OPTI-PEUTICS
Retinal Therapies to Restore Vision
No Approved Therapies to Treat Dry Age-Related Macular Degeneration

**Disease Overview**
- Macula, part of the retina responsible for clear vision begins to thin
- Affects people over the age of 50
- ~11 Million patients in US
- ~196 Million worldwide

**Drivers of Disease**
- RPE Injury & Dysfunction
- Mitochondrial Dysfunction
- Drusen Development

*RPE = Retinal Pigment Epithelium*
Solution: Topical Eye Drops

Our Ideal Target Product Profile

• Novel small molecules
• Formulated as eye drops that will reach the back of the eye
• Targets mitochondrial dysfunction
• Protects RPE from oxidative damage
• Easier use and higher compliance
• Composition of matter patent with broad utility claims filed in 2018
In **vitro** models of AMD
- Oxidative stress
- UV-B light damage
- Aged Bruch’s membrane

In **vivo** models of AMD
- Rotenone-induced retinal degeneration
- Superoxide dismutase 1 -/- retinal degeneration
M484 Improves RPE Survival & Mitochondrial Function

RPE Cell Survival

Oxidative Stress Model

- Non-toxic
- Protective

UV-Light Damage Model

- Protective

Mitochondrial Function

ATP Production

- Non-toxic
- Protective

TBHP = tert-butyl hydroperoxide
ATP = adenosine triphosphate
M414 & M434 Improve RPE Cell Survival & Mitochondrial Function

RPE Cell Survival

Mitochondrial Function

Oxidative Stress Model

M414

M434

EC_{50}

225 nM

112.5 nM

**p< 0.001
Mitochondrial Eye Therapy
Competitive Landscape

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Pharma Partnerships Solving the Dry AMD Disease
Milestones & Timeline

- **SAR Activity Med Chemistry**: Generate Usable Lead Compounds and Formulation
  - 6-8 months
  - $40K-$50K
  - Yale Center for Molecular Discovery

- **Pharmacokinetics**: Assess Topical and Systemic Delivery to Target Ocular Tissue
  - 2-3 months
  - $62K
  - PharmOptima, LLC

- **In Vivo Efficacy Studies**: Testing in Animal Models of Retinal Degeneration
  - 4-6 months
  - $80K
  - PharmOptima, LLC
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