Analysis of Pro-Inflammatory Microenvironment around Intracortical Electrodes in Response to Imantinib

Clark, Alexus

Intracortical electrodes can be utilized by those with severe brain injuries. When they are implanted the Blood Brain Barrier (BBB) is breached causing neurodegeneration and inflammatory responses by the body. After this occurs the electrode fails and has to be removed. In order to decrease or diminish these responses the BBB needs to be healed. A possible tool to do so is Imatinib Myselate, which has shown to reduce BBB breach in stroke, multiple sclerosis, spinal cord injury, and leaky endothelial cell models. My objective in this experiment was to analyze the pro inflammatory response around electrodes of rats that were injected with (IMT). To do so, intracortical electrodes were first implanted into the barrel cortexes of rats. For four weeks the IMT group was injected with Imatinib and the Control with saline. After, the rats' brain was stained with CD86 to identify pro-inflammatory responses. An Intensity analysis of the region surrounding the electrode implant was completed. This area was analyzed because the breached BBB allowed natural killer cells to surround the electrode. After staining the date collected was quantified using Image J and Matplotlib.The results showed more pro-inflammatory cells around the electrodes of rats injected with Imantinib than the control implanted with Saline. Although a statistical difference was not shown, IMT increased BBB leakage.