Introduction
Diabetic retinopathy (DR), a complication of diabetes, is the leading cause of blindness among working-age adults [1].

DR is diagnosed by changes to retinal blood vessels, but changes to retinal neurons may occur first:
- Thinning of retinal layers, changes in function [2, 3]

Retinal ganglion cells (RGCs) are the most likely neuron to show signs of damage:
- Output neurons, indicate health of visual pathway
- Communicate visual features by firing spike trains in response to light stimuli [4, 5]

Specifically, alpha RGCs
- Affected by other retinal diseases [6]
- Weakened baseline firing and contrast responses in preliminary experiments [7, 8]

Purpose
To identify the earliest detectable effects of diabetic retinopathy in the STZ mouse model by testing the function and morphology of ON and OFF sustained alpha RGCs.

Methodology

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>Control Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>STZ injection: 2 weeks</td>
<td>Saline injection</td>
</tr>
</tbody>
</table>

Diabetic models
- SRC function
- Electrophysiology rig
- Ex vivo light responses

Cell morphology
- Sholl analysis

Vascular integrity
- Pericyte coverage

Dorsotemporal (DT) region
- High alpha density

Results
Diabetic DT and DN ON alphas have lower peak and avg. firing rates.

Diabetic DT OFF sustained alphas have higher baseline firing rates and less surround suppression.

Diabetic DT ON alphas have smaller cell diameters. Diabetic OFF sustained alphas do not display changes in cell size.

Conclusions
- Earliest evidence of neurodegeneration in DR
- Changes in firing rate and cell size
- May affect contrast vision
- Damage precedes vascular changes
- 2 weeks post-diabetes induction, vessels remain healthy

Future Research
- Determine if the cell itself is affected or if the input it receives is affected by DR
- Test other mouse models of diabetes
- Identify pharmacological targets for treatment

References

Conclusion
- Diabetic DT ON alphas indicate diabetic DT OFF sustained alphas do not display changes in cell size.

Future Research
- Determine if the cell itself is affected or if the input it receives is affected by DR
- Test other mouse models of diabetes
- Identify pharmacological targets for treatment

References