



Lymphatic clearance of red blood cells from human and mouse brain tissue following intraventricular hemorrhage

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Intraventricular hemorrhage is one of the most fatal forms of traumatic brain injury. However, therapy for this type of hemorrhage is limited and new strategies are needed to reduce hematoma proliferation. This study demonstrates that the meningeal lymphatic vessels (MLVs) serve as “tunnels” for the clearance of red blood cells from the ventricular system of the brain in male and adult rodents.

To confirm the important role of the MLS in the removal of red blood cells from the ventricles of the brain, the effectiveness of this process was studied under conditions of damage to the MLS. For this purpose, the photoablation method was used. This method involves the introduction of a photosensitizer, visudin, into the large cistern of the brain and its excitation with a laser with a wavelength of 689 nm. The photodynamic reaction leads to damage to the meningeal network.

The results found that MLVs transported red blood cells from the right lateral ventricle to the deep cervical lymph nodes. Using the membranes of the brain of people who died from intraventricular hemorrhage, red blood cells were found in MLVs. Our results in animals and humans convincingly indicate that MLVs play an important role in the evacuation of red blood cells from the brain during the development of intracranial hemorrhages.

Key words: intraventricular hemorrhage, meningeal lymphatic vessels, photoablation, photosensitizer.

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