

Chronic Pain: Observations as Patient and Provider About What Works (...and what doesn't)

Pain Clinic Team Members: Laguna Honda Hospital

Grace Dammann, MD
Daniel Rybold, MD
Mandy Sen, Pharm D
Sharon Brahms, RN, CMT
Carole Bailey, RN, CMT
Michael Moore, MSW
Alice Wong, MMT
Dorit Jaffe, MMT
Jennifer Block, M.Div

Golden Gate Bridge



Facts

- 1.8 billion crossings since 1937
- 40-50 million crossings a year
- Since 1970, 36 fatalities, 17 from head-on crossover accidents
- Odds of head-on: about 0

Nonetheless...



Nonetheless !



What Happened?

- Medically
- Emotionally
- Cognitively
- Professionally

What Happened Medically

- 45 days in a coma
- 48 units RBCs, platelets, all factors, Day 1
- Almost 13 months of continuous hospitalization
- 13 operations in the first 13 days
- 5 major later operations
- 2 later TBIs

Buddhism

བདེན་པ་བཞི་ནི།

The Four Noble Truths

ཏ་སྤྱལ་བ་སྤུལ་གྱི་བདེན་པ་

1) The truth of suffering

ཨ་ཀུན་འབྱུང་གི་བདེན་པ་

2) The truth of the origin of suffering

ཨ་འགོག་པའི་བདེན་པ་

3) The truth of the cessation of suffering

ཨ་ལམ་གྱི་བདེན་པ་

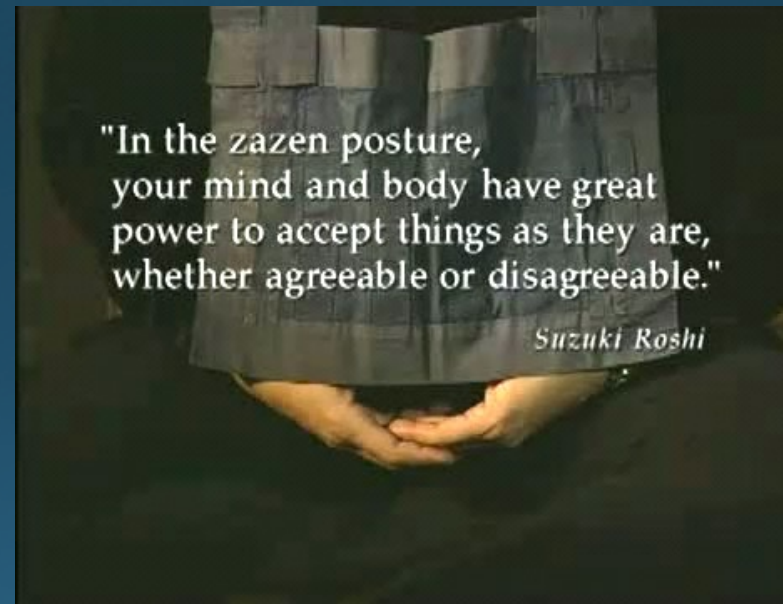
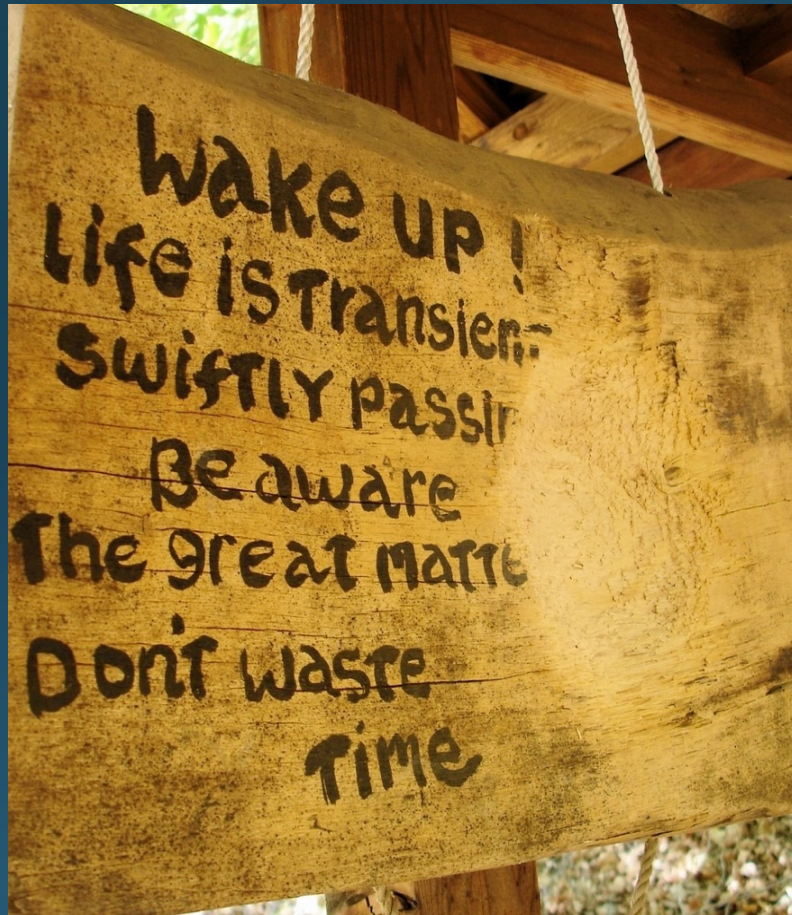
4) The truth of the path



Why Buddhism?



Why?



Suzuki Roshi

Why?



Thoughts as Patient

*1) Remember that the most important thing for the patient's healing is being around happy people. Figure out what you need to do to be happy at work, and just do it. Help other members of your team be happy at work.

*2) The most important member of the team, for the patient, is probably the CNA.

*3) Take a long view on the time/meaning for recovery

Thoughts...

4) What is helpful are tools to deal with: a) pain, b) identity crises, c) not knowing, d) appreciating the smallest things and e) constant change

For you, and me, as health-care providers:

- 1) Remember your purpose...

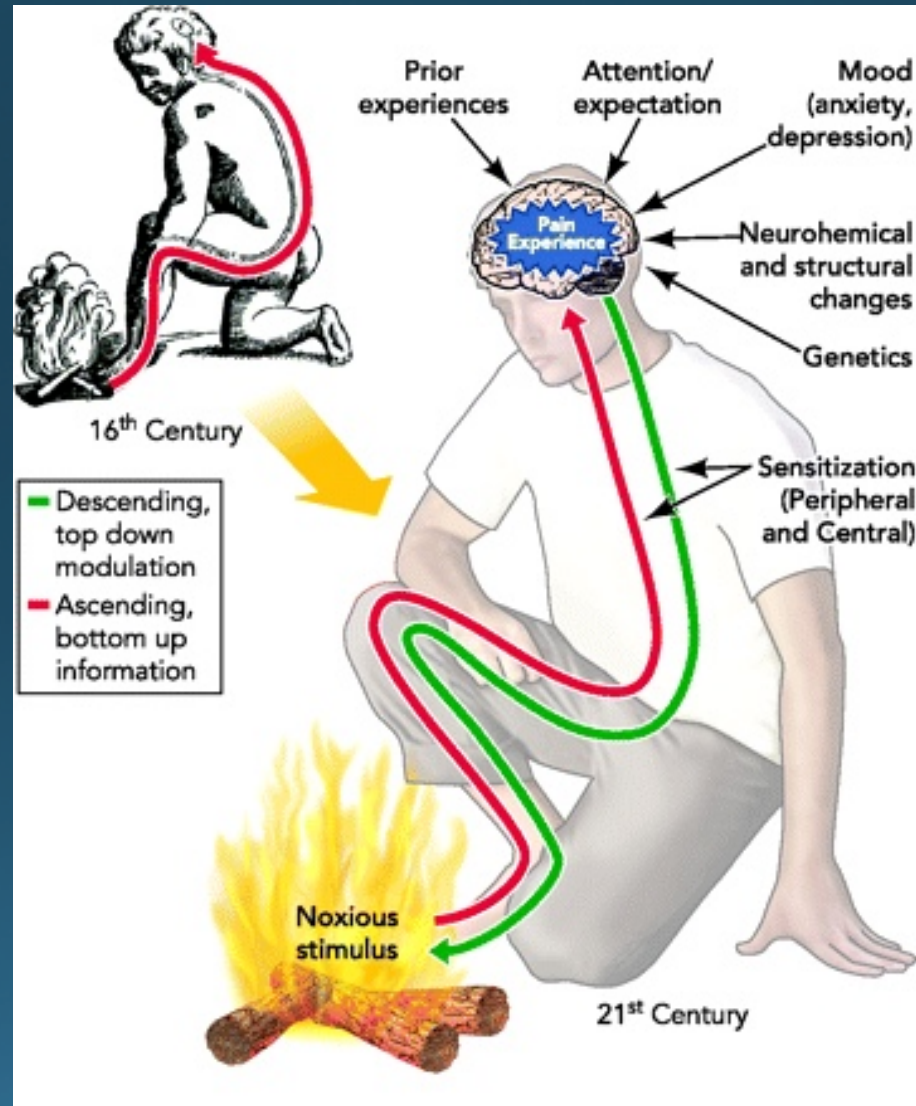
- 2) Try to figure out what mistakes we often make, and develop checklists to protect ourselves and others

- 3) Teach your children well...

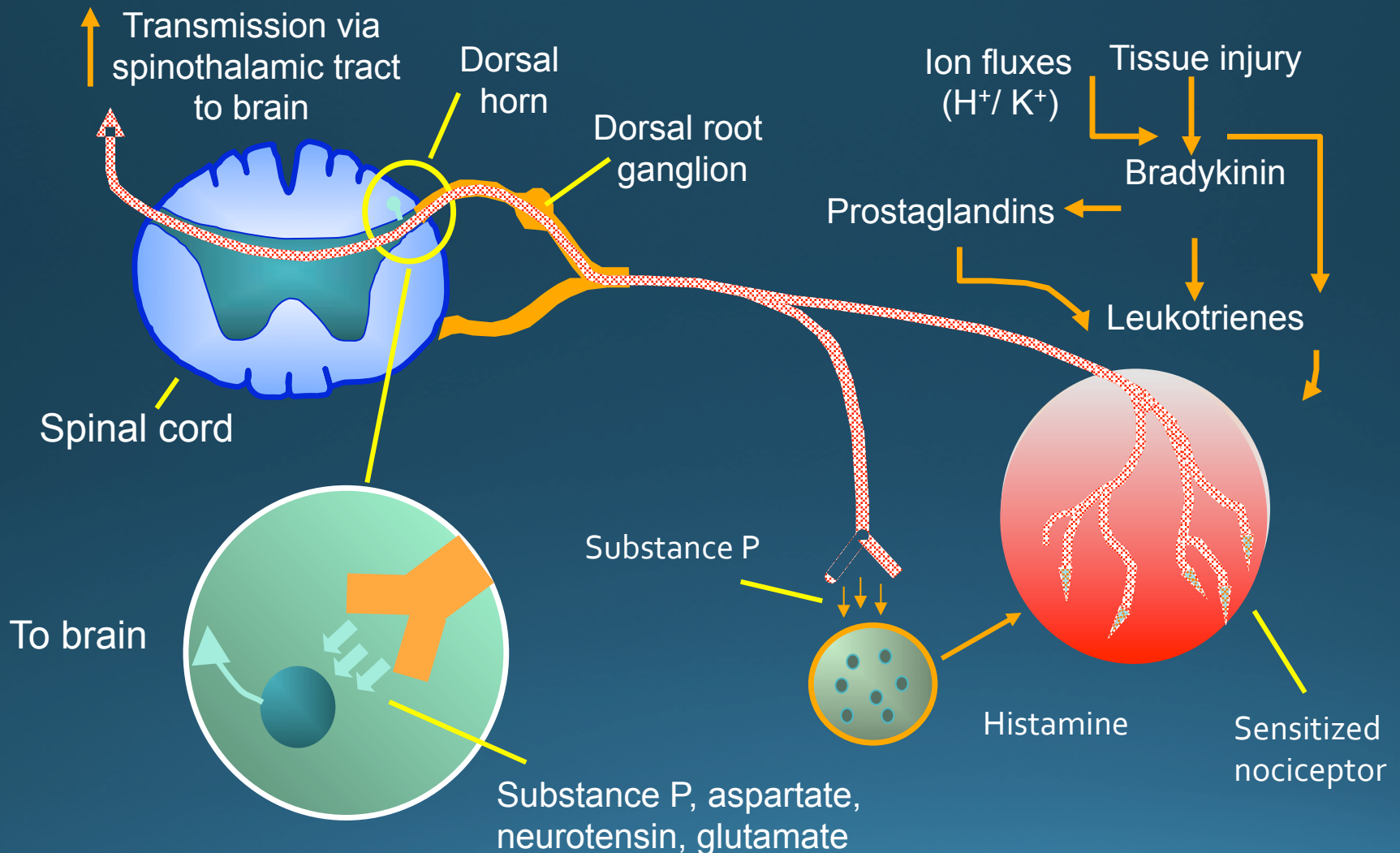
Pain—What is it?

An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage...pain is always subjective...it is unquestionably a sensation in a part or parts of the body, but it is also unpleasant and therefore also an emotional experience...¹

Neurology of Pain

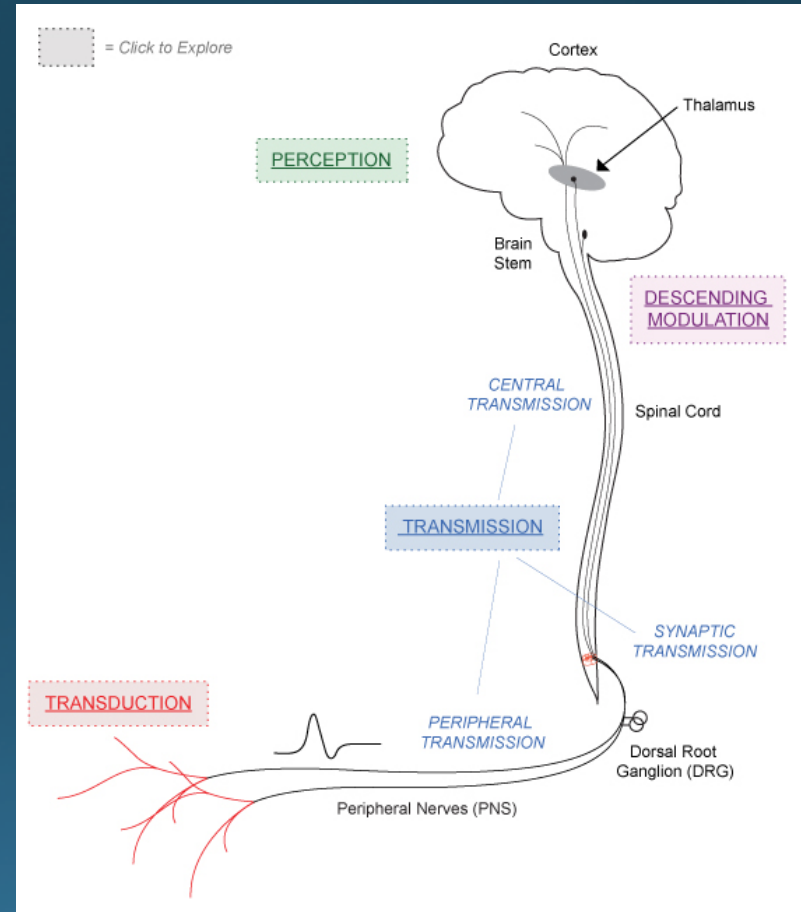


Neurochemistry of Pain

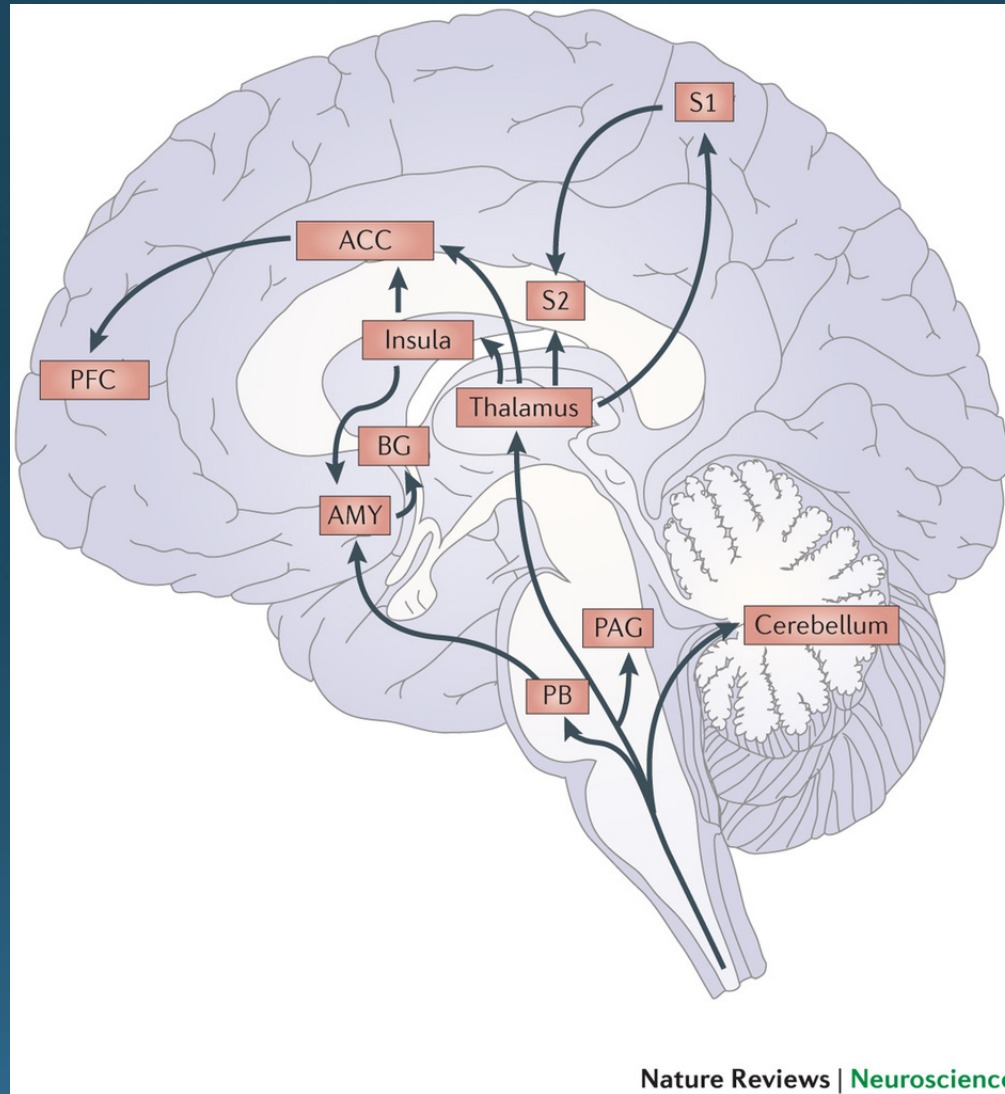


Stages: Propagation of Pain

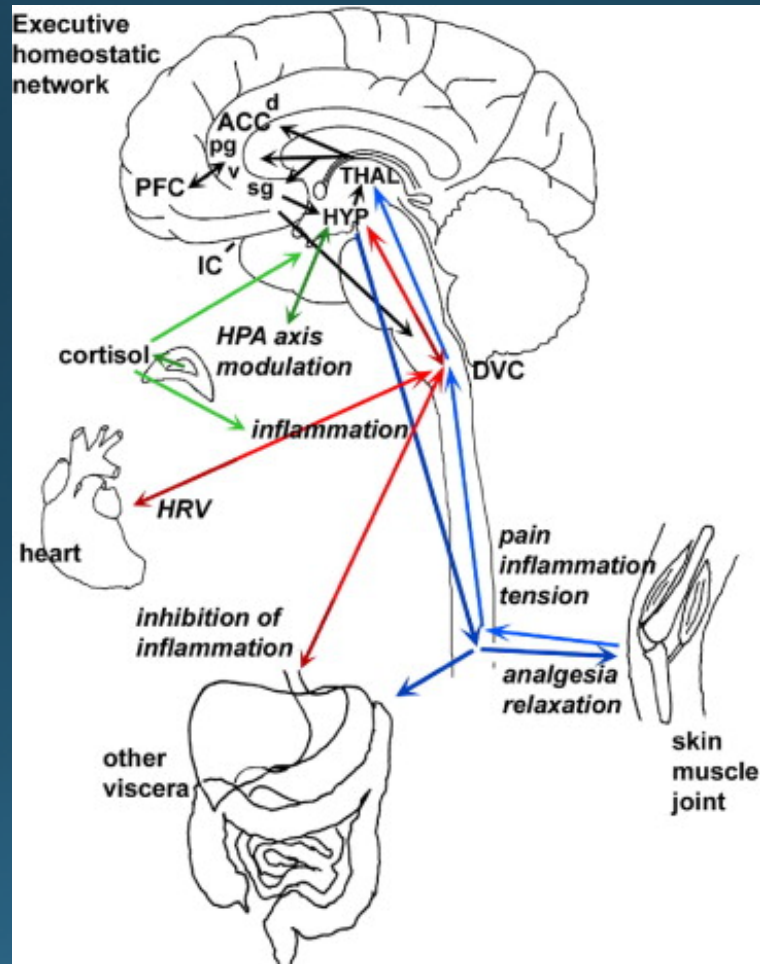
- Transduction and conduction
- Transmission
 - a. peripheral sensitization
 - b. central sensitization
- Modulation
- Perception
- Interpretation
- Behavior



Perception: Afferent Pain Pathways in the Brain



Behavior: Top Down/Bottom Up



Chronic Pain



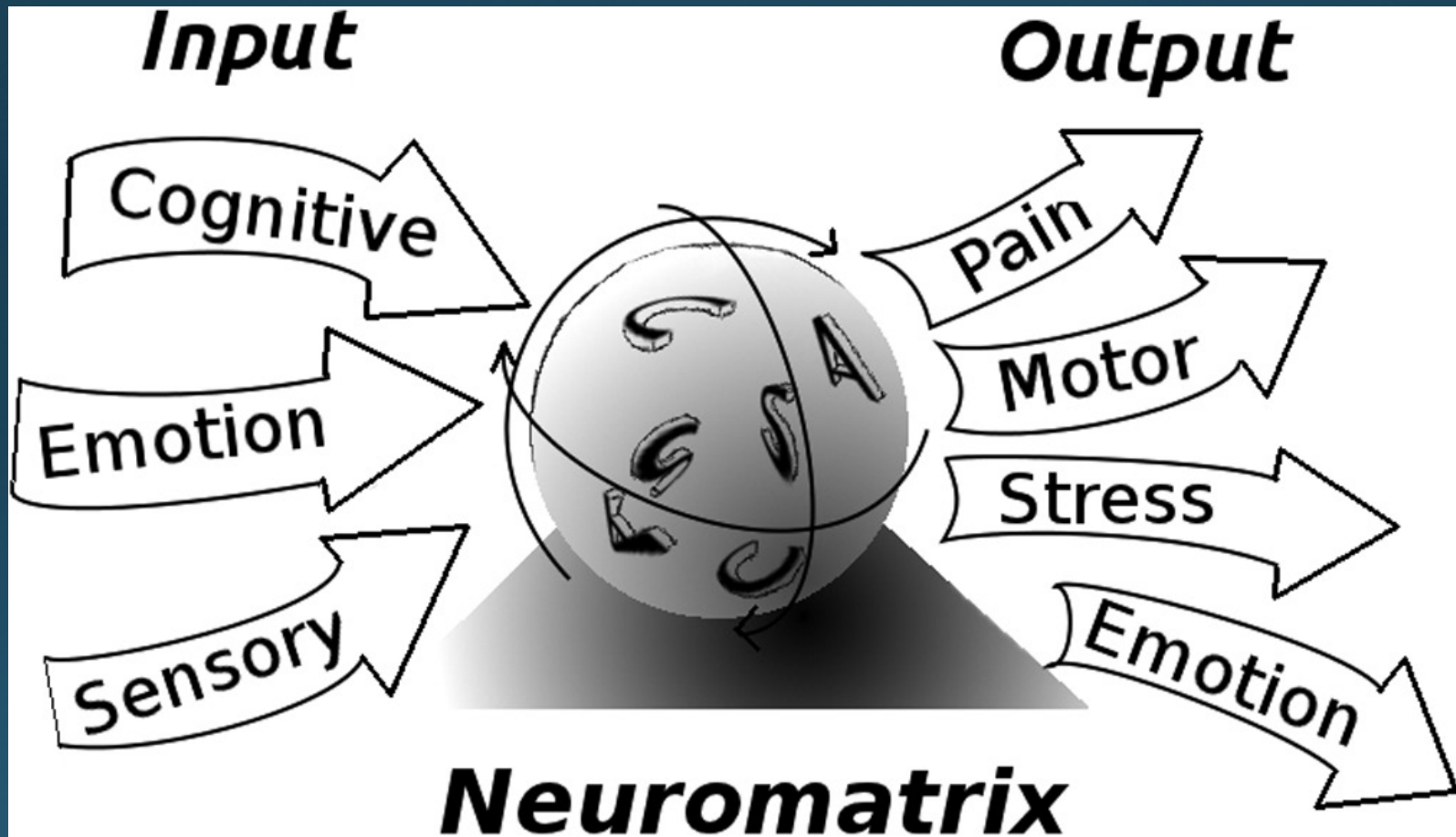
Factors Influencing How Pain is Experienced

- *Biological*—the extent of an illness or injury and whether the person has other illnesses, is under stress, or has specific genes or predisposing factors that effect pain tolerance or threshold
- *Psychological*—anxiety, fear, grief, anger or depression and thinking the pain represents something worse than it does...
- *Social*—the response of significant others to the pain—whether support, criticism, or enabling

Neuromatrix Theory

- Pain is produced by the output of a widely distributed neural network that is genetically determined and modified by sensory experience throughout life
- Pain is the output of this neural network, and not a response to sensory input following tissue injury, etc.
- Chronic pain syndromes do not need to have an obvious cause, but are associated with changes in the central nervous system.
- Brain is not a fixed system, rather it is neoplastic...

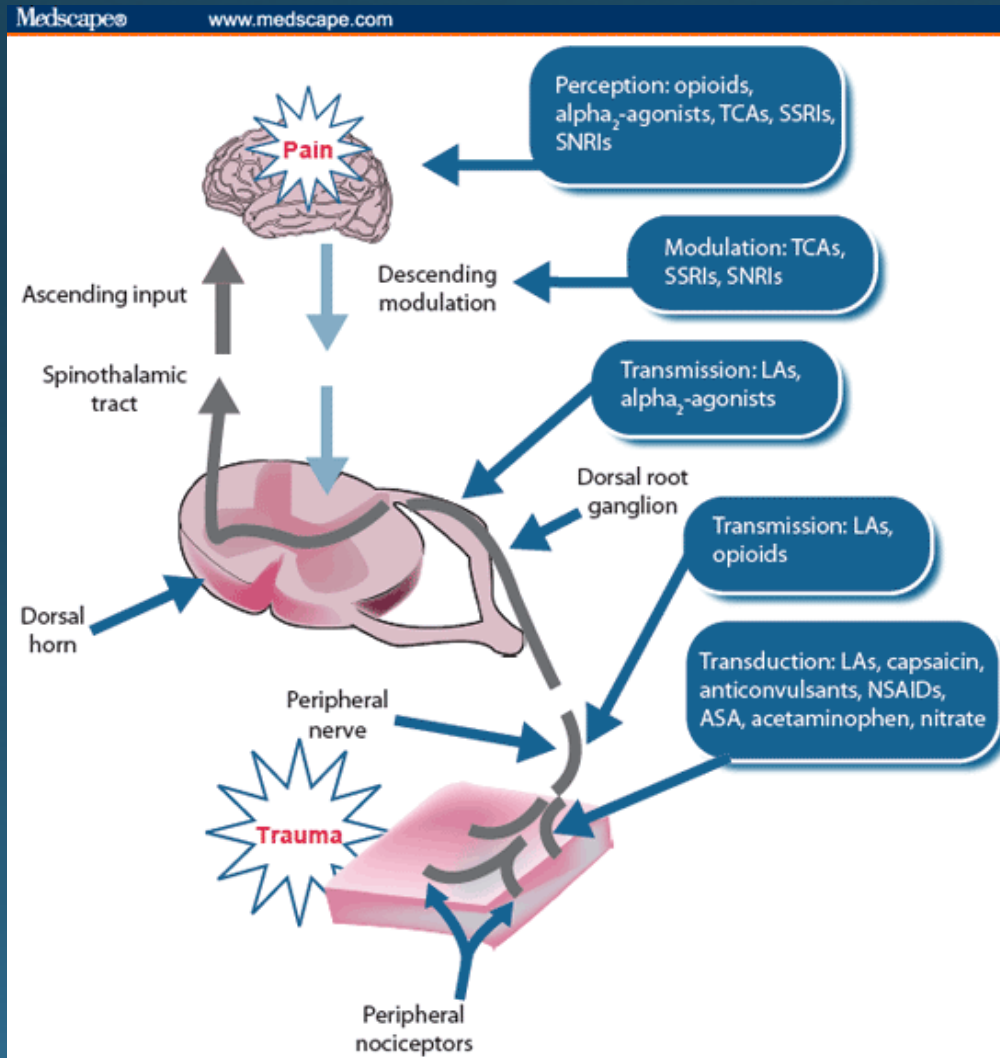
Neuromatrix



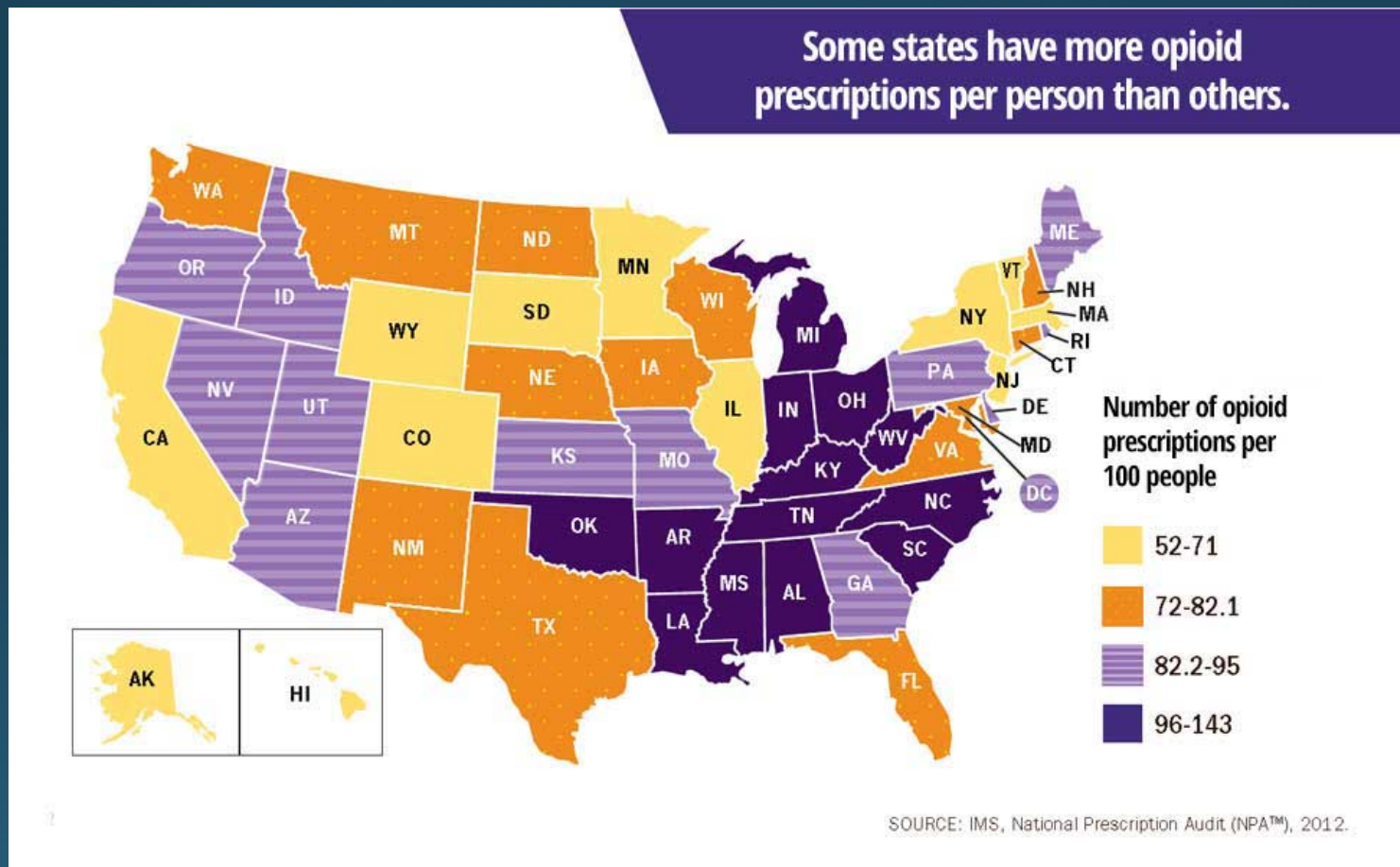
Institute of Medicine Conclusion

"Pain affects the lives of more than 100 million Americans, making its control of enormous value to individuals and society. To reduce the impact of pain and the resultant suffering will require a transformation in how pain is perceived both by the people with pain and by those...who care for them..."¹

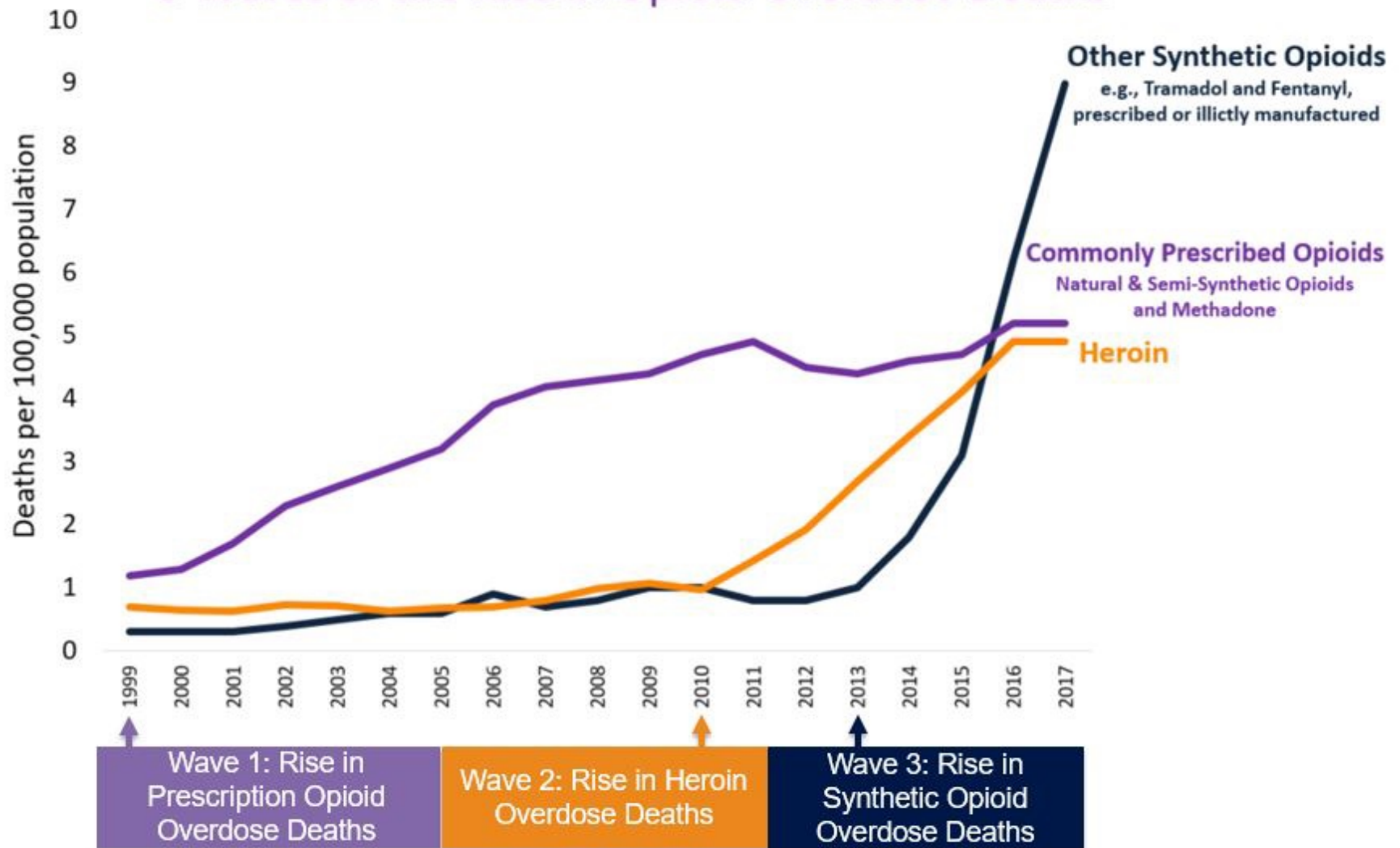
Multiple Sites of Control



Painkiller Prescriptions, by State

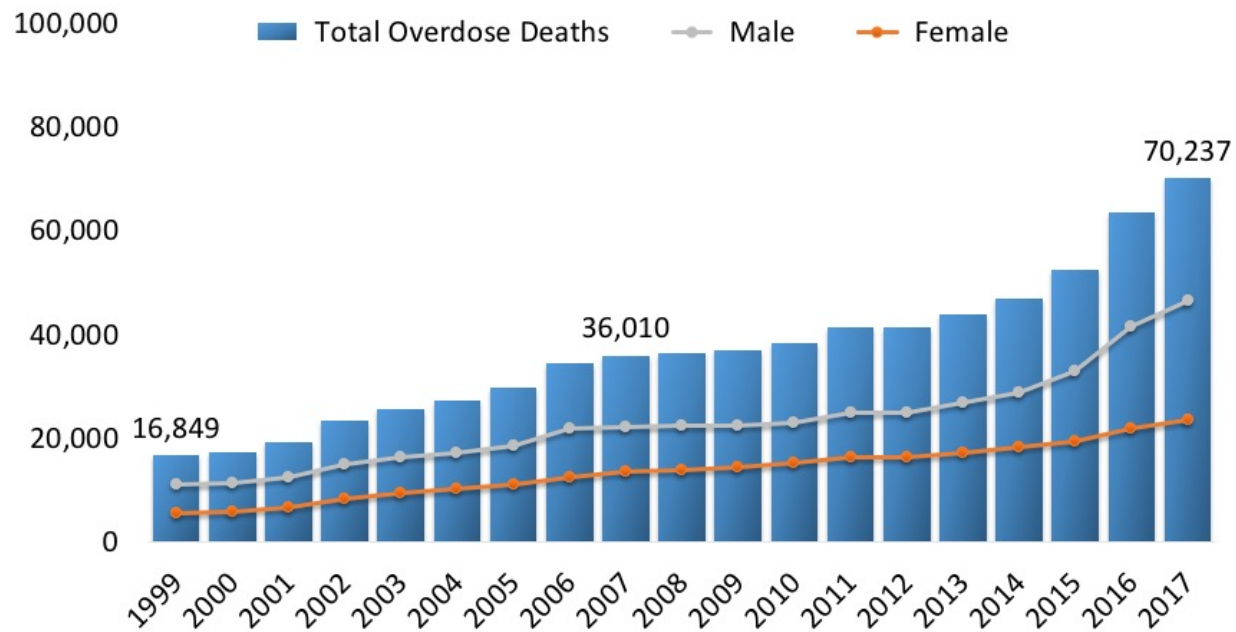


3 Waves of the Rise in Opioid Overdose Deaths



SOURCE: National Vital Statistics System Mortality File.

Figure 1. **National Drug Overdose Deaths**
Number Among All Ages, by Gender, 1999-2017



Source: : Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018

CAUSES OF **ACCIDENTAL DEATHS**

Drug overdose

64,000

Suicide

44,000

Car crash

40,000

Murder

16,000

Gun death

15,000

IN 2016

SOURCE: CENTERS FOR DISEASE CONTROL & PREVENTION (CDC)

Federal Response to “Epidemic”: 2011

- The “epidemic” led to development of strategies to target “high dose” (>200 mg morphine equivalent dose/day) medical users and persons who seek medical care from multiple doctors, receive high doses, and are likely involved in drug diversion
- The Obama Administration’s plan, released in 2011, had 4 components: 1. education of providers, 2. monitoring plans in each state, 3. appropriate disposal options for unused opiates, 4. law enforcement efforts to decrease prescription diversion and abuse

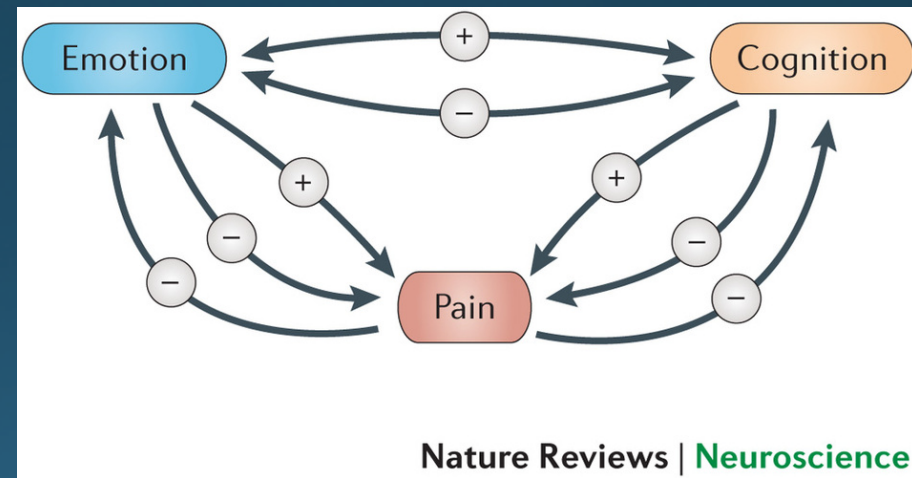
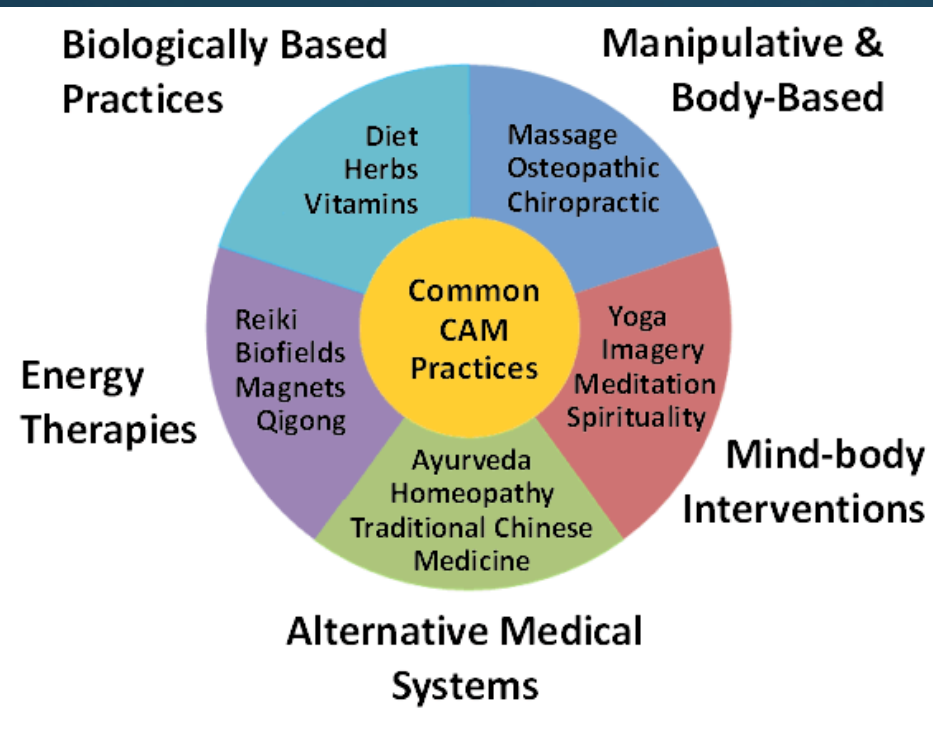
What Have the Guidelines Taught Us? (according to NIH expert panel)

“...evidence is
insufficient for every
clinical decision that a
provider must make
about the use of opioids
for chronic pain...”¹

Pain and Wellness Clinic

- We began in June of 2011
- We provide a safe space, a therapeutic milieu, using a team approach of creating wellness and a sense of well-being while patients learn to live with pain
- Team includes 3 massage therapists, a pharmacist, a volunteer MD, a volunteer Buddhist Chaplain, an MD acupuncturist, an MD, an APN, a social worker, and music therapist and volunteers who practice various complementary therapies
- Patients seen weekly X 8, then biweekly< then monthly, while effective
- We had 2476 treatments in calendar year 2014 for 89 patients with chronic non-malignant pain, for 838 clinic visits
- We had 829 clinic visits in 2018

CAM services



Complementary Alternative Medicine

1. Risk mitigation (liberal use of surgery, interventions, drugs)—VA is now using body based therapies first 1
2. Mind-Body Medicine: communication systems in the brain—cortex, limbic system, and hypopituitary-adrenal axis influence output to the periphery...modulates mind, brain and body “psycho-neuroendocrine immunology”
3. Neuroplasticity: ability of brain and nervous system to change themselves. Somatosensory cortical changes develop in chronic pain states → changes in sensory perception, motor patterns, and co-contractions in what should be isolated muscle groups. 1

Rationale for CAM

5. Cost-effectiveness of MBM techniques

6. Effect of MBM strategies in reducing pro-inflammatory states that characterize chronic stress and aggravation of pain states through mediation of hypothalamic-pituitary-adrenal axis.

7. Most CAM strategies work to disrupt pain pathways in much the same way as opiates do but at different receptor sites or intervals.

Threat Response Mechanisms: Cognitive Response BAD TRUMPS GOOD₁

- 1. Bad emotions, parents, feedback have more impact
- 2. Bad information processed more thoroughly
- 3. Bad impressions and stereotypes quicker to form
and more resistant to change

Threat Response Mechanisms: Emotional Response—Fight, Flight

- Mapping Stress in the Nervous System

Sympathetic Activation

Fight, flight, freeze

Hyper-aroused

Calmly Focused, Alert

Lethargic

Drowsy

Asleep

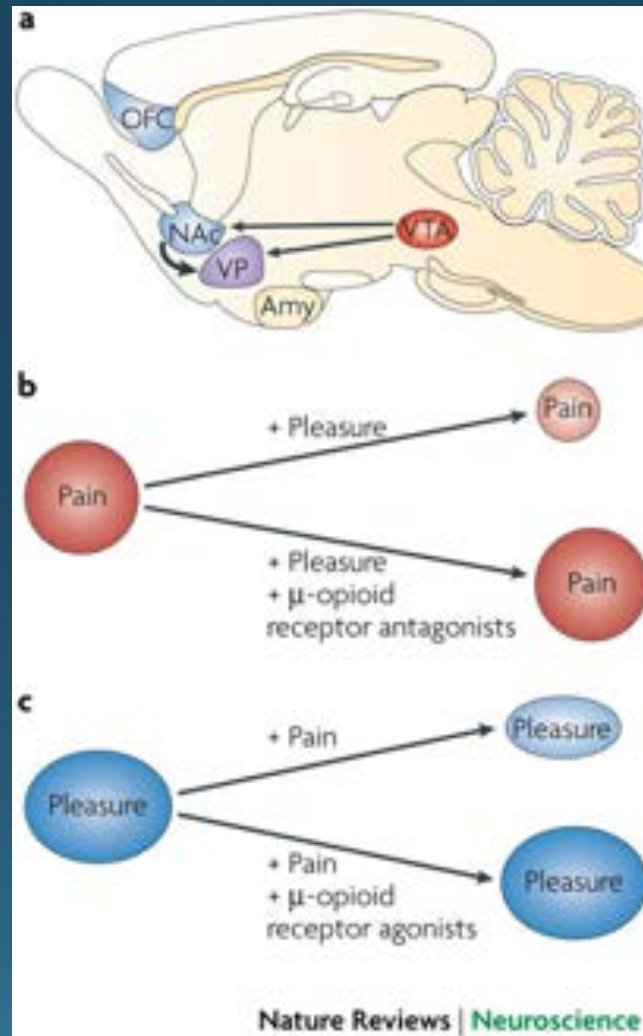
Parasympathetic Activation

Short term Survival,
Long Term Burnout

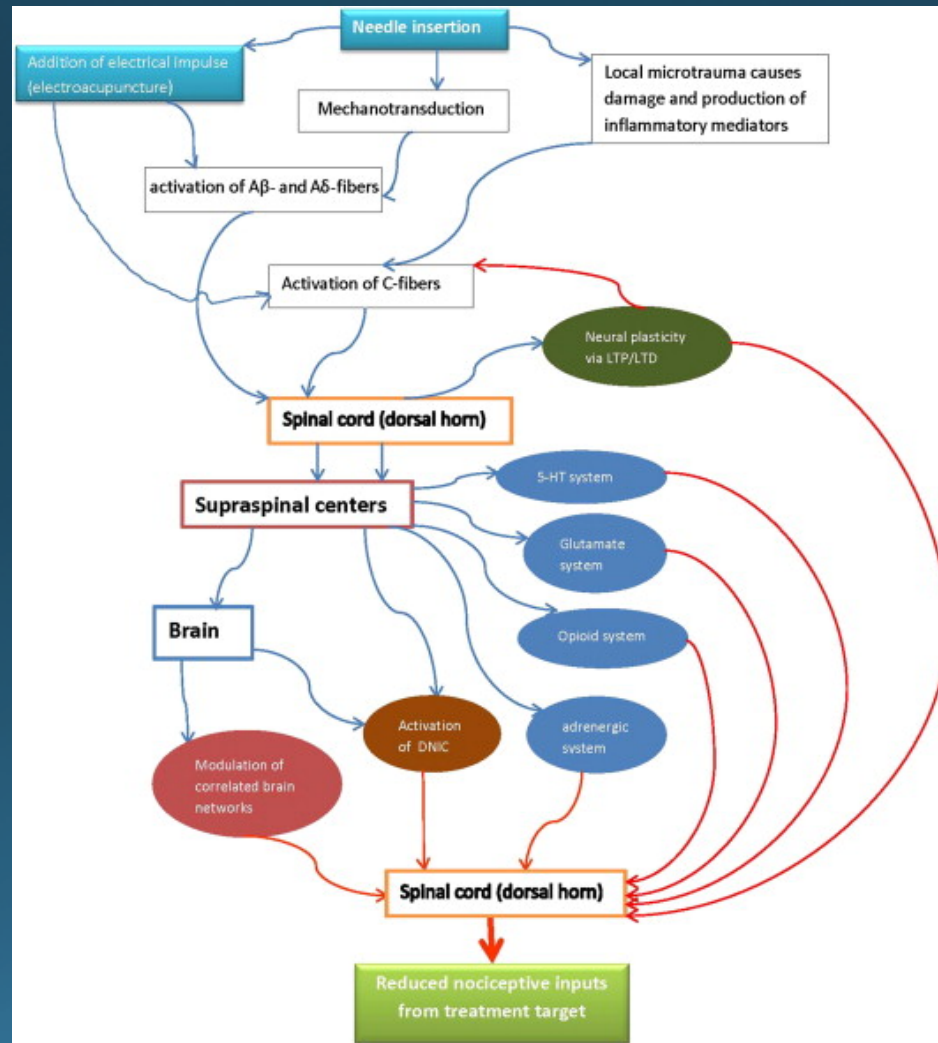
High Performance
Zone

Recovery and Rest
Phase

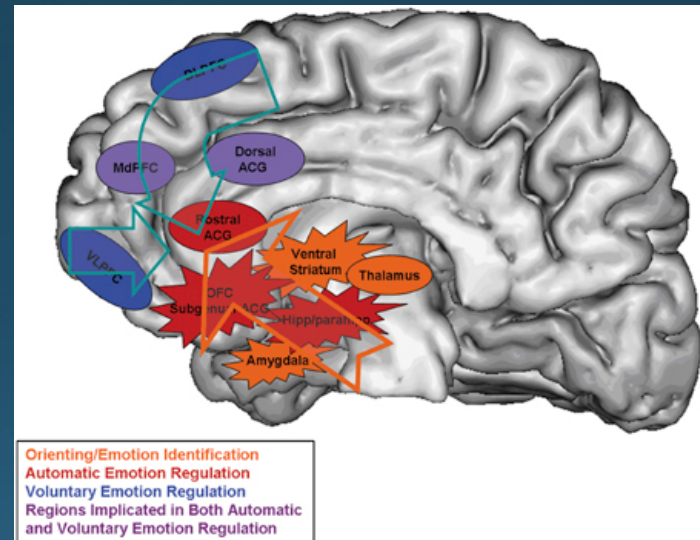
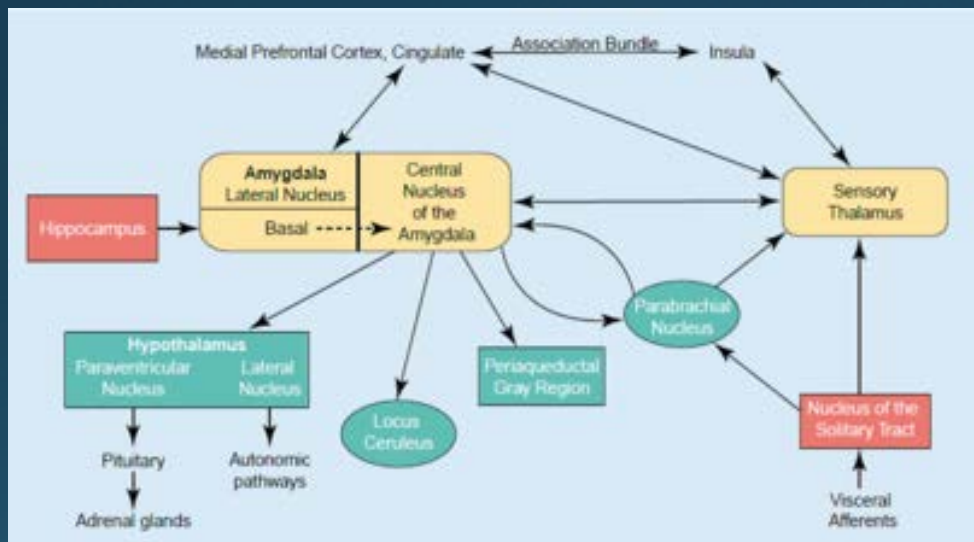
Pain/Pleasure₁



Acupuncture

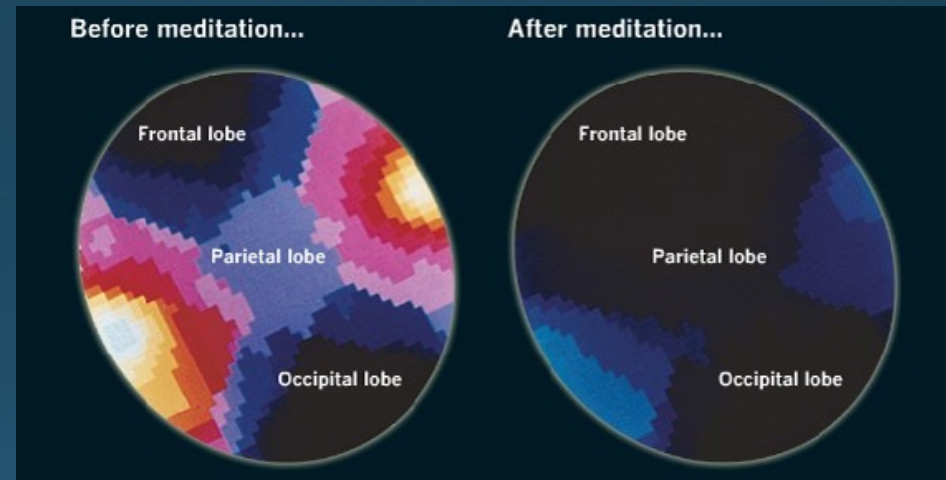


Meditation



How Meditation Changes the Brain

- Enhances cognitive functioning by improving working memory, sustained attention, monitoring faculty (to avoid mind wandering), perceptual abilities, problem-solving, executive functioning, slowing age-related cognitive decline
- Enhances emotional functioning by promoting prosocial behavior, self-awareness, and emotional regulation



Therapeutic Modalities Outcome

6/1/2013-12/31/2014

Therapeutic Modality	Number of Visits	Post-Treatment Outcome				
		"better"	"much better"	"worse"	"same"	No answer or other
Acupuncture Only	68	43	5	0	5	15
Massage Only	9	5	0	0	1	3
Music Only	8	3	1	0	1	4
Qi-Gong Only	0					
Acupuncture + Massage	359	245	18	0	9	87
Qi-Gong + Massage	17	4	2	0	1	10
Music + Acupuncture+ Qi Gong	1	1				
Music + Acupuncture+ Massage	291	213	10	2	10	56
All 4 modalities	49	33	1	0	3	12

Well-being/Happiness

- Underpinnings of well-being:
 - 1. Sustained positive emotion
 - 2. Recovery from negative emotion
 - 3. Empathy, altruism and pro-social behavior
 - 4. Mindfulness, less mind-wandering, less being pulled involuntarily by irrelevant emotional distractors
- Neural pathways underlying each of the 4 components above ALL EXHIBIT PLASTICITY and thus can be transformed during experience and training.¹

Thoughts as Provider

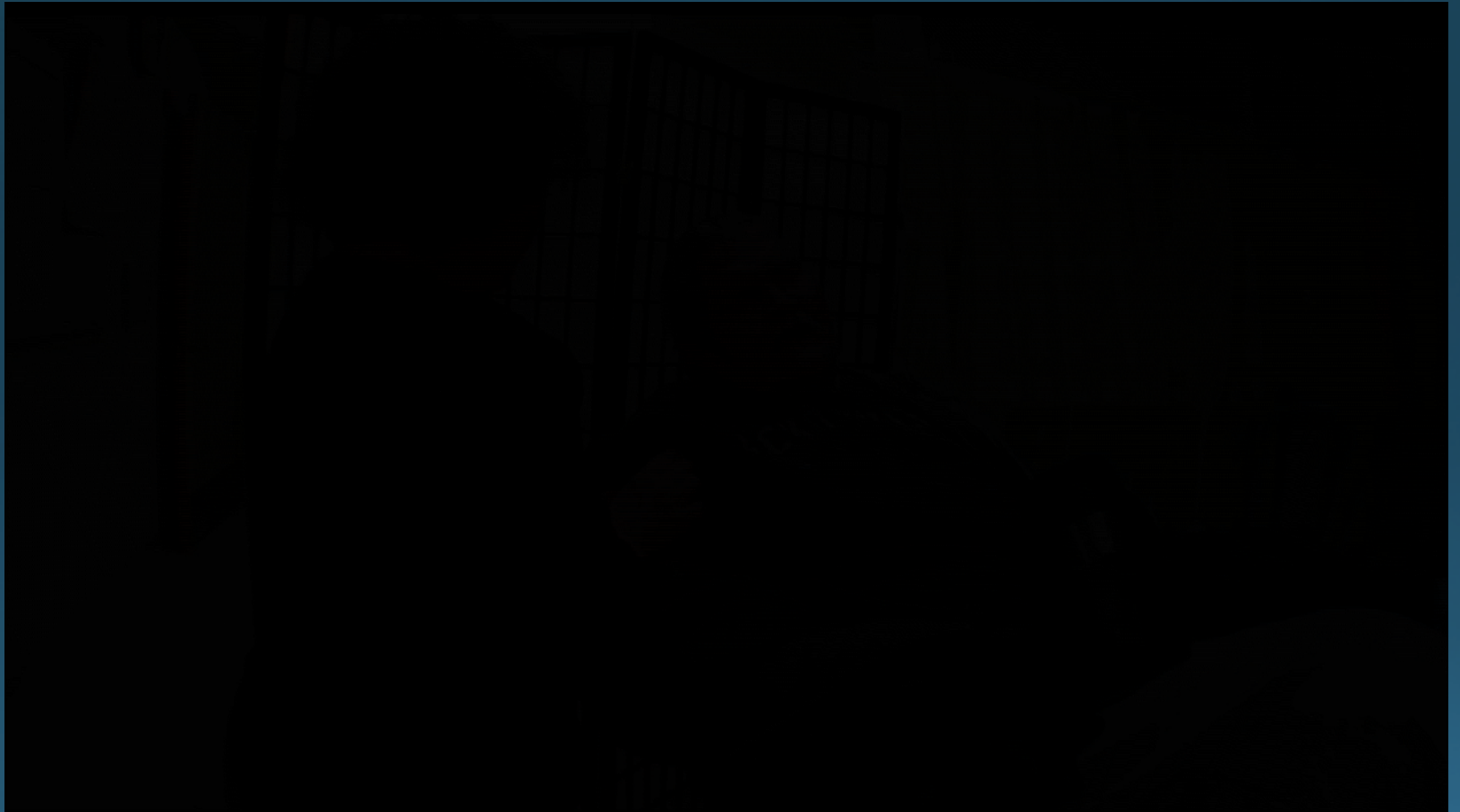
- Virtually no one says: “I want to suffer”...
- Staff included

- Work on the positive, the ‘do no harm’
- With patients and staff alike

Realize that everyone thrives with a feeling of purpose

- Recognize that we are all in this together
- It always takes a supportive village to achieve what is truly worthwhile

Pain Clinic: in “Real-Time”



References

- 1. CDC Grand Rounds: Prescription Drug Overdoses—a U.S. Epidemic. *MMWR* January 13, 2012/61(01):10-13.
- 2. National Vital Statistics. “Multiple Cause of Death Dataset”. Available at: <http://www.cdc.gov/nchs/nvss.htm>
- 3. Center for Disease Control and Prevention. National Vital Statistics system mortality data. (2015). Available at: <http://www.cdc.gov/nchs/deaths.htm>
- 4. Center for Disease Control: CDC Guideline for Prescribing Opioids—United States, 2016. *MMWR* March 18, 2016/65 (01): 1-49.
- 5. Taylor, Anne et. Al. Top-Down and Bottom-up Mechanisms in Mind-Body Medicine: Development of an Integrative Framework for Psychophysiological Research. *Explore*. 2010 January; 6(1): 29. 1-22.

References

- 5. O'neil, Mary and Caterina Mako. Addressing spiritual pain. *Health Progress: Journal of the Catholic Health Association of the United States*. January-February, 2011:41-44.
- 6. Farrar, John et. al. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain*. 94(2001): 149-158.
- 7. Ballantyne, Jane and Sullivan, Mark. Intensity of chronic pain—the wrong metric? *New England Journal of Medicine* 2015; 373 2098-2099.
- 8. Woolf CJ, Mannion RJ. Neuropathic Pain: Aetiology, symptoms, mechanisms, and management. *Lancet*. 1999;353:1959-1964.
- 9. Lembke, A. Drug Dealer, MD: How Doctors Were Duped, Patients Got Hooked, and Why it is So Hard to Stop. Baltimore, MD: Johns Hopkins University Press, 2016.

References

- 10. Zeidan, Grant, et al. Mindfulness meditation-related pain relief: Evidence for unique mechanisms in the regulation of pain. *Neurosci Lett*. 2012 June 29;520(2): 165-173.
- 11. Nakata, H. et al. Meditation reduces pain-related neural activity in the anterior cingulate cortex, insula, somatosensory cortex and the thalamus. *Frontiers in Psychology*. 2014 December (5)article 1489.
- 12. Bushnell, Catherine et al. Cognitive and emotional control of pain and its disruption in chronic pain. *Nature Reviews Neuroscience* 2013;14:501-513.
- 13. Merskey H, Bogduk N, eds. *Classification of Chronic Pain: Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms*. 2nd ed. Seattle, WA: IASP Press; 1994.
- 14. Backonja MM. Defining neuropathic pain. *Anesth Analg*. 2003;97:785-790.

References

- 15. Bourne, Sam et al. Basic Anatomy and Physiology of Pain Pathways. Neurosurgery Clinic of North America 25 (2014) 629-638.
- 16. Zeidan, Fadel et. al. Mindfulness-Meditation-Based Pain Relief is Not Mediated by Endogenous Opioids. The Journal of Neuroscience. March 16, 2016. 36(11):3391-3397.
- 17..Schutte, Brigid. Harvard neuroscientist: Meditation not only reduces stress, here's how it changes your brain. The Washington Post, May 28, 2015.
- 18. CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016. MMWR. March 18, 2016 / 65(1);1–49

References

19. Bergland, J. Neuroscientists Identify How Mindset Alters Pain Perceptions. *Psychology Today*. June 13, 2015.
20. Chou, R et al, Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Non-Cancer Pain. *The Journal of Pain*, 2009 February; 10(2): 113-130
21. Committee on Pain Research, Care, and Education; Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming...* Washington, DC: The National Academies Press, 2012.
22. IASP (International Association for the Study of Pain), 2011. *Pain Terms*, <http://www.iasp-pain.org>
23. Steeds, Charlotte. The Anatomy and Physiology of Pain. *Surgery* 2009; 27:12:507-511.
24. IASP, *Integrative Pain Medicine: A Holistic Model*, in *Pain: Clinical Updates*, 2014 May; 22(2): 1-6.

References

- 25. Woolf CJ, Mannion RJ. Neuropathic pain: aetiology, symptoms, mechanisms, and management. *Lancet*. 1999;353:1959-1964.
- 26. Merskey H, Bogduk N, eds. *Classification of Chronic Pain: Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms*. 2nd ed. Seattle, WA: IASP Press; 1994.
- 27. Backonja MM. Defining neuropathic pain. *Anesth Analg*. 2003;97:785-790.
- 28. Zhang, et. al. Placebo analgesia is mediated exclusively through the U–opioid receptor in rat. *Int. J. of Neuropsychopharmacology*. 2013, 16, 849–856.

References

- 29. Attridge, N, et. al. The experience of cognitive intrusion of pain: Scale development validation. *Pain* 2015;156:1978–1990.
- 30. Benedetti, F, et. al. Neurobiological mechanisms of the placebo effect. *J Neurosci* 2005; 25 (45): 10 390–10402.
- 31. Zeidan, F. et. al. brain mechanisms supporting modulation of pain by mindfulness meditation. *J Neurosci* 2011; 31(14): 5540-5548.
- 32. Craig, AD. How do you feel? Interoception: the sense of the physiological condition of the body. *Nat Rev Neurosci* 2002; 3(8):655-666.
- 33. Berthoud, HR. Functional and chemical anatomy of the afferent vagal system. *Auton Neurosci* 2000;85(1-3):1-17.
- 34. Chen, Andrew. Higher cortical modulation of pain perception in the human brain: Psychological determinant. *Neurosci Bull* 2009; 25(5):267-276.

References

- 35. Lu, Changbo, et. al. Insular cortex is critical for the perception, modulation, and chronification of pain. *Neurosci Bull* 2016; 32(2): 191-201.
- 36. Xie, Yu-feng, et. al. Cerebral cortex modulation of pain. *Acta Pharmacol Sin* 2009;(1):31-41.
- 37. Villemure, C., et. al. Effects of odors on pain perception: Deciphering the roles of emotion and attention. *Pain* 2003; 106: 101-108.
- 39. Roy, M. et. al. Emotional valence contributes to music-induced analgesia. *Pain* 2008; 134: 140-147.
- 40. de la Fuente-Fernandez, R. et. al. Expectation and dopamine release: Mechanism of the placebo-effect in Parkinson's disease. *Science* 2001; 293:1164-1166.

References

- 41. Goyal, et. al. Meditation Programs for Psychological stress and well-being: A systematic review and meta-analysis. *JAMA Intern Med.* 2014;174(3):357-368.
- 42. Fournier JC, et. al. Antidepressant drug effects and depression severity: a patient-level meta-analysis. *JAMA.* 2010; 303 (1): 47-53.
- 43. Corliss, Julie. Mindfulness meditation may ease anxiety, mental stress. *Harvard Health Blog.(Updated)* December 14, 2016
- 44. Grossman, P. et. al. Mindfulness-based stress reductions and health benefits: A meta-analysis. *Journal of Psychosomatic Research.* 2004; 57:35-43.
- 45. Holzel, B et. al. How does mindfulness meditation work? Proposed mechanisms of action...*Perspectives on Psychological Science* . 2011; 6(6): 537-559.

References

- 46. Colloca, L et. al. Placebo analgesia: Psychological and neurobiological mechanisms. *Pain* 2013; 154(4): 511-514.
- 47. Boccia, M. et. al. The meditative mind: A comprehensive meta-analysis of MRI studies. *Biomed Res Int* 2015.
- 48. Dowell, D et. al. CDC Guidelines for Prescribing Opioids for Chronic Pain—United States, 2016. *JAMA*. 2016;315(15):1624-1645.
- 49. Delgado, R et. al. Assessing the Quality, Efficacy, and Effectiveness of the Current Evidence Base of Active Self-Care Complementary and Integrative Medicine Therapies for the Management of Chronic Pain: A Rapid Evidence Assessment of the literature. *Pain Medicine*. 2014; 15: S9-S20.
- 50. Denk, F. et. al. Pain vulnerability: a neurobiological perspective. *Nature Neuroscience*. 2014; 17: 192-200.
- 51. Garland, E. Pain processing in the human nervous system: a selective review of nociceptive and biobehavioral pathways. *Prim Care*. 2012; 39(3): 561-571.
- 52. Sloat, S. Trump's election map also maps 'despair deaths': the opioid crisis is rooted in rural America. *The Washington Post*. November 9, 2016.
- 53. McGreevey, S. Mindfulness meditation training changes brain structures in 8 weeks. *Massachusetts General Hospital News Release*. January 21, 2011.

References

- 54. Center for Disease Control. CDC Wonder.
<http://www.wonder.cdc.gov>. Atlanta, Georgia
- 55. Davidson, R.J. Neuroscience of Happiness. In Sachs, J et. al. World Happiness: New York City, NY: The Earth Institute, Columbia University, 2015.
- 56. Davidson, R.J. Emotion Regulation, Happiness, and the Neuroplasticity of the Brain. *Advances in Mind-Body Medicine*, 2005, 21(3-4), 25.
- 57. Shortell, Alyson. The 69-year-old man who scientists call the world's happiest man says the secret to being happy takes just 15 minutes a day. *Business Insider: Science*, Jan 27, 2016.

References

58. Bonakdar, Robert Alan. Integrative Pain Management. *Med Clin N Am* 101(2017) 987-1004.
59. Lin, Yuan-Chi, et. al. Using Integrative Medicine in Pain Management: An. Evaluation of Current Evidence. *Anesthesia & Analgesia*. 125 (2017); 6:2081-2093.
60. Chen, Lucy and Michalsen, Andreas. Management of chronic pain using complementary and integrative medicine. *The BMJ* 2017; 357:j1284.
61. Deng, Gary et. al. Complementary Therapies and Integrative Medicine in Lung Cancer. *CHEST* 2013; 143 (5) (Suppl):e420S-436S.
62. National Center for Complementary and Integrative Health. Clinical Practice Guidelines. *NIH: Clinical Practice Guidelines: September 24, 2017*.
63. Yadev, Valdemir, et. al. Summary of evidence-based guideline: Complementary and alternative medicine in multiple sclerosis. *Neurology* 2014;82:1083-1092.

References

- Cohen, Helen and Mark Lipman. Open Studio Productions. *StatesofGrace*. June, 2014.