

**Results and discussion.** The application of CRISPR technologies may lead to adverse outcomes which may not present themselves until later in life, or potentially even in subsequent generations. These could ultimately lead to long-tail and potentially high liability claims. The personalised therapy approaches for diseases such as HIV and Alzheimer's offered by CRISPR technology comes at a cost, and potentially considerable cost. At a period of stress on healthcare budgets across the world, the opportunity costs of such therapeutics have to be assessed. Wherever in the life of a human, the manipulation of the gene can have, besides the wanted, some unwanted effects. This is an especially sensitive topic when it comes to fetus, embryos, newborns or children. CRISPR based interventions following fertility treatments, respectively in young children with e.g. diagnosis of a genetic disease are exposed to medical malpractice claims.

**Conclusions.** While CRISPR technology clearly offers the potential to precisely treat human genetic diseases with cell therapy approaches, it will bring several ethical concerns that society will need to address quickly. CRISPR technology will doubtlessly have a massive impact on human society, including the insurance industry.

## PHYSIOLOGICAL BASES OF HYPERBARIC OXYGENATION

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**Introduction.** Hyperbaric oxygenation is a therapeutic method that enhances the oxygen supply of hypoxic tissues and increases the ability of wound healing / tissue remodeling. Currently, HBO therapy is used not only for acute hypoxic diseases, but also for many chronic and refractory diseases with tissue hypoxia or intractable infection.

**Aim.** The purpose of this review is to provide an overview of the mechanisms of the therapeutic effect of hyperbaric oxygen.

**Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** The therapeutic effect of hyperbaric oxygen consists of a combination of its compressive, antihypoxic (partial or complete restoration of pO in tissues) and hyperoxic (an increase in pO in tissues in comparison with the norm) components of action. The compression component of hyperbaric oxygenation includes an increase in the density of the gas environment and the actual effect of increased atmospheric pressure, increased mechanical stress on external respiration, decreased physical performance in a hyperbaric environment and a decrease in the volume of gas in the body. The antihypoxic effect of hyperbaric oxygenation is due to a significant increase in the mass of physically dissolved oxygen, primarily in plasma, as well as in other liquid tissues of the body, which makes it possible to remove general and local hypoxia. The antihypoxic effect of HBO, which is important in eliminating hypoxia and its consequences, interrupting the "vicious circles" of metabolic reactions caused by hypoxia, is limited by the exposure time of hyperbaric oxygenation and quickly disappears after the end of the session. The final effect, which persists for quite a long time (up to several months), is determined not only, but rather not so much by the antihypoxic as by the hyperoxic effect of hyperbaric oxygen. The hyperoxic effect is to enhance

the delivery of oxygen not only to hypoxic, but also to normoxic cells, tissues and organs of the whole organism. This component of hyperbaric oxygenation makes a tangible contribution to the positive outcome of hyperbaric oxygen treatment.

**Conclusions.** Hyperbaric oxygenation in the treatment of hypoxia is a safe and clearly superior treatment when compared to other methods such as mechanical ventilation and extracorporeal membrane oxygenation for lung oxygenation. When combined with other pharmacological and non-pharmacological therapeutic options, this treatment can reduce infection and mortality in the COVID-19 pandemic.

## COVID-19 AND DIABETES MELLITUS: TWO PANDEMICS

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**Introduction.** The spread of the new coronavirus SARS COV-2 on almost every continent of the world (except Antarctica) has become an unprecedented challenge to human health around the world. The most vulnerable categories of people prone to this disease are patients with severe chronic diseases such as cardiovascular disease (coronary heart disease, heart failure, hypertension, cerebrovascular disease), chronic obstructive pulmonary disease (COPD), kidney and diabetes (DM). An epidemiological analysis conducted by different groups of scientists from China, Italy and the United States showed a different frequency of confirmed SARS COV-2 infection in patients with diabetes.

**Aim** of the study was to analyze clinical data on the mutual influence of coronavirus and diabetes mellitus on the course of this two pathologies.

**Materials and methods.** An analysis of clinical data on the combined course of diabetes mellitus and coronavirus infection was carried out according to Google Scholar and Pub Med

**Results and discussion.** According to the Centers for Disease Prevention and Control, in China the incidence of diabetes among patients with COVID-19 was 5.3% of 20 892 patients, 10.9% of 7.162 patients in the United States and 35.5% of 355 patients in Italy. A comparison of data on the prevalence of COVID-19 in China and the United States (5.3% and 10.9%, respectively) with the overall prevalence of diabetes in these countries (10.9% and 13.3%, respectively), showed that the number of infected patients with Diabetes mellitus does not exceed the overall prevalence of diabetes in these countries. This means that the risks of developing COVID-19 in patients with diabetes do not exceed such risks in the general population. However, against the background of pre-existing diabetes, infection with the new coronavirus SARS COV-2 has been found to lead to a more severe course of the disease than in patients without diabetes, and the death rate in patients with diabetes is much higher, as confirmed by a number of studies of Chinese scientists. According to the data obtained, the incidence of severe COVID-19 was 1.3-3.9 times, and the incidence of death was 1.5-4.4 times higher in people with diabetes compared to people without diabetes. Published in 2020 in the journal *Diabetes Metabolic Syndrome* (№14 (4): 395-403), a meta-analysis of 30 studies describing the results of COVID-19 pneumonia confirms that patients with diabetes have significantly