

How opiates and Hypercapnia affect the control of breathing

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Breathing is gas exchange....



Hypercapnic acidosis (HA) is the primary mechanism that drives breathing



The control of breathing is integrated neurophysiological behavior



Neuronal basis of the breathing rhythm



The preBötzinger complex: A central rhythm generator



Clinical Topic: How opiates affect the central control of breathing

The hallmark of opiate overdose: Respiratory depression



Source: National Center for Health Statistics, CDC Wonder

http://www.drugabuse.gov/related-topics/trends-statistics/infographics/prescription-



Opiates

0,

CO₂

How does hypercapnia influence opioid neuromodulation in the preBotzinger Complex?

Effects of DAMGO and HA on rhythmogenesis



Opiates and hypercapnia depresses neural rhythm



We know...

Hypercapnia alone stimulates breathing







Hypercapnia may also enhance opiate neuromodulation breathing centers (e.g., the preBotzinger complex)

Respiratory depression caused by DAMGO is stronger with acidification



Where did the injection sites of the drug hit?



Overall Conclusion:

Opiate and hypercapnia use depresses respiratory frequency through a pH dependent mechanism.

Thank you!

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