Background Hypoxic-ischaemic encephalopathy leads to neurologic impairment or even death. Secretoneurin (SN), a neuropeptide with angiogenic and anti-apoptotic properties, provided strong neuroprotection in an adult animal model of cerebral ischaemia.

Aim To evaluate the effect of SN in established in vivo and in vitro models of neonatal hypoxic-ischaemic brain injury.

Methods Seven day old mice underwent unilateral common carotid artery ligation, followed by exposure to hypoxia (8% oxygen). Thereafter, mouse pups were randomly injected intraperitoneally with SN (0.25 μg/g body weight) or vehicle. As endpoint we determined the histological injury score and the number of caspase-3 positive cells 24 h after the insult. Primary cultured hippocampal neurons were treated with oxygen glucose deprivation (OGD) on day 10. Neurons were assigned to the following groups: i) control ii) OGD iii) OGD+SN (1, 10 or 50 μg/g body weight). As primary outcome parameter, cell death was evaluated via real time live confocal imaging using calcein-AM and propidium iodide (PI).

Results SN displayed a non-significant trend to lower mean values of histological injury score compared to control (n = 11–12, p > 0.05) and significantly reduced the number of cells stained positively for activated caspase-3 (n = 6, p < 0.05). In vitro SN application on hippocampal neurons (OGD+SN) significantly reduced the number of dead cells assessed by the PI/calcein ratio compared with the untreated OGD group (n = 8, p < 0.05).

Conclusion We provide first evidence that SN is neuroprotective in established in vitro and in vivo models of neonatal hypoxic-ischaemic brain injury and might therefore be considered a promising therapeutic option.