Eye evolution: How it all started?

IRIS TECHNOLOGIES

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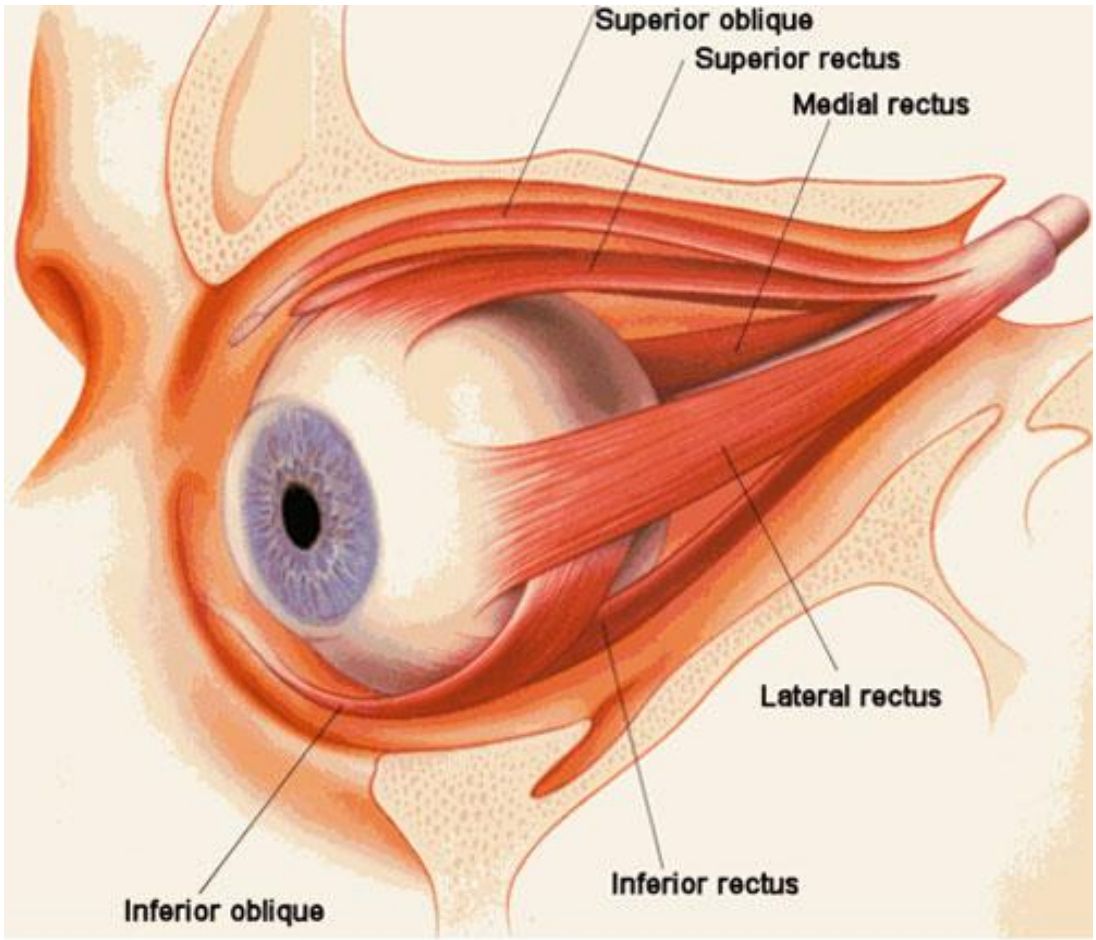
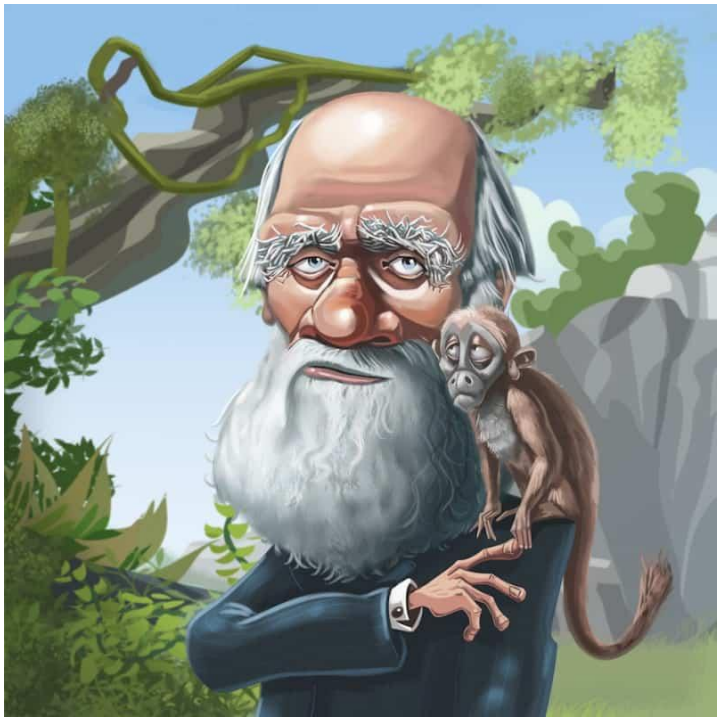


Fig. 1 Extraocular Muscle Anatomy

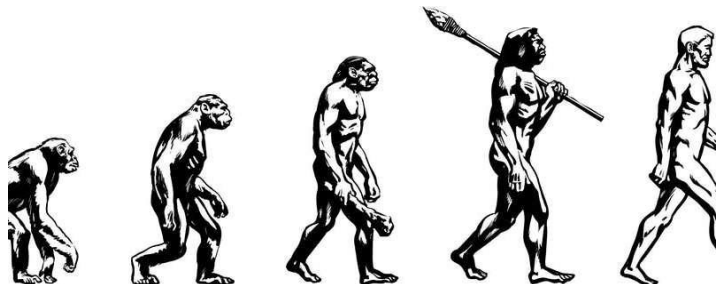


Charles Darwin acknowledged right in the beginning that the eye would be a difficult case for his new theory to explain. Before he made his statement about the evolution of the eye, he stated that it seems highly absurd that eye could have evolved. Nevertheless he and scientists after him studied the eye in order to give the answers we have today.

Introduction

Many skeptics of the Darwin's theory argue that it is impossible such a complex mechanism like the human eye to have developed through random mutations and natural selection. The critics ask how evolution, if it occurs gradually, could have created the separate parts of the eye - the lens, the retina, the pupil and so forth - since none of these structures by themselves would make vision possible.

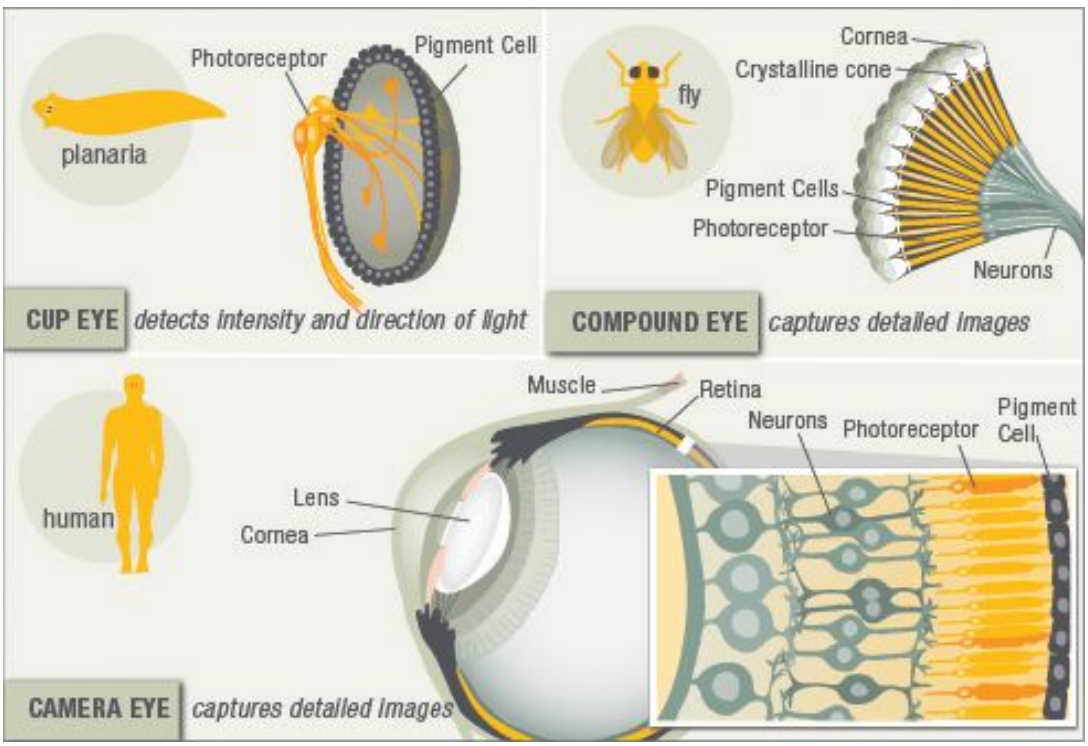
And yet, as early as 500 million years ago, the evolution of the eye started.



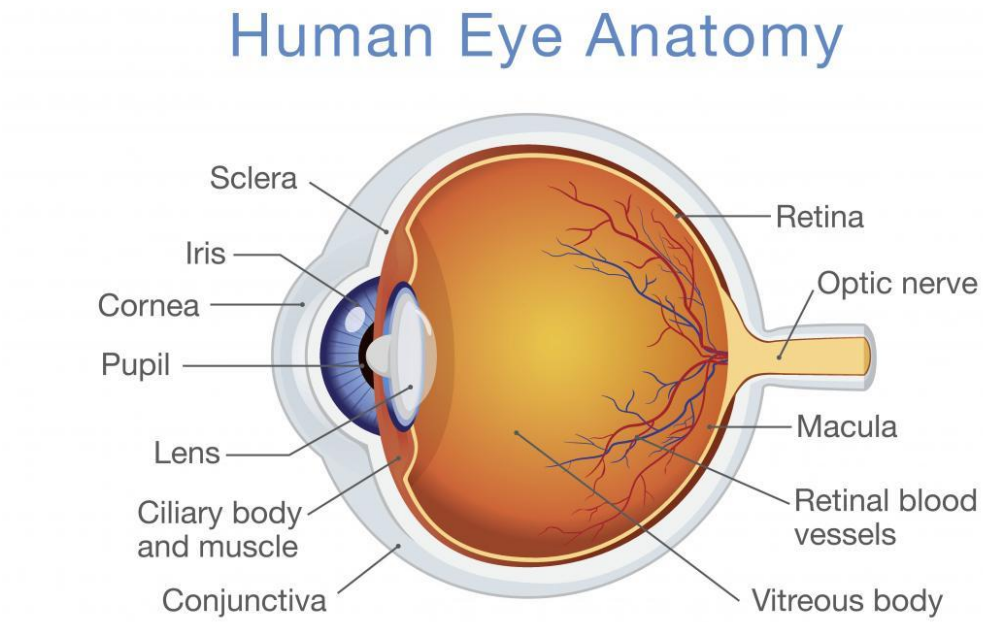
Eye evolution

According to scientists the first eye-like structure was a simple light spot, such as the one found in single-celled organisms like euglena. This eyespot is sensitive to light - when it detects the light, the euglena travels in the direction of the light source to photosynthesis. It is considered that this is the simplest precursor of the eyes we have today.

A more complex structure, which can be seen as the next step in the eyevolution, is the eye of the planarian flatworm. The planarian eye is cupped rather than flat - this shape enables it to better sense the direction of the incoming light. More information is provided because it can now see shadows. This ability allows an organism to hide from predators.



Over time, the deeper the light cups grew in some organisms, the smaller the opening at the front became. This resulted in a pinhole effect. Pihole eyes can be found in the nautilus, an ancestor of the octopus, and it is the highest revolution one can have without a cornea or lens. Exactly the appearance of the lens is the key step towards the kind of eye we know.



Before lens though a thin layer of coating over the pinhole was developed, now called the cornea. The cornea protects the eye from infection, allowing the inside of it to fill with fluid that improves light sensitivity and processing. The lens was created by crystalline proteins formed at the surface. Thanks to the lens, the eye can change its curvature to adapt to near and far vision. This way, beginning with a simple light-sensitive spot, the eyes evolved to the complex organ they are now.

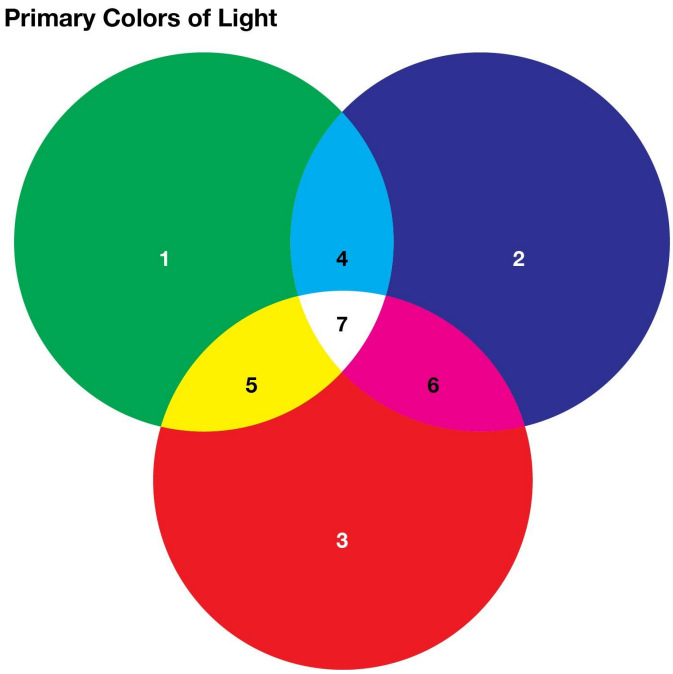
Interesting facts about the eyes

After we have gone through the complex information about the evolution of the eye, let’s find out what makes our eyes even more amazing! Here are some facts you may not know:

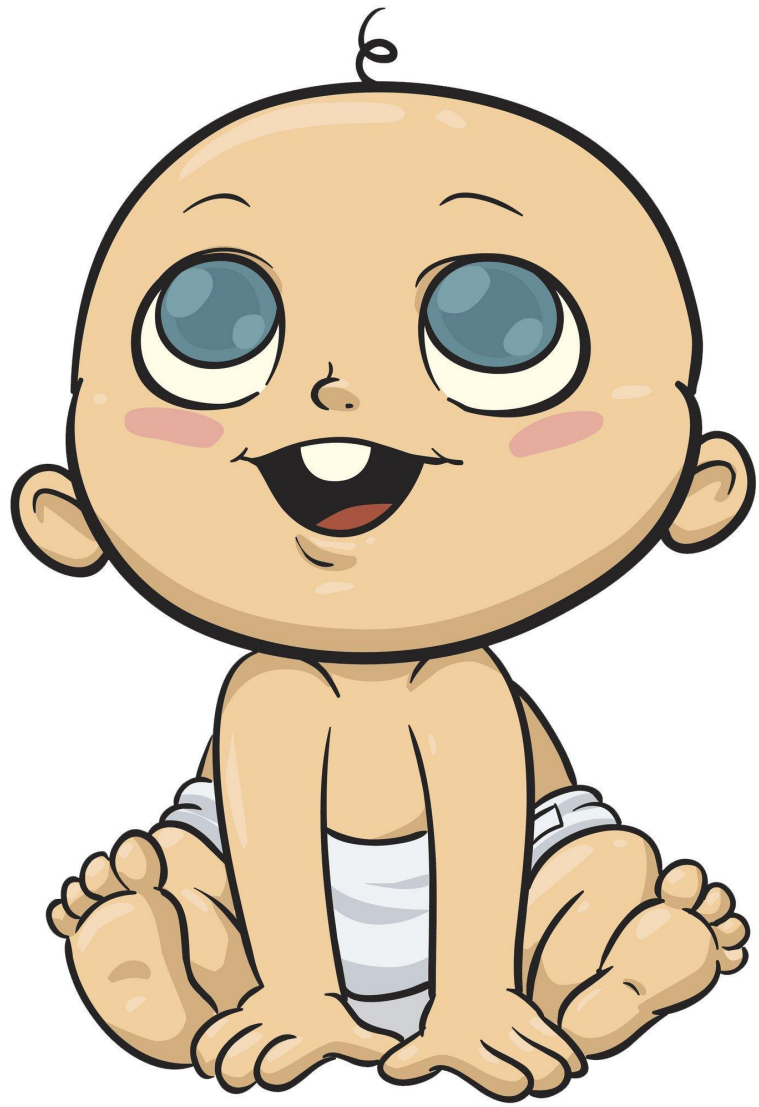
- **We see with our brains, not with our eyes.** They basically function like a camera, capturing light and sending data back to the brain.
- **We actually see things upside down and our brain turns the image the correct way up.** Because of the curved cornea, the light that enters our eyes is refracted and creates an upside down image on the retina.

- **A fingerprint has 40 unique characteristics, while an iris - 256.** This is why retinal scans are increasingly being used for security purposes.
- **The eye is the muscle with the fastest reaction in your body.** It contracts in less than 1/1000th of a second.

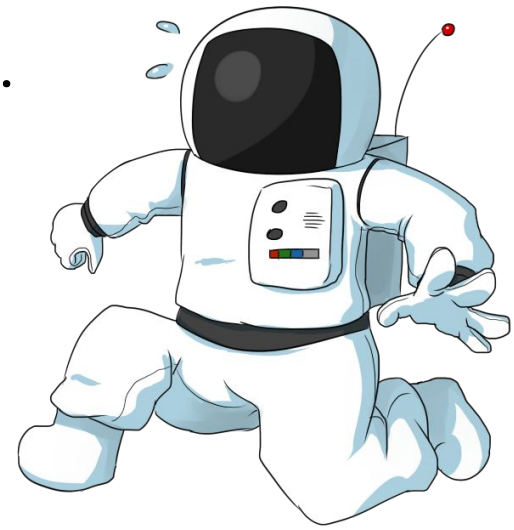
- **The human eye sees only three colours. All others are a combination of these.** Three types of cones can be found in the retina and each one of them is a sensitive to certain colour - to red, to blue or to green. These three cones work together to make it possible for us to see millions of other colours and shades.



- **All people with blue eyes share the same ancestor.** Initially there were humans with brown eyes only, until a genetic mutation occured around 6000-10 000 years ago.



- **You blink on average 4 200 000 times a year.** We blink to lubricate our eyes. Adults tend to blink around 15-20 times a minute, while babies - only 1-2 times. It is not established as due to what reason this phenomenon occurs.
- **In space, astronauts can not cry.** Tears can not fall because of lack of gravity. Instead, they collect in little balls and make one’s eyes sting.

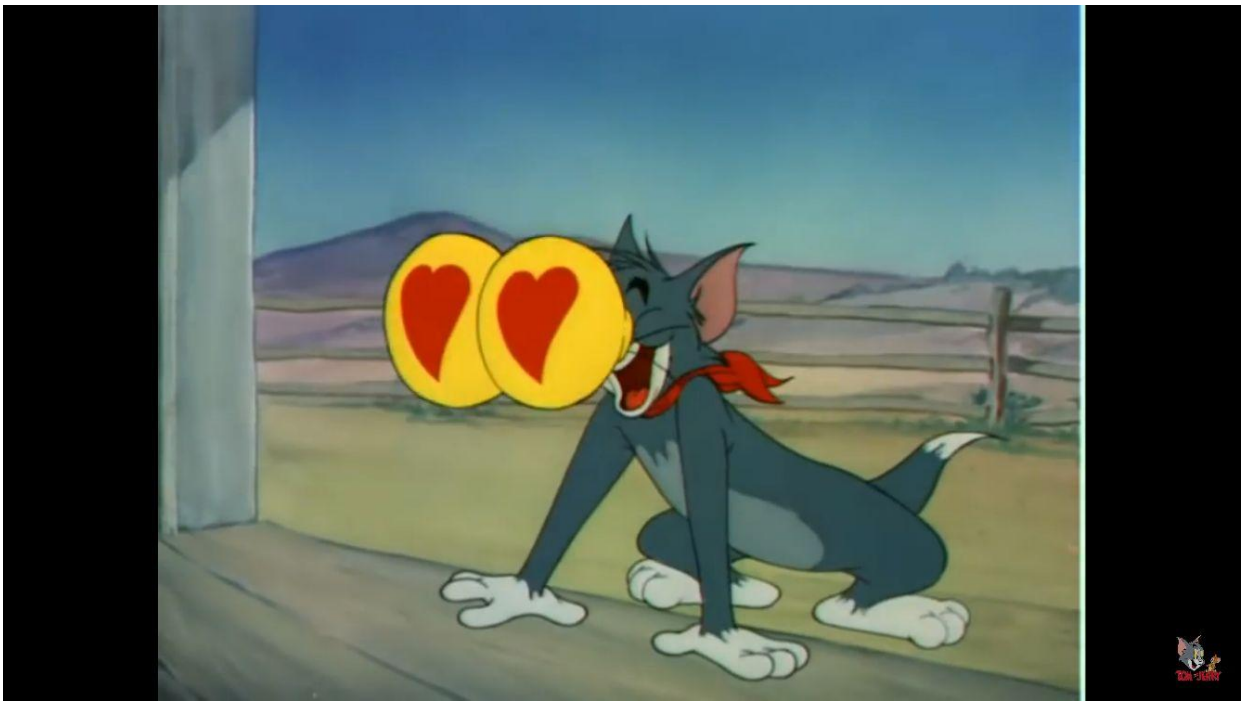


- Your eyes are in big trouble because of the blue light. The blue light comes from all the devices that we own and it can really damage our eyes.

  This is why we have **Iris**. Iris will reduce the blue light that you are exposed to and will keep your eyes safe!

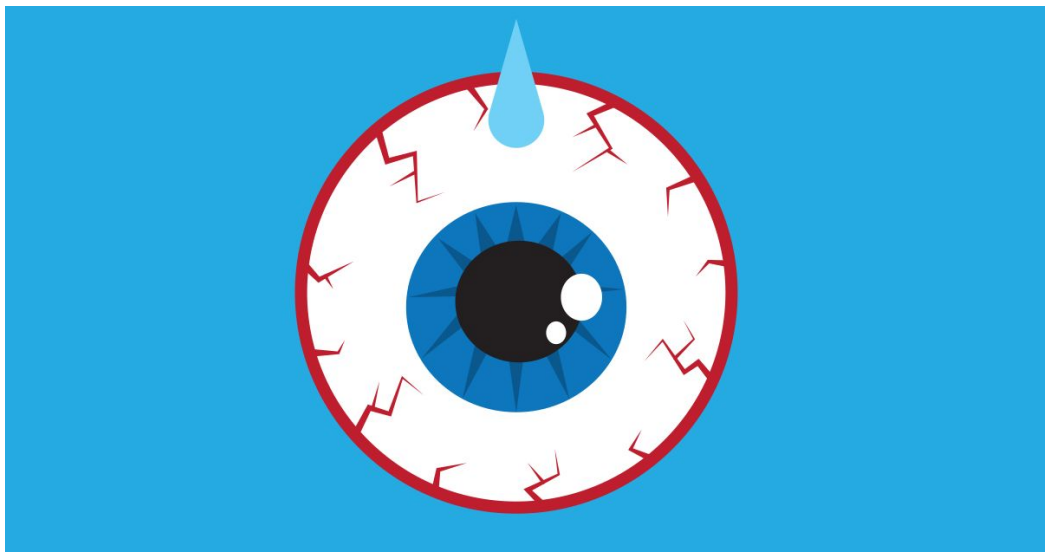
- **Babies do not produce tears until they are about six weeks old.**
- **Our eyes remain the same size from birth** unlike the ears and the nose which keep growing throughout our lives.

- **The only cells that survive from the time we are born until death are in our eyes.**
- **When you look at someone you are attracted to, your pupils expand by up to 45%.**

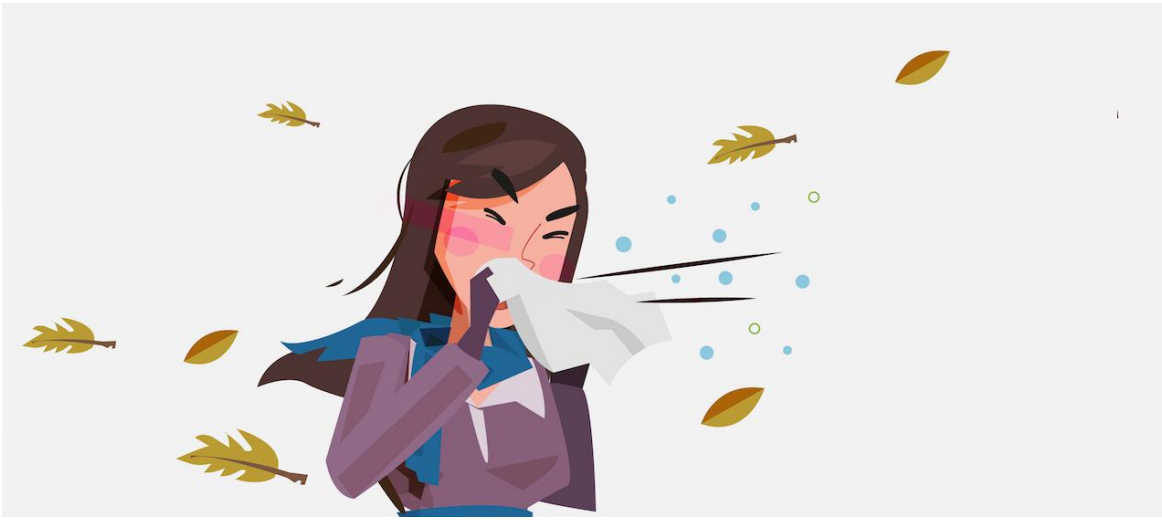


- **Oily fish, Vitamin A and Vitamin C can help to preserve good eyesight.** The regular consumption of oily fish can reduce the risk of age-related macular degeneration. If you want to find out which are the right foods for good eye health, read our article on the matter.

- **Smokers have almost double the chance of experiencing dry eye.** It is known that tobacco smoke irritates eyes and even second hand exposure to the smoke can worsen dry eye, especially if you are wearing contact lenses. Smoking also reduces your night vision.



- **It is impossible to sneeze with your eyes open.** Your eyes and nose are connected by cranial nerves, so the stimulation from a sneeze travels up one nerve to the brain, then down another nerve to the eyelids, typically prompting a blink.



Conclusion

The eyes are a remarkable mechanism which enables us and other animals to understand the world around us better. Thanks to these small but vital organs, we have survived years of danger and evolved to become the people we are today. Our ability to see the world in colour and detail make our lives so much brighter and happier and we should appreciate it - after all it goes by as fast as a blink of an eye!