



## Ralph Lydic Ph.D.

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### Research Interests

Ralph Lydic, PhD., is the Bert La Du Professor of Anesthesiology, Professor of Physiology, and Associate Chair Anesthesia Research. The National Heart, Lung, and Blood Institute of the National Institutes of Health funds Dr. Lydic's laboratory. The goals of his research programs are to elucidate the mechanisms by which sleep, opioids, and volatile anesthetics depress breathing and arousal. The evolutionary perspective, and current data, supports the view that neurons generating sleep and wakefulness preferentially modulate the ability of opioids, hypnotics, and anesthetics to obtund wakefulness. This concept underlies work in Dr. Lydic's laboratory characterizing the neurochemical and signal transduction processes through which cholinergic neurons modulate sleep, arousal, and autonomic control. Recent work has shown that adenosine and nitric oxide modulate pontine acetylcholine release and arousal. A second research program is characterizing the effects of opioids on cholinergic neurotransmission. These studies aim to understand the cellular and molecular mechanisms by which opioids inhibit cholinergic neurotransmission and disrupt sleep and breathing. Both of these research programs encourage an active interaction between basic and clinical investigators.

### Selected References

Watson CJ, Lydic R, Baghdoyan HA. Sleep and GABA levels in the oral part of rat pontine reticular formation are decreased by local and systemic administration of morphine. *Neuroscience* 144:375-86, 2007.

Lydic, R. Sleep disruption is related to allelic variation in the ob gene. *Am J Physiol Regul Integr Comp Physiol* 290:R892-893, 2006.



Coleman CG, Baghdoyan HA, Lydic R. Dialysis delivery of an adenosine A2A agonist into the pontine reticular formation of C57BL/6J mouse increase pontine acetylcholine release and sleep. *J Neurochem* 96:1750-1759, 2006.

Lydic R, Garza-Grande R, Struthers R, Baghdoyan HA. Nitric oxide in B6 mouse and nitric oxide-sensitive soluble guanylate cyclase in cat modulate acetylcholine release in pontine reticular formation. *J Appl Physiol* 100:1666-1673, 2006

Bernard R, Lydic R, Baghdoyan HA. Hypocretin (orexin) receptor subtypes differentially enhance acetylcholine release and activate G protein subtypes in rat pontine reticular formation. *J Pharmacol Exp Ther* 317:163-171, 2006.

Osman NI, Baghdoyan HA, Lydic R. Morphine inhibits acetylcholine release in rat prefrontal cortex when delivered systemically or by microdialysis to basal forebrain. *Anesthesiology* 103: 779-87, 2005.

Lydic R and Baghdoyan HA. Sleep, anesthesiology, and the neurobiology of arousal state control. *Anesthesiology* 103: 1268-95, 2005.

Douglas CL, Bowman, GN, Baghdoyan HA, and Lydic R. C57BL/6J and B6.V-LEPOB mice differ in the cholinergic modulation of sleep and breathing. *J App Physiol* 98:918-929, 2005.

Douglas CL, Demarco GJ, Baghdoyan HA, and Lydic R. Pontine and basal forebrain cholinergic interaction: implications for sleep and breathing. *Respiratory Physiology and Neurobiology* 143: 251-62, 2004.

Coleman CG, Lydic R, and Baghdoyan HA. Acetylcholine release in the pontine reticular formation of C57BL/6J mouse is modulated by non-M1 muscarinic receptors. *Neuroscience* 126:831-838, 2004.

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