sputum/mucus CF respiratory screen or culture helps doctors to diagnose and identify these bacteria or fungi so they can use the most effective antibiotics to cure a specific infection. An additional method of CF is the X-Ray with a small dose of ionizing radiation. It helps to evaluate dilated airways, which contains mucus,and also to detect lung infections that can be treated with antibiotics. Chest x-rays are used regularly to observe changes in patients with cystic fibrosis and detect other respiratory conditions such as pneumonia and collapsed lung. To discover more detailed lung picture we can use CT scanning. Chest CT scans can show both mucus and bronchiectasis that may specify infection, inflammation, and potential lung damage. Normally, sinuses are filled with air and appear black in CT scans but in patients with CF, the sinuses can be filled completely with mucus and appear white or grey in a sinus CT scan. To find out how lungs are working it is useful to apply Pulmonary function tests (PFTs). PFTs are non-invasive tests that measures Rates of flow and gas exchange and Lung volume and lung capacity.

We can observe that each of these methods are equally important when it comes to diagnose cystic fibrosis. The patients and parents can experience anxiety due to extra testing, the waiting associated with it and the difficulty in explaining the results. All these methods offer great hopes for the patient if the patient is diagnosed early before any irreversible damage is done.

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USING OF MELATONIN AS A POTENTIAL COVID-19 PROPHYLAXIS METHOD

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One of the most terrible occurrences in recent history is the current COVID-19 pandemic. The elderly people and those with chronic inflammations are more likely to die as a result of coronavirus infection. As a result, it's critical to figure out how to boost vulnerable groups coronavirus resistance. The goal of this study is to look into the possibilities of using melatonin as a medicine to assist reduce the number of deaths and boost the body's immune system.

Melatonin (N-acetyl-5-methoxytryptamine) is a bioactive molecule that has been used to treat sleep disorders, delirium, atherosclerosis, respiratory disease, and viral infections.

Recent studies show that the effect of SARS-CoV on humans is clearly age-related. Obviously, the increased sensitivity to coronavirus in the elderly is due to their reduced levels of melatonin. Daily variations in melatonin in young people (age 26+/-2 years) were in the region of 7 pg/ml, and in people aged 84+/-2 years, the level of melatonin dropped to 2 pg/ml. So, the application of melatonin may partially alleviate age-related comorbidities exacerbating SARS-CoV-2 infection and increasing its risk.

Viral respiratory infections are associated with oxidative stress characterized by elevated levels of reactive oxygen (ROS) and/or nitrogen species (RNS). SARS-CoV induces oxidative stress; oxidative stress induces the expression of PLA2G2D phospholipase; higher expression of PLA2G2D reduces anti-viral immunity, making the virus more lethal. Melatonin possesses high antioxidant properties. It binds up to 10 free radicals per molecule, while such classic antioxidants as vitamins C and E bind just one. Also, melatonin has a high bioavailability, penetrating blood-brain barrier and placenta.

The COVID-19 societal crisis has led to massive and prolonged stress, anxiety and sleep deprivation, which shall become a subject of systemic scientific analysis. These evident factors may have a significant negative impact on people's immune systems and their ability to combat COVID-19 and other illnesses. Like the neuroendocrine system, the immune system has its own set of rhythms. Melatonin's nightly release, for example, is timed to coincide with the peak of progenitor cell proliferation before they are differentiated into granulocytes and macrophages.

Based on circadian cycles, phagocyte activity rises in tandem with the nocturnal peak of melatonin. Long-term sleep deprivation and/or chronic stress impair immune function by disrupting barrier mechanisms, suppressing phagocytosis, reducing proliferation and activity of some leukocytes, particularly CD^{4+} T cells, while increasing T-suppressors and raising oxidative stress and pro-inflammatory background, as well as increasing oxidative stress and pro-inflammatory

background. As a result, those who suffer from chronic sleep loss and/or stress are more vulnerable to infectious infections.

The production of melatonin is significantly impaired in people with chronic insomnia. The longer a person has experienced symptoms of insomnia, the greater the effect on melatonin concentration. However, in the case of chronic stress, initially, the concentration of melatonin rises significantly as a protective mechanism exerting anti-inflammatory and antioxidant effects, dropping sharply after. So, restoring (even partially) normal sleep habits and reducing anxiety through melatonin may have a significant public health effect during current COVID-19 crisis.

Thus, we may be able to prevent the development of severe disease symptoms in coronavirus patients, reduce the severity of their symptoms, and/or reduce the immuno-pathology of coronavirus infection on patients' health after the active phase of the infection is over by using the safe over-the-counter drug melatonin.

Vlasova K.V.

SUPRAOPTIC NUCLEI RECEPTORS DENSENESS AT NIGHT PERIOD UNDER LIGHT EXPOSURE

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Melatoninis a hormone that your brain produces in response to darkness. It helps with the timing of your circadian rhythms (24-hour internal clock) and with sleep. Being exposed to light at night can block melatonin production and it affects the time organization of a large number of central and peripheral functions. It is also a powerful antioxidant mediator and has roles in other physiologic pathways. Melatonin deficiency is associated with metabolic derangements including glucose and cholesterol dysregulation, hypertension, disordered sleep and even cancer.

Our aim was to check the reaction on light stress of melatonin receptors 1A type in magnocellular neurons of supraoptic nuclei (SON) of the hypothalamus. Objective – to detect the role of light on melatonin receptors of supraoptic nuclei. White male rats were divided into two groups with the same biomaterial sampling time at 2 o'clock of midnight on the eighth day. The difference between groups is the light exposure on laboratory animals. The brain samples were fixed with formalin, dehydrated and it was embedded in paraffin. To detect melatonin receptors denseness was used specific polyclonal antibodies produced by Abcam.

Staining of SON neurocytes obtained denseness of melatonin receptors at 02.00 A.M. – 0,488± 0,0024 under complete darkness whereas in the group of animals with light exposure influence at 02.00 A.M. the results of denseness of receptors – 0,216 ± 0,0017 in SON indicating the existing primary signs of cellular disfunctions.

Saving the biorhythm is extremely important as changing the functioning of the hypothalamus SON neurocytes is likely to have significant consequences associated with an imbalance of homeostasis. Hence all of the above mentioned and further more menaces were an absolute outcome of a prolonged and intense disturbance in the daily routine and habits which must be subjected in order to do the needful.

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SUBMICROSCOPIC CHANGES OF THE LATERAL PREOPTIC NUCLEUS OF THE HYPOTHALAMUS UNDER LIGHT STIMULATION

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Today, there is an increase in the number of elderly people among the world's population. Typical problems of this age group are impaired quality and/or duration of sleep, which can affect the development of pathological processes and overall health. Sleep is an extremely complex genetically determined cyclic process that is regulated by homeostatic and circadian components involving various neural structures, among which the lateral preoptic nucleus (LPO) of the hypothalamus plays a key role.