

Effects of wildfire smoke on the reproductive potential of male rats

Introduction. The negative impact of wildfire smoke on human health is a unique interdisciplinary problem for the modern scientific community. Despite the fact that wildfires have recently become global, many aspects of the toxic effects of smoke and its components on human health remain unknown. Epidemiological data today convincingly prove the negative impact of smoke from wildfires on human health. At the same time, multi-component composition of the smoke and the presence of a potential repro- and genotoxicants and determines the need for a comprehensive study of the toxic effects of smoke on the reproductive system, including remote, manifested in the offspring.

Methods. Adult Wistar male rats were exposed to wildfire smoke inhalation for 1 day, 1 week and 4 weeks (4 hours/day, 5 days/week). A histological examination of the gonads and survival and postnatal development of offspring was carried out.

Results. Smoke exposure for 1 day and 7 days did not reveal a pronounced effect on spermatogenesis parameters. However, increasing the duration of exposure to 4 weeks led to a decrease in the spermatogenesis index and Leydig cells. Exposure to smoke for 4 weeks, the incidence of stillbirth was more pronounced and amounted to 29.4%, the rate of death of rat pups in the first week of life was 3.6%.

Conclusion. The results obtained can be considered as a fundamental basis for the development of preventive health-saving measures for both the population and forest firefighters. In addition, the identified dependencies will make it possible to contribute to the assessment of environmental damage from natural fires when assessing the potential ability of small mammals to reproduce.