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Macular Degeneration

Age-related macular degeneration is the most common cause of blindess later in life in the developed world. Due to the fact that we have an ageing population, the prevalence of this condition is expected to double by the year 2020.

What is it?

Age-related macular degeneration (we shall call it AMD from now on) is the result of a lifetime of damage to the macula, the most sensitive part of the retina that allows us to watch television, drive, see colours, recognise people, read and so on.

There are essentially two main causes of this damage. Damage from unstable molecules called free-radicals, and damage from blue light. We receive protection from this condition by three substances collectively known as Macular Pigment.

Lutein, Zeaxanthin and Meso-Zeaxanthin, the three constituents of macular pigment perform two main functions. They absorb damaging blue light before it causes harm to the macula and they are powerful anti-oxidants which mop up the free-radicals protecting the macula from their ill-effects.

Blue light is energetic light. It is a short-wavelength radiation, sitting next to ultraviolet (UV) light on the elctromagentic spectrum. Below are some of the radiations stretching from from Gamma Rays to Radio Waves.

Gamma Rays → X-Rays → Ultraviolet → Visible Light → Infra-Red → Radio Waves

The further to the left of the chart above, the more damaging the radiation is. Visible light runs from Blue light to green to red. Thus, blue light is much more damaging than red light to the eye. What is blue light? Anything that looks blue – the sky, the sea, painted walls and so on.

There has been much advertising recently on skin care products that prevent the signs of ageing of the skin by using UV blocking agents. The cornea, the clear part of the front of the eye and the lens inside the eye absorb the vast majority of UV radiation. However, blue light passes through to the back of the eye and causes damage. Macular pigment is yellow in colour and this yellow substance helps to absorb the blue light before it causes damage to the macula. The higher the level of macular pigment, the better the protection against blue light. Think of it as being sunglasses for the backs of the eyes.

Free-radicals are molecules that are missing something (an *electron*) and this makes them unstable. This unhappy molecule sees that our cells have the thing that they are missing and they steal it from us causing damage. If enough damage is done to a cell, then the cell will die. Obviously, this is not a good thing, as some of the cells that die at the macula are responsible for getting rid of waste from the cells. The more of the cells that die, the less able the other cells surrounding it are at keeping the

waste clear. Eventually, there is a build up of waste (a substance called *lipofuscin*) and this is deposited at the back of the eye, causing distorted and blurred vision.

Risk factors for Macular Degeneration

There are some factors for AMD that you can do nothing about, and there are others that are modifiable.

Risk factors that we cannot change include :

- Family history - there is an increased risk of manifesting AMD if there is a close family history
- Age - the older we get, the more at risk we are of AMD.
- Eye colour - lighter coloured irides have been shown to increase our risk
- Gender - it seems that females are slightly more at risk than males in getting AMD.
- Ethnicity – caucasian people are more at risk than other races.

The modifiable risk factors include :

- Diet - Macular Pigment, a protective mechanism against AMD is purely dietary in origin
- Smoking - smoking has been shown to reduce Macular Pigment levels
- Exposure to blue light - blue light is 'energetic' and can cause damage to the macula
- Obesity - all the cells in the body compete for nutrients - the more cells there are, the less nutrients there are to go round

A diet sheet is included in this information pack. If you need another one, you can either download one from the Macular Pigment Research Group Website (at www.mprg.ie, see the section Macular Pigment/Diet and MP), or we will be pleased to print out another one for you.

Obiously, the benefits of reducing or stopping smoking are well know. Smoking reduces the levels of Macular Pigment so by reducing or stopping smoking, not only do you extend your life expectancy, you will also have less risk of AMD.

Wearing sunglasses reduces the damage from radiation to the eye. Almost all sunglasses will carry a CE mark which means that they will absorb ultraviolet light. This form of radiation can cause damage to the anterior structures of the eye, especially the lens, and is a causative factor in developing cataracts. By choosing a tint that preferentially filters out blue light (yellow/brown lenses) as well as ultraviolet light, you will help to reduce the damage caused to the macula.

Taking supplements of Macular Pigment and also Omega 3 will help to boost the levels of Macular Pigment at the back of the eye, both helping to improve vision and also to reduce the risk of AMD if you don't have it and also to slow down the progression of and, in some cases has even reversed some of the damage caused by, AMD.