

# innovations

from The University of Vermont

**TITLE:** EMERGENCE OF A R-TYPE  $Ca^{2+}$  CHANNEL CONTRIBUTES TO CEREBRAL ARTERY CONSTRICTION FOLLOWING SUBARACHNOID HEMORRHAGE

**INVENTORS:** George Wellman, Masanori Ishiguro

**DESCRIPTION:** Cerebral aneurysm rupture and subarachnoid hemorrhage (SAH) inflict disability and death among thousands of individuals each year. The consequences of SAH following cerebral aneurysm rupture are devastating with mortality rates as high as 50% and the majority of survivors left with moderate to severe disability. Cerebral vasospasm, characterized as a delayed and sustained arterial constriction, is a major contributor to these high morbidity and mortality rates. Large diameter arteries have been implicated in contributing to decreased blood flow resulting in SAH. However, small diameter arteries, below the resolution limits of standard angiography, may also be affected by subarachnoid blood. The invention is based in part on the discovery that such small diameter arteries have R-type voltage dependent calcium channels that are involved in regulating calcium flow and play an important role in decreased cerebral blood flow observed following SAH. It has been discovered that SAH leads to enhanced  $Ca^{2+}$  entry in myocytes of small diameter cerebral arteries through the emergence of R-type voltage-dependent  $Ca^{2+}$  channels (VDCCs) encoded by the gene  $Ca_v 2.3$ .

**ADVANTAGES:** The inventors believe that the administration of an R-type voltage-dependent calcium channel inhibitor will allow the management of the cerebral blood flow during a time when it would normally decrease blood flow in small diameter arteries. The emergence of  $Ca_v 2.3$  in cerebral arteries following subarachnoid hemorrhage is unique and the first to be described in the expression of this ion channel in vascular smooth muscle. A unique peptide has been identified that may selectively antagonize  $Ca_v 2.3$  and therefore reverse subarachnoid hemorrhage-induced vasospasm.

**PATENT STATUS:** Patent Pending

**LICENSING STATUS:** Worldwide rights available

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