

## **Smoke in your Eyes**

Genetics, diet, and advanced age are known to play a role in the development of age-related macular degeneration (AMD). Cigarette smoking is also listed as an important risk factor, and one that can be controlled by the patient.

While it is common knowledge that cigarette smoking generates many negative side effects, including increased risk of cardiovascular disease and certain cancers, why is it that current smokers have a two-to-three times higher risk of AMD than non-smokers, and the risk of disease increases with the intensity of smoking? <sup>(1)</sup>

In 2016, Dr. Mariela Marazita, a cell biologist from Argentina, and her colleagues published results from their studies on cigarette smoking and development of AMD <sup>(2)</sup>.

Part of maintaining a healthy cell life is the cell's ability to detoxify, or get rid of debris, or reactive intermediates and overcome oxidative stress, the imbalance of manifestations of oxygen within the cell. Disturbances in the cells' ability to detoxify can cause toxic effects through excess production of peroxides and free radicals. The result is damaged cells and ultimately premature cell death. The retina is one of the highest oxygen-consuming tissues in the human body. These natural filtering procedures are happening in the retinal pigment epithelium (RPE), the cells responsible to nourish retinal visual

cells such as cones and rods. Smoking disables the ability of retina cells to detoxify, leading to eventual death of the RPE cells. To top it all off, smoking also depletes valuable micronutrients and vitamins, which act as additional natural oxidation inhibitors.

Dr. Marazita's research showed this effect by exposing a sample of human RPE cells with cigarette smoke concentrate (CSC) and hydrogen peroxide. The cells exhibited responses including increased activity in the cell's immune system, inflammation and release of cytokines, all of which could explain the increased risk of AMD in smokers.

Although this study revealed relevant data about the effect of smoking towards the progression of AMD on a cellular level, research using human cells is limited due to various genetic components each individual and the body's unique ability to react to stresses like smoking.

With this information in mind, we hope that it can show the general population about the harmful effects that smoking have towards the body, but more importantly, the eyes.

## **REFERENCES**

- (1) Armstrong RA, et al. *Overview of Risk Factors for Age-Related Macular Degeneration (AMD)* **J Stem Cells** **10:171-191, 2015.**
- (2) Marazita MC, et al. *Oxidative stress-induced premature senescence dysregulates VEGF and CFH expression in retinal pigment epithelial cells: Implications for Age-related Macular Degeneration,* **Redox Biology** **7:78-87, 2016.**