

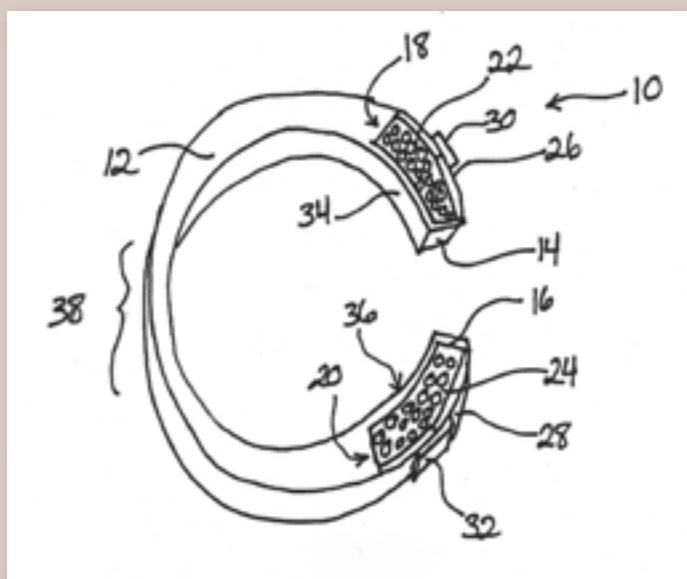
Minimizing neural damage

Patent granted for brain cooling and monitoring device

Dr Vivian Ramsden (at right) not only directs the Department of Family Medicine's Research Division at the University of Saskatchewan, but also participates in building new science. She and her colleagues developed a brain cooling device and monitoring system meant to reduce the inflammatory response of the brain to stroke (Figure 1).



Figure 1. Schematic used in patent application



Intended for use before hospitalization in cases of suspected stroke, the device can widen the window of early treatment before irreversible damage sets in. The device is portable, is noninvasive, is easy to use, and facilitates continuous temperature monitoring. Blood passing through the carotid artery on the way to the brain is cooled by proximity to the cold inserts in the U-shaped collar and, in turn, cools the brain. A temperature indicative of a cooling effect is either determined clinically or by assessing a patient's initial temperature and observing any decrease.

Temperature is a critical determinant in limiting the amount of neural damage from an ischemic attack or stroke. The therapeutic window for intervention is relatively small (3 to 6 hours after the event); applied cooling strategies can extend the window and reduce the inflammatory response. It is

important to decrease the temperature of the brain in suspected stroke and head trauma patients from a more internal source (eg, carotid arterial blood flowing to the brain), without unnecessarily cooling the entire body, which would increase the chance of activating the body's shivering mechanisms. Shivering increases body temperature, which in this case would be detrimental to patients.

The most recent guidelines for suspected stroke published by the American Heart Association recommend immediate general assessment by prehospital care providers within the first 10 minutes of arriving at the scene. This assessment calls for determination of vital signs, including temperature. In the past, the tools to facilitate this assessment were unavailable; precise control of the magnitude and duration of the cooling was needed. As a result of earlier research, the prototypes of both the cooling collar and the temperature monitoring device have evolved.

Dr Ramsden has been working with Dr Jim Thornhill (Physiology at the University of Saskatchewan) and a team of specialists—Mr Tim Hillier (MD Ambulance in Saskatoon, Sask), Dr Dale Corbett (Faculty of Medicine at Memorial University of Newfoundland), Dr Dave Fletcher, and Dr Gill White (Canadian Tarpaulin Manufacturing in Saskatoon)—on this research project.

—Saskatoon, Sask