

Summary of the activity and results obtained in the project in 2025

Project number **N:2025.55**

Project name **Selective interstitial chemotherapy with autoimmunization of patients with cerebral glioblastoma**

The aim of the first stage of the research was to study the literature on the problem of selective chemotherapy and autoimmunization in patients with glioblastoma of the brain. The main task was to thoroughly familiarize ourselves with the existing methods of selective chemotherapy, evaluate their advantages and disadvantages. According to the literature, the main methods of selective chemotherapy are the following: a) Intrathecal method; b) Method of applying plates with chemotherapy drugs to the walls of the removed tumor. c) Convection method. d) Method of installing a pump with chemotherapy drugs; e) Method of long-term implantation of a catheter port in the bed of the removed tumor.

The intrathecal chemotherapy: involves the administration of chemotherapy drugs into the subarachnoid space of the spinal cord and brain. The drug is administered through a needle via a lumbar puncture. A disadvantage of this method is its toxic effect on the spinal cord, nerve roots, and cerebral ventricles. The drug concentration drops very quickly due to the constant production of cerebrospinal fluid by the ventricular plexuses.

The application method: involves removing the brain tumor and applying "Gliodel" sheets impregnated with Cormustin to the brain surface, in the tumor bed. This technique can slow the recurrence of glioblastoma. The disadvantage of this method is the constant decrease in the concentration of the chemotherapy drug over several weeks and the subsequent inability to inhibit tumor growth.

The convection method involves inserting a silicone catheter into the site of the removed glioblastoma for 10-14 days. The short period of intracerebral catheter implantation is completely insufficient to stop the continued growth of the glioblastoma.

The method of selective interstitial chemotherapy with implantation of a port-catheter: consists of implanting a silicone catheter into the bed of the removed glioblastoma, and connecting it to the port, which is inserted under the skin under the collarbone, on the side of the removed tumor. Advantages of this method: The medication is administered in a dose 50-70 times less than that used in systemic chemotherapy and does not have the effects of general toxicity and suppression of the immune system, allowing it to be combined with systemic chemotherapy. The ability to grow glioblastoma cells from a patient and determine the sensitivity for chemotherapeutic drug. The effectiveness of chemotherapy is monitored by monthly MRI of the brain. Depending on MRI data, autologous plasma may be administered to stimulate cellular immunity against glioblastic cells. Disadvantages of the method: the need to repeat chemotherapy every 2-4 weeks. There is no data on how to determine the depth of chemotherapy drug penetration into brain tissue. Local repeated administration of chemotherapy drugs causes necrosis of healthy cells and small capillaries, which increases the risk of venous hemorrhage.

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Date: 23.01.25

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