

**SEE GA  
DIFFERENTLY**

**GEOGRAPHIC ATROPHY (GA):**  
**Imaging Guide for  
Diagnosis and Detecting  
Progression**

# Taking a closer look at GA

Imaging can help with detection, diagnosis, and monitoring of the progression of age-related macular degeneration (AMD) to GA.<sup>1</sup>

Detection of AMD progression to GA can be achieved using imaging modalities such as optical coherence tomography (OCT), colour fundus photography (CFP), and fundus autofluorescence (FAF).<sup>1</sup>



## DIAGNOSTIC HALLMARKS

### Early AMD

Multiple small (<math><63 \mu\text{m}</math>) and few intermediate (<math>63\text{-}124 \mu\text{m}</math>) drusen, or retinal pigment epithelium (RPE) abnormalities.<sup>1</sup>

### Intermediate AMD

Extensive intermediate drusen (<math>63\text{-}124 \mu\text{m}</math>) or more than 1 large drusen (<math>\geq 125 \mu\text{m}</math>). Degenerative changes in the retinal layers may also be observed.<sup>1</sup>

### Advanced AMD (GA)

Progressive atrophy of choriocapillaris, RPE, and photoreceptors, as well as new and growing atrophic lesions.<sup>1</sup>

## Optical coherence tomography (OCT)

### Key Features<sup>1</sup>

1. Degeneration of overlying photoreceptors increases reflectivity below Bruch's membrane
2. Hyper-reflective foci correspond to attenuation or disruption of the RPE
3. Atrophy of the RPE
4. Area of choroidal hypertransmission

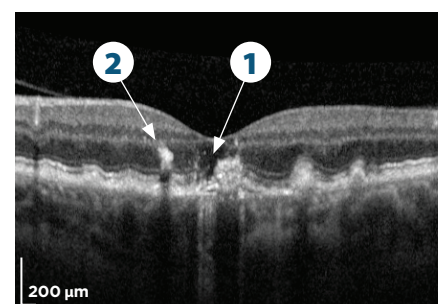


Image courtesy of Dr. Arshad Khanani

Intermediate AMD

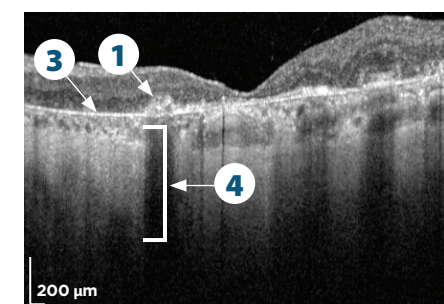


Image courtesy of Dr. Arshad Khanani

Advanced AMD (GA)

Images are from separate patients.

## Colour fundus photography (CFP)

CFP was the primary modality of large epidemiologic studies and disease classification systems.

### Key Features<sup>2</sup>

1. Drusen *and*
2. Fundus abnormalities are identifiable as hyperpigmented areas
3. GA lesion borders are sharply demarcated with increased choroidal vessel visibility (dashed circle)

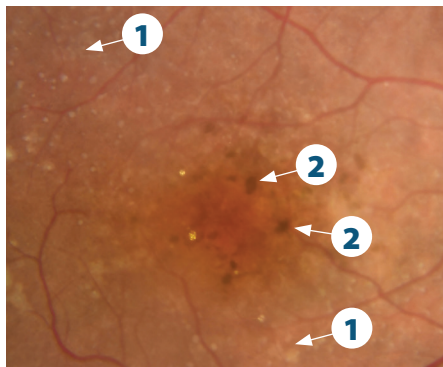


Image courtesy of Dr. Arshad Khanani  
Intermediate AMD

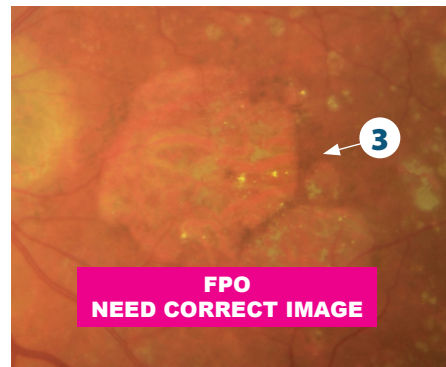


Image courtesy of Dr. Mohammad Rafieetary  
Advanced AMD (GA)

Images are from separate patients.

## Fundus autofluorescence (FAF)

### Key Features<sup>1</sup>

1. Reticular pseudodrusen appearing as multiple, clustered, regularly networked, round areas of low-contrast hypo-autofluorescence may be prognostic of advancing AMD
2. Abnormal patterns of hyperautofluorescence surrounding atrophic lesions
3. Areas of hypo-autofluorescence with sharply demarcated borders indicate atrophic lesions

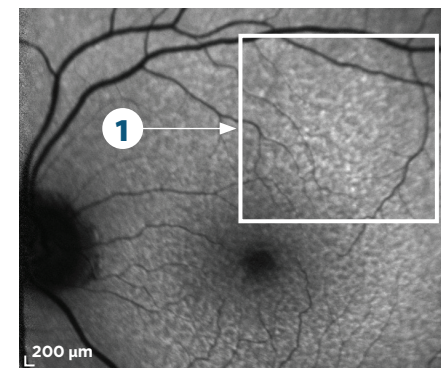


Image courtesy of Dr. Arshad Khanani  
Intermediate AMD

Images are from separate patients.

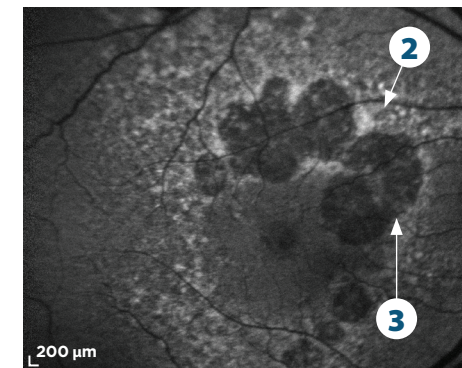


Image courtesy of Dr. David Lally  
Advanced AMD (GA)

## iRORA vs cRORA

Incomplete RPE and outer retinal atrophy (iRORA), also known as nascent GA in the absence of choroidal neovascularization, represents an earlier phase of disease progression before advancing to complete RPE and outer retinal atrophy (cRORA).<sup>3</sup>

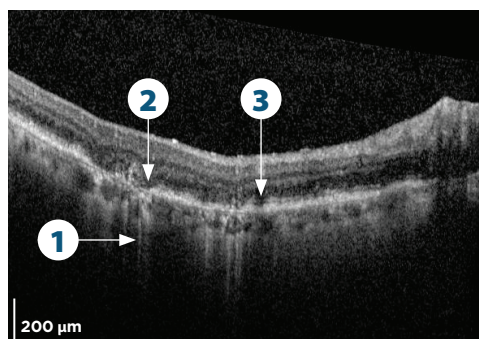


Image courtesy of Dr. Carl Danzig

### iRORA<sup>4</sup>

1. Some hypertransmission present in the choroid, but it is discontinuous
2. A corresponding zone of attenuation and disruption of RPE
3. Overlying photoreceptor degeneration

cRORA is a more advanced stage of atrophy.<sup>3</sup>

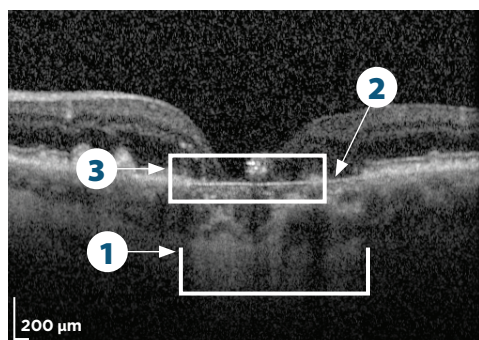


Image courtesy of Dr. Arshad Khanani

### cRORA<sup>3,\*</sup>

1. Area of homogenous choroidal hypertransmission  $\geq 250 \mu\text{m}$
2. Absence of the RPE band  $\geq 250 \mu\text{m}$
3. Evidence of overlying outer retinal thinning and a loss of photoreceptors

\*Absence of scrolled RPE or other signs of an RPE tear.

**TIP:** Proper optimization of instrumentation can minimize artifacts and improve the quality of imaging.<sup>5</sup> Work with your imaging partner to configure your instrument to your needs and specifications.

## Lesion characteristics may help predict rate of progression

Hyperautofluorescent FAF patterns can be predictive of the rate of GA progression. Rate of progression is slowest with no hyperautofluorescence or a focal pattern, and highest with banded and diffuse patterns. Eyes with diffuse-trickling patterns may also progress relatively quickly.<sup>1</sup>

### Banded pattern

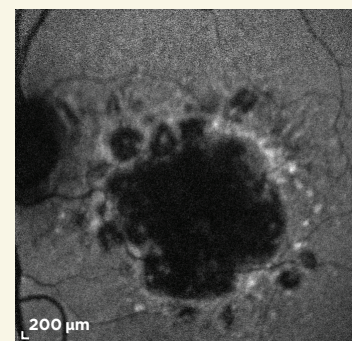


Image courtesy of Dr. Arshad Khanani

### Diffuse pattern

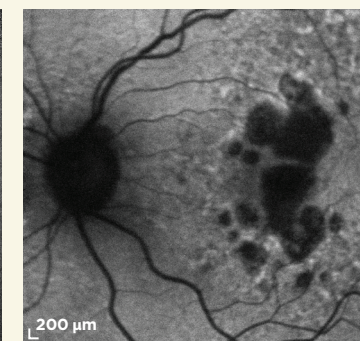


Image courtesy of Dr. Arshad Khanani

### Diffuse-trickling pattern

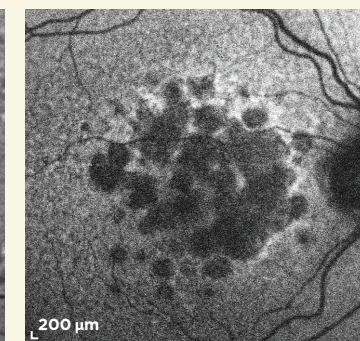


Image courtesy of Dr. Carl Danzig

## References:

1. Fleckenstein M, Mitchell P, Freund KB, et al. *Ophthalmology*. 2018;125(3):369-390.
2. Monés J, et al. *Ophthalmol Retina*. 2017;1(6):461-473.
3. Sadda SR, Guymer R, Holz FG, et al. *Ophthalmology*. 2018;125(4):537-548.
4. Guymer RH, Rosenfeld PJ, Curcio CA, et al. *Ophthalmology*. 2020;127(3):394-409.
5. De Pretto LR, Moulton EM, Alibhai AY, et al. *Sci Rep*. 2019;9(1):1-5.

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