Enzyme controlling cell death paves way for treatment of brain damage in newborns

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Enzyme controlling cell death paves way for treatment of brain damage in newborns. Credit: Image courtesy of the University of Gothenburg

where the brain is starved of oxygen around the time of delivery – is normally treated by cooling the infant, but this only helps one baby in nine. New research from the Sahlgrenska Academy at the University of Gothenburg, Sweden, could now pave the way for new ways of treating brain damage in newborns.

Birth asphyxia can cause irreparable brain damage and lifelong handicaps, including cerebral palsy, epilepsy and mental retardation. The brain damage evolves over a time period of hours to days after the injury. This opens up a therapeutic window where we are able to affect outcome. Birth asphyxia is normally treated by cooling the infant, which has been shown to reduce the risk of lasting problems.

Unfortunately this therapy stops only one child in nine from suffering brain damage. Furthermore, premature babies cannot be treated in this way. In her doctoral thesis, Ylva Carlsson has therefore attempted to find a new treatment strategy that can be used not only in combination with cooling therapy but also to help children where cooling therapy is not an option.

The focus is on an enzyme which controls elements of the apoptosis – cell death – associated with the brain damage. "We've mapped the role this enzyme plays in the development of brain damage in newborns who suffer from birth asphyxia," says Carlsson. "The results show that a reduction in the amount of this enzyme also reduces the extent of the brain damage. Added protection is given if cooling therapy is used too."

Based on a study of mice, Carlsson is also able to show in her thesis that the mechanisms behind brain damage vary according to the age of the brain: a treatment that can protect adults turned out to exacerbate the damage in newborns.

"This may mean that some drugs developed for brain damage in adults should probably not be given to newborn babies," says Carlsson. "Tailor-made treatments targeting specific brain damage mechanisms and combination treatments for children may therefore be the way forward. But first we need to look more closely at how best to control these proteins without disrupting other key functions in the growing brain."

Provided by University of Gothenburg