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Alex Lee

Corresponding Author*:* Alex Lee, Xianning West road 28#, Xi'an city, Shanxi province, China.710,049.

E-mail: alexlee2019@outlook.com, Telephone: 8,613,519,143,877.

Explaining the epidemiology of myopia : 1.The photon of high-frequency electromagnetic radiation can strike the eye to form a hole of a diameter in photon diameter scale. 2.The visual light passes through the hole can not be refracted to macula,this visual light 's image loses in macula. 3.The particle property of photon of high-frequency high-frequency electromagnetic radiation explains elongaion of eye..

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Visual light leak in high-frequency electromagnetic radiation hole: A photon-electron theory for living tissue for explaining myopia

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Abstract:The exact etiology of myopia remains elusive. The author proposes the particle property of photon in living tissue and the photon-electron theory in living tissue, if the frequency of the photon beyond the threshold, the photon has enough energy to strike the electron away and forms a hole of a diameter in photon diameter scale in living tissue include the eye.The visual light which passes through the radiation hole in the eye cannot be refracted on the macula. Longer time of high-frequency electromagnetic radiation will cause more holes and a larger radius of holes, which lead to high myopia, this is in accordance with the investigation results that high myopic eyes have macular holes (micron scale). According to the particle property of the photon model, the eye elongated by the striking of high-frequency photons.

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TEXT

Myopia is a worldwide visual impairment[1]. Myopia has increased from 25% to 44% between 1972 and 2004 in the United States[1]. In the cities of Asia, the prevalence is over 80%[1]. There will be 2.62 billion people in myopia by the year 2020, and about 4.76 billion people (49.8% of the world population) will become myopia by the end of 2050[2]. From 350 BC to now, literature has showed hypotheses about etiology of myopia such as lack of enough outdoor activities and too long time of near work [1], literature suggested that blue light from screen may correlate with myopia[3,4], but the identical effect of blue light remains unclear[3-5]. The specific causes of myopia remain undefined[1,6,7].

A hypothesis of X-ray particle property in living tissue

In Color Cathode Ray Tube Computer Monitors and Color Cathode Ray Tube Television Set, three guns are used to shoot the electrons to phosphor spots for producing red, green and blue[8], during the shooting the electrons colliding with the shadow mask, the phosphor layer, and the face panel glass produce photons in the X-ray region of the electromagnetic spectrum called Bremsstrahlung X-rays[9-11], The mean energy of photons reaching the operator working in front of the monitor was above 17 keV[9]. An experiment showed that the annual equivalent dose of X-ray radiation of Cathode Ray Tube Computer Monitors and Cathode Ray Tube Television Set is about 0.1 mSv/y higher than the background radiation[10],

Albert Einstein proposed that light is not a wave passing through space, but a collection of independent wave packets (photons), which has an energy hν [12]. In 1923 the "Compton scattering" showed the particle concept of electromagnetic radiation[13]. In 2017, an experiment tested the records of light-by-light scattering at the Large Hadron Collider [14].

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The electromagnetic radiation effect on cornea has been investigated on the wave property but not the particle property[15,16]. The effects of ionizing radiation in living tissue are controversial [9,10].

The first hypothesis: The photon of X-ray has the particle-like property in living tissue.

A hypothesis of photon-electron scattering in living tissue

According to photon-electron theory, when the photon's frequency reaches or exceeds a threshold, electrons are kicked out only by the hit of photons, this differs from the classical electromagnetic theory[12]

The second hypothesis:

The photon of X-ray has enough frequency to hit the electrons away and shot in a straight line in living tissue.

A hypothesis of massive photons of X-ray radiation producing holes in the eye

It has reported the holes produced by heavy-ion radiation. In 1983, literature showed a membrane lesion in the heavy ion irradiated corneas [17], later in 2004, the Brookhaven National Laboratory in the US made an experiment on cells irradiation by heavy ions, which showed that holes may form as the result of heavy ion irradiation in liposomes and that these holes are large enough to allow leakage of cell internal contents [18].

There is literature reported the hole results of electromagnetic radiation. In 1946, literature reported an experiment result on the animal that the Cathode Ray have a penetration without underlying reaction[19]. In 1983, an experiment showed the hole is the physical damage to the lens after microwave radiation on the murine ocular lens[20].In

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2016, literature reported a corneal hole during radiation therapy for cancers of the head and neck[21].

So,the third hypothesis is:

The X-ray radiation can produce holes in living tissue include the eye. Because the photon of X-ray has enough frequency to scatter the electron away from the original position in living tissue, massive high-frequency photons can scatter massive electrons away from their original positions in the living tissue, which leads to holes in living tissue. The diameter of the hole irradiated by electromagnetic radiation is in the photon scale.

Myopia

1. To illustrate the principle of this design, the writer ignores the pupil, vitreous body, etc. The visual light refracted to retina forms a reversed image, this is omitted. The writer omits eye's other characteristics in this model.

2. To show the assumption, the scale of photon and photon radiation hole in the figures is not the real scale.

3. To compare the visual acuity in a healthy eye and an eye with radiated hole, it is proposed that in a time, three visual light photons are in the incidence angles of α, β, γ, in the following discussions, these three visual light photons are in the fixed incidence angles of α,β, γ as the example visual light photons (Fig.1).

4. Taking the distance of m for example, the m is the furthest vision distance for the three chosen visual light photons for the normal eye. We can see from Figure 2.a, the visual light photon in the incidence angle of γ will not include into the eye when the distance was further than m.

5. The three visual light photons fly into the eye in the distance of m, the healthy eye can focus the three visual light photons to the macula lutea[22] (Fig.2. a).

6. In the distance of m, in the eye with radiated hole, the three visual light photons pass through the radiated hole without touching the cornea and lens, the refraction does not happen, the visual lights go in the straight line. The macula cannot get the visual light photon, the eye lose the image of these three visual light photons, and this is why myopic eye cannot see clearly in the far distance of m (Fig.2. b).

7. From Figure 2.b we can see, if the distance is further than m, the eye with radiated holes still cannot focus the three visual light photons to the macula, because the incidence angles are different which results in leakage of visual light photon in cornea and lens.That means in a further distance than m, the eye with radiated holes cannot have a clear vision as a healthy eye shown in Figure 2.a.This is in accordance with myopia symptom: if the distance was further than m, the eye still cannot see clearly as a healthy eye in Figure 2.a.

8. In a close distance of n (n<m), the distance of n is the furthest distance for the eye with radiated holes to include the three visual light photons to cornea and lens in the example, because if the distance is further than n, the different incidence angles will make visual light photons excluded in cornea and lens. The macula will lose visual light photons because they pass through the hole without refraction.

8. Three visual light photons are focused on macula in the eye with X-ray radiated holes by cornea and lens in the distance of n (Fig.2. c), because the crystallins can scatter the photon of visual light independently[23], most light is refracted in the cornea, the exact

focusing is made by the soft lens with changing into different shapes[15,23], this is why myopic eye can see clearly in a close distance.

So, if the distance is shorter than n, the eye with radiation holes can see clearly, if the distance is further than n, the eye with radiated holes has lower visual acuity compared with a healthy eye, these are myopia symptoms.

The correction of myopia with wearing the concave lens

Myopia glass is a concave lens which can scatter the photon, using a concave lens can help cornea and lens collecting more photons comparing with a non-concave lens in the far distance of m for an eye with holes irradiated by high frequency electromagnetic radiation, the principle is shown in Figure 2.b and Figure 2.d. This is why myopic people can see clearly in far distance by wearing myopia glass.

Eye elongation

Myopic eyes are longer compares with healthy eyes[24], which caused by reduced collagen synthesis and increased collagen degradation[4]. But according to this model, massive high-frequency photons radiate into the eye and hit electrons of the eye which produces a propulsive force in the axial length direction, so the eye elongated by shooting of high-frequency photons.

Verification of this model

1. In this kind of myopic eyeball, we will find many holes which have a radius in the photon scale.

2. Larger radius of the hole and more holes correlate with the higher myopia, which is in accordance with the investigation results that the most common macular change in highly

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myopic eyes is macular holes(micron scale) [25-30], according to this model, the hole in the eye causes myopia but not myopia causes the hole.

3. Testing myopic person's living or working environment, we will find high-frequency electromagnetic radiation instrument.

Prevention of myopia:

Decreasing near work time and increasing the outdoor activity treated as the way of prevention of myopia in children [4], but according to this model, prevention of myopia is in two ways:

1. Using special glass which can avoid the eye from the high-frequency electromagnetic radiation but can let visual light pass through, for example, the lead glass can decrease X-ray beam radiation but let visual light pass [9,31,32].

2. Using special material which can block the machine from emitting high-frequency electromagnetic radiation.

Curing myopia

The radius of the macular hole is about 400 µm, which results from high myopia[4], but according to this model, the high-frequency electromagnetic radiation can cause a hole, the radius of the radiation hole is in photon scale, maybe the long time of striking of high-frequency electromagnetic radiation causes the macular hole. When a person was shot by a bullet, we always need to cure the shot hole, the same as the high-frequency electromagnetic radiation, we need to cure the hole in the eye to cure myopia

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Figure Legends

Fig.1. Three visual light photons in incidence angles of: α, β, γ.

Fig.2. Myopia and the concave lens principle. a. Healthy eye refracts the three visual light photons to the macula in a far distance of m. **b.** In the far distance of m, the eye with the holes irradiated by high-frequency electromagnetic radiation cannot refract any visual light photons to the macula, the macula lost the three visual light photons. **c.** n<m, in close distance of n, the eye with the holes irradiated by high-frequency electromagnetic radiation refracts the three visual light photons to the macula. **d.** Myopia glass is a concave lens which refracts two visual light photons to cornea and lens in the eye with the holes irradiated by high-frequency electromagnetic radiation, the cornea and lens focus these two visual light photons to the macula in a far distance of m.

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Figures

Figure 1

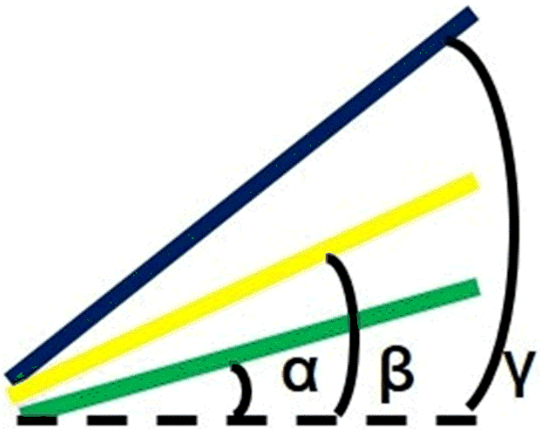

Figure 2

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