

# Covid-19 Pandemic Stress and Its Impact on Our Epigenome



**Milena Georgieva**



**George Miloshev**

---

**T**he word Covid-19 raises caution as no other word ever has. Not even the words “war” or “death” have been as scary as “Covid-19”. Cases of a new coronavirus first emerged in late 2019, when a mysterious illness was reported in Wuhan, China. The cause of the disease was soon confirmed as a new kind of coronavirus, and the infection quickly spread across countries.

The world went under complete lockdown!

In our modern world of advanced technologies such as AI, self-driving cars, and trips to Mars, we are on lockdown, socially distanced by a banal and, at first glance, prosaic viral respiratory infection. How can this be explained? How, in the world of modern medicine, where we bravely discuss gene editing, human design, and the possibilities of combating human disease, are we completely defeated by a viral infection? These are questions we scientists often discuss during our regular webinars and digital meetings. And yet we cannot find any logical explanation...

Covid-19 has threatened the modern world and commanded a major change in our way of living, our way of communicating, and our whole working process. We went digital!!

With the successful development of a vaccine and treatment protocol, this disease will eventually disappear, or at least fatal cases will be reduced to near zero. But how shall we exit the crisis provoked by the infection within us—the crisis provoked by the fear of losing our work and our monthly income, which can overwhelm our whole being!!

Stress, stress, and stress – this is the world we now live in. We strive to reduce our stress, and meditative and psychotherapeutic techniques teach the importance of inner regulation. The best way to combat stress is to focus on what makes us happy and relaxed, because stress, no matter the source or type, leaves marks on our genes and adds chemical molecules that control our genetic activity for generations to come. Take, for example, the Dutch famine at the end of the Second World War. For months, the German occupation of the Netherlands left the country under complete lockdown. This was accompanied by extensive stress and lack of food. Women pregnant during this period gave birth to children small in size who, later in life, suffered from metabolic syndrome, Type 2 diabetes, and cardiovascular disease. Medical records of these individuals show extensive change in the epigenetic profiles of the genes involved in their metabolism and overall maintenance of their physiological functions. These records were the first proofs linking stress to changes in gene activity, and showed that these changes continued on for many generations. Since then, a lot of additional data has accumulated linking stress with changes in gene activity. The most striking fact about these changes in gene activity is that they are transmitted to future generations.

In this time of Covid-19, we will witness a similar outcome. People under lockdown, stressed by their changed way of life, stricken by the fear of becoming homeless, poor, and without any way to survive the economic crisis will, undoubtedly, experience impacts on their genes. Years will pass before we can detect these changes and track them in future generations. It is certain that the pandemic and the stress it causes in almost everyone will have changed our epigenetics, and will lead to increases in mental disorders and other pathologies. Special attention should be given to these emerging dangers. It will require the joint efforts of scientists, medical doctors, psychotherapists, and policy makers to track down the epigenetic changes induced by the pandemic and its impact on human health.

Particular care should be given to the mental health of all of us living under the pandemic and to our future generations.



**Associate Professor Milena Georgieva**, PhD, Molecular Genetics Lab, Institute of Molecular Biology, BAS. Milena is an Associate Professor of Molecular Biology. Her current work investigates the interplay between DNA and the environment during normal development, aging and age-associated diseases. As a specialist in Molecular Biology, Genetics, and Epigenetics, Milena believes that in modern biomedicine we can now very clearly distinguish between the time “before” and “after” the project “The Human Genome.” The time “after” not only marks the beginning of the new millennium but also highlights the beginning of a turning point in modern medicine, where the handwriting of our genes and the specificity of our DNA are studied in the light of epigenetics. As a zealous communicator of science, Milena strives to present trends in modern science in accessible and interesting language.

E-mail: [milenageorgy@gmail.com](mailto:milenageorgy@gmail.com)

LinkedIn: <https://www.linkedin.com/in/milena-georgieva/>

ORCID ID: <https://orcid.org/0000-0002-2371-7544>

Website: [www.chromatinepigenetics.com](http://www.chromatinepigenetics.com)

**Professor George Miloshev**, PhD, Head of the Laboratory of Molecular Genetics, Institute of Molecular Biology, Bulgarian Academy of Sciences. Professor Miloshev is a full professor of Molecular Genetics, and head of the laboratory. His main interests are in the field of chromatin, with special emphasis on the interplay between the environment and chromatin structure and dynamics. His scientific interests and research efforts are aimed at gaining deeper understanding of general cellular mechanisms, specifically about epigenetic phenomena. The intention of his work is to acquire information for practical use in medicine, criminology, and ecology. The areas of his research include epigenetic mechanisms, nuclear organization, and chromatin structure and dynamics, especially at higher order levels of organization.

E-mail: [H1resteam@gmail.com](mailto:H1resteam@gmail.com)

LinkedIn: <https://www.linkedin.com/in/george-miloshev-b7595148/>

ORCID ID: <https://orcid.org/0000-0003-2979-8899>

Website: [www.chromatinepigenetics.com](http://www.chromatinepigenetics.com)