Conclusion

Repetitive and profound hypoglycemia in newborn infants can result in irreversible brain damage and lead to severe neurologic sequelae and motor and developmental abnormalities. Our results showed imbalance in the expression pattern of dopaminergic receptor subtypes in neonatal hypoglycemia and its role in glucose regulation. Disrupted dopaminergic signalling and increased hypoglycemic stress in neonatal hypoglycemia contributed to the neuronal loss. Neuronal loss in neonatal hypoglycemic rats is mediated through the expression of pattern of second messengers- cAMP and IP3, transcription factor- CREB, second messenger enzyme- PLC and Glucose transporter- GLUT 3. Decrease in the expression of neuronal survival factors – NFkB, GDNF, BDNF and antioxidant enzymes – SOD, GPx and activation of apoptotic factors - Akt-1, TNF-α, Bax and caspase-8 clearly indicated the extent of brain damage inflicted by both hypoglycemia and glucose infusion induced hyperglycemia. We observed that the adverse effects of neonatal hypoglycemia are a result of oxidative stress in the brain tissue which inflicts irreversible tissue damage. In our study, we have suggested a resuscitation program using a neuroprotectant, *Bacopa monnieri* crude extract and its active component, Bacoside A. Treatment of neonatal hypoglycemic rats with *Bacopa monnieri* and Bacoside A significantly reversed the altered dopaminergic neurotransmission, second messenger signalling and activation of apoptotic factors. The present study confirmed the increased antioxidant protection offered by *Bacopa monnieri* and Bacoside A, there by decreasing neuronal damage and providing effective functional recovery of dopaminergic system. We have thus put forth a promising herbal therapy which ameliorates the risks for permanent neuronal damage and reduces the incidence of lifelong disabilities.
Neuroprotective role of *Bacopa monnieri* and Bacoside A

- Neuronal loss, Apoptosis
  - Caspase 8
  - Bax
  - Akt - 1

- Reactive Oxygen Species, DNA Damage
  - SOD
  - GPx

Neonatal Hypoglycemia

- Defective Dopamine Neurotransmission
  - Dopamine
  - Glut - 4
  - CREB
  - cAMP
  - IP3
  - PLC

- Cognitive Deficits
  - NFkB
  - BDNF
  - GDNF
  - TNF - α

- Neonatal Hypoglycemia
- After Treatment