

## Chapter 37

### REFERENCES

1. Franks NP. General anaesthesia: from molecular targets to neuronal pathways of sleep and arousal. *Nat Rev Neurosci*. 2008;9:370-386.
2. Eckenhoff RG. Promiscuous ligands and attractive cavities: how do the inhaled anesthetics work? *Mol Interv*. 2001;1:258-268.
3. Koblin DD, Chortkoff BS, Laster MJ, et al. Polyhalogenated and perfluorinated compounds that disobey the Meyer-Overton hypothesis. *Anesth Analg*. 1994;79:1043-1048.
4. Raines DE. Anesthetic and nonanesthetic halogenated volatile compounds have dissimilar activities on nicotinic acetylcholine receptor desensitization kinetics. *Anesthesiology*. 1996;84:663-671.
5. Peoples RW, Weight FF. Cutoff in potency implicates alcohol inhibition of N-methyl-D-aspartate receptors in alcohol intoxication. *Proc Natl Acad Sci U S A*. 1995;92:2825-2829.
6. Eckenhoff RG, Tanner JW, Johansson JS. Steric hindrance is not required for n-alkanol cutoff in soluble proteins. *Mol Pharmacol*. 1999;56:414-418.
7. Mohr JT, Gribble GW, Lin SS, et al. Anesthetic potency of two novel synthetic polyhydric alkanols longer than the n-alkanol cutoff: evidence for a bilayer-mediated mechanism of anesthesia? *J Med Chem*. 2005;48:4172-4176.
8. Eger EI, Koblin DD, Laster MJ, et al. Minimum alveolar anesthetic concentration values for the enantiomers of isoflurane differ minimally. *Anesth Analg*. 1997;85:188-192.
9. Sedensky MM, Cascorbi HF, Meinwald J, et al. Genetic differences affecting the potency of stereoisomers of halothane. *Proc Natl Acad Sci U S A*. 1994;91:10054-10058.
10. Cantor RS. The lateral pressure profile in membranes: a physical mechanism of general anesthesia. *Biochemistry*. 1997;36:2339-2344.
11. Koubi L, Tarek M, Bandyopadhyay S, et al. Effects of the nonimmobilizer hexafluoroethane on the model membrane dimyristoylphosphatidylcholine. *Anesthesiology*. 2002;97:848-855.
12. Sedensky MM, Siefker JM, Koh JY, et al. A stomatin and a degenerin interact in lipid rafts of the nervous system of *Caenorhabditis elegans*. *Am J Physiol Cell Physiol*. 2004;287:C468-C474.
13. Brannigan G, Henin J, Law R, et al. Embedded cholesterol in the nicotinic acetylcholine receptor. *Proc Natl Acad Sci U S A*. 2008;105:14418-14423.
14. Franks NP, Lieb WR. Do general anaesthetics act by competitive binding to specific receptors? *Nature*. 1984;310:599-601.
15. Eckenhoff MF, Eckenhoff RG. Quantitative autoradiography of halothane binding in rat brain. *J Pharmacol Exp Ther*. 1998;285:371-376.
16. Xu Y, Tang P, Zhang W, et al. Fluorine-19 nuclear magnetic resonance imaging and spectroscopy of sevoflurane uptake, distribution, and elimination in rat brain. *Anesthesiology*. 1995;83:766-774.
17. Bhattacharya AA, Curry S, Franks NP. Binding of the general anesthetics propofol and halothane to human serum albumin. High resolution crystal structures. *J Biol Chem*. 2000;275:38731-38738.
18. Liu R, Loll PJ, Eckenhoff RG. Structural basis for high-affinity volatile anesthetic binding in a natural 4-helix bundle protein. *FASEB J*. 2005;19:567-576.
19. Zhang H, Astrof NS, Liu JH, et al. Crystal structure of isoflurane bound to integrin LFA-1 supports a unified mechanism of volatile anesthetic action in the immune and central nervous systems. *FASEB J*. 2009;23:2735-2740.
20. Eckenhoff RG. An inhalational anesthetic binding domain in the nicotinic acetylcholine receptor. *Proc Natl Acad Sci U S A*. 1996;93:2807-2810.
21. Xu Y, Seto T, Tang P, Firestone L. NMR study of volatile anesthetic binding to nicotinic acetylcholine receptors. *Biophys J*. 2000;78:746-751.
22. Chiara DC, Dangott LJ, Eckenhoff RG, Cohen JB. Identification of nicotinic acetylcholine receptor amino acids photolabeled by the volatile anesthetic halothane. *Biochemistry*. 2003;42:13457-13467.
23. Brannigan G, LeBard DN, Henin J, et al. Multiple binding sites for the general anesthetic isoflurane identified in the nicotinic acetylcholine receptor transmembrane domain. *Proc Natl Acad Sci U S A*. 2010;107:14122-14127.
24. Ishizawa Y, Pidikiti R, Liebman PA, Eckenhoff RG. G protein-coupled receptors as direct targets of inhaled anesthetics. *Mol Pharmacol*. 2002;61:945-952.
25. Eckenhoff RG, Tanner JW, Liebman PA. Cooperative binding of inhaled anesthetics and ATP to firefly luciferase. *Proteins*. 2001;42:436-441.
26. Harrison NL, Kugler JL, Jones MV, et al. Positive modulation of human gamma-aminobutyric acid type A and glycine receptors by the inhalation anesthetic isoflurane. *Mol Pharmacol*. 1993;44:628-632.
27. Kutchai H, Geddis LM, Jones LR, Thomas DD. Differential effects of general anesthetics on the quaternary structure of the Ca-ATPases of cardiac and skeletal sarcoplasmic reticulum. *Biochemistry*. 1998;37:2410-2421.

28. Fang M, Tao YX, He F, et al. Synaptic PDZ domain-mediated protein interactions are disrupted by inhalational anesthetics. *J Biol Chem.* 2003;278:36669-36675.
29. van Swinderen B, Saifee O, Shebestor L, et al. A neomorphic syntaxin mutation blocks volatile-anesthetic action in *Caenorhabditis elegans*. *Proc Natl Acad Sci U S A.* 1999;96:2479-2484.
30. Mowrey D, Haddadian EJ, Liu LT, et al. Unresponsive correlated motion in alpha7 nAChR to halothane binding explains its functional insensitivity to volatile anesthetics. *J Phys Chem B.* 2010;114:7649-7655.
31. Das J, Addona GH, Sandberg WS, et al. Identification of a general anesthetic binding site in the diacylglycerol-binding domain of protein kinase Cdelta. *J Biol Chem.* 2004;279:37964-37972.
32. Rebecchi MJ, Pentyala SN. Anaesthetic actions on other targets: protein kinase C and guanine nucleotide-binding proteins. *Br J Anaesth.* 2002;89:62-78.
33. Gomez RS, Guatimosim C. Mechanism of action of volatile anesthetics: involvement of intracellular calcium signaling. *Curr Drug Targets CNS Neurol Disord.* 2003;2:123-129.
34. Pan JZ, Xi J, Tobias JW, et al. Halothane binding proteome in human brain cortex. *J Proteome Res.* 2007;6:582-592.
35. Hinkley RE Jr. Microtubule-macroto tubule transformations induced by volatile anesthetics. Mechanism of macroto tubule assembly. *J Ultrastructure Res.* 1976;57:237-250.
36. Hameroff S, Nip A, Porter M, Tuszynski J. Conduction pathways in microtubules, biological quantum computation, and consciousness. *Biosystems.* 2002;64:149-168.
37. Samain E, Bouillier H, Rucker-Martin C, et al. Isoflurane alters angiotensin II-induced Ca<sup>2+</sup> mobilization in aortic smooth muscle cells from hypertensive rats: implication of cytoskeleton. *Anesthesiology.* 2002;97:642-651.
38. Kaech S, Brinkhaus H, Matus A. Volatile anesthetics block actin-based motility in dendritic spines. *Proc Natl Acad Sci U S A.* 1999;96:10433-10437.
39. Nagele P, Mendel JB, Placzek WJ, et al. Volatile anesthetics bind rat synaptic snare proteins. *Anesthesiology.* 2005;103:768-778.
40. Pan JZ, Wei H, Hecker JG, et al. Rat brain DNA transcript profile of halothane and isoflurane exposure. *Pharmacogenet Genomics.* 2006;16:171-182.
41. Cheng SC, Brunner EA. Inducing anesthesia with a GABA analog, THIP. *Anesthesiology.* 1985;63:147-151.
42. Li GD, Chiara DC, Sawyer GW, et al. Identification of a GABAA receptor anesthetic binding site at subunit interfaces by photolabeling with an etomidate analog. *J Neurosci.* 2006;26:11599-11605.
43. Caraiscos VB, Newell JG, You T, et al. Selective enhancement of tonic GABAergic inhibition in murine hippocampal neurons by low concentrations of the volatile anesthetic isoflurane. *J Neurosci.* 2004;24:8454-8458.
44. Jurd R, Arras M, Lambert S, et al. General anesthetic actions in vivo strongly attenuated by a point mutation in the GABA(A) receptor beta3 subunit. *FASEB J.* 2003;17:250-252.
45. Liao M, Sonner JM, Jurd R, et al. Beta3-containing gamma-aminobutyric acid A receptors are not major targets for the amnesic and immobilizing actions of isoflurane. *Anesth Analg.* 2005;101:412-418.
46. Mihic SJ, Ye Q, Wick MJ, et al. Sites of alcohol and volatile anaesthetic action on GABA(A) and glycine receptors. *Nature.* 1997;389:385-389.
47. Jevtovic-Todorovic V, Todorovic SM, Mennerick S, et al. Nitrous oxide (laughing gas) is an NMDA antagonist, neuroprotectant and neurotoxin. *Nat Med.* 1998;4:460-463.
48. Franks NP, Dickinson R, de Sousa SL, et al. How does xenon produce anaesthesia? *Nature.* 1998;396:324.
49. Franks NP, Honore E. The TREK K2P channels and their role in general anaesthesia and neuroprotection. *Trends Pharmacol Sci.* 2004;25:601-608.
50. Bhattacharji A, Klett N, Go RC, Covarrubias M. Inhalational anaesthetics and n-alcohols share a site of action in the neuronal Shaw2 Kv channel. *Br J Pharmacol.* 2010;159:1475-1485.
51. Catterall WA, Few AP. Calcium channel regulation and pre-synaptic plasticity. *Neuron.* 2008;59:882-901.
52. White IL, Franks NP, Dickinson R. Effects of isoflurane and xenon on Ba<sup>2+</sup>-currents mediated by N-type calcium channels. *Br J Anaesth.* 2005;94:784-790.
53. Study RE. Isoflurane inhibits multiple voltage-gated calcium currents in hippocampal pyramidal neurons. *Anesthesiology.* 1994;81:104-116.
54. Takei T, Saegusa H, Zong S, et al. Increased sensitivity to halothane but decreased sensitivity to propofol in mice lacking the N-type Ca<sup>2+</sup> channel. *Neurosci Lett.* 2003;350:41-45.
55. Joksovic PM, Weiergraber M, Lee W, et al. Isoflurane-sensitive presynaptic R-type calcium channels contribute to inhibitory synaptic transmission in the rat thalamus. *J Neurosci.* 2009;29:1434-1445.
56. Joksovic PM, Bayliss DA, Todorovic SM. Different kinetic properties of two T-type Ca<sup>2+</sup> currents of rat reticular thalamic neurones and their modulation by enflurane. *J Physiol.* 2005;566:125-142.
57. Elliott JR, Elliott AA, Harper AA, Winpenny JP. Effects of general anaesthetics on neuronal sodium and potassium channels. *Gen Pharmacol.* 1992;23:1005-1011.
58. Ouyang W, Wang G, Hemmings HC Jr. Isoflurane and propofol inhibit voltage-gated sodium channels in isolated rat neurohypophysial nerve terminals. *Mol Pharmacol.* 2003;64:373-381.
59. Lingamaneni R, Hemmings HC Jr. Differential interaction of anaesthetics and antiepileptic drugs with neuronal Na<sup>+</sup> channels, Ca<sup>2+</sup> channels, and GABA(A) receptors. *Br J Anaesth.* 2003;90:199-211.
60. Shiraishi M, Harris RA. Effects of alcohols and anesthetics on recombinant voltage-gated Na<sup>+</sup> channels [erratum appears in *J Pharmacol Exp Ther.* 2004;310(2):843]. *J Pharmacol Exp Ther.* 2004;309:987-994.
61. Hollmann MW, Strumper D, Herroeder S, Durieux ME. Receptors, G proteins, and their interactions. *Anesthesiology.* 2005;103:1066-1078.
62. Peterlin Z, Ishizawa Y, Araneda R, et al. Selective activation of G-protein coupled receptors by volatile anesthetics. *Mol Cell Neurosci.* 2005;30:506-512.
63. van Swinderen B, Metz LB, Shebestor LD, et al. Goalpha regulates volatile anesthetic action in *Caenorhabditis elegans*. *Genetics.* 2001;158:643-655.
64. Tseng YY, Liang J. Are residues in a protein folding nucleus evolutionarily conserved? *J Mol Biol.* 2004;335:869-880.
65. Xi J, Liu R, Asbury GR, Eckenhoff MF, Eckenhoff RG. Inhalational anesthetic-binding proteins in rat neuronal membranes. *J Biol Chem.* 2004;279:19628-19633.
66. Morgan PG, Hoppel CL, Sedensky MM. Mitochondrial defects and anesthetic sensitivity. *Anesthesiology.* 2002;96:1268-1270.

67. Hollenbeck PJ. Mitochondria and neurotransmission: evacuating the synapse. *Neuron*. 2005;47:331-333.
68. Darbandi-Tonkabon R, Hastings WR, Zeng CM, et al. Photoaffinity labeling with a neuroactive steroid analogue. 6-azi-pregnanolone labels voltage-dependent anion channel-1 in rat brain. *J Biol Chem*. 2003;278:13196-13206.
69. Darbandi-Tonkabon R, Manion BD, Hastings WR, et al. Neuroactive Steroid interactions with voltage-dependent anion channels: lack of relationship to GABAA receptor modulation and anesthesia. *J Pharmacol Exp Ther*. 2004;308:502-511.
70. Eger EI, Fisher DM, Dilger JP, et al. Relevant concentrations of inhaled anesthetics for in vitro studies of anesthetic mechanisms. *Anesthesiology*. 2001;94:915-921.
71. Urban BW, Friederich P. Anesthetic mechanisms in-vitro and in general anesthesia. *Toxicol Lett*. 1998;100-101:9-16.
72. Eckenhoff RG, Johansson JS. On the relevance of "clinically relevant concentrations" of inhaled anesthetics in in vitro experiments. *Anesthesiology*. 1999;91:856-860.
73. Raines DE, Miller KW. On the importance of volatile agents devoid of anesthetic action. *Anesth Analg*. 1994;79:1031-1033.
74. Hayashi Y, Maze M. Alpha 2 adrenoceptor agonists and anaesthesia. *Br J Anaesth*. 1993;71:108-118.
75. Sonner JM, Gong D, Li J, et al. Mouse strain modestly influences minimum alveolar anesthetic concentration and convulsivity of inhaled compounds. *Anesth Analg*. 1999;89:1030-1034.
76. Morgan PG, Sedensky MM. Mutations conferring new patterns of sensitivity to volatile anesthetics in *Caenorhabditis elegans*. *Anesthesiology*. 1994;81:888-898.
77. Kayser EB, Morgan PG, Sedensky MM. Mitochondrial complex I function affects halothane sensitivity in *Caenorhabditis elegans*. *Anesthesiology*. 2004;101:365-372.
78. Hawasli AH, Saifee O, Liu C, et al. Resistance to volatile anesthetics by mutations enhancing excitatory neurotransmitter release in *Caenorhabditis elegans*. *Genetics*. 2004;168:831-843.
79. Nash HA, Scott RL, Lear BC, Allada R. An unusual cation channel mediates photic control of locomotion in *Drosophila*. *Curr Biol*. 2002;12:2152-2158.
80. Sergeev P, da Silva R, Lucchinetti E, et al. Trigger-dependent gene expression profiles in cardiac preconditioning: evidence for distinct genetic programs in ischemic and anesthetic preconditioning. *Anesthesiology*. 2004;100:474-488.
81. Futterer CD, Maurer MH, Schmitt A, et al. Alterations in rat brain proteins after desflurane anesthesia. *Anesthesiology*. 2004;100:302-308.
82. Richards CD. Anaesthetic modulation of synaptic transmission in the mammalian CNS. *Br J Anaesth*. 2002;89:79-90.
83. Adams DJ, Biggs PJ, Cox T, et al. Mutagenic insertion and chromosome engineering resource (MICER). *Nat Genet*. 2004;36:867-871.
84. Austin CP, Batten JF, Bradley A, et al. The knockout mouse project. *Nat Genet*. 2004;36:921-924.
85. Xin HB, Deng KY, Shui B, et al. Gene trap and gene inversion methods for conditional gene inactivation in the mouse. *Nucleic Acids Res*. 2005;33:e14.
86. Subramaniam L. Security and predictability: two missing pieces in BGP. Available at: <http://cs.nyu.edu/~lakshmi/wired.pdf>.
87. Rampil IJ. Anesthetic potency is not altered after hypothermic spinal cord transection in rats. *Anesthesiology*. 1994;80:606-610.
88. Antognini JF, Carstens E, Atherley R. Does the immobilizing effect of thiopental in brain exceed that of halothane? *Anesthesiology*. 2002;96:980-986.
89. Antognini JF, Schwartz K. Exaggerated anesthetic requirements in the preferentially anesthetized brain. *Anesthesiology*. 1993;79:1244-1249.
90. Jinks SL, Martin JT, Carstens E, et al. Peri-MAC depression of a nociceptive withdrawal reflex is accompanied by reduced dorsal horn activity with halothane but not isoflurane. *Anesthesiology*. 2003;98:1128-1138.
91. Massimini M, Boly M, Casali A, et al. A perturbational approach for evaluating the brain's capacity for consciousness. *Prog Brain Res*. 2009;177:201-214.
92. Ferrarelli F, Massimini M, Sarasso S, et al. Breakdown in cortical effective connectivity during midazolam-induced loss of consciousness. *Proc Natl Acad Sci U S A*. 2010;107:2681-2686.
93. Murphy M, Bruno M, Rieder BA, et al. Propofol anesthesia and sleep: a high-density EEG study. *Sleep*. 2011;34(3):283A-291A.
94. Keifer JC, Baghdoyan HA, Lydic R. Pontine cholinergic mechanisms modulate the cortical electroencephalographic spindles of halothane anesthesia. *Anesthesiology*. 1996;84:945-954.
95. Alkire MT, Haier RJ, Fallon JH. Toward a unified theory of narcosis: brain imaging evidence for a thalamocortical switch as the neurophysiologic basis of anesthetic-induced unconsciousness. *Conscious Cogn*. 2000;9:370-386.
96. Eino D, Stewart J, Atkinson S, Morgan M. Effect of isolation on barbiturate anaesthesia in the rat. *Psychopharmacology (Berl)*. 1976;50:85-88.
97. Tung A, Bergmann BM, Herrera S, et al. Recovery from sleep deprivation occurs during propofol anesthesia. *Anesthesiology*. 2004;100:1419-1426.
98. Tanase D, Baghdoyan HA, Lydic R. Dialysis delivery of an adenosine A1 receptor agonist to the pontine reticular formation decreases acetylcholine release and increases anesthesia recovery time. *Anesthesiology*. 2003;98:912-920.
99. Sato T, Araki I, Kushikata T, et al. Decreased hypothalamic prostaglandin D2 and prostaglandin E2 contents during isoflurane anaesthesia in rats. *Can J Anaesth*. 1995;42:1031-1034.
100. Tung A, Lynch JP, Roizen MF. Use of the BIS monitor to detect onset of naturally occurring sleep. *J Clin Monit Comput*. 2002;17:37-42.
101. Gallez D, Babloyantz A. Predictability of human EEG: a dynamical approach. *Biol Cybern*. 1991;64:381-391.
102. Sleigh JW, Donovan J. Comparison of bispectral index, 95% spectral edge frequency and approximate entropy of the EEG, with changes in heart rate variability during induction of general anaesthesia. *Br J Anaesth*. 1999;82:666-671.
103. Kelz MB, Sun Y, Chen J, et al. An essential role for orexins in emergence from general anesthesia. *Proc Natl Acad Sci U S A*. 2008;105:1309-1314.
104. Gompf H, Chen J, Sun Y, et al. Halothane-induced hypnosis is not accompanied by inactivation of orexinergic output in rodents. *Anesthesiology*. 2009;111:1001-1009.
105. Zecharia AY, Nelson LE, Gent TC, et al. The involvement of hypothalamic sleep pathways in general anesthesia: testing the hypothesis using the GABAA receptor beta3N265M knock-in mouse. *J Neurosci*. 2009;29:2177-2187.
106. McCormick DA, Bal T. Sleep and arousal: thalamocortical mechanisms. *Annu Rev Neurosci*. 1997;20:185-215.

107. Steriade M, McCormick DA, Sejnowski TJ. Thalamocortical oscillations in the sleeping and aroused brain. *Science*. 1993;262:679-685.
108. Gottschalk A, Miotke SA. Volatile anesthetic action in a computational model of the thalamic reticular nucleus. *Anesthesiology*. 2009;110:996-1010.
109. Sherin JE, Shiromani PJ, McCarley RW, Saper CB. Activation of ventrolateral preoptic neurons during sleep. *Science*. 1996;271:216-219.
110. Saper CB, Chou TC, Scammell TE. The sleep switch: hypothalamic control of sleep and wakefulness. *Trends Neurosci*. 2001;24:726-731.
111. Lydic R, Baghdoyan HA: Sleep, anesthesiology, and the neurobiology of arousal state control. *Anesthesiology*. 2005;103:1268-1295.
112. Plourde G, Chartrand D, Fiset P, et al. Antagonism of sevoflurane anaesthesia by physostigmine: effects on the auditory steady-state response and bispectral index. *Br J Anaesth*. 2003;91:583-586.
113. Jones BE. From waking to sleeping: neuronal and chemical substrates. *Trends Pharmacol Sci*. 2005;26:578-586.
114. Berridge CW, Foote SL. Effects of locus coeruleus activation on electroencephalographic activity in neocortex and hippocampus. *J Neurosci*. 1991;11:3135-3145.
115. Correa-Sales C, Rabin BC, Maze M. A hypnotic response to dexmedetomidine, an alpha 2 agonist, is mediated in the locus coeruleus in rats. *Anesthesiology*. 1992;76:948-952.
116. Zhang Y, Laster MJ, Eger EI, et al. Blockade of 5-HT<sub>2A</sub> receptors may mediate or modulate part of the immobility produced by inhaled anesthetics. *Anesth Analg*. 2003;97:475-479.
117. Haas H, Panula P. The role of histamine and the tuberomammillary nucleus in the nervous system. *Nat Rev Neurosci*. 2003;4:121-130.
118. Nelson LE, Guo TZ, Lu J, et al. The sedative component of anesthesia is mediated by GABA(A) receptors in an endogenous sleep pathway. *Nat Neurosci*. 2002;5:979-984.
119. Sutcliffe JG, de Lecea L. The hypocretins: setting the arousal threshold. *Nat Rev Neurosci*. 2002;3:339-349.
120. Peyron C, Tighe DK, van den Pol AN, et al. Neurons containing hypocretin (orexin) project to multiple neuronal systems. *J Neurosci*. 1998;18:9996-10015.
121. Brevig HN, Watson CJ, Lydic R, Baghdoyan HA. Hypocretin and GABA interact in the pontine reticular formation to increase wakefulness. *Sleep*. 2010;33:1285-1293.
122. Kushikata T, Hirota K, Yoshida H, et al. Orexinergic neurons and barbiturate anesthesia. *Neuroscience*. 2003;121:855-863.
123. Yasuda Y, Takeda A, Fukuda S, et al. Orexin a elicits arousal electroencephalography without sympathetic cardiovascular activation in isoflurane-anesthetized rats. *Anesth Analg*. 2003;97:1663-1666.
124. Minami K, Uezono Y, Sakurai T, et al. Effects of anesthetics on the function of orexin-1 receptors expressed in *Xenopus* oocytes. *Pharmacology*. 2007;79:236-242.
125. Dong H, Niu J, Su B, et al. Activation of orexin signal in basal forebrain facilitates the emergence from sevoflurane anesthesia in rat. *Neuropeptides*. 2009;43:179-185.
126. Friedman EB, Sun Y, Moore JT, et al. A conserved behavioral state barrier impedes transitions between anesthetic-induced unconsciousness and wakefulness: evidence for neural inertia. *PLoS One*. 2010;5:e11903.
127. Alkire MT, McReynolds JR, Hahn EL, Trivedi AN. Thalamic microinjection of nicotine reverses sevoflurane-induced loss of righting reflex in the rat. *Anesthesiology*. 2007;107:264-272.
128. Vanini G, Watson CJ, Lydic R, Baghdoyan HA. Gamma-aminobutyric acid-mediated neurotransmission in the pontine reticular formation modulates hypnosis, immobility, and breathing during isoflurane anesthesia. *Anesthesiology*. 2008;109:978-988.
129. Luo T, Leung LS. Basal forebrain histaminergic transmission modulates electroencephalographic activity and emergence from isoflurane anesthesia. *Anesthesiology*. 2009;111:725-733.
130. Alkire MT, Asher CD, Franciscus AM, Hahn EL. Thalamic microinfusion of antibody to a voltage-gated potassium channel restores consciousness during anesthesia. *Anesthesiology*. 2009;110:766-773.