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Central Retinal Enrichment Supplementation Trials - enrichment of macular pigment with respect to vision in Normal subjects

Submission date
17/07/2012

Recruitment status
No longer recruiting

Registration date
22/08/2012

Overall study status
Completed

Last Edited
04/10/2018

Condition category
Eye Diseases

[X] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
The macula is the central part of the retina at the back of the eye responsible for fine detail, central and colour vision. We believe that a pigment (colour) found at the macula known as macular pigment may help increase visual performance and reduce problems with glare from bright light in people with otherwise normal vision (i.e., no eye disease). This could be important for everybody, and especially those who rely strongly on good vision, like pilots, train drivers and athletes. Macular pigment is made up of three naturally occurring pigments known as carotenoids. These macular carotenoids are lutein, zeaxanthin and meso-zeaxanthin. Research has shown that this dietary pigment may be increased by taking food supplements that contain these three important carotenoids.

Who can participate?
This study is open to any adult aged 18 years or over with no eye disease.

What does the study involve?
The study involves four visits to the Vision Research Centre over a 12-month period. Each study visit will take around two and half hours. Study visits will involve various non-invasive vision tests along with visual performance and experience (assessed by questionnaire). We will also take a blood sample to measure the carotenoid nutrients in blood before and following supplementation. The blood sample will be taken by a trained professional. Functioning of mental processes will also be tested (using computerised tests) at each study visit, as these nutrients are also found in the brain. Study volunteers will be randomly allocated to receive either an eye-related dietary supplement (containing carotenoids) or a placebo (a tablet identical to the supplement but containing no carotenoids or other active ingredients). Neither the study organisers nor the volunteers will know which tablet each person receives. The study volunteers will be provided with a summary of their height, weight, blood pressure and advice (e.g., lifestyle modification for those who are overweight), as appropriate. Information leaflets on lifestyle changes (e.g. advice on healthy eating, regular physical activity and stopping smoking) will be provided at the study centre. In the case of measurements that may require immediate action, for example if the participants blood pressure is dangerously high, the participant will be

advised to go directly to their GP or local hospital, and any assistance needed to make these arrangements will be provided by an appropriate member of the study team.

What are the possible benefits and risks of participating?
We anticipate that this research will benefit a wide range of people with respect to vision and visual performance. The leaflet used to recruit participants will clearly state that any benefits arising from the research is likely to be in the longer term and to society in general, rather than to them personally. We foresee no risks to the study volunteers. The dietary supplement used in the study has been tested and has been deemed suitable for human consumption. In the unlikely event of a study volunteer experiencing any side effects, a concerned authority will be informed immediately and appropriate protective action for the volunteer will be taken.

Where is the study run from?
The study will be run from the Macular Pigment Research Groups Vision Research Centre at the Waterford Institute of Technology, Waterford, Ireland.

When is the study starting and how long is it expected to run for?
The study will start in September 2012 and each patient will be enrolled for 12 months. It may take us up to 1 year to recruit all the patients for this study and so the expected finish date could be August 2014.

Who is funding the study?
This study is funded by the European Research Council, Belgium.

Who is the main contact?
Miss Sarah ORegan
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Study website
http://www.mprg.ie

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
281096

Study information

Scientific Title
Enrichment of macular pigment with respect to vision in normal subjects

Acronym
CREST Normal

Study objectives
The macula, the central part of the retina, is responsible for optimal spatial vision. There is a growing body of evidence that a dietary pigment at the macula, known as macular pigment, can enhance visual performance and experience by filtering short-wavelength (blue) light and thereby reducing the effects of chromatic aberration and light scatter. Chromatic aberration causes out of focus vision and light scatter causes glare disability in all normal individuals. Macular pigment contains the carotenoids lutein, zeaxanthin and meso-zeaxanthin. The typical western diet contains around 60 carotenoids, and 18 have been identified in human serum. However, only three carotenoids are found at the macula, indicating the unique biological selectivity for their uptake at this location. It is likely that the accumulation of macular pigment has evolved because of its optical and antioxidant properties. For example, macular pigment limits retinal oxidative damage passively (through filtration of blue light) and actively (by quenching free radicals). Recent research has shown that macular pigment can be augmented by dietary supplementation in most (but not all) subjects, suggesting that the macular concentrations of these carotenoids are
suboptimal in many people. Our research group has discovered that a dip in the central portion of this pigment, seen in around 12% of individuals, is an undesirable feature of its spatial profile and may be linked to an inability to generate meso-zeaxanthin at the macula. We have also identified that enrichment of macular pigment, including reconstruction of undesirable central dips, can be achieved by inclusion of meso-zeaxanthin in a dietary supplement. We propose to uniquely enrich macular pigment with all three macular carotenoids, and assess its impact on visual performance and experience in normal subjects. This ground-breaking study will advance our understanding of the optical hypothesis of macular pigment, and potentially improve normal vision.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Research Ethics Committee, Waterford Institute of Technology, Ireland, 02/11/2010, ref: 10/JN /01

Study design
Single-centre double-blind randomised placebo-controlled study

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Hospital

Study type(s)
Screening

Participant information sheet
http://www.wit.ie/images/uploads/Research_PDF/CREST_Normal_Patient_information_leaflet.pdf

Health condition(s) or problem(s) studied
Chromatic aberration and light scatter impacting on visual performance

Interventions
Intervention 1: a soft-gel carotenoid combination formulation containing 10 mg meso-zeaxanthin, 10 mg lutein and 2 mg zeaxanthin in a sunflower oil suspension.
Intervention 2: soft-gel placebo control containing sunflower oil.

One tablet to be taken per day, preferably with a meal, for the duration of the study.

Total duration of intervention is 12 months

Intervention Type
Other

Phase
Not Applicable

Primary outcome measure
Contrast sensitivity at 12 months of supplementation. The level of significance for changes will be set at 0.05

Secondary outcome measures
All outcome measures will be measured at each study visit (i.e. baseline, 3, 6 and 12 months):
1. Glare disability (measured by the Functional Vision Analyzer)
2. Photostress recovery (measured by threshold contrast sensitivity before and after a 10-second exposure to blue photostress lamp)
3. Macular pigment (measured using customised heterochromatic flicker photometry [Macular Metrics II Maculux] and dual wavelength autofluorescence [Heidelberg Engineering Spectralis])
4. Visual acuity (measured using Snellen letters [Thomson chart])
5. Light scatter (measured using the C-Quant)

6. Foveal architecture (measured using the Heidelberg Engineering Spectralis and the Zeiss Visucam 200)
7. Serum carotenoid concentrations (measured by high performance liquid chromatography analysis)
8. Cognitive function (measured using the Cambridge Cognition CANTAB [CAmbridge Neuropsychological Test Automated Battery] software)

Overall study start date
01/09/2012

Completion date
31/08/2014

Eligibility

Key inclusion criteria
1. Age 18 years or over
2. Corrected distance visual acuity of ≥ 6/6
3. Spectacle prescription of ≤ ±5D
4. Have not taken eye-related dietary supplements containing the macular carotenoids (lutein, zeaxanthin and/or meso-zeaxanthin) in the previous 12 months
5. No ocular pathology
6. Macular pigment optical density at 0.25 degrees ≤ 0.4

Participant type(s)
Patient

Age group
Adult

Lower age limit
18 Years

Sex
Both

Target number of participants
60 subjects and 60 controls

Key exclusion criteria
1. Ocular pathology
2. Recent history of carotenoid supplementation
3. Younger than 18 years old
4. Corrected distance visual acuity of < 6/6
5. Spectacle prescription of > ±5D
6. Macular pigment optical density at 0.25 degrees > 0.4

Date of first enrolment
01/09/2012

Date of final enrolment
31/08/2014

Locations

Countries of recruitment
Ireland

United Kingdom

Study participating centre
Macular Pigment Research Group
Waterford
Ireland
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Sponsor information

Organisation
European Research Council (EU)

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Sponsor type
Research council

Website
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ROR
https://ror.org/0472cxd90

Funder(s)

Funder type

Government

Funder Name
European Research Council (EU) ref: 281096

Alternative Name(s)
ERC

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location

Results and Publications

Publication and dissemination plan
Not provided at time of registration

Intention to publish date

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article	protocol	01/04/2014		Yes	No
Results article	results	01/02/2017		Yes	No