



LEV GOLDFARB. BIOGRAPHICAL OVERVIEW

LEV GOLDFARB, PhD, MD, Professor, National Institute of Health (USA). He has 168 publications of scientific articles in the journals of the Web of Science Core collection. His articles were quoted 10348 times, h-index 55. Research interests: neurology, genetics, neurodegenerative diseases, hereditary, infectious and prion diseases of the nervous system.

After graduating from the Ryazan Medical Institute in 1959, Dr. L.G. Goldfarb was assigned to work in the Siberian city of Kemerovo. At that time, a huge epidemic of Tick-borne encephalitis was raging in the Kemerovo region. In the spring and summer season, thousands of patients with signs of nervous system disease filled rural and city hospitals. The rapid industrial development of Western Siberia during and after the World War II led to an increase in population arriving from the European part of Russia. A large number of non-immune people came into contact with natural foci of infections.

After a brief specialization in neuroinfectious diseases at the Neurological department of the Kemerovo Regional Hospital, Dr. Goldfarb was commissioned to review clinical examination of each patient with suspected Tick-borne encephalitis, their registration, and collection of material for serological diagnostic studies. This required repeated visits to each hospital in rural regions and towns, and to communicate with attending physicians and managers at all levels.

Methods for prevention of Tick-borne encephalitis

needed significant improvement. In the early 1960-s, the Institute of Poliomyelitis and Virus Encephalitis in Moscow developed a new inactivated culture vaccine against Tick-borne encephalitis to combat the growing epidemic. Kemerovo region has become a testing ground for determining the reactogenicity, immunological and epidemiological effectiveness of the new vaccine. Mikhail Petrovich Chumakov, director of the Institute, and leading researchers E.S. Sarmanova, D.K. Lvov, K.G. Umanskiy, and N.N. Gorchakovskaya spent most of their time in the Kemerovo region. Significant improvements have also been made to non-specific methods of prophylaxis – tick control in the frequently visited forests. Dr. Goldfarb has become one of the contributors.

Comprehensive studies conducted in the Kemerovo region in the 1960s made it possible to develop a rational strategy for combating Tick-borne encephalitis and led to a significant and sustainable reduction in morbidity and mortality in a large, densely populated region. These results were achieved through a deep, including mathematical, analysis of the characteristics of

the epidemic process, the selection and full-scale application of effective methods for the prevention of Tick-borne encephalitis in each locality.

In rural areas with a constantly high infection rate, vaccination of the entire population has proven to be the most effective method of prevention. In these areas, a steady decrease in the incidence of Tick-borne encephalitis by a factor of 12 was achieved after 80 to 90% of the population aged 4 years and older was vaccinated. The method of suppressing the tick populations by acaricidal treatment of forests was mainly used to protect the population of cities in which an 8-fold reduction in Tick-borne encephalitis incidence was achieved.

In 1969, Dr. Goldfarb, a senior researcher at the Institute of Poliomyelitis and Virus Encephalitis, arrived in Yakutia at the invitation of the Minister of Health, Prokopiĭ Andreyevich Petrov, to study the causes, the directions of spread and methods of prevention of Viliuisk encephalomyelitis. With the full participation and assistance of Prokopiĭ Andreyevich, L.G. Goldfarb organized and conducted 12 expeditions in collaboration with scientists from several Moscow research institutes (1970–1979), and then another 8 expeditions (1992–2006) with the participation of foreign experts to study the problems associated with the spread of Viliuisk encephalomyelitis to a vast territory of Central Yakutia. The work was encouraged and supported by Academician Mikhail Petrovich Chumakov and Professor Carleton Gajdusek.

The results of multiyear research confirmed with full confidence the proposed by P.A. Petrov view that Viliuisk encephalomyelitis is a unique disease with signs of meningitis, encephalitis and myelitis, and a tendency to develop a slowly progressive syndrome that reflects severe necrotic and inflammatory processes, mainly in the gray matter of the brain. The clinical diagnosis of Viliuisk encephalomyelitis has been improved by eliminating various unrelated neurodegenerative disorders. In the course of this work, Spinocerebellar ataxia and Spastic paraplegia were found to be wide-spread in some regions and to clog up the Viliuisk encephalomyelitis registry. Considering these facts, a diagnostic committee was created under the leadership of Afanasiĭ Ivanovich Vladimirtsev, and later researchers of the Institute of Health Vsevolod Afanasyevich Vladimirtsev and Fyodor Alekseyevich Platonov to review each case of suspected Viliuisk encephalomyelitis. The database was created and then computerized. The laboratory of Vladimir Leonidovich Osakovskiy and Tatyana Mikhailovna Sivtseva implemented laboratory diagnostics of Viliuisk encephalomyelitis based on the study of cere-

brospinal fluid for the presence of oligoclonal immunoglobulins.

A detailed study of the epidemiology of Viliuisk encephalomyelitis made it possible to determine with high accuracy the geographical area in which Viliuisk encephalomyelitis originated, as well as the direction and speed of its spread to other territories with the use of diagnostically and statistically reliable materials. It has been established that the spread of Viliuisk encephalomyelitis followed extensive human migrations. In the 1960s, the disease spread to the territory of Central Yakutia, reaching a maximum in 1976. A thorough examination in several villages near the city of Yakutsk confirmed that the penetration of the disease into new geographical areas with migrants led to outbreaks of Viliuisk encephalomyelitis among local residents who never left their ulus.

By agreement with P.A. Petrov and A.I. Vladimirtsev, the majority of patients in the acute and subacute stages of the disease remained hospitalized for a long time in several specialized hospitals: the Encephalitis department of the Republican Hospital in Yakutsk, the Neuropsychiatric hospital in Viliuisk, and the Neuropsychiatric nursing home in Sosnovka, the Viliuisk district. This approach helped isolate patients considered to be contagious and allowed to interrupt the chain of infections. From the mid-1980s, a decrease in the incidence of Viliuisk encephalomyelitis began. To accelerate this trend, the Institute of Health conducted long-term monitoring of each registered patient, including planned hospitalizations of patients with subacute and chronic forms and visits to their places of residence with the goal of early identification of new patients in the extended families and communities.

L.G. Goldfarb was appointed an expert of the World Health Organization and received a grant from the US Department of Health to carry out work on Viliuisk encephalomyelitis in accordance with his and Dr. A.A. Chepurnov's ("Vector", Novosibirsk) program. One of the tasks was the justification and implementation of measures to prevent the further spread of Viliuisk encephalomyelitis to the unaffected territories of the Republic of Sakha (Yakutia), the Russian Federation, and the neighboring states. The incidence of Viliuisk encephalomyelitis continued to decline: in the 2000s, the disease disappeared from Central Yakutia, and in the 2010s from the Viliuisk region. After 2012, no new cases of Viliuisk encephalomyelitis were detected.

Dr. Goldfarb's activities to ensure sanitary and epidemiological well-being in the Republic of Sakha (Yakutia) were not limited to work on Viliuisk enceph-

alomyelitis and other neurodegenerative diseases. A genetic predisposition to type 2 diabetes was studied in collaboration with F.A. Platonov, P.M. Ignatiev, V.L. Osakovskiy, L. L. Alekseyeva, and others. The incidence of diabetes in Yakutia has increased significantly and is shifting to a relatively younger age. The study revealed a relationship between the predisposition to diabetes and rare alleles in the genes responsible for insulin production and adipose tissue metabolism. The genetic profiles of people most susceptible to diabetes development were identified. The results are presented in the monograph "*Epidemic of Type 2 Diabetes in Yakutia*", "Nauka" Publishing House, 2011, Novosibirsk. The monograph is dedicated and published under the name of our late friend *Pavel Mikhailovich Ignatiev*, a remarkable researcher and doctor. The results are used to select fully adequate medicines for treating patients, for diagnosing diabetic retinopathy, and preventing blindness, which was the subject of a doctoral dissertation of L.L. Alekseyeva.

Many doctors and researchers of the Republic of Sakha (Yakutia) were involved in the work conducted by L.G. Goldfarb. Leading scientists F.A. Platonov and S.K. Kononova completed a four-month training course at his Clinical Neurogenetics Unit in Bethesda, Maryland, near Washington, which promoted the creation of a molecular-genetics laboratory in Yakutsk to diagnose Spinocerebellar ataxia and to clarify the geographical distribution of this disease. Yakut researchers participated in numerous publications in Russia and abroad. Several PhD and DSc dissertations were successfully completed. In 2014, L.G. Goldfarb and a group of co-authors published the book "*Viliuisk Encephalomyelitis*", Publishing

House of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, which describes the results of a 60-year study of this deadly disease. The monograph is dedicated to the memory of Prokopiyy Andreyevich Petrov, the discoverer and the most consistent researcher of this disease.

The Goldfarb Laboratory has conducted research on many other projects. The dominant mutations in the PRNP gene responsible for Creutzfeldt-Jakob disease, as well as the genetic causes for Fatal familial insomnia and other prion diseases have been discovered and studied. Mutations in the Desmin gene (*DES*) have been recognized as the cause of cardiac and musculoskeletal myopathy in more than 100 patients. Mutations in the *MYOT*, *FLMN*, and *BAG3* genes cause myofibrillar myopathies with a recognizable phenotype. A Belarus cluster of more than 40 patients with an unusual form of amyotrophic lateral syndrome (ALS) is associated with a mutation in the *SOD1* gene. New variants of Charcot-Marie-Toots disease (2D and V), identified in 6 families, are caused by a mutation in the *GARS* gene. A list of publications with Dr. Goldfarb's participation includes 215 scientific articles in peer-reviewed journals and 29 reviews and book chapters.

The President of the Republic of Sakha (Yakutia) awarded Dr. Goldfarb with a medal "*Civil Valor*" for many years of fruitful cooperation in studying of Viliuisk encephalomyelitis and contributions to the training of research scientists. The President of the Academy of Sciences of the Republic of Sakha (Yakutia) awarded L.G. Goldfarb with *The Large Silver Medal* for his accomplishments in sciences.