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# Subretinal Injection of Sodium Iodate Creates a Geographic Atrophy-Like Model in Nanopigs™

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## INTRODUCTION

- Geographic atrophy (GA) is one of the signs of dry age-related macular degeneration (AMD) , which refers to the retinal pigment epithelium (RPE) cell death that precedes photoreceptor atrophy and leads to blindness.

- Sodium iodate ($NaIO_3$) is known to selectively impair RPE, which leads to photoreceptor degeneration, modeling GA[1, 2].

- The Nanopig™ is an ideal candidate for developing large ocular animal models due to its similarities to the human eye, such as a rod photoreceptor dominant periphery and a cone photoreceptor dominant visual streak[3].

- The objective of this study was to develop a large animal model of GA in Nanopigs™ injecting $NaIO_3$ subretinally.

## METHODS

- 3 Nanopigs™ (Sinclair Research, Altasciences) received a bilateral subretinal injection of $NaIO_3$ (0.05 mg/mL).

- Ophthalmic examinations (OEs) were performed at baseline and on Days 3, 8, and 14 following $NaIO_3$ injection.

- Fundus images of retinal changes were documented using a RetCam Shuttle.

- *In vivo* retinal microanatomy was evaluated under general anesthesia by non-invasive imaging with a Confocal Scanning Laser Ophthalmoscopy (cSLO)/Spectral Domain Optical Coherence Tomography (SD-OCT) instrument (Spectralis® HRA/OCT, Heidelberg Engineering). The cSLO images were taken using the near-infrared (IR) and autofluorescence (AF) modes. The SD-OCT images were acquired as raster scans (9 automatic real-time tracking [ART]) or single scan (21 ART).
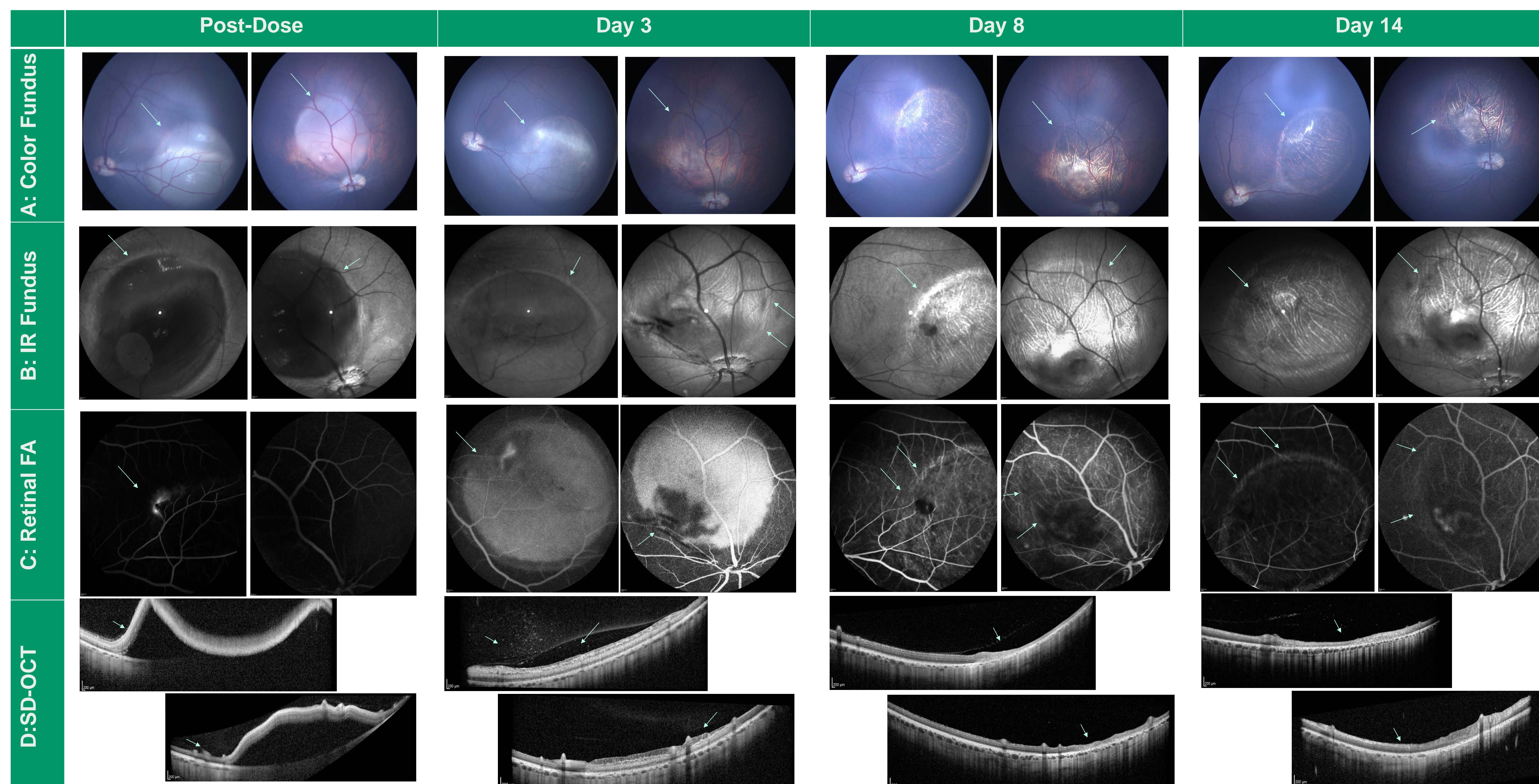


**Figure 1.** Representative Images of the $NaIO_3$ GA Model in Nanopig™

A. Color fundus images taken by the RetCam Shuttle, demonstrating the damage caused by the $NaIO_3$ injection in two animals over two weeks.

B. IR Fundus images show the damage to the RPE by revealing the choroid as the damage progresses.

C. Retinal FA images show more of the choroid through the damaged RPE over time.

D. SD-OCT shows retinal thinning in the damaged portion of the Nanopig™ retina, and no changes in the undamaged portion.

## RESULTS

- All six eyes received a successful 100µL injection of NaIO3 subretinally.

- Blebs could be observed at all time points during Oes and fundus imaging.

- The retina was reattached by Day 3, as observed in the OCT images.

- Fluorescein Angiography (FA) showed increased signals on Day 3 and marked bleb area on Days 8 and 14, suggesting localized RPE damage.

- Retinal thinning and likely inflammatory cells in the vitreous were observed in OCT images.

## CONCLUSION

- Subretinal injection of $NaIO_3$ successfully created a localized GA-like lesion in Nanopigs™.

- This localized retinal damage model will allow for the screening and development of new therapies and drug candidates for Dry-AMD.

### Acknowledgments

## REFERENCES

1. Hanus J. *Cell Death and Discovery* 2016; 16054.
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3. McCall, M. A. *Cold Spring Harbor Perspectives in Medicine*; 14:a041296.