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## HISTO-MORPHOLOGICAL CHANGES IN LUNG TISSUE IN COVID-19

**Abstract:** 2019 coronavirus infection (COVID-19) is an infectious disease caused by SARS-CoV-2, which is severe acute respiratory syndrome. The disease was first identified in Wuhan, China in 2019 and spread globally, causing the 2019–2020 coronavirus pandemic. The disease causes symptoms such as high temperature, cough and difficulty breathing. In some cases, muscle pain, phlegm, and sore throat are observed. Although most people infected with the virus develop mild symptoms, some patients develop severe pneumonia and multiple organ failure. Among diagnosed cases, the mortality rate is on average 3.4 percent. Among people under 20 years old, this indicator is 0.2 percent, among people over 80 years old it is 15 percent.

## INTRODUCTION

The COVID-19 coronavirus infection is usually spread from person to person through droplets produced during coughing and sneezing. After being infected with the virus, it takes an average of 5 days for symptoms to appear. This period can last from 2 to 14 days. The standard method of diagnosis is to test nasal or throat fluid using reverse transcription polymerase chain reaction (rRT-PCR). A patient may also be diagnosed with a CT scan to identify symptoms, risk factors, and signs of pneumonia.

The World Health Organization reported that the SARS-CoV-2 coronavirus appeared when it was transmitted from bats to humans through another animal. The researchers listed 4 assumptions about the emergence of the coronavirus in order of probability. Among them, the main focus is on the fact that the coronavirus appeared when it was transmitted from bats to humans through another animal. Direct transmission of the virus from bats to humans is considered to be relatively low, while food and laboratory spread are considered unlikely.

The closest relative of the virus that causes COVID-19 is found in bats. However, the evolutionary distance between the viruses detected in bats and SARS-CoV-2 is several decades, the report says, suggesting that the virus did not spread from them.

According to the agency, the research results were as expected and left many questions unanswered. The panel recommended further research on all hypotheses except the "laboratory origin" hypothesis.

## METHODS

From March 2021, in Great Britain, medical research within the framework of the program to study the effects of the SARS-CoV-2 coronavirus on the body - "Human Challenge Program" - began among volunteers. The government said the study was the first in the world where volunteers were deliberately infected with the SARS-CoV-2 coronavirus. Its goals include the development and improvement of vaccines and treatments for the disease.

Specialists from London's "Royal Free Hospital" who are studying the characteristics of the coronavirus worked with the first group of volunteers. Study participants were exposed to the coronavirus in a safe and controlled environment. The participants were continuously monitored by doctors and specialists.

During the research, it was intended to determine how the human immune system responds to the Sars-CoV-2 virus and how the patient infected with the virus spreads its particles around. Similar studies in healthy volunteers have been used in the development of vaccines against influenza and malaria. But what's different about this study is that the participants in those trials were first vaccinated with the appropriate vaccine.

## RESULTS

This disease mainly affects the upper and lower respiratory tract. People with strong immunity have a very low risk of contracting this disease, and even if they do get it, they get over it easily. Therefore, it is necessary to strengthen immunity. How? Through proper nutrition, physical education and breathing exercises.

The diet must contain proteins, the food should be varied and contain a lot of minerals, vitamins, especially vitamin C.

Top 9 products:

1. Lemon. Grind lemon in a blender, add a little sugar and eat one teaspoon three times a day.
2. Chakanda (oblepixa). Useful properties are also preserved in dried fruits. Drink chakanda fruit tea every day.
3. Currant. Both jam and frozen are equally useful. In addition to vitamin C, this fruit contains A, V6, V12, calcium, potassium, iron, magnesium and sodium.
4. Namatak. It is very useful to drink Namatak syrup and tea from its fruits. In the evening, put ten fruits of namatak in a thermos and pour boiling water over it. The next day, drink this tincture throughout the day. This drink increases immunity.
5. Sauerkraut. Serve sauerkraut with a little olive oil and finely chopped onion.
6. Onion. Everyone knows that onions are natural antibiotics.
7. Garlic. In addition to ventilation and protection against viruses, garlic is very useful for patients with cardiovascular diseases. It lowers blood pressure and cholesterol levels.
8. Cottage cheese. Homemade cottage cheese is especially useful. Eating 150 g of cottage cheese with currants, chakanda or lemon per day is beneficial for the body.
9. Egg. It is necessary to eat one egg for breakfast. It contains vitamins A, V2, V5, V6, V9, V12, D, K, N, RR, as well as biotin, calcium, magnesium, zinc, selenium, copper, manganese iron - boiled eggs contain these useful vitamins.

It is important for people allergic to various foods to use hypoallergenic products for disease prevention!

To prevent infection, it is recommended to wash your hands frequently, keep a distance from others, and avoid touching your face with your hands. The use of masks is not recommended for everyone, but only for those who suspect that they are infected with the virus and those who look after them. There is currently no vaccine or drug for COVID-19. Disease management consists of symptomatic treatment, isolation, and experimental measures.

Since the start of vaccination against coronavirus, as of July 2021, 3 billion 436 million doses of vaccine have been used worldwide.

## DISCUSSION

A CT scan actually shows that a certain percentage of the lungs are not working properly due to an advanced infection. When describing lung damage when infected with coronavirus, the doctor usually

sees changes called "cloudy glass" or "consolidation" on X-rays. They appear due to the violation of the barrier between the vessels and the alveoli, and the alveoli are filled with fluid from the vessels. But not all alveoli, even alveoli in the "dark glass" zone, will be completely filled with liquid, - says radiologist Anna Belozeroва, chief specialist in radiation diagnostics of the Ministry of Health of the Republic of Karelia. It should be said that gas exchange is significantly hindered in the areas of "dark glass". As a result, breathing becomes difficult.

Doctors need to know the level of lung damage in some cases, for example, when making a decision about which department to admit a patient to the general or intensive care unit, or when it is important for the doctor to see the dynamics of the disease. But when making a decision, doctors do not aim to improve the results of computed tomography — they focus on other indicators of the body's activity. The degree of damage can be measured by eye. This approach is also called "empirical visual scale". Anna Belozeroва explains that the lung is cut in steps of one millimeter in the computer tomography. — We evaluate the degree of injury by the duration of cuts, we watch them like a cartoon.

Levels of lung damage in Russia are divided into five categories:

- KT-0 — no damage;
- KT-1 - less than 25% of the lung volume is damaged;
- KT-2 — 25-50% of the lung volume is damaged;
- KT-3 — 50-75% of lung volume is damaged;
- CT-4 — 75% of the lung volume is damaged.

During the last ten years, multicentric bacteriological investigations have been carried out at a rapid pace around the world. Pneumonia is often caused by pneumococci, influenza bacilli, staphylococci, beta-hemolytic streptococcus, and klebsiella. At the same time, among the factors causing pneumonia, in addition to known pneumotropic pathogens, new pathogens such as mycoplasma, chlamydia, legionella have appeared.

Primary pneumonias are often caused by gram-positive microorganisms, for example, pneumococci in 30-90% of them, streptococci in 15-30%, hemophilic bacilli in 10-15%, gram-negative flora is less common.

In croupous pneumonia, the reflex spasm of the large-caliber bronchi leads to atelectasis of a piece or several lung segments, and then to a violation of local lymph and blood circulation, the infection spreads throughout the piece in the form of an "oily spot". In another way of the disease, due to the weakening of local protective factors, the spread of infection in a limited area of the lung tissue is observed in the bronchogenic way, which is mainly characteristic of focal pneumonia.

If the process spreads through the peribronchial path and reaches the alveoli, in this case interstitial pneumonia is considered, but many authors reject interstitial pneumonia as a nosological unit and try to justify it by the lack of radiological and clear morphological signs. However, the changes in interstitial pneumonia are not caused by inflammation, but by the vascular reaction caused by the effect of the virus on the lung tissue. According to another point of view, interstitial pneumonia, croup and focal pneumonia are considered as one of the phases of return.

The main morphological sign of pneumonia is involvement of alveoli in the inflammatory process. The general morphological picture of inflammation in pneumonia is the filling of vessels with blood (hyperemia), the beginning of serous edema in the lung stroma, the release of fibrin-rich exudate, leukocyte infiltration, erythrocyte diapedesis, the death of epithelial cells and leukocytes, the number of pathogens. is represented by 'decreasing'. Later, as a result of proteolysis, fibrosis is formed in place of the epithelium. Infiltration foci of different density appear, their color is gray, reddish, brown, depending on the stage of the disease.

The pandemic was canceled on May 5, 2023, according to WHO. The COVID-19 pandemic lasted exactly 3 years, 1 month, and 24 days. During this period, about 7 million people died due to the



coronavirus, and more than 765 million cases of the disease were detected. Earlier, in early April, Germany announced that the COVID-19 pandemic was completely over, and from April 7, all restrictions on wearing masks were removed.

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