keratitis Model	Mouse	Corneal inoculation with HSV-1	Viral infection, corneal ulceration
	Corneal Transplant Model	Rabbit	Corneal transplantation	Immune rejection, graft survival
Glaucoma	DBA/2J Mouse	Mouse	Genetic mutation	Elevated IOP, optic nerve damage
	Laser-Induced Model	Rat	Laser photocoagulation of trabecular meshwork	Elevated IOP, optic nerve damage
	Bugeye Mutant	Zebrafish	Genetic mutation	Elevated IOP, retinal abnormalities
Age-Related Macular Degeneration (AMD)	Ccl2/Ccl7 Knockout Mouse	Mouse	Gene knockout	Reduced retinal inflammation
	Light-Induced Damage Model	Rat	Exposure to intense light	Photoreceptor degeneration
Diabetic Retinopathy (DR)	Streptozotocin-Induced Model	Mouse	Injection of streptozotocin	Hyperglycemia-induced retinal damage
	High-Fat Diet Model	Rat	Feeding high-fat diet	Metabolic syndrome, retinal damage
Retinitis Pigmentosa (RP)	Pde6b Mutant	Mouse	Gene mutation	Photoreceptor degeneration
	Zebrafish Models	Zebrafish	Gene knockout or knockdown	Photoreceptor degeneration
Leber Congenital Amaurosis (LCA)	CEP290 Mutant	Zebrafish	Gene mutation	Photoreceptor degeneration
	LCA5 Knockout	Mouse	Gene editing	Photoreceptor degeneration

Ophthalmic Disease Animal Model Development Platform

Protheragen recognizes the importance of using diverse animal species in ophthalmic research to ensure that findings are both clinically relevant and scientifically rigorous. Our services include the development of animal models in mice, rats, rabbits, and non-human primates, each offering unique advantages for studying different aspects of ophthalmic diseases.



Mouse











Hamster

Rabbit



Nude Mouse

Zebrafish

Administration Methods

A critical aspect of **Protheragen's** ophthalmic disease animal model development is the optimization of administration methods. Efficient and effective delivery of therapeutic agents to the target ocular tissues is essential for obtaining reliable and meaningful results in preclinical studies. Protheragen has developed a range of innovative administration techniques tailored to the unique anatomical and physiological characteristics of the eye.

• Eye Drops

Intravitreal Injection

• Periocular Injection

Ointments

- Subconjunctival Injection
- Intracameral Injection



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Rabbit Dry Eye Model

The rabbit dry eye model was induced by benzalkonium chloride (BAC) eye drops, and the model was verified by positive drugs. Compared with the normal group, after 14 days of BAC eye drops, the tear secretion of the model group decreased, the tear film breakup time was shortened, and the corneal staining score increased.



Cynomolgus Monkey Dry Eye Model

The dry eye model was established in male cynomolgus monkeys by surgically ablating their hormone-secreting glands and simultaneously exposing them to cold wind stimulation. After 14 days, the model group exhibited a significant reduction in tear secretion, shortened tear film breakup time (TFBUT), and increased corneal staining scores. The positive control demonstrated a robust therapeutic efficacy.



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Preclinical Research



Protheragen's preclinical research services cover a wide range of areas from target validation to efficacy, pharmacokinetics and safety studies. We utilize state-of-the-art facilities and equipment to conduct high-quality studies that meet international standards. In addition, we conducted an ocular tissue distribution experiment. After administering the drug by eye drops, the drug distribution showed that it was more distributed in the anterior segment tissues and less distributed in the posterior segment tissues.



■ 30min ■ 1h ■ 2h ■ 3h ■ 7h ■ 24h

Fig 3. Mean anterior segment tissue drug concentrations in Dutch rabbits after a single eye drop administration.



^{■ 30}min ■ 1h ■ 2h ■ 3h ■ 7h ■ 24h

Fig 4. Mean ocular posterior segment tissue drug concentrations in Dutch rabbits after a single eye drop administration.

Clinical CRO Services

Protheragen's suite of services, including investigator-initiated trial (IIT), medical writing, regulatory strategy, patient recruitment, biostatistics, quality management, medical monitoring, safety and pharmacovigilance, data management, and project management, is designed to ensure that every aspect of the clinical trial process is meticulously planned and executed. In addition, we provide one-stop investigator-initiated trial (IIT) services to assist clients in developing therapeutics for ophthalmic diseases.



Compliance Approval

The first phase entails securing regulatory approvals to guarantee that all research activities adhere to ethical guidelines and legal mandates. This step is essential for protecting the rights and wellbeing of participants in the study.



Recruitment and Screening

The screening process is thorough, examining aspects like nationality, occupation, place of residence, and health status to ensure that the study population is both representative and pertinent to the research goals.



Quality Control

Throughout the trial, Protheragen enforces a comprehensive set of quality control measures. These encompass regular audits, ongoing data monitoring, and interim analyses to ensure that the study progresses as planned and maintains the highest scientific integrity.



Data Collection

Protheragen collaborates with hospitals and medical centers to facilitate the collection of clinical data. This phase is meticulously executed, employing cutting-edge equipment and protocols to ensure the data collected is of high quality and scientifically robust.



Service Delivery

Finally, Protheragen guarantees that research results are delivered promptly, employing secure and efficient data transfer methods to ensure the integrity and confidentiality of the research data.

Featured Products





Protheragen offers a comprehensive portfolio of biospecimens and ocular cell products related to human ophthalmic diseases. With an extensive network of collection sites, we ensure diverse sample acquisition while maintaining strict ethical standards. Additionally, we provide customized solutions to cater to the specific research requirements of our clients.

- **Diverse Collection Sites**: Our network of collection sites allows for a rapid and efficient response to client needs, ensuring a diverse and representative sample pool.
- Ethical Sourcing: We are committed to ethical sourcing practices, ensuring that all samples are acquired with respect for donor privacy and dignity, in compliance with relevant standards and regulations.
- **Preservation Expertise**: Our cryopreservation and stabilization techniques ensure the long-term viability and integrity of our biospecimens, enabling high-quality analysis and reproducible results.







Tear





Ocular Cells



Looking Forward to Receiving Your Inquiry!



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