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Dark adaptation and Retinal Topography in AMD (DART-AMD)

Submission date 05/03/2025	**Recruitment status** Recruiting	[X] Prospectively registered [_] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [X] Record updated in last year
Registration date 10/03/2025	**Overall study status** Ongoing	
Last Edited 01/04/2025	**Condition category** Eye Diseases	

Plain English summary of protocol

Background and study aims

Intermediate age-related macular degeneration (AMD) is the disease stage that precedes advanced AMD, and which is associated with an increased risk of progression to visual loss. For this reason, there is interest in developing treatments which will slow progression from intermediate to advanced AMD. In order to assess new treatments in clinical trials, it is necessary to use sensitive measures of progression. One measure which has shown promise is the rate at which eyes adjust their sensitivity after moving from high to low light conditions – the rate of dark adaptation. This has been shown, on average, to be substantially slower in people with intermediate AMD than in people of the same age without the condition. However, it is very variable between people – even when they have the same disease severity. One explanation is that the localised changes which are seen on the retina of people with AMD affect their rates of dark adaptation. This study aims to test this hypothesis by comparing the rates of dark adaptation in retinal locations showing specific structural changes, to those which do not. The researchers will also compare how rapidly changes in adaptation rates occur between these different retinal locations.

Who can participate?

Patients aged 55-85 years with intermediate AMD in at least one eye who do not have other medical conditions which may affect vision, such as other eye conditions or systemic diseases such as diabetes

What will the study involve?

Participants will be tested at the start of the study and followed up 12 months later. A subgroup will also have their dark adaptation assessed 2 weeks after their first visit to assess repeatability. At each visit, the researchers will carry out some basic vision tests (e.g. measuring visual acuity using a letter chart) and will then put some drops into their eyes to dilate the pupils. They will then take some photographs of the eyes and carry out a test to monitor the sensitivity of the participant's eyes during a period of darkness. Participants will be asked to look at a bright light for 1 minute followed by a period in which the researchers will monitor visual sensitivity (how well they can see). The participant will be asked to put their chin on a chinrest, look into a bowl, and press a button when they see a spot of light appear in the bowl in front of them. This test is very similar to the visual field tests carried out when visiting the optician.

What are the possible benefits and risks of participating?
There are no direct benefits to the participants. The benefits of the study relate more to our understanding of AMD and to our ability to use effective outcome measures in future clinical trials. The researchers anticipate that understanding the relationship between rates of adaptation and structural features of AMD will improve the utility of the dark adaptation test in clinical trials.
There is no risk from the eye tests, however, participants may find them tiring. The eye drops are the same kind that participants are likely to have had when they visited the eye hospital. They cause the pupils of the eyes to dilate, which means that the participant will be sensitive to bright lights after the appointment. The drops may also make vision a bit blurry, and it is recommended not to drive or operate heavy machinery for at least 6 hours afterwards. Very occasionally, people have a reaction to the drops which make their eyes red and sore. If this were to happen the participant should contact the researchers immediately to advise them how to obtain help. All light levels used in the tests in the study (including the bright adapting light) fall within the safety guidelines set out in British Standard BS EN 15004-2 (2007). This light adaptation protocol has been used by members of the research group in previous studies including people with AMD.

Where is the study run from?
The study is run by and sponsored by City St George's, University of London (UK). Moorfields Eye Hospital is the clinical site for data collection.

When is the study starting, and how long is it expected to run for?
January 2025 to December 2027

Who is funding the study?
The Macular Society (UK)

Who is the main contact?
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Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
353203

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
City University ID: 860878, CPMS 67483

Study information

Scientific Title
The impact of structural features on dark adaptation impairment in intermediate age-related macular degeneration: a prospective observational study

Acronym
DART-AMD

Study objectives
Delayed dark adaptation is widely reported to be a feature of intermediate age-related macular degeneration (iAMD). However, the extent of the deficit varies substantially between individuals. One explanation for this might be the variability between individuals in the topographical distribution of structural features of AMD. Typically, rates of dark adaptation are measured at a single retinal locus. If this happens to coincide with a localised region of structural abnormality in a particular individual, this may result in an increased delay in dark adaptation. The technology has not previously been available to investigate this hypothesis, but the development of software which enables fundus-controlled microperimetry to be used to evaluate rates of adaptation at specific and customised retinal loci makes this a viable topic of investigation.

Ethics approval required
Ethics approval required

Ethics approval(s)
notYetSubmitted

Study design
Cross-sectional component with nested repeatability study and a prospective longitudinal observational component

Primary study design
Observational

Study type(s)
Other

Health condition(s) or problem(s) studied
Age-related macular degeneration

Interventions
The cross-sectional component involves 72 individuals with iAMD. The scotopic MAIA (sMAIA) microperimeter will be controlled with the open perimetry interface (OPI) and a user-friendly app to measure dark adaptation at specific locations identified on an OCT image. Four locations will be assessed in each eye evaluated, two of these will target the location of a structural feature of AMD (drusen, pigmentary change, subretinal drusenoid deposit [SDD]), and the other two will be locations at equivalent eccentricity to the structural features. A comparison will be made between the rates of adaptation overlying the features with those at locations at which the features are absent. 30 participants will be invited to return to take part in a repeatability evaluation to investigate the measurement error associated with this novel method of assessment of dark adaptation. Finally, all participants will be invited to return for a follow-up assessment after 12 months to investigate whether the rate of change of dark adaptation is more rapid overlying the specific features of AMD. In addition, we will evaluate the effect of the progression of intermediate AMD on contrast sensitivity, assessed using the PopCSF programme. This will be achieved by measuring the area under the contrast sensitivity function at baseline and at the 12-month follow-up appointment.

Intervention Type
Other

Primary outcome(s)
The rate of the second component of rod-mediated dark adaptation (compared between feature-bearing and non-feature-bearing retinal locations) This will be measured at baseline (again within 2 weeks for those participating in the repeatability study) and 12 months. This will be extracted from modelled threshold data from the scotopic MAIA microperimeter and expressed as log units/minute.

Key secondary outcome(s))
1. The time constant of cone-mediated dark adaptation. This will be measured at baseline (again within 2 weeks for those participating in the repeatability study), and 12 months. This will be extracted from modelled threshold data from the scotopic MAIA microperimeter, and expressed as minutes.
2. The area under the contrast sensitivity function, measured in log units. This will be measured at baseline (again within 2 weeks for those participating in the repeatability study) and 12 months. The data will be extracted from the PopCSF software (Elfadaly et al. 2020).

Completion date
31/12/2027

Eligibility

Key inclusion criteria
1. Intermediate AMD in at least one eye according to the Beckman grading scale (Ferris et al., 2013). The fellow eye can be of any AMD status, including no AMD and late-stage AMD
2. Aged 55-85 years and with the capacity to undertake psychophysical testing (for example, it should have been possible to obtain BCVA in the routine clinical test)
3. Sufficient English language comprehension to enable understanding of the participant

information sheet and test instructions
4. ETDRS letter chart BCVA in the study eye not worse than 50 letters (6/30 Snellen VA equivalent)

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Senior

Lower age limit
55 years

Upper age limit
85 years

Sex
All

Key exclusion criteria
1. Ocular pathology in the study eye (or in either eye for genetic conditions), other than age-related macular degeneration, which may affect visual function
2. Van Herick grade <2 or history of allergic reaction to dilating eye drops
3. Intraocular pressure >24 mmHg
4. Unable to classify AMD grade or to obtain clear OCT image
5. Lens opacity greater than grade 2 on any LOCS III criterion, or other media opacity/nystagmus that might interfere with quality retinal imaging.
6. Diabetes or other significant systemic disease or medication known to affect visual or retinal function
7. Health condition or other reason to make it unlikely that attendance at the follow-up appointment at 12 months would not be feasible

Date of first enrolment
01/04/2025

Date of final enrolment
31/07/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre

Moorfields Eye Hospital
162 City Road
London
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Sponsor information

Organisation
City, University of London

ROR
https://ror.org/04489at23

Funder(s)

Funder type
Charity

Funder Name
Macular Society

Alternative Name(s)
Macular Disease Society, The Macular Society

Funding Body Type
Government organisation

Funding Body Subtype
Associations and societies (private and public)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
The data-sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes