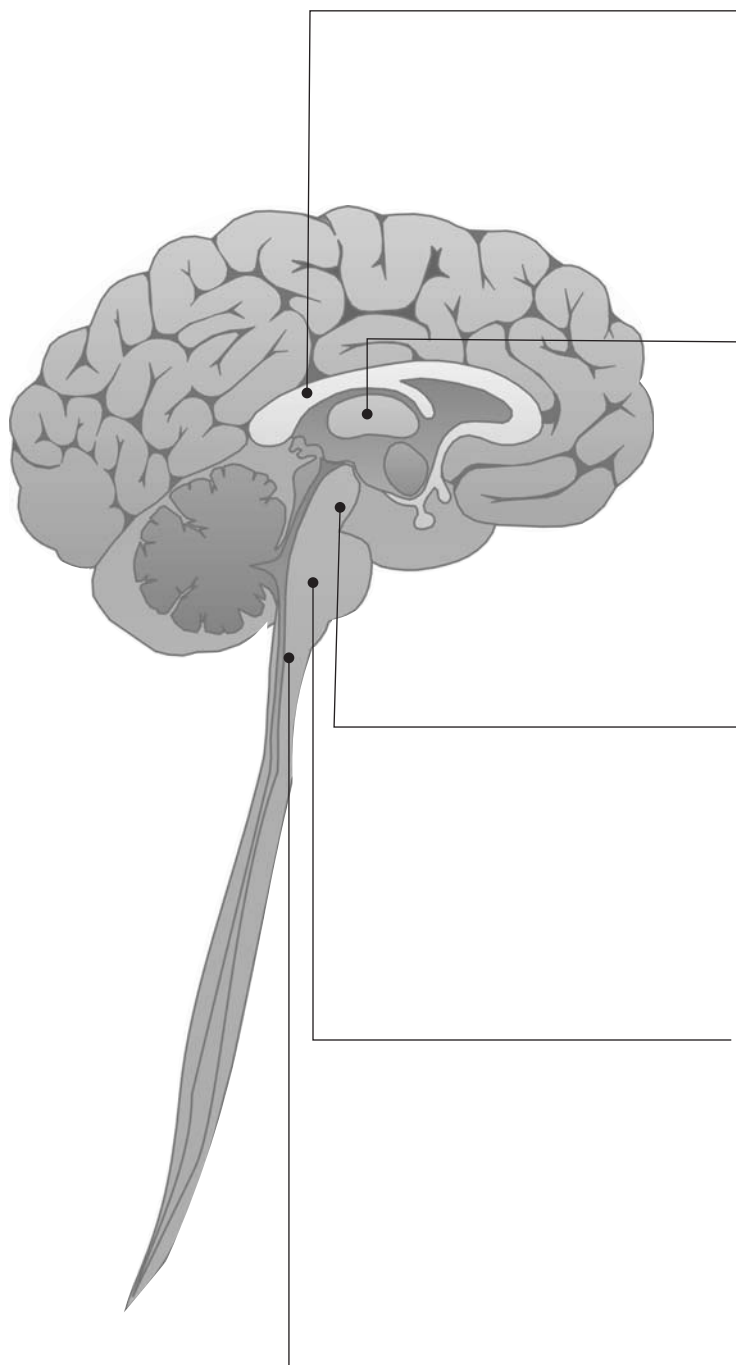


# Abnormal Breathing Patterns in Brain Injury

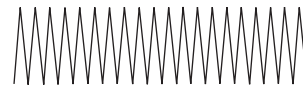


## Cheyne-Stokes breathing



- **Pattern;** rhythmic waxing and waning of respirations' rate and depth, alternating with brief periods of respiratory arrest (apnea)
- **Indicates;** injury deep inside cerebral hemispheres and basal ganglia.

## Central neurogenic hyperventilation



- **Pattern;** sustained regular and rapid respirations, with forced inspiration and expiration.
- **Indication;** injury to lower mid-brain or middle-to-upper pons.

## Apnustic breathing



- **Pattern;** prolonged inspiration followed by inspiratory or expiratory pause
- **Indicates;** injury to middle- to-lower pons area or extensive brain stem damage.

## Cluster breathing



- **Pattern;** Irregular respirations alternating with pauses
- **Indicates;** injury to upper medulla or lower pons.

## Ataxic breathing



- **Pattern;** completely irregular breathing pattern with randomly deep and shallow respirations and pauses
- **indicates;** injury to medulla