Neutrophils block brain capillaries in the penumbra region of the ischemic mouse model with a 60-min transient middle cerebral artery occlusion

Secondary antibodies with the corresponding fluorophores were used to detect CD31 (green) and Ly-6G (red). The 3D model was constructed in Fiji, showing neutrophils (red) densely aggregate inside the capillaries (green). This obstruction of blood flow could lead to tissue hypoxia and further severe damages. This image shows how the rapid adherence of neutrophils to capillaries upon ischemia could explain why many stroke patients cannot fully recover, even after receiving timely treatments. The image is a part of my honours research project, in which I investigate the effects of a phosphodiesterase inhibitor on improving stroke outcomes by reducing neutrophil adherence and increasing blood flow.

A consortium of types of macrophages in brain tissue of a meningioma patient

Shown here is a fluorescent stain for macrophages, with two anti-bodies attempting to elucidate the connection between grade of meningioma cancer and its underlying immune response. In this stain from the brain of a patient with meningioma, both CD68 and CD163 antibodies are lit up, correlating to the presence of two different types of macrophages: M1, aka anti-tumour cells, and M2, which are pro-tumoral. The blue circles are cells stained with DAPI which outlines the cell nucleus. In this case, there are more cells encircled in an orange stain, indicative of a M2 macrophage. Occasionally, green light is apparent for M1 macrophages. Being able to see how the population of M1 to M2 macrophages compares is important to more accurately predict patient prognosis, since M1 is more favourable to anti-cancer responses.